Appendix A
NIC RI and RI Addendum Results Tables

Appendix A
NIC RI Results Tables

Table 4-1a
North Industrial Corridor (NIC) Site
Phase 1 Water Level Measurements (Jan 1997-June 1998)

Well ID	Nested Well Depth Zone	Date	Measuring Point Elevation* (feet msl)	Depth to Water (feet bmp)	Water Level Elevation (feet msl)	Comments
BRND-MW-12	S	10/6/1997		14.28		
CN-MW-01	F	10/7/1997	1318.32	15.02	1303.30	
CN-MW-01	F	5/4/1998	1318.32	14.52	1303.80	
CN-MW-02	F	10/7/1997	1316.57	13.25	1303.32	
CN-MW-02	F	5/4/1998	1316.57	12.75	1303.82	
CN-MW-03	F	10/7/1997	1316.72	12.77	1303.95	
CN-MW-03	F	5/4/1998	1316.72	12.35	1304.37	
CN-MW-04	D	10/7/1997	1318.41	13.71	1304.70	
CN-MW-04	D	5/4/1998	1318.41	13.43	1304.98	
CN-MW-05	D	10/7/1997	1318.19	13.42	1304.77	
CN-MW-05	D	5/4/1998	1318.19	13.13	1305.06	
CN-MW-06	D	10/7/1997	1322.98	15.40	1307.58	
CN-MW-06	D	5/4/1998	1322.98	14.04	1308.94	
CN-MW-07	D	10/7/1997	1323.17	15.61	1307.56	
CN-MW-07	D	5/4/1998	1323.17	14.14	1309.03	
CN-MW-08	F	10/7/1997	1322.12	16.81	1305.31	
CN-MW-08	F	5/4/1998	1322.12	15.62	1306.50	
CN-MW-09	F	10/7/1997	1319.49	13.87	1305.62	
CN-MW-09	F	5/4/1998	1319.49	12.80	1306.69	
CN-MW-10	D	10/7/1997	1321.25	14.93	1306.32	
CN-MW-10	D	5/4/1998	1321.25	13.62	1307.63	
CN-MW-11	D	10/7/1997	1321.11	14.78	1306.33	
CN-MW-11	D	5/4/1998	1321.11	13.28	1307.83	
CN-MW-12	D	10/7/1997	1318.60	14.37	1304.23	
CN-MW-12	D	5/4/1998	1318.60	13.91	1304.69	
CN-MW-13	D	10/7/1997	1317.45	13.70	1303.75	
CN-MW-13	D	5/4/1998	1317.45	12.97	1304.48	
CN-MW-14	D	10/7/1997	1318.70	15.87	1302.83	
CN-MW-14	D	5/4/1998	1318.70	14.44	1304.26	
CN-MW-15	D	10/7/1997	1320.34	15.24	1305.10	
CN-MW-15	D	5/4/1998	1320.34	14.79	1305.55	
CN-MW-16	D	10/7/1997	1321.27	15.98	1305.29	
CN-MW-16	D	5/4/1998	1321.27	15.31	1305.96	
CN-MW-17	D	10/7/1997	1321.09	15.70	1305.39	
CN-MW-17	D	5/4/1998	1321.09	14.88	1306.21	
CN-MW-18	D	10/7/1997	1319.77	14.27	1305.50	
CN-MW-18	D	5/4/1998	1319.77	13.56	1306.21	
CN-MW-19	D	10/7/1997	1321.06	15.63	1305.43	
CN-MW-19	D	5/4/1998	1321.06	14.56	1306.50	
CN-MW-20	D	10/7/1997	1321.34	15.61	1305.73	
CN-MW-20	D	5/4/1998	1321.34	14.42	1306.92	
CN-MW-21	D	10/7/1997	1320.11	14.41	1305.70	
CN-MW-21	D	5/4/1998	1320.11	13.03	1307.08	

Table 4-1a
North Industrial Corridor (NIC) Site
Phase 1 Water Level Measurements (Jan 1997-June 1998)

Well ID	Nested Well Depth Zone	Date	Measuring Point Elevation* (feet msl)	Depth to Water (feet bmp)	Water Level Elevation (feet msl)	Comments
CN-MW-22	D	10/7/1997	1321.58	16.18	1305.40	
CN-MW-22	D	5/4/1998	1321.58	15.06	1306.52	
CN-MW-23	D	10/7/1997	1320.66	15.42	1305.24	
CN-MW-23	D	5/4/1998	1320.66	14.10	1306.56	
CN-MW-24	D	10/7/1997	1321.47	15.52	1305.95	
CN-MW-24	D	5/4/1998	1321.47	14.27	1307.20	
CN-MW-25	D	10/7/1997	1321.83	16.06	1305.77	
CN-MW-25	D	5/4/1998	1321.83	14.73	1307.10	
CN-MW-26	D	10/7/1997	1321.25	14.97	1306.28	
CN-MW-26	D	5/4/1998	1321.25	13.64	1307.61	
CN-MW-27	D	10/7/1997	1321.55	15.31	1306.24	
CN-MW-27	D	5/4/1998	1321.55	13.93	1307.62	
CN-MW-28	D	10/7/1997	1320.34	14.23	1306.11	
CN-MW-28	D	5/4/1998	1320.34	12.77	1307.57	
CN-MW-29	D	10/7/1997	1321.41	14.92	1306.49	
CN-MW-29	D	5/4/1998	1321.41	13.56	1307.85	
CN-MW-30	D	10/7/1997	1322.95	16.60	1306.35	
CN-MW-30	D	5/4/1998	1322.95	15.19	1307.76	
CN-MW-31	D	10/7/1997	1321.85	15.45	1306.40	
CN-MW-31	D	5/4/1998	1321.85	13.94	1307.92	
CN-MW-32	D	10/7/1997	1322.90	16.15	1306.75	
CN-MW-32	D	5/4/1998	1322.90	14.47	1308.43	
CN-MW-33	I	10/7/1997	1321.66	15.65	1306.01	
CN-MW-33	I	5/4/1998	1321.66	14.26	1307.40	
CN-MW-34	S	10/7/1997	1321.63	15.61	1306.02	
CN-MW-34	S	5/4/1998	1321.63	14.24	1307.39	
CN-MW-35	I	10/7/1997	1320.89	15.48	1305.41	
CN-MW-35	I	5/4/1998	1320.89	14.66	1306.23	
CN-MW-36	S	10/7/1997	1321.05	15.63	1305.42	
CN-MW-36	S	5/4/1998	1321.05	14.84	1306.21	
CN-MW-37	I	10/7/1997	1320.82	15.53	1305.29	
CN-MW-37	I	5/4/1998	1320.82	14.88	1305.94	
CN-MW-38	S	10/7/1997	1320.93	15.66	1305.27	
CN-MW-38	S	5/4/1998	1320.93	15.00	1305.93	
CN-MW-39	S	10/7/1997	1322.83	15.26	1307.57	
CN-MW-39	S	5/4/1998	1322.83	13.90	1308.93	
CN-MW-40	S	10/7/1997	1322.96	16.84	1306.12	
CN-MW-40	S	5/4/1998	1322.96	15.41	1307.55	
CN-MW-41	S	10/7/1997	1321.15	15.11	1306.04	
CN-MW-41	S	5/4/1998	1321.15	13.82	1307.33	
CN-MW-42	S	10/7/1997	1320.06	14.01	1306.05	
CN-MW-42	S	5/4/1998	1320.06	12.70	1307.36	

Table 4-1a
North Industrial Corridor (NIC) Site
Phase 1 Water Level Measurements (Jan 1997-June 1998)

Well ID	Nested Well Depth Zone	Date	Measuring Point Elevation* (feet msl)	Depth to Water (feet bmp)	Water Level Elevation (feet msl)	Comments
CN-MW-43	S	10/7/1997	1321.18	15.45	1305.73	
CN-MW-43	S	5/4/1998	1321.18	14.27	1306.91	
CN-MW-44	S	10/7/1997	1318.70	13.29	1305.41	
CN-MW-44	S	5/4/1998	1318.70	12.58	1306.12	
CN-MW-45	S	10/7/1997	1320.54	15.60	1304.94	
CN-MW-45	S	5/4/1998	1320.54	15.15	1305.39	
CN-MW-46	S	10/7/1997	1317.70	13.48	1304.22	
CN-MW-46	S	5/4/1998	1317.70	13.10	1304.60	
CN-MW-47	S	10/7/1997	1316.13	12.35	1303.78	
CN-MW-47	S	5/4/1998	1316.13	11.93	1304.20	
CN-MW-48	S	10/7/1997	1317.36	14.07	1303.29	
CN-MW-48	S	5/4/1998	1317.36	13.56	1303.80	
CN-MW-49	D	5/4/1998	1320.61	12.79	1307.82	
CN-MW-50	S	10/7/1997	1320.58	14.30	1306.28	
CN-MW-50	S	5/4/1998	1320.58	12.76	1307.82	
CN-MW-51	D	10/7/1997	1319.27	14.20	1305.07	
CN-MW-51	D	5/4/1998	1319.27	13.68	1305.59	
CN-MW-52	S	10/7/1997	1319.06	14.08	1304.98	
CN-MW-52	S	5/4/1998	1319.06	13.55	1305.51	
CN-MW-53	D	10/7/1997	1316.26	14.15	1302.11	
CN-MW-53	D	5/4/1998	1316.26	13.64	1302.62	
CN-MW-54	S	10/7/1997	1316.16	13.20	1302.96	
CN-MW-54	S	5/4/1998	1316.16	12.65	1303.51	
CN-MW-55	S	10/7/1997	1320.59	14.43	1306.16	
CN-MW-55	S	5/4/1998	1320.59	13.01	1307.58	
CN-MW-56	D	10/7/1997	1321.28	15.05	1306.23	
CN-MW-56	D	5/4/1998	1321.28	13.61	1307.67	
CN-MW-59	D	10/7/1997	1319.34	14.70	1305.17	
CN-MW-59	D	5/4/1998	1319.34	13.63	1305.71	
CN-MW-60	S	10/7/1997	1319.34	14.15	1305.19	
CN-MW-60	S	5/4/1998	1319.34	13.77	1306.43	
CN-MW-61	S	10/7/1997	1320.20	14.61	1305.59	
CN-MW-61	S	5/4/1998	1320.20	13.37	1306.43	
CN-MW-62	D	10/7/1997	1319.80	14.20	1305.60	
CN-MW-62	D	5/4/1998	1319.80	12.39	1307.97	
CN-MW-63	D	10/7/1997	1320.36	13.67	1306.69	
CN-MW-63	D	5/4/1998	1320.35	12.26	1308.09	
CN-MW-64	S	10/7/1997	1320.35	13.44	1306.91	
CN-MW-64	S	5/4/1998	1320.35	13.14	1304.20	
CN-MW-67	D	10/7/1997	1317.34	13.79	1303.55	
CN-MW-67	D	5/4/1998	1317.34	13.14	1304.16	
CN-MW-68	S	10/7/1997	1314.14	13.77	1303.53	
CN-MW-68	S	5/4/1998	1314.14	10.44	1303.70	

Table 4-1a
North Industrial Corridor (NIC) Site
Phase 1 Water Level Measurements (Jan 1997-June 1998)

Well ID	Nested Well Depth Zone	Date	Measuring Point Elevation* (feet msl)	Depth to Water (feet bmp)	Water Level Elevation (feet msl)	Comments
CN-MW-69D	D	10/7/1997	1314.14	11.01	1303.13	
CN-MW-69D	D	5/4/1998	1314.14	10.43	1303.78	
CN-MW-69S	S	10/7/1997	1320.97	11.00	1303.21	
CN-MW-69S	S	5/4/1998	1320.97	15.12	1305.85	
CN-MW-70D	D	10/7/1997	1320.85	15.75	1305.22	
CN-MW-70D	D	5/4/1998	1320.85	15.04	1305.81	
CN-MW-70S	S	10/7/1997	1320.85	15.64	1305.21	
CN-MW-70S	S	5/4/1998	1320.85	20.81	1301.72	
CNE-MW-01		10/6/1997	1325.70	18.62	1307.08	
CNE-MW-01		5/13/1998	1325.70	17.59	1308.11	
CNE-MW-02		10/7/1997	1322.80	16.22	1306.58	
CNE-MW-02		5/13/1998	1322.80	14.86	1307.94	
CNE-MW-03		5/13/1998	1321.77	13.90	1307.87	
CNE-MW-04		10/7/1997	1326.06	17.23	1308.83	
CNE-MW-05		10/6/1997	1331.50	24.11	1307.39	
CNE-MW-05		5/13/1998	1331.50	22.93	1308.57	
CNE-MW-06D	D	10/6/1997	1324.43	17.05	1307.38	
CNE-MW-06D	D	5/13/1998	1324.43	15.85	1308.58	
CNE-MW-06S	S	10/6/1997	1324.32	16.91	1307.41	
CNE-MW-06S	S	5/13/1998	1324.32	15.71	1308.61	
CNE-MW-07D	D	10/6/1997	1323.15	15.98	1307.17	
CNE-MW-07D	D	5/1/1998	1323.15	13.48	1309.67	
CNE-MW-07D	D	5/13/1998	1323.15	14.89	1308.26	
CNE-MW-07S	S	10/6/1997	1322.92	15.77	1307.15	
CNE-MW-07S	S	5/1/1998	1322.92	13.27	1309.65	
CNE-MW-07S	S	5/13/1998	1322.92	14.69	1308.23	
CNE-MW-08D	D	10/6/1997	1327.35	20.12	1307.23	
CNE-MW-08D	D	5/13/1998	1327.35	19.09	1308.26	
CNE-MW-08S	S	10/6/1997	1327.33	20.34	1306.99	
CNE-MW-08S	S	5/13/1998	1327.33	19.37	1307.96	
CNE-MW-09D	D	10/6/1997	1329.26	22.23	1307.03	
CNE-MW-09D	D	5/13/1998	1329.26	21.08	1308.18	
CNE-MW-09S	S	10/6/1997	1329.17	22.20	1306.97	
CNE-MW-09S	S	5/13/1998	1329.17	21.15	1308.02	
CNE-MW-10D	D	10/7/1997	1322.98	16.22	1306.76	
CNE-MW-10D	D	5/13/1998	1322.98	15.03	1307.95	
CNE-MW-10S	S	10/7/1997	1323.03	16.35	1306.68	
CNE-MW-10S	S	5/13/1998	1323.03	15.14	1307.89	
CNE-MW-11D	D	10/7/1997	1322.29	15.58	1306.71	
CNE-MW-11D	D	5/13/1998	1322.29	14.30	1307.99	
CNE-MW-11S	S	10/7/1997	1322.23	15.48	1306.75	
CNE-MW-11S	S	5/13/1998	1322.23	14.17	1308.06	

Table 4-1a
North Industrial Corridor (NIC) Site
Phase 1 Water Level Measurements (Jan 1997-June 1998)

Well ID	Nested Well Depth Zone	Date	Measuring Point Elevation* (feet msl)	Depth to Water (feet bmp)	Water Level Elevation (feet msl)	Comments
CNE-MW-12D	D	10/7/1997	1323.27	15.99	1307.28	
CNE-MW-12D	D	5/1/1998	1323.27	13.93	1309.34	
CNE-MW-12D	D	5/13/1998	1323.27	14.45	1308.82	
CNE-MW-12S	S	10/7/1997	1323.12	15.89	1307.23	
CNE-MW-12S	S	5/1/1998	1323.12	13.73	1309.39	
CNE-MW-12S	S	5/13/1998	1323.12	14.26	1308.86	
CNE-MW-13D	D	10/7/1997	1324.75	16.64	1308.11	
CNE-MW-13D	D	5/13/1998	1324.75	14.82	1309.93	
CNE-MW-13S	S	10/7/1997	1326.64	16.56	1310.08	
CNE-MW-13S	S	5/13/1998	1326.64	14.73	1311.91	
CNE-MW-14D	D	10/7/1997	1325.35	15.29	1310.06	
CNE-MW-14D	D	5/1/1998	1325.35	13.05	1312.30	
CNE-MW-14D	D	5/13/1998	1325.35	13.12	1312.23	
CNE-MW-14S	S	10/7/1997	1325.44	15.63	1309.81	
CNE-MW-14S	S	5/1/1998	1325.44	12.76	1312.68	
CNE-MW-14S	S	5/13/1998	1325.44	13.20	1312.24	
CNE-MW-15D	D	10/7/1997	1322.78	15.82	1306.96	
CNE-MW-15D	D	5/13/1998	1322.78	14.46	1308.32	
CNE-MW-15S	S	10/7/1997	1322.52	15.54	1306.98	
CNE-MW-15S	S	5/13/1998	1322.52	14.09	1308.43	
CNE-MW-16D	D	10/6/1997	1323.28	16.51	1306.77	
CNE-MW-16D	D	5/13/1998	1323.28	15.51	1307.77	
CNE-MW-16S	S	10/6/1997	1323.41	16.66	1306.75	
CNE-MW-16S	S	5/13/1998	1323.41	15.68	1307.73	
CNE-MW-17D	D	10/6/1997	1323.97	17.19	1306.78	
CNE-MW-17D	D	5/13/1998	1323.97	16.28	1307.69	
CNE-MW-17S	S	10/6/1997	1324.20	17.39	1306.81	
CNE-MW-17S	S	5/13/1998	1324.20	16.46	1307.74	
CNE-MW-18D	D	10/6/1997	1324.24	17.46	1306.78	
CNE-MW-18D	D	5/13/1998	1324.24	16.59	1307.65	
CNE-MW-18S	S	10/6/1997	1324.21	17.42	1306.79	
CNE-MW-18S	S	5/13/1998	1324.21	16.58	1307.63	
CNE-MW-19D	D	10/6/1997	1323.70	17.11	1306.59	
CNE-MW-19D	D	5/13/1998	1323.70	16.37	1307.33	
CNE-MW-19S	S	10/6/1997	1323.79	17.19	1306.60	
CNE-MW-19S	S	5/13/1998	1323.79	16.41	1307.38	
CNE-MW-20D	D	10/6/1997	1323.63	17.45	1306.18	
CNE-MW-20D	D	5/13/1998	1323.63	16.70	1306.93	
CNE-MW-20S	S	10/6/1997	1323.71	17.54	1306.17	
CNE-MW-20S	S	5/13/1998	1323.71	16.76	1306.95	
CNE-MW-21D	D	10/6/1997	1323.68	17.17	1306.51	
CNE-MW-21D	D	5/13/1998	1323.68	16.30	1307.38	

Table 4-1a
North Industrial Corridor (NIC) Site
Phase 1 Water Level Measurements (Jan 1997-June 1998)

Well ID	Nested Well Depth Zone	Date	Measuring Point Elevation* (feet msl)	Depth to Water (feet bmp)	Water Level Elevation (feet msl)	Comments
CNE-MW-21S	S	10/6/1997	1323.66	17.15	1306.51	
CNE-MW-21S	S	5/13/1998	1323.66	16.28	1307.38	
CNE-MW-22D	D	10/6/1997	1323.22	16.02	1307.20	
CNE-MW-22D	D	5/13/1998	1323.22	14.87	1308.35	
CNE-MW-22S	S	10/6/1997	1323.15	15.93	1307.22	
CNE-MW-22S	S	5/13/1998	1323.15	14.77	1308.38	
CNE-MW-23		10/7/1997	1331.01	22.72	1308.29	
CNE-MW-23		5/13/1998	1331.01	21.04	1309.97	
CNE-MW-24		10/7/1997	1331.10	21.11	1309.99	
CNE-MW-24		5/13/1998	1331.10	19.58	1311.52	
CNE-MW-25		10/7/1997	1327.62	17.28	1310.34	
CNE-MW-25		5/13/1998	1327.62	15.34	1312.28	
CNE-MW-26		10/7/1997	1331.68	15.55	1316.13	
CNE-NE-01D	D	10/7/1997	1323.27	16.39	1306.88	
CNE-NE-01S	S	10/7/1997	1323.47	16.62	1306.85	
CNE-NE-02D	D	10/7/1997	1321.41	14.90	1306.51	
CNE-NE-02S	S	10/7/1997	1321.54	14.98	1306.56	
CNE-NE-03D	D	10/7/1997	1321.37	14.97	1306.40	
CNE-NE-03S	S	10/7/1997	1321.40	15.01	1306.39	
CNE-NE-04D	D	10/7/1997	1320.55	14.13	1306.42	
CNE-NE-04D	D	5/1/1998	1320.55	13.21	1307.34	
CNE-NE-04S	S	10/7/1997	1320.35	13.90	1306.45	
CNE-NE-04S	S	5/1/1998	1320.35	13.02	1307.33	
CNE-NE-05D	D	10/7/1997	1319.06	12.92	1306.14	
CNE-NE-05S	S	10/7/1997	1319.05	12.82	1306.23	
CNE-NE-06D	D	10/7/1997	1318.76	13.28	1305.48	
CNE-NE-06S	S	10/7/1997	1318.66	12.76	1305.90	
CNE-NE-07D	D	10/7/1997	1320.14	14.22	1305.92	
CNE-NE-07S	S	10/7/1997	1320.05	14.21	1305.84	
CNE-NE-08I		10/7/1997	1319.72	15.74	1303.98	
CNE-NE-09D	D	10/7/1997	1316.61	12.79	1303.82	
CNE-NE-09S	S	10/7/1997	1316.79	12.94	1303.85	
CNE-NE-10D	D	10/7/1997	1318.57	13.94	1304.63	
CNE-NE-10S	S	10/7/1997	1318.43	13.81	1304.62	
CNE-NE-11D	D	10/7/1997	1314.99	11.37	1303.62	
CNE-NE-12I		10/7/1997	1318.17	13.66	1304.51	
CNE-NE-12I		10/7/1997	1318.17	13.66	1304.51	
CNE-OW-1D	D	10/6/1997	1321.53	15.59	1305.94	
CNE-OW-2D	D	10/6/1997	1320.78	14.53	1306.25	
CNE-OW-3D	D	10/6/1997	1320.90	14.45	1306.45	
CNE-OW-4		10/6/1997	1321.27	14.99	1306.28	
CSI-MW-01		5/1/1998		15.14		
CSI-MW-07		5/1/1998		15.36		

Table 4-1a
North Industrial Corridor (NIC) Site
Phase 1 Water Level Measurements (Jan 1997-June 1998)

Well ID	Nested Well Depth Zone	Date	Measuring Point Elevation* (feet msl)	Depth to Water (feet bmp)	Water Level Elevation (feet msl)	Comments
CSI-MW-08		5/1/1998		14.57		
CSI-MW-09		5/1/1998		14.92		
CSI-MW-10		5/1/1998		15.56		
CTC-MW-01		4/30/1998	1326.51	16.53	1309.98	
CTC-MW-03		4/30/1998	1327.01	15.67	1311.34	
CTC-MW-04D	D	4/30/1998	1326.44	16.14	1310.30	
CTC-MW-04S	S	4/30/1998	1326.81	16.29	1310.52	
CTC-MW-05D	D	10/8/1997	1323.28	15.57	1307.71	
CTC-MW-05D	D	4/30/1998	1323.28	13.32	1309.96	
CTC-MW-05S	S	10/8/1997	1323.32	15.67	1307.65	
CTC-MW-05S	S	4/30/1998	1323.32	13.41	1309.91	
CTC-MW-07S	S	10/8/1997	1325.62	17.83	1307.79	
CTC-MW-07S	S	4/30/1998	1325.62	15.47	1310.15	
DA-MW-04		5/1/1998	1326.14	11.20	1314.94	
DA-MW-05		5/1/1998	1328.30	12.33	1315.97	
DA-MW-09		5/1/1998	1326.33	11.20	1315.13	
DRB-02A		4/21/1998			1295.48	
DRB-04		4/21/1998			1295.19	
DRB-06	S	4/21/1998			1294.93	
DRB-08	S	4/21/1998			1300.18	
DRB-11	S	4/21/1998			1299.38	
DRB-11A		10/30/1997	1307.60	12.69	1294.91	
DRB-13		4/21/1998			1296.74	
DRB-13A		10/30/1997	1312.11	16.62	1295.49	
DRB-13A		4/21/1998	1312.11	15.37	1296.74	
DRB-15		4/21/1998			1297.51	
DRB-150	F	10/30/1997	1311.54	18.15	1293.39	
DRB-16		4/21/1998			1295.14	
DRB-17		4/21/1998			1295.96	
DRB-18		4/21/1998			1296.62	
DRB-19		4/21/1998			1295.92	
DRB-19stbd	D	4/21/1998			1292.39	
DRB-21		4/21/1998			1295.66	
DRB-21stbd	D	4/21/1998			1293.82	
DRB-23		4/21/1998			1297.26	
DRB-24		4/21/1998			1297.08	
DRB-25		4/21/1998			1296.43	
DRB-27		4/21/1998			1295.67	
DRB-28		4/21/1998			1295.10	
DRB-29		4/21/1998			1297.35	
DRB-29S	S	4/21/1998	1308.70	11.35	1297.35	
DRB-32		4/21/1998			1296.00	
DRB-32A		4/21/1998	1310.32	14.32	1296.00	

Table 4-1a
North Industrial Corridor (NIC) Site
Phase 1 Water Level Measurements (Jan 1997-June 1998)

Well ID	Nested Well Depth Zone	Date	Measuring Point Elevation* (feet msl)	Depth to Water (feet bmp)	Water Level Elevation (feet msl)	Comments
DRB-33		4/21/1998			1296.36	
DRB-33A		4/21/1998	1310.77	14.41	1296.36	
DRB-34	S	4/21/1998			1299.29	
DRB-35		4/21/1998			1300.72	
DRB-36		4/21/1998			1296.59	
DRB-36A		4/21/1998			1297.56	
DRB-37		4/21/1998			1297.83	
DRB-40		4/21/1998			1295.38	
DRB-42		4/21/1998			1296.49	
DRB-42A		4/21/1998			1296.80	
DRB-43		4/21/1998			1297.64	
DRB-44		4/21/1998			1295.70	
DRB-46		4/21/1998			1301.39	
DRB-A		4/21/1998			1295.14	
DRB-B		4/21/1998			1295.20	
DRB-C		4/21/1998			1295.06	
DRB-D	D	4/21/1998			1295.18	
DRB-E		4/21/1998			1297.52	
DRB-I		4/21/1998			1297.07	
DRB-J		4/21/1998			1295.68	
DRB-MW-01	S	10/30/1997	1312.01	12.37	1299.64	
DRB-MW-01	S	4/21/1998	1312.01	9.63	1302.38	
DRB-MW-02	S	10/30/1997	1313.50	11.76	1301.74	
DRB-MW-02	S	4/21/1998	1313.50	13.94	1299.56	
DRB-MW-02	S	5/1/1998	1313.50	13.95	1299.55	
DRB-MW-02	S	4/21/1998			1299.56	
DRB-MW-03	S	4/21/1998			1300.59	
DRB-MW-03	S	10/30/1997	1314.86	14.28	1300.58	
DRB-MW-03	S	4/21/1998	1314.86	14.27	1300.59	
DRB-MW-04		4/21/1998	1311.15	16.82	1294.33	
DRB-MW-05	S	4/21/1998	1311.21	17.30	1293.91	
DRB-MW-06	S	4/21/1998	1307.42	13.00	1294.42	
DRB-MW-07	S/I	4/21/1998	1311.10	16.47	1294.63	
DRB-MW-08	S/I	4/21/1998	1312.37	17.68	1294.69	
DRB-MW-09	F	4/21/1998	1309.34	15.19	1294.15	
DRB-MW-10	S/I	10/30/1997	1307.70	13.39	1294.31	
DRB-MW-10	S/I	4/21/1998	1307.70	13.10	1294.60	
DRB-MW-11	S	4/21/1998	1307.19	12.49	1294.70	
DRB-MW-12		10/30/1997	1309.00	14.93	1294.07	
DRB-MW-12		4/21/1998	1309.00	14.78	1294.22	
DRB-MW-13		4/21/1998	1304.96	10.84	1294.12	
DRB-MW-20	S	4/21/1998			1296.88	
DRB-MW-30	S	4/21/1998			1298.49	

Table 4-1a
North Industrial Corridor (NIC) Site
Phase 1 Water Level Measurements (Jan 1997-June 1998)

Well ID	Nested Well Depth Zone	Date	Measuring Point Elevation* (feet msl)	Depth to Water (feet bmp)	Water Level Elevation (feet msl)	Comments
DRB-MW-40	F	4/21/1998			1296.50	
DRB-MW-50		4/21/1998			1294.83	
DRB-MW-60		4/21/1998			1295.86	
DRB-MW-70		4/21/1998			1294.54	
DRB-MW-80		4/21/1998			1294.17	
DRB-MW-90		4/21/1998			1295.26	
DRB-MW-100		4/21/1998			1295.71	
DRB-MW-110		4/21/1998			1293.34	
DRB-MW-120	F	4/21/1998			1292.74	
DRB-MW-130	S/I	4/21/1998			1293.41	
DRB-MW-140		4/21/1998			1294.27	
DRB-MW-150		4/21/1998			1293.02	
DRB-MW-170		4/21/1998			1297.77	
DRB-MW-180		4/21/1998			1295.58	
DRB-MW-190		4/21/1998			1294.07	
DRB-MW-200		4/21/1998			1295.69	
DRB-MW-210		4/21/1998			1293.84	
DRB-MW-220		4/21/1998			1293.75	
DRB-MW-230		4/21/1998			1293.95	
DRB-MW-250	D	4/21/1998			1299.95	
DRB-MW-260		4/21/1998			1301.06	
DRB-MW-270		4/21/1998			1292.33	
DRB-MW-280		4/21/1998			1294.99	
DRB-MW-290		4/21/1998			1299.54	
DRB-MW-300		4/21/1998			1298.37	
DRB-MW-320		4/21/1998			1295.27	
DRB-MW-330		4/21/1998			1299.66	
DRB-MW-340		4/21/1998			1297.64	
DRB-MW-350		4/21/1998			1292.73	
DRB-MW-360	F	4/21/1998			1295.74	
DRB-MW-370		4/21/1998			1297.08	
DRB-MW-380		4/21/1998			1297.58	
DRB-MW-390	S/I	4/21/1998			1294.59	
DRB-MW-400		4/21/1998			1294.90	
DRB-MW-410		4/21/1998			1299.72	
DRB-MW-420	S/I	4/21/1998			1300.50	
DRB-MW-430	S/I	4/21/1998			1300.98	
DRB-MW-440		4/21/1998			1300.88	
DRB-MW-450	S/I	4/21/1998			1300.12	
DRB-MW-460		4/21/1998			1299.72	
DRB-MW-480	F	4/21/1998			1300.95	
DRB-RGBD	D	4/21/1998			1295.73	
DRB-T-1		4/21/1998			1294.57	

Table 4-1a
North Industrial Corridor (NIC) Site
Phase 1 Water Level Measurements (Jan 1997-June 1998)

Well ID	Nested Well Depth Zone	Date	Measuring Point Elevation* (feet msl)	Depth to Water (feet bmp)	Water Level Elevation (feet msl)	Comments
DRB-T-3		4/21/1998			1294.05	
DRB-T-4		4/21/1998			1294.22	
DRB-T-5		4/21/1998			1294.74	
DRB-T-6		4/21/1998			1294.41	
DRB-T-7		4/21/1998			1294.15	
DRB-T-8		4/21/1998			1293.96	
EXC-MW-02A	S	4/30/1998	1314.04	10.59	1303.45	
EXC-MW-02B	D	4/30/1998	1314.26	10.82	1303.44	
EXC-MW-03A	S	4/30/1998	1315.87	12.71	1303.16	
EXC-MW-03B	D	4/30/1998	1315.79	12.66	1303.13	
EXC-MW-04A	S	4/30/1998	1316.71	13.76	1302.95	
EXC-MW-04B	D	4/30/1998	1317.06	14.07	1302.99	
EXC-MW-06A	S	4/30/1998	1312.44	10.33	1302.11	
EXC-MW-06B	D	4/30/1998	1312.38	10.23	1302.15	
EXC-MW-07B	D	4/30/1998	1313.14	11.61	1301.53	
EXC-MW-08A	S	4/30/1998	1311.62	10.48	1301.14	
EXC-MW-08B	D	4/30/1998	1311.73	10.54	1301.19	
EXC-MW-09A	S	4/30/1998	1313.40	10.92	1302.48	
EXC-MW-10A	S	4/30/1998	1314.83	11.40	1303.43	
LBC-02		5/1/1998	1335.40	14.43	1320.97	
LBC-05		5/1/1998	1332.46	13.02	1319.44	
LBC-06		5/1/1998	1330.83	12.00	1318.83	
LBC-08		5/1/1998	1331.96	12.84	1319.12	
NBPN-MW-02		5/1/1998		12.69		
NBPN-MW-05		5/1/1998		12.66		
NBPN-MW-09		5/1/1998		12.71		
OHS-EMW-01		2/27/1997		17.07		
OHS-EMW-02		2/27/1997		19.19		
OHS-MW-01A		2/27/1997		18.37		
OHS-MW-02A		2/27/1997		16.87		
OHS-MW-03A		2/27/1997		16.15		
OHS-MW-04A		2/27/1997		14.41		
OHS-MW-05A		2/27/1997		12.93		
OHS-MW-06A		2/27/1997		15.35		
OHS-MW-07A		2/27/1997		16.56		
QM-MW-01		4/30/1998		12.32		
QM-MW-03		4/30/1998		10.12		
QM-MW-06		4/30/1998		13.22		
QT-MW-02		4/29/1998	1326.00	16.37	1309.63	
QT-MW-03		4/29/1998	1321.45	14.16	1307.29	
QT-MW-04		4/29/1998	1321.72	14.24	1307.48	
QT-MW-06		4/29/1998	1320.13	13.97	1306.16	
QT-MW-07		4/29/1998	1320.97	13.96	1307.01	

Table 4-1a
North Industrial Corridor (NIC) Site
Phase 1 Water Level Measurements (Jan 1997-June 1998)

Well ID	Nested Well Depth Zone	Date	Measuring Point Elevation* (feet msl)	Depth to Water (feet bmp)	Water Level Elevation (feet msl)	Comments
QT-MW-08		4/29/1998	1319.23	13.12	1306.11	
RM-MW-01		4/30/1998		11.56		
RM-MW-04		4/30/1998		10.65		
RM-MW-05		4/30/1998		10.36		
RM-MW-07		4/30/1998		11.73		
SYP-401S	S	4/30/1998		11.60		
SYP-402S	S	5/1/1998		13.69		
UCL-MW-01D	D	9/25/1997	1347.64	5.75	1341.89	
UCL-MW-01D	D	10/2/1997	1347.64	6.30	1341.34	
UCL-MW-01S	S	9/25/1997	1347.44	6.26	1341.18	
UCL-MW-01S	S	10/2/1997	1347.44	6.45	1340.99	
UCL-MW-02	F	9/25/1997	1348.21	8.90	1339.31	
UCL-MW-02	F	10/2/1997	1348.21	9.25	1338.96	
UCL-MW-02	F	10/8/1997	1348.21	9.54	1338.67	
UCL-MW-02	F	4/29/1998	1348.21	5.59	1342.62	
UCL-MW-03	F	9/25/1997	1345.51	4.38	1341.13	
UCL-MW-03	F	10/2/1997	1345.51	4.42	1341.09	
UCL-MW-03	F	10/8/1997	1345.51	4.45	1341.06	
UCL-MW-03	F	4/29/1998	1345.51	2.24	1343.27	
UCL-MW-04	F	9/25/1997	1347.85	7.18	1340.67	
UCL-MW-04	F	10/2/1997	1347.85	7.88	1339.97	
UCL-MW-04	F	4/29/1998	1347.95	7.51	1340.44	
UCL-MW-05	F	9/25/1997	1348.18	7.36	1340.82	
UCL-MW-05	F	10/2/1997	1348.18	7.59	1340.59	
UCL-MW-05	F	4/29/1998	1348.18	3.88	1344.30	
UCL-MW-06	F	10/8/1997	1349.04	9.28	1339.76	
UCL-MW-06	F	4/29/1998	1349.04	5.70	1343.34	
UCL-MW-07		9/25/1997	1339.44	4.70	1334.74	
UCL-MW-07		10/2/1997	1339.44	5.49	1333.95	
UCL-MW-08	F	9/25/1997	1327.71	3.20	1324.51	
UCL-MW-08	F	10/2/1997	1327.71	3.42	1324.29	
UCL-MW-08	F	4/29/1998	1327.71	2.90	1324.81	
UCL-MW-09	F	9/25/1997	1330.62	11.61	1319.01	
UCL-MW-09	F	10/2/1997	1330.62	10.31	1320.31	
UCL-MW-09	F	4/29/1998	1330.62	8.02	1322.60	
UCL-MW-10	F	9/25/1997	1337.83	12.84	1324.99	
UCL-MW-10	F	10/2/1997	1337.83	12.32	1325.51	
UCL-MW-10	F	4/29/1998	1337.93	8.61	1329.32	
UCL-MW-11		9/25/1997	1325.59	4.32	1321.27	
UCL-MW-11		10/2/1997	1325.59	4.54	1321.05	
UCL-MW-11		4/29/1998	1325.80			Well Temporarily Inaccessible
UCL-MW-12D	D	9/25/1997	1347.79	17.40	1330.39	

Table 4-1a
North Industrial Corridor (NIC) Site
Phase 1 Water Level Measurements (Jan 1997-June 1998)

Well ID	Nested Well Depth Zone	Date	Measuring Point Elevation* (feet msl)	Depth to Water (feet bmp)	Water Level Elevation (feet msl)	Comments
UCL-MW-12D	D	10/2/1997	1347.79	17.49	1330.30	
UCL-MW-12S	S	9/25/1997	1347.83	17.29	1330.54	
UCL-MW-12S	S	10/2/1997	1347.83	17.40	1330.43	
UCL-MW-12S	S	4/29/1998	1347.83	12.96	1334.87	
UCL-MW-13	F	9/25/1997	1347.21	11.78	1335.43	
UCL-MW-13	F	10/2/1997	1347.21	12.05	1335.16	
UCL-MW-14	F	9/25/1997	1349.51	7.07	1342.44	
UCL-MW-14	F	10/2/1997	1349.51	7.45	1342.06	
UCL-MW-15	F	9/25/1997	1344.81	5.82	1338.99	
UCL-MW-15	F	10/2/1997	1344.81	5.82	1338.99	
UCL-MW-16	F	9/25/1997	1349.55	16.99	1332.56	
UCL-MW-16	F	10/2/1997	1349.55	33.80	1315.75	
UCL-MW-17	F	9/25/1997	1348.65	13.32	1335.33	
UCL-MW-17	F	10/2/1997	1348.65	25.82	1322.83	
UCL-MW-18	F	4/29/1998	1330.54	9.13	1321.41	
UCL-MW-19	F	9/25/1997	1331.26	14.20	1317.06	
UCL-MW-19	F	10/2/1997	1331.26	12.76	1318.50	
UCL-MW-19	F	4/29/1998	1331.26	11.11	1320.15	
UCL-MW-20	F	9/25/1997	1331.34	14.07	1317.27	
UCL-MW-20	F	10/2/1997	1331.34	12.90	1318.44	
UCL-MW-20	F	4/29/1998	1331.34	11.27	1320.07	
UCL-MW-21	F	9/25/1997	1331.45	13.47	1317.98	
UCL-MW-21	F	10/2/1997	1331.45	12.66	1318.79	
UCL-MW-22		9/25/1997	1327.23	11.66	1315.57	
UCL-MW-22		10/2/1997	1327.23	11.32	1315.91	
UCL-MW-22		4/29/1998	1327.23	9.75	1317.48	
UCL-MW-23	F	9/25/1997	1326.81	6.18	1320.63	
UCL-MW-23	F	10/2/1997	1326.81	8.85	1317.96	
UCL-TW-01	F	9/25/1997	1346.25	10.40	1335.85	
UCL-TW-01	F	10/2/1997	1346.25	10.38	1335.87	
UCL-TW-02A	F	9/25/1997	1343.87	7.43	1336.44	
UCL-TW-02A	F	10/2/1997	1343.87	12.41	1331.46	
UCL-TW-03	F	9/25/1997	1346.96	9.95	1337.01	
UCL-TW-03	F	10/2/1997	1346.96	9.69	1337.27	
UCL-TW-04	F	4/29/1998	1335.99	2.00	1333.99	
ULI-MW-02		4/29/1997		11.90		
ULI-MW-02		7/6/1997		10.80		
ULI-MW-03		7/6/1997		11.50		
ULI-MW-04		4/29/1997		12.90		
URS-MW-01		10/8/1997	1312.95	12.95	1300.00	
URS-MW-01	S	4/30/1998	1312.95	11.64	1301.31	
URS-MW-02		4/30/1998		11.07		
URS-MW-03	S	10/8/1997	1313.13	11.30	1301.83	

Table 4-1a
North Industrial Corridor (NIC) Site
Phase 1 Water Level Measurements (Jan 1997-June 1998)

Well ID	Nested Well Depth Zone	Date	Measuring Point Elevation* (feet msl)	Depth to Water (feet bmp)	Water Level Elevation (feet msl)	Comments
URS-MW-03	S	4/30/1998	1313.13	11.10	1302.03	
USD-MW-02D	D	10/8/1997	1334.61	11.49	1323.12	
USD-MW-02D	D	4/30/1998	1334.61	8.15	1326.46	
USD-MW-02S	S	4/30/1998	1334.53	8.15	1326.38	
USD-MW-04D	D	10/8/1997	1327.97	17.53	1310.44	
USD-MW-04D	D	4/30/1998	1327.97	14.75	1313.22	
USD-MW-04S	S	10/8/1997	1327.87	17.43	1310.44	
USD-MW-04S	S	4/30/1998	1327.87	14.58	1313.29	
USD-MW-05D	D	10/8/1997	1327.47	18.49	1308.98	
USD-MW-05D	D	4/30/1998	1327.47	15.27	1312.20	
USD-MW-05S	S	10/8/1997	1327.46	17.79	1309.67	
USD-MW-05S	S	4/30/1998	1327.46	15.03	1312.43	
USD-MW-06D	D	10/8/1997	1330.89	22.03	1308.86	
USD-MW-06D	D	4/30/1998	1330.89	19.12	1311.77	
USD-MW-06S	S	4/30/1998	1330.78	18.23	1312.55	
VCM-MW-01	S	1/23/1997		14.00		
VCM-MW-01	S	4/2/1997		14.00		
VCM-MW-02B	S	1/23/1997		14.00		
VCM-MW-02B	S	4/2/1997		14.00		
VCM-MW-03	S	1/23/1997		14.35		
VCM-MW-03	S	4/2/1997		14.35		
VCM-MW-04	D	1/23/1997		22.00		
VCM-MW-04	D	4/2/1997		22.00		
VCM-MW-06	D	1/23/1997		28.00		
VCM-MW-06	D	4/2/1997		28.00		
VCM-MW-07	D	1/23/1997		31.00		
VCM-MW-07	D	4/2/1997		31.00		
WND-01S	S	10/6/1997	1325.96	18.65	1307.31	
WND-01S	S	4/30/1998	1325.96	16.41	1309.55	
WND-02D	D	10/6/1997	1311.30	13.34	1297.96	
WND-02D	D	5/1/1998	1311.30	12.73	1298.57	
WND-02S	S	5/1/1998	1311.19	12.91	1298.28	
WND-03S	S	10/6/1997	1315.71	14.70	1301.01	
WND-03S	S	4/30/1998	1315.71	14.27	1301.44	
WND-04S	S	4/30/1998	1318.70	15.83	1302.87	
WND-06S	S	10/6/1997	1326.65	19.43	1307.22	
WND-06S	S	4/30/1998	1326.65	17.00	1309.65	
WND-07S	S	5/1/1998	1320.73	14.03	1306.70	
WND-08S	S	10/7/1997	1318.19	14.20	1303.99	
WND-08S	S	5/2/1998	1318.19	13.87	1304.32	
WND-09S	S	10/6/1997	1317.26	13.90	1303.36	

Table 4-1a
North Industrial Corridor (NIC) Site
Phase 1 Water Level Measurements (Jan 1997-June 1998)

Well ID	Nested Well Depth Zone	Date	Measuring Point Elevation* (feet msl)	Depth to Water (feet bmp)	Water Level Elevation (feet msl)	Comments
WND-10S	S	10/6/1997	1317.95	13.94	1304.01	
WND-10S	S	10/7/1997	1317.95	13.86	1304.09	
WND-10S	S	4/30/1998	1317.95	13.34	1304.61	
WND-10S	S	5/4/1998	1317.95	14.23	1303.86	
WND-11S	S	10/6/1997	1316.29	13.36	1302.93	
WND-11S	S	4/30/1998	1316.29	13.09	1303.20	
WND-12D	D	10/6/1997	1315.04	12.09	1302.95	
WND-12D	D	4/30/1998	1315.04	11.65	1303.39	
WND-12S	S	4/30/1998	1314.83	11.54	1303.29	
WND-13D	D	10/7/1997	1312.42	12.86	1299.56	
WND-13D	D	5/1/1998	1312.42	11.92	1300.50	
WND-13S	S	10/7/1997	1312.63	13.07	1299.56	
WND-13S	S	5/1/1998	1312.63	12.10	1300.53	
WND-14D	D	10/6/1997	1317.15	14.21	1302.94	
WND-14D	D	10/7/1997	1317.15	14.25	1302.90	
WND-14D	D	5/2/1998	1317.15	13.82	1303.33	
WND-14S	S	10/6/1997	1317.23	14.31	1302.92	
WND-14S	S	10/7/1997	1317.23	14.36	1302.87	
WND-14S	S	5/2/1998	1317.23	13.89	1303.34	
WND-15D	D	10/7/1997	1305.96	13.56	1292.40	
WND-15D	D	5/1/1998	1305.96	12.80	1293.16	
WND-15S	S	10/7/1997	1306.32	13.94	1292.38	
WND-15S	S	5/1/1998	1306.32	13.18	1293.14	
WND-18D	D	10/7/1997	1310.65	14.90	1295.75	
WND-18D	D	5/1/1998	1310.65	14.69	1295.96	
WND-18S	S	10/7/1997	1310.72	15.00	1295.72	
WND-18S	S	5/1/1998	1310.72	14.59	1296.13	
WND-19D	D	10/7/1997	1306.62	11.41	1295.21	
WND-19D	D	5/1/1998	1306.62	11.07	1295.55	
WND-19S	S	10/7/1997	1306.59	11.35	1295.24	
WND-19S	S	5/1/1998	1306.59	11.04	1295.55	
WND-20S	S	10/7/1997	1313.58	16.61	1296.97	
WND-20S	S	5/1/1998	1313.58	16.23	1297.35	
WND-21D	D	10/7/1997	1309.53	11.22	1298.31	
WND-21D	D	5/1/1998	1309.53	11.08	1298.45	
WND-21S	S	10/7/1997	1309.57	11.67	1297.90	
WND-21S	S	5/1/1998	1309.57	11.04	1298.53	
WND-22D	D	10/6/1997	1323.01	14.95	1308.06	
WND-22D	D	4/30/1998	1323.01	13.68	1309.33	
WND-22S	S	10/6/1997	1322.74	14.46	1308.28	
WND-22S	S	4/30/1998	1322.74	12.62	1310.12	
WND-23S	S	10/6/1997	1316.97	13.73	1303.24	
WND-23S	S	4/30/1998	1316.97	13.35	1303.62	

Table 4-1a
North Industrial Corridor (NIC) Site
Phase 1 Water Level Measurements (Jan 1997-June 1998)

Well ID	Nested Well Depth Zone	Date	Measuring Point Elevation* (feet msl)	Depth to Water (feet bmp)	Water Level Elevation (feet msl)	Comments
WND-24D	D	10/7/1997	1306.68	12.43	1294.25	
WND-24D	D	5/1/1998	1306.68	12.02	1294.66	
WND-24S	S	10/7/1997	1306.68	12.46	1294.22	
WND-24S	S	5/1/1998	1306.68	12.06	1294.62	
WND-25D	D	10/6/1997	1318.12	14.72	1303.40	
WND-25D	D	10/7/1997	1318.12	14.84	1303.28	
WND-25D	D	4/30/1998	1318.12	14.28	1303.84	
WND-25D	D	5/4/1998	1318.12	15.50	1303.80	
WND-25S	S	10/6/1997	1318.09	14.70	1303.39	
WND-25S	S	10/7/1997	1318.09	14.79	1303.30	
WND-25S	S	4/30/1998	1318.09	14.24	1303.85	
WND-25S	S	5/4/1998	1318.09	15.11	1303.90	
WND-26D	D	10/6/1997	1314.84	14.45	1300.39	
WND-26D	D	4/30/1998	1314.84	14.02	1300.82	
WND-26S	S	10/6/1997	1314.94	14.35	1300.59	
WND-26S	S	4/30/1998	1314.94	14.11	1300.83	
WND-27S	S	5/1/1998	1314.57	12.54	1302.03	
WND-28S	S	10/6/1997	1320.37	14.91	1305.46	
WND-28S	S	4/30/1998	1320.37	14.42	1305.95	
WND-29D	D	10/7/1997	1319.30	16.10	1303.20	
WND-29D	D	4/30/1998	1319.30	15.49	1303.81	
WND-29S	S	10/7/1997	1319.01	15.70	1303.31	
WND-29S	S	4/30/1998	1319.01	15.05	1303.96	
WND-30D	D	5/1/1998	1313.19	13.65	1299.54	
WND-31S	S	10/7/1997	1317.26	15.52	1301.74	
WND-32S	S	10/7/1997	1317.68	16.08	1301.60	
WND-33D	D	10/6/1997	1310.19	12.33	1297.86	
WND-33D	D	5/7/1998	1310.19	11.80	1298.39	
WND-33S	S	10/6/1997	1310.22	12.34	1297.88	
WND-33S	S	5/7/1998	1310.22	11.80	1298.42	
WND-34D	D	10/6/1997	1313.98	14.48	1299.50	
WND-34D	D	5/1/1998	1313.98	13.92	1300.06	
WND-34S	S	10/6/1997	1313.92	14.44	1299.48	
WND-34S	S	5/1/1998	1313.92	13.86	1300.06	
WND-35D	D	5/7/1998	1314.91	15.66	1299.25	
WND-36D	D	10/6/1997	1314.22	13.51	1300.71	
WND-36D	D	5/1/1998	1314.22	13.06	1301.16	
WND-36S	S	10/6/1997	1314.30	13.60	1300.70	
WND-36S	S	5/1/1998	1314.30	13.13	1301.17	
WND-37DR	D	5/1/1998		14.92		
WND-38D	D	10/7/1997	1307.68	11.36	1296.32	
WND-38D	D	5/4/1998	1307.68	10.85	1296.83	

Table 4-1a
North Industrial Corridor (NIC) Site
Phase 1 Water Level Measurements (Jan 1997-June 1998)

Well ID	Nested Well Depth Zone	Date	Measuring Point Elevation* (feet msl)	Depth to Water (feet bmp)	Water Level Elevation (feet msl)	Comments
WND-38S	S	10/7/1997	1307.52	11.20	1296.32	
WND-38S	S	5/4/1998	1307.52	10.72	1296.80	
WND-39D	D	10/7/1997	1308.45	12.04	1296.41	
WND-39D	D	5/1/1998	1308.45	11.36	1297.09	
WND-39S	S	10/7/1997	1308.69	12.08	1296.61	
WND-39S	S	5/1/1998	1308.69	11.38	1297.31	
WND-40D	D	10/7/1997	1302.48	12.06	1290.42	
WND-40D	D	5/1/1998	1302.48	11.41	1291.07	
WND-40S	S	10/7/1997	1302.62	12.23	1290.39	
WND-40S	S	5/1/1998	1302.62	11.55	1291.07	
WND-41D	D	10/6/1997	1307.05	12.03	1295.02	
WND-41D	D	5/1/1998	1307.05	11.82	1295.23	
WND-41S	S	10/6/1997	1307.05	12.10	1294.95	
WND-41S	S	5/1/1998	1307.05	11.91	1295.14	
WND-42D	D	10/7/1997	1303.81	14.97	1288.84	
WND-42D	D	5/1/1998	1303.81	14.26	1289.55	
WND-42S	S	10/7/1997	1303.65	14.83	1288.82	
WND-42S	S	5/1/1998	1303.65	14.13	1289.52	
WND-43D	D	10/7/1997	1307.49	13.15	1294.34	
WND-43D	D	5/1/1998	1307.49	12.84	1294.65	
WND-43S	S	10/7/1997	1307.48	13.20	1294.28	
WND-43S	S	5/1/1998	1307.48	12.90	1294.58	
WND-44D	D	10/7/1997	1303.63	14.04	1289.59	
WND-44D	D	5/1/1998	1303.63	13.35	1290.28	
WND-44S	S	10/7/1997	1303.38	13.80	1289.58	
WND-44S	S	5/1/1998	1303.38	13.12	1290.26	
WND-45D	D	10/7/1997	1305.49	12.35	1293.14	
WND-45D	D	5/1/1998	1305.49	11.86	1293.63	
WND-45S	S	10/7/1997	1305.79	12.60	1293.19	
WND-45S	S	5/1/1998	1305.79	12.12	1293.67	
WND-46D	D	10/7/1997	1304.93	11.97	1292.96	
WND-46D	D	5/1/1998	1304.93	11.52	1293.41	
WND-46S	S	10/7/1997	1305.08	12.07	1293.01	
WND-46S	S	5/1/1998	1305.08	11.62	1293.46	
WND-47D	D	10/7/1997	1304.78	12.27	1292.51	
WND-47D	D	5/1/1998	1304.78	11.76	1293.02	
WND-47S	S	10/7/1997	1304.95	12.10	1292.85	
WND-47S	S	5/1/1998	1304.95	11.94	1293.01	
WND-48D	D	10/7/1997	1301.21	13.07	1288.14	
CN-RW-01		10/7/1997	1322.53	21.83	1300.70	
CN-RW-01		5/4/1998	1322.53	13.45	1306.59	
CN-RW-02		5/4/1998	1320.28	12.64	1307.64	

Table 4-1a
North Industrial Corridor (NIC) Site
Phase 1 Water Level Measurements (Jan 1997-June 1998)

Well ID	Nested Well Depth Zone	Date	Measuring Point Elevation* (feet msl)	Depth to Water (feet bmp)	Water Level Elevation (feet msl)	Comments
CN-VEW-05D	D	10/7/1997	1320.04	14.52	1305.52	
CN-VEW-05D	D	5/4/1998	1320.04	12.26	1307.74	
CN-VEW-11D	D	10/7/1997	1320.28	14.17	1306.11	
CN-VEW-11D	D	5/4/1998	1320.28	13.01	1307.28	
CN-VEW-13D	D	5/4/1998	1320.05	13.44	1306.61	
CN-VEW-14D	D	10/7/1997	1320.29	14.41	1305.88	
CN-VEW-14D	D	5/4/1998	1320.16	13.60	1306.56	
CN-VEW-18D	D	10/7/1997	1320.05	14.58	1305.47	
CN-VEW-18D	D	5/4/1998	1319.93	13.49	1306.44	
CN-VEW-21D	D	5/4/1998	1317.95	13.23	1304.72	
CN-VEW-22D	D	10/7/1997	1319.93	14.45	1305.48	
CN-VEW-22D	D	5/4/1998	1318.12	14.22	1303.90	
DRB-RW-01		4/21/1998			1295.54	
DRB-RW-02		4/21/1998			1295.78	
DRB-RW-04		4/21/1998			1295.19	
DRB-RW-05		4/21/1998			1295.35	
DRB-RW-06		4/21/1998			1295.83	
DRB-RW-07	S	4/21/1998			1295.84	
DRB-RW-08		4/21/1998			1293.84	
DRB-RW-09		4/21/1998			1294.15	
DRB-RW-10		4/21/1998			1294.58	
DRB-RW-11		4/21/1998			1293.83	
DRB-RW-12		4/21/1998			1294.28	
DRB-RW-13		4/21/1998			1295.26	
DRB-RW-14		4/21/1998			1294.32	
DRB-RW-15		4/21/1998			1295.31	
DRB-RW-16		4/21/1998			1292.84	
DRB-RW-17		4/21/1998			1290.96	
DRB-RW-18	S/I	4/21/1998			1293.66	
DRB-RW-19	S/I	4/21/1998			1295.32	
DRB-RW-20	S/I	4/21/1998			1292.64	
DRB-RW-21		4/21/1998			1289.71	
DRB-RW-22	S/I	4/21/1998			1290.01	
DRB-RW-23	S/I	4/21/1998			1292.04	
DRB-RW-24	S/I	4/21/1998			1295.21	
DRB-RW-25	S/I	4/21/1998			1292.32	
DRB-RW-26	S/I	4/21/1998			1292.76	
DRB-RW-27	S/I	4/21/1998			1292.96	
DRB-RW-28	S/I	4/21/1998			1293.54	
DRB-RW-29	F	4/21/1998			1292.15	
DRB-RW-30		4/21/1998			1290.96	
DRB-RW-31		4/21/1998			1292.15	
DRB-RW-32		4/21/1998			1300.71	

Table 4-1a
North Industrial Corridor (NIC) Site
Phase 1 Water Level Measurements (Jan 1997-June 1998)

Well ID	Nested Well Depth Zone	Date	Measuring Point Elevation* (feet msl)	Depth to Water (feet bmp)	Water Level Elevation (feet msl)	Comments
UCL-PZ-01	F	4/29/1998	1333.50	3.06	1330.44	
UCL-PZ-02	F	4/29/1998	1328.60	6.35	1322.25	
UCL-R-01	F	9/25/1997	1350.29	13.80	1336.49	
UCL-R-01	F	10/2/1997	1350.29	10.05	1340.24	
UCL-R-02	F	9/25/1997	1335.87	21.32	1314.55	
UCL-R-02	F	10/2/1997	1335.87	3.70	1332.17	
UCL-R-02	F	4/29/1998	1335.87	21.60	1314.27	Pumping
UCL-R-03	F	9/25/1997	1335.57	18.46	1317.11	
UCL-R-03	F	10/2/1997	1335.57	4.88	1330.69	
UCL-R-03	F	4/29/1998	1335.57	15.60	1319.97	Pumping
UCL-R-04	F	9/25/1997	1336.95	17.46	1319.49	
UCL-R-04	F	10/2/1997	1336.95	5.89	1331.06	
UCL-R-04	F	4/29/1998	1336.95	15.50	1321.45	Pumping
UCL-R-05	F	9/25/1997	1338.32	17.78	1320.54	
UCL-R-05	F	10/2/1997	1338.32	9.25	1329.07	
UCL-R-05	F	4/29/1998	1338.32	19.60	1318.72	Pumping
UCL-R-06	F	9/25/1997	1344.84	22.55	1322.29	
UCL-R-06	F	10/2/1997	1344.84	15.70	1329.14	
UCL-R-06	F	4/29/1998	1344.84	16.30	1328.54	Pumping
UCL-R-07	F	9/25/1997	1330.72	16.72	1314.00	
UCL-R-07	F	10/2/1997	1330.72	10.28	1320.44	
UCL-R-07	F	4/29/1998	1330.72	9.30	1321.42	Pumping
UCL-R-08	F	9/25/1997	1326.90	13.64	1313.26	
UCL-R-08	F	10/2/1997	1326.90	5.88	1321.02	
UCL-R-08	F	4/29/1998	1326.90	15.30	1311.60	Pumping
UCL-R-09	F	9/25/1997	1327.52	18.80	1308.72	
UCL-R-09	F	10/2/1997	1327.52	5.10	1322.42	
UCL-R-09	F	4/29/1998	1327.52	3.25	1324.27	Pumping
UCL-R-10	F	9/25/1997	1331.36	19.42	1311.94	
UCL-R-10	F	10/2/1997	1331.36	11.28	1320.08	
UCL-R-10	F	4/29/1998	1331.36	16.25	1315.11	Pumping
UCL-R-11	F	9/25/1997	1331.59	16.95	1314.64	
UCL-R-11	F	10/2/1997	1331.59	10.45	1321.14	
UCL-R-11	F	4/29/1998	1331.59	16.25	1315.34	Pumping
UCL-R-12	F	9/25/1997	1330.27	16.82	1313.45	
UCL-R-12	F	10/2/1997	1330.27	8.85	1321.42	
UCL-R-12	F	4/29/1998	1330.27	11.55	1318.72	Pumping
ULI-HP-01		4/15/1997		13.00		
ULI-HP-02		4/15/1997		13.00		
ULI-HP-03		4/15/1997		13.00		
WND-48D	D	5/1/1998	1301.21	12.38	1288.83	
WND-48S	S	10/7/1997	1300.98	12.90	1288.08	
WND-48S	S	5/1/1998	1300.98	12.19	1288.79	

Table 4-1a
North Industrial Corridor (NIC) Site
Phase 1 Water Level Measurements (Jan 1997-June 1998)

Well ID	Nested Well Depth Zone	Date	Measuring Point Elevation* (feet msl)	Depth to Water (feet bmp)	Water Level Elevation (feet msl)	Comments
WND-49D	D	10/7/1997	1308.15	12.08	1296.07	
WND-49D	D	5/1/1998	1308.15	12.67	1295.48	
WR-MW-04		4/30/1998	1322.91	10.70	1312.21	
WR-MW-05		4/30/1998	1321.97	10.25	1311.72	
WR-MW-09		4/30/1998	1326.93	12.63	1314.30	
WR-MW-10		4/30/1998	1323.03	10.91	1312.12	

Note: Table includes measurements taken by CDM (October 1997 and April/May 1998) and measurements taken by others between January 1997 and June 1998.
msl = Mean Sea Level Elevation
bmp = Below measuring point
* = The Phase 1 Measuring Point Elevation utilized any existing well measuring point elevation survey data. Surveys may not have all utilized the same datum, and benchmark variability may be present. Surveyed measuring point elevations not available for all wells.
Pumping = Reading taken during pumping, measured water level is lower than ambient (nonpumping) condition

Table 4-1b
North Industrial Corridor (NIC) Site
Phase 2 Water Level Measurements (Mar 2001-Aug 2001)

Well ID	Nested Well Depth Zone	Date	Measuring Point Elevation* (feet msl)	Depth to Water (feet bmp)	Water Level Elevation (feet msl)	Comments
313A	D	8/22/2001	1299.96	16.68	1283.28	AKA MW-113D
313B	S	3/21/2001	1299.82	16.26	1283.56	AKA MW-113S
313B	S	8/22/2001	1299.82			Well inaccessible
501B	S	3/21/2001	1301.26	17.49	1283.77	
501B	S	8/22/2001	1301.26	17.44	1283.82	
719	S	3/21/2001	1297.44	11.32	1286.12	
719	S	8/22/2001	1297.44	11.71	1285.73	
729	S	3/21/2001	1296.73	11.84	1284.89	
729	S	8/22/2001	1296.73	12.07	1284.66	
CN-MW-06	D	3/20/2001	1323.54	14.37	1309.17	
CN-MW-06	D	8/21/2001	1323.54	16.01	1307.53	
CN-MW-12	D	3/20/2001	1319.15	14.62	1304.53	
CN-MW-12	D	8/21/2001	1319.15			Destroyed by facility construction
CN-MW-39	S	3/20/2001	1323.48	14.25	1309.23	
CN-MW-39	S	8/21/2001	1323.48	15.86	1307.62	
CN-MW-46	S	3/20/2001	1318.36	13.85	1304.51	
CN-MW-46	S	8/21/2001	1318.36			Destroyed by facility construction
CN-MW-55	S	3/20/2001	1321.19	13.29	1307.90	
CN-MW-55	S	8/21/2001	1321.19	15.20	1305.99	
CN-MW-56	D	3/20/2001	1321.76	13.88	1307.88	
CN-MW-56	D	8/21/2001	1321.76	15.79	1305.97	
CN-MW-59	D	3/20/2001	1320.44	14.55	1305.89	
CN-MW-59	D	8/21/2001	1320.44	15.38	1305.06	
CN-MW-60	S	3/20/2001	1319.90	14.01	1305.89	
CN-MW-60	S	8/21/2001	1319.90	14.83	1305.07	
CNE-MW-07D	D	3/20/2001	1323.45	15.21	1308.24	
CNE-MW-07D	D	8/20/2001	1323.45	17.69	1305.76	
CNE-MW-07S	S	3/20/2001	1323.21	15.02	1308.19	
CNE-MW-07S	S	8/20/2001	1323.21	17.48	1305.73	
CNE-MW-12D	D	3/20/2001	1323.67	14.39	1309.28	
CNE-MW-12D	D	8/20/2001	1323.67	17.11	1306.56	
CNE-MW-12S	S	3/20/2001	1323.49	14.11	1309.38	
CNE-MW-12S	S	8/20/2001	1323.49	16.95	1306.54	
CNE-NE-04D	D	3/20/2001	1320.78	13.92	1306.86	
CNE-NE-04D	D	8/20/2001	1320.78	15.61	1305.17	
CNE-NE-04S	S	3/20/2001	1320.60	13.72	1306.88	
CNE-NE-04S	S	8/20/2001	1320.60	15.42	1305.18	
CNE-NE-06D	D	3/20/2001	1319.11	13.79	1305.32	
CNE-NE-06D	D	8/20/2001	1319.11	14.63	1304.48	
CNE-NE-06S	S	3/20/2001	1318.88	13.19	1305.69	
CNE-NE-06S	S	8/20/2001	1318.88	14.15	1304.73	
CNE-NE-07D	D	3/20/2001	1320.75	14.42	1306.33	
CNE-NE-07D	D	8/20/2001	1320.75	15.83	1304.92	
CNE-NE-07S	S	3/20/2001	1320.66	14.44	1306.22	
CNE-NE-07S	S	8/20/2001	1320.66	15.78	1304.88	
CNE-NE-08I		3/19/2001	1320.48	15.71	1304.77	
CNE-NE-08I		8/20/2001	1320.48	17.12	1303.36	
CNE-NE-09D	D	3/20/2001	1317.43	12.90	1304.53	
CNE-NE-09D	D	8/21/2001	1317.43	14.00	1303.43	
CNE-NE-09S	S	3/20/2001	1317.66	13.50	1304.16	
CNE-NE-09S	S	8/21/2001	1317.66	14.15	1303.51	

Table 4-1b
North Industrial Corridor (NIC) Site
Phase 2 Water Level Measurements (Mar 2001-Aug 2001)

Well ID	Nested Well Depth Zone	Date	Measuring Point Elevation* (feet msl)	Depth to Water (feet bmp)	Water Level Elevation (feet msl)	Comments
CNE-NE-10D	D	3/20/2001	1319.37	14.23	1305.14	
CNE-NE-10D	D	8/21/2001	1319.37	15.26	1304.11	
CNE-NE-10S	S	3/20/2001	1319.21	14.08	1305.13	
CNE-NE-10S	S	8/21/2001	1319.21	15.15	1304.06	
CNE-NE-11D	D	3/20/2001	1315.74	11.56	1304.18	
CNE-NE-11D	D	8/20/2001	1315.74	12.44	1303.30	
CNE-NE-12I		3/20/2001	1318.92	13.83	1305.09	
CNE-NE-12I		3/20/2001	1318.92	13.83	1305.09	
CNE-NE-12I		8/21/2001	1318.92	14.68	1304.24	
CNE-NE-12I		8/21/2001	1318.92	14.68	1304.24	
CSI-MW-01		3/20/2001	1304.00	16.23	1287.77	
CSI-MW-01		8/21/2001	1304.00	16.64	1287.36	
CSI-MW-09		3/20/2001	1302.63	15.31	1287.32	
CSI-MW-09		8/21/2001	1302.63	15.69	1286.94	
CSI-MW-10		3/20/2001	1302.08	15.21	1286.87	
CSI-MW-10		8/21/2001	1302.08	15.58	1286.50	
CTC-MW-01	D	3/19/2001	1327.13	16.94	1310.19	
CTC-MW-01	D	8/21/2001	1327.13			
CTC-MW-02		8/21/2001	1324.96			Destroyed
CTC-MW-03		3/19/2001	1327.68	16.04	1311.64	
CTC-MW-03		8/21/2001	1327.68			
CTC-MW-06D	D	3/19/2001	1324.61	15.34	1309.27	
CTC-MW-06D	D	8/21/2001	1324.61	17.84	1306.77	
CTC-MW-06S	S	3/19/2001	1324.61	15.30	1309.31	
CTC-MW-06S	S	8/21/2001	1324.61	17.80	1306.81	
CTC-MW-07S	S	3/19/2001	1326.12	15.98	1310.14	
CTC-MW-07S	S	8/21/2001	1326.12	18.78	1307.34	
DRB-04		3/25/2001	1313.95	17.10	1298.31	Product Present
DRB-04		8/21/2001	1313.95	18.87	1295.08	Product Present
DRB-MW-02	S	8/21/2001	1313.50	13.90	1299.60	
DRB-MW-03	S	3/27/2001	1315.40	15.60	1299.80	
DRB-MW-03	S	8/21/2001	1315.40	16.23	1299.17	
DRB-MW-11	S	3/25/2001	1307.85	12.75	1295.75	Product Present
DRB-MW-11	S	8/21/2001	1307.85	13.78	1294.07	Product Present
DRB-MW-110		3/27/2001	1311.70	16.93	1294.77	
DRB-MW-110		8/21/2001	1311.70	17.55	1294.15	
DRB-MW-140		3/25/2001	1312.61	17.01	1295.68	Product Present
DRB-MW-140		8/21/2001	1312.61	18.13	1294.48	Product Present
DRB-MW-150		3/27/2001	1312.12	17.82	1294.30	
DRB-MW-150		8/21/2001	1312.12	18.37	1293.75	
DRB-MW-20	S	3/25/2001	1312.39	14.20	1298.20	Product Present
DRB-MW-20	S	8/21/2001	1312.39	16.52	1295.87	Product Present
DRB-MW-250	D	3/27/2001	1314.20	16.00	1298.20	
DRB-MW-250	D	8/21/2001	1314.20	16.33	1297.87	
DRB-MW-30	S	3/27/2001	1312.72	13.94	1298.78	
DRB-MW-30	S	8/21/2001	1312.72	15.34	1297.38	
DRB-MW-350		3/27/2001	1306.40	13.38	1293.02	
DRB-MW-350		8/21/2001	1306.40	14.04	1292.36	
DRB-MW-370		3/27/2001	1311.64	14.04	1297.60	
DRB-MW-370		8/21/2001	1311.64	15.32	1296.32	
DRB-MW-380		3/27/2001	1312.46	14.80	1297.66	
DRB-MW-380		8/21/2001	1312.46	15.50	1296.96	

Table 4-1b
North Industrial Corridor (NIC) Site
Phase 2 Water Level Measurements (Mar 2001-Aug 2001)

Well ID	Nested Well Depth Zone	Date	Measuring Point Elevation* (feet msl)	Depth to Water (feet bmp)	Water Level Elevation (feet msl)	Comments
DRB-MW-440		3/27/2001	1312.97	12.45	1300.52	
DRB-MW-440		8/21/2001	1312.97	13.32	1299.65	
EXC-MW-02A	S	3/19/2001	1314.74	11.10	1303.64	
EXC-MW-02A	S	8/22/2001	1314.74	11.85	1302.89	
EXC-MW-02B	D	3/19/2001	1315.00	11.31	1303.69	
EXC-MW-02B	D	8/22/2001	1315.00	12.08	1302.92	
EXC-MW-04A	S	8/22/2001	1317.39	15.01	1302.38	
EXC-MW-04B	D	8/22/2001	1317.75	15.34	1302.41	
EXC-MW-05B	D	3/19/2001	1316.36	13.69	1302.67	
EXC-MW-05B	D	8/22/2001	1316.36	14.43	1301.93	
EXC-MW-06A	S	3/19/2001	1313.17	10.76	1302.41	
EXC-MW-06A	S	8/22/2001	1313.17	11.53	1301.64	
EXC-MW-06B	D	3/19/2001	1313.12	10.70	1302.42	
EXC-MW-06B	D	8/22/2001	1313.12	11.46	1301.66	
EXC-MW-07B	D	3/19/2001	1313.81	12.06	1301.75	
EXC-MW-07B	D	8/22/2001	1313.81	12.91	1300.90	
FLE-MW-01D	D	3/20/2001	1318.19	16.78	1301.41	
FLE-MW-01D	D	8/20/2001	1318.19	17.65	1300.54	
FLE-MW-01S	S	3/20/2001	1318.05	16.66	1301.39	
FLE-MW-01S	S	8/20/2001	1318.05	17.54	1300.51	
FLE-MW-02D	D	3/20/2001	1318.16	16.00	1302.16	
FLE-MW-02D	D	8/20/2001	1318.16	16.99	1301.17	
FLE-MW-02S	S	3/20/2001	1318.13	15.97	1302.16	
FLE-MW-02S	S	8/20/2001	1318.13	16.97	1301.16	
GPC-HC-02		3/20/2001	1322.71	14.41	1308.30	
GPC-HC-02		8/20/2001	1322.71	16.49	1306.22	
GPC-HC-03		8/20/2001				Replaced with SWL-12
JSP-MW-01		3/19/2001	1324.25	19.73	1304.52	
JSP-MW-01		8/20/2001	1324.25	21.26	1302.99	
JSP-MW-02		3/19/2001	1322.05	17.42	1304.63	
JSP-MW-02		8/20/2001	1322.05	18.93	1303.12	
JSP-MW-03		3/19/2001	1329.34	25.36	1303.98	
JSP-MW-03		8/20/2001	1329.34	26.94	1302.40	
JSP-MW-04		3/19/2001	1324.21	19.85	1304.36	
JSP-MW-04		8/20/2001	1324.21	21.40	1302.81	
JSP-MW-05		3/19/2001	1321.95	18.22	1303.73	
JSP-MW-05		8/20/2001	1321.95	19.73	1302.22	
JSP-MW-06		3/19/2001	1321.54	18.59	1302.95	
JSP-MW-06		8/20/2001	1321.54	20.13	1301.41	
JSP-MW-07		3/19/2001	1327.60	19.75	1307.85	
JSP-MW-07		8/20/2001	1327.60	23.39	1304.21	
JSP-MW-08		3/19/2001	1324.26	21.14	1303.12	
JSP-MW-08		8/20/2001	1324.26	22.78	1301.48	
JSP-MW-09		3/19/2001	1320.08	16.96	1303.12	
JSP-MW-09		8/20/2001	1320.08	18.52	1301.56	
NBPN-MW-02		3/19/2001	1310.00	12.66	1297.34	
NBPN-MW-02		3/19/2001	1310.00	12.66	1297.34	
NBPN-MW-02		8/20/2001	1310.00	13.66	1296.34	
NBPN-MW-02		8/20/2001	1310.00	13.66	1296.34	
NBPN-MW-03		3/19/2001	1311.62	14.44	1297.18	
NBPN-MW-03		8/20/2001	1311.62	15.41	1296.21	Root material in well

Table 4-1b
North Industrial Corridor (NIC) Site
Phase 2 Water Level Measurements (Mar 2001-Aug 2001)

Well ID	Nested Well Depth Zone	Date	Measuring Point Elevation* (feet msl)	Depth to Water (feet bmp)	Water Level Elevation (feet msl)	Comments
NBPN-MW-05		3/19/2001	1310.65	12.69	1297.96	
NBPN-MW-05		8/20/2001	1310.65	13.68	1296.97	
NBPN-MW-06		8/20/2001				Well Buried, missing
NMW-01D	D	3/20/2001	1328.72	16.97	1311.75	
NMW-01D	D	8/20/2001	1328.72	20.43	1308.29	
NMW-01S	S	3/20/2001	1328.75	17.02	1311.73	
NMW-01S	S	8/20/2001	1328.75	20.45	1308.30	
NMW-02D	D	3/19/2001	1315.77	13.09	1302.68	
NMW-02D	D	8/20/2001	1315.77	13.70	1302.07	
NMW-02S	S	3/19/2001	1315.65	12.91	1302.74	
NMW-02S	S	8/20/2001	1315.65	13.85	1301.80	
NMW-03D	D	3/19/2001	1315.88	14.62	1301.26	
NMW-03D	D	8/20/2001	1315.88	15.53	1300.35	
NMW-03S	S	3/19/2001	1315.98	15.38	1300.60	
NMW-03S	S	8/20/2001	1315.98	16.30	1299.68	
NMW-04D	D	3/19/2001	1316.14	15.85	1300.29	
NMW-04D	D	8/22/2001	1316.14	16.65	1299.49	
NMW-04S	S	3/19/2001	1316.30	15.99	1300.31	
NMW-04S	S	8/22/2001	1316.30	16.80	1299.50	
NMW-05D	D	3/19/2001	1316.21	13.55	1302.66	
NMW-05D	D	8/20/2001	1316.21	14.22	1301.99	
NMW-05S	S	3/19/2001	1316.08	13.40	1302.68	
NMW-05S	S	8/20/2001	1316.08	14.09	1301.99	
NMW-06D	D	3/19/2001	1314.92	17.11	1297.81	
NMW-06D	D	8/21/2001	1314.92	18.13	1296.79	
NMW-06S	S	3/19/2001	1314.82	17.00	1297.82	
NMW-06S	S	8/21/2001	1314.82	18.00	1296.82	
NMW-07D	D	3/19/2001	1313.33	16.45	1296.88	
NMW-07D	D	8/21/2001	1313.33	16.77	1296.56	
NMW-07S	S	3/19/2001	1313.18	16.35	1296.83	
NMW-07S	S	8/21/2001	1313.18	16.66	1296.52	
NMW-08D	D	3/19/2001	1306.90	11.02	1295.88	
NMW-08D	D	8/21/2001	1306.90	11.78	1295.12	
NMW-08S	S	3/19/2001	1306.90	11.07	1295.83	
NMW-08S	S	8/21/2001	1306.90	11.83	1295.07	
NMW-09D	D	3/19/2001	1306.87	11.77	1295.10	
NMW-09D	D	8/21/2001	1306.87	12.32	1294.55	
NMW-09S	S	3/19/2001	1306.89	11.81	1295.08	
NMW-09S	S	8/21/2001	1306.89	12.36	1294.53	
NMW-10D	D	8/21/2001	1309.71	15.13	1294.58	
NMW-10S	S	3/19/2001	1309.63	14.53	1295.10	
NMW-10S	S	8/21/2001	1309.63	15.03	1294.60	
NMW-11D	D	3/19/2001	1305.58	13.75	1291.83	
NMW-11D	D	8/20/2001	1305.58	14.60	1290.98	
NMW-11S	S	3/19/2001	1306.24	14.18	1292.06	
NMW-11S	S	8/20/2001	1306.24	15.17	1291.07	
NMW-12D	D	3/19/2001	1305.08	13.14	1291.94	
NMW-12D	D	8/20/2001	1305.08	13.90	1291.18	
NMW-12S	S	3/19/2001	1304.83	12.88	1291.95	
NMW-12S	S	8/20/2001	1304.83	13.65	1291.18	

Table 4-1b
North Industrial Corridor (NIC) Site
Phase 2 Water Level Measurements (Mar 2001-Aug 2001)

Well ID	Nested Well Depth Zone	Date	Measuring Point Elevation* (feet msl)	Depth to Water (feet bmp)	Water Level Elevation (feet msl)	Comments
NMW-13D	D	3/20/2001	1304.55	13.67	1290.88	
NMW-13D	D	8/20/2001	1304.55	14.49	1290.06	
NMW-13S	S	3/20/2001	1304.34	13.51	1290.83	
NMW-13S	S	8/20/2001	1304.34	14.30	1290.04	
NMW-14D	D	3/20/2001	1302.89	11.48	1291.41	
NMW-14D	D	8/20/2001	1302.89	12.28	1290.61	
NMW-14S	S	3/20/2001	1302.78	11.36	1291.42	
NMW-14S	S	8/20/2001	1302.78	12.17	1290.61	
NMW-15D	D	3/20/2001	1303.53	13.83	1289.70	
NMW-15D	D	8/20/2001	1303.53	14.42	1289.11	
NMW-15S	S	3/20/2001	1303.40	13.73	1289.67	
NMW-15S	S	8/20/2001	1303.40	14.32	1289.08	
NMW-16D	D	3/20/2001	1306.28	17.44	1288.84	
NMW-16D	D	8/20/2001	1306.28	18.10	1288.18	
NMW-16S	S	3/20/2001	1306.19	17.35	1288.84	
NMW-16S	S	8/20/2001	1306.19	17.98	1288.21	
NMW-17D	D	3/19/2001	1312.55	17.06	1295.49	
NMW-17D	D	8/20/2001	1312.55	17.37	1295.18	
NMW-17S	S	3/19/2001	1312.63	17.17	1295.46	
NMW-17S	S	8/20/2001	1312.63	17.43	1295.20	
NMW-18D	D	3/19/2001	1307.89	13.99	1293.90	
NMW-18D	D	8/20/2001	1307.89	14.08	1293.81	
NMW-18S	S	3/19/2001	1307.78	13.91	1293.87	
NMW-18S	S	8/20/2001	1307.78	14.03	1293.75	
NMW-19D	D	3/19/2001	1308.10	13.15	1294.95	
NMW-19D	D	8/20/2001	1308.10	13.43	1294.67	
NMW-19S	S	3/19/2001	1308.13	13.16	1294.97	
NMW-19S	S	8/20/2001	1308.13	13.42	1294.71	
NMW-20D	D	3/20/2001	1306.48	15.38	1291.10	
NMW-20D	D	8/20/2001	1306.48	15.54	1290.94	
NMW-20S	S	3/20/2001	1306.65	15.35	1291.30	
NMW-20S	S	8/20/2001	1306.65	15.50	1291.15	
NMW-21D	D	3/20/2001	1306.10	15.88	1290.22	
NMW-21D	D	8/20/2001	1306.10	16.08	1290.02	
NMW-21S	S	3/20/2001	1306.03	15.81	1290.22	
NMW-21S	S	8/20/2001	1306.03	15.96	1290.07	
NMW-22D	D	3/20/2001	1304.53	14.57	1289.96	
NMW-22D	D	8/20/2001	1304.53	14.74	1289.79	
NMW-22S	S	3/20/2001	1304.40	14.48	1289.92	
NMW-22S	S	8/20/2001	1304.40	14.64	1289.76	
NMW-23D	D	3/20/2001	1304.77	13.53	1291.24	
NMW-23D	D	8/20/2001	1304.77	13.66	1291.11	
NMW-23S	S	3/20/2001	1304.68	13.48	1291.20	
NMW-23S	S	8/20/2001	1304.68	13.57	1291.11	
NMW-24D	D	3/21/2001	1303.79	13.70	1290.09	
NMW-24D	D	8/20/2001	1303.79	13.99	1289.80	
NMW-24S	S	3/21/2001	1303.06	13.59	1289.47	
NMW-24S	S	8/20/2001	1303.06	13.88	1289.18	
NMW-25D	D	3/20/2001	1300.65	15.00	1285.65	
NMW-25D	D	8/20/2001	1300.65	15.65	1285.00	
NMW-25S	S	3/20/2001	1300.66	15.05	1285.61	
NMW-25S	S	8/20/2001	1300.66	15.68	1284.98	

Table 4-1b
North Industrial Corridor (NIC) Site
Phase 2 Water Level Measurements (Mar 2001-Aug 2001)

Well ID	Nested Well Depth Zone	Date	Measuring Point Elevation* (feet msl)	Depth to Water (feet bmp)	Water Level Elevation (feet msl)	Comments
NMW-26D	D	3/20/2001	1298.76	14.94	1283.82	
NMW-26D	D	8/20/2001	1298.76	15.50	1283.26	
NMW-26S	S	3/20/2001	1298.71	14.90	1283.81	
NMW-26S	S	8/20/2001	1298.71	15.35	1283.36	
NMW-27D	D	3/20/2001	1299.85	14.52	1285.33	
NMW-27D	D	8/20/2001	1299.85	15.04	1284.81	
NMW-27S	S	3/20/2001	1299.89	14.58	1285.31	
NMW-27S	S	8/20/2001	1299.89	15.10	1284.79	
NMW-28D	D	3/20/2001	1299.33	12.61	1286.72	
NMW-28D	D	8/20/2001	1299.33	13.05	1286.28	
NMW-28S	S	3/20/2001	1299.25	12.53	1286.72	
NMW-28S	S	8/20/2001	1299.25	12.96	1286.29	
NMW-29D	D	3/20/2001	1300.00	15.10	1284.90	
NMW-29D	D	8/20/2001	1300.00	15.34	1284.66	
NMW-29S	S	3/20/2001	1300.13	15.23	1284.90	
NMW-29S	S	8/20/2001	1300.13	15.47	1284.66	
NMW-30D	D	3/20/2001	1299.62	13.20	1286.42	
NMW-30D	D	8/20/2001	1299.62	13.48	1286.14	
NMW-30S	S	3/20/2001	1299.73	13.36	1286.37	
NMW-30S	S	8/20/2001	1299.73	13.62	1286.11	
NMW-31D	D	3/20/2001	1303.55	12.12	1291.43	
NMW-31D	D	8/20/2001	1303.55	12.43	1291.12	
NMW-31S	S	3/20/2001	1303.69	12.27	1291.42	
NMW-31S	S	8/20/2001	1303.69	12.57	1291.12	
NMW-32D	D	3/20/2001	1303.78	13.38	1290.40	
NMW-32D	D	8/20/2001	1303.78	13.87	1289.91	
NMW-32S	S	3/20/2001	1303.61	13.16	1290.45	
NMW-32S	S	8/20/2001	1303.61	13.59	1290.02	
NMW-33D	D	3/20/2001	1322.59	15.63	1306.96	
NMW-33D	D	8/20/2001	1322.59	16.43	1306.16	
NMW-33S	S	3/20/2001	1322.43	15.44	1306.99	
NMW-33S	S	8/20/2001	1322.43	16.21	1306.22	
NMW-34D	D	3/19/2001	1314.59	11.45	1303.14	
NMW-34D	D	8/20/2001	1314.59	12.09	1302.50	
NMW-34S	S	3/19/2001	1314.69	11.48	1303.21	
NMW-34S	S	8/20/2001	1314.69	12.15	1302.54	
NMW-35D	D	3/20/2001	1303.73	12.05	1291.68	
NMW-35D	D	8/20/2001	1303.73	12.33	1291.40	
NMW-35S	S	3/20/2001	1303.74	12.07	1291.67	
NMW-35S	S	8/20/2001	1303.74	12.25	1291.49	
NMW-36D	D	8/20/2001	1318.44	16.98	1301.46	
NMW-37D	D	8/20/2001	1318.15	17.40	1300.75	
NMW-38D	D	8/20/2001	1319.83	19.05	1300.78	
NMW-39D	D	3/19/2001	1308.25	11.98	1296.27	
NMW-39D	D	8/21/2001	1308.25	12.80	1295.45	
NMW-39S	S	3/19/2001	1308.19	11.93	1296.26	
NMW-39S	S	8/21/2001	1308.19	12.74	1295.45	
NMW-40D	D	3/19/2001	1313.86	16.46	1297.40	
NMW-40D	D	8/21/2001	1313.86	17.39	1296.47	
NMW-40S	S	3/19/2001	1313.97	16.60	1297.37	
NMW-40S	S	8/21/2001	1313.97	17.55	1296.42	

Table 4-1b
North Industrial Corridor (NIC) Site
Phase 2 Water Level Measurements (Mar 2001-Aug 2001)

Well ID	Nested Well Depth Zone	Date	Measuring Point Elevation* (feet msl)	Depth to Water (feet bmp)	Water Level Elevation (feet msl)	Comments
NMW-41D	D	3/20/2001	1305.27	11.67	1293.60	
NMW-41D	D	8/20/2001	1305.27	12.22	1293.05	
NMW-41S	S	3/20/2001	1305.13	11.53	1293.60	
NMW-41S	S	8/20/2001	1305.13	12.10	1293.03	
NMW-42D	D	8/21/2001	1315.79	16.02	1299.77	
NMW-42S	S	8/21/2001	1315.68	15.90	1299.78	
NMW-43D	D	8/21/2001	1314.24	16.90	1297.34	
NMW-44D	D	8/21/2001	1315.81	17.22	1298.59	
NMW-45D	D	8/21/2001	1319.07	17.38	1301.69	
NMW-46D	D	8/21/2001	1309.30	14.32	1294.98	
NMW-47D	D	3/19/2001	1310.54	9.70	1300.84	
NMW-47D	D	8/21/2001	1310.54	10.39	1300.15	
NMW-47S	S	3/19/2001	1310.59	9.69	1300.90	
NMW-47S	S	8/21/2001	1310.59	10.43	1300.16	
NMW-48D	D	8/20/2001	1311.51	13.06	1298.45	
NMW-48S	S	8/20/2001	1311.29	12.85	1298.44	
NWL-01D	D	3/19/2001	1313.01	13.45	1299.56	
NWL-01D	D	8/20/2001	1313.01	14.40	1298.61	
NWL-01S	S	3/19/2001	1313.10	13.50	1299.60	
NWL-01S	S	8/20/2001	1313.10	14.49	1298.61	
NWL-02D	D	3/19/2001	1309.35	11.09	1298.26	
NWL-02D	D	8/21/2001	1309.35	12.02	1297.33	
NWL-02S	S	3/19/2001	1309.32	11.07	1298.25	
NWL-02S	S	8/21/2001	1309.32	12.03	1297.29	
NWL-03S	S	3/19/2001	1311.28	13.41	1297.87	
NWL-03S	S	8/21/2001	1311.28	14.39	1296.89	
NWL-04S	S	3/19/2001	1306.63	9.44	1297.19	
NWL-04S	S	8/21/2001	1306.63	10.39	1296.24	
NWL-05S	S	3/19/2001	1311.20	14.46	1296.74	
NWL-05S	S	8/21/2001	1311.20	14.88	1296.32	
NWL-06S		8/22/2001	1314.82	18.43	1296.39	
NWL-07D	D	3/19/2001	1307.24	13.88	1293.36	
NWL-07D	D	8/20/2001	1307.24	14.45	1292.79	
NWL-07S	S	3/19/2001	1307.48	14.36	1293.12	
NWL-07S	S	8/20/2001	1307.48	15.00	1292.48	
NWL-08D	D	3/19/2001	1308.48	15.61	1292.87	
NWL-08D	D	8/20/2001	1308.48	16.23	1292.25	
NWL-08S	S	3/19/2001	1308.47	15.56	1292.91	
NWL-08S	S	8/20/2001	1308.47	16.18	1292.29	
NWL-09D	D	3/19/2001	1310.59	12.67	1297.92	
NWL-09D	D	8/21/2001	1310.59	14.40	1296.19	
NWL-09S	S	3/19/2001	1310.60	12.64	1297.96	
NWL-09S	S	8/21/2001	1310.60	14.45	1296.15	
NWL-10S		8/21/2001	1298.72	13.60	1285.12	
NWL-11S		8/23/2001	1300.17	15.03	1285.14	
NWL-12S		8/21/2001	1304.98	13.14	1291.84	
NWL-13S		8/21/2001	1308.30	13.88	1294.42	
SK-MW-01D	D	3/21/2001	1315.61	15.40	1300.20	
SK-MW-01D	D	8/20/2001	1315.61	16.13	1299.48	
SK-MW-01S	S	3/21/2001	1315.43	16.03	1299.40	
SK-MW-01S	S	8/20/2001	1315.43	16.87	1298.56	

Table 4-1b
North Industrial Corridor (NIC) Site
Phase 2 Water Level Measurements (Mar 2001-Aug 2001)

Well ID	Nested Well Depth Zone	Date	Measuring Point Elevation* (feet msl)	Depth to Water (feet bmp)	Water Level Elevation (feet msl)	Comments
SK-MW-04S	S	3/21/2001	1312.80	12.25	1300.55	
SK-MW-04S	S	8/20/2001	1312.80	12.89	1299.91	
UCL-MW-07		8/20/2001	1339.96	8.26	1331.70	
UCL-MW-11		3/20/2001	1327.30	3.29	1324.01	
UCL-MW-11		8/20/2001	1327.30	5.56	1321.74	
UCL-MW-12D	D	3/20/2001	1348.39	16.95	1331.44	
UCL-MW-12D	D	8/20/2001	1348.39	19.53	1328.86	
UCL-MW-12S	S	3/20/2001	1348.49	16.26	1332.23	
UCL-MW-12S	S	8/20/2001	1348.49	19.39	1329.10	
UCL-MW-22		3/20/2001	1327.81	10.29	1317.52	
UCL-MW-22		8/20/2001	1327.81	11.94	1315.87	
ULI-MW-01		3/20/2001	1315.40	11.21	1304.19	
ULI-MW-01		8/21/2001	1315.40	12.05	1303.35	
ULI-MW-04		3/20/2001	1317.02	13.50		
ULI-MW-04		3/20/2001	1316.79	13.50	1303.29	
ULI-MW-04		8/21/2001	1316.79	14.52	1302.27	
UPRF-MW-03		8/20/2001	1318.07	17.20	1300.87	
UPRF-MW-09		8/20/2001	1317.83	17.22	1300.61	
UPRF-MW-16		8/20/2001	1319.90	19.50	1300.40	
URS-MW-01		3/19/2001	1313.66	12.10	1301.56	
URS-MW-01		8/21/2001	1313.66	12.89	1300.77	
URS-MW-02		3/19/2001	1314.13	11.52	1302.61	
URS-MW-02		8/21/2001	1314.13	12.24	1301.89	Roots in Well
USD-MW-01		3/19/2001	1332.92	15.98	1316.94	
USD-MW-01		8/21/2001	1332.92	21.44	1311.48	
USD-MW-05D	D	8/21/2001	1327.80	18.58	1309.22	
USD-MW-05SR	S	8/21/2001	1327.96	18.82	1309.14	
USD-MW-07D		8/21/2001				Destroyed
USD-MW-07SR	S	8/21/2001	1348.70	7.68	1341.02	
USD-MW-10D		8/21/2001				Destroyed
USD-MW-10SR	S	8/21/2001	1330.68	8.35	1322.33	
UST-02		8/21/2001	1306.56	14.92	1291.64	
VCM-MW-01	S	3/20/2001	1303.09	15.31	1287.78	
VCM-MW-01	S	8/21/2001	1303.09	15.79	1287.30	
VCM-MW-02B	S	3/20/2001	1306.44	15.54	1290.90	
VCM-MW-02B	S	8/21/2001	1306.44	15.80	1290.64	
VCM-MW-03	S	3/20/2001	1304.63	13.62	1291.01	
VCM-MW-03	S	8/21/2001	1304.63	13.89	1290.74	
VCM-MW-04	D	3/20/2001	1303.12	15.34	1287.78	
VCM-MW-04	D	8/21/2001	1303.12	15.77	1287.35	
VCM-MW-06	D	3/20/2001	1307.00	16.08	1290.92	
VCM-MW-06	D	8/21/2001	1307.00	16.32	1290.68	
VCM-MW-07	D	3/20/2001	1304.66	13.61	1291.05	
VCM-MW-07	D	8/21/2001	1304.66	13.87	1290.79	
VWRS-MW-02D	D	3/19/2001	1313.42	16.17	1297.25	
VWRS-MW-02D	D	8/22/2001	1313.42	17.24	1296.18	
VWRS-MW-02S	S	3/19/2001	1313.33	16.09	1297.24	
VWRS-MW-02S	S	8/22/2001	1313.33	17.14	1296.19	

Table 4-1b
North Industrial Corridor (NIC) Site
Phase 2 Water Level Measurements (Mar 2001-Aug 2001)

Well ID	Nested Well Depth Zone	Date	Measuring Point Elevation* (feet msl)	Depth to Water (feet bmp)	Water Level Elevation (feet msl)	Comments
VWRS-MW-07D	D	3/19/2001	1309.52	12.34	1297.18	
VWRS-MW-07D	D	8/22/2001	1309.52	13.39	1296.13	
VWRS-MW-07S	S	3/19/2001	1309.54	12.42	1297.12	
VWRS-MW-07S	S	8/22/2001	1309.54			Well covered by drums, couldn't measure
VWRS-MW-09D	D	3/19/2001	1309.38	12.36	1297.02	
VWRS-MW-09D	D	8/22/2001	1309.38	13.37	1296.01	
VWRS-MW-09S	S	3/19/2001	1309.20	12.25	1296.95	
VWRS-MW-09S	S	8/22/2001	1309.20	13.25	1295.95	
WNC-05D	D	3/19/2001	1318.20	15.00	1303.20	
WNC-05D	D	8/20/2001	1318.20	15.61	1302.59	
WNC-06D	D	8/20/2001	1328.12	20.62	1307.50	
WNC-09D	D	3/19/2001	1315.16	11.31	1303.85	
WNC-09D	D	8/20/2001	1315.16	11.85	1303.31	
WNC-09SR	S	3/19/2001	1315.14	11.37	1303.77	
WNC-09SR	S	8/20/2001	1315.14	11.89	1303.25	
WNC-10D	D	3/20/2001	1316.81	12.18	1304.63	
WNC-10D	D	8/20/2001	1316.81	13.06	1303.75	
WNC-11D	D	3/19/2001	1314.36	11.30	1303.06	
WNC-11D	D	8/20/2001	1314.36	11.88	1302.48	
WNC-16D	D	3/19/2001	1313.61	11.95	1301.66	
WNC-16D	D	8/21/2001	1313.61	13.04	1300.57	
WNC-23D	D	3/19/2001	1318.61	14.82	1303.79	
WNC-23D	D	8/20/2001	1318.61	15.70	1302.91	
WNC-31D	D	8/20/2001	1318.31	17.42	1300.89	
WNC-32D	D	8/20/2001	1318.82	18.32	1300.50	
WNC-37SR	S	3/19/2001	1315.18	15.63	1299.55	
WNC-37SR	S	8/20/2001	1315.18	16.59	1298.59	
WNC-49SR	S	3/19/2001	1308.22	12.80	1295.42	
WNC-49SR	S	8/20/2001	1308.22	13.33	1294.89	
WND-01S	S	3/19/2001	1326.57	16.88	1309.69	
WND-01S	S	8/21/2001	1326.57	19.46	1307.11	
WND-02D	D	3/19/2001	1311.66	13.21	1298.45	
WND-02D	D	8/20/2001	1311.66	13.85	1297.81	
WND-02S	S	3/19/2001	1311.53	13.04	1298.49	
WND-02S	S	8/20/2001	1311.53	13.65	1297.88	
WND-03S	S	3/19/2001	1316.50	14.78	1301.72	
WND-03S	S	8/22/2001	1316.50	15.63	1300.87	
WND-04S	S	3/19/2001	1319.04	16.35	1302.69	
WND-04S	S	8/22/2001	1319.04	17.10	1301.94	
WND-05S	S	3/19/2001	1317.74	14.54	1303.20	
WND-05S	S	8/20/2001	1317.74	15.16	1302.58	
WND-06S	S	8/20/2001	1327.75	20.34	1307.41	
WND-07S	S	3/19/2001	1321.37	14.50	1306.87	
WND-07S	S	8/21/2001	1321.37	15.89	1305.48	
WND-08S	S	3/20/2001	1315.72	11.59	1304.13	
WND-08S	S	8/20/2001	1315.72	12.40	1303.32	
WND-09S	S	8/20/2001	1317.26			Destroyed
WND-10S	S	3/20/2001	1318.58	13.84	1304.74	
WND-10S	S	8/20/2001	1318.58			Tree roots, no water
WND-11S	S	3/19/2001	1316.77	13.66	1303.11	
WND-11S	S	8/20/2001	1316.77	14.30	1302.47	

Table 4-1b
North Industrial Corridor (NIC) Site
Phase 2 Water Level Measurements (Mar 2001-Aug 2001)

Well ID	Nested Well Depth Zone	Date	Measuring Point Elevation* (feet msl)	Depth to Water (feet bmp)	Water Level Elevation (feet msl)	Comments
WND-12D	D	3/19/2001	1315.84	12.21	1303.63	
WND-12D	D	8/20/2001	1315.84	12.84	1303.00	
WND-12S	S	3/19/2001	1315.76	12.11	1303.65	
WND-12S	S	8/20/2001	1315.76	12.96	1302.80	
WND-13D	D	8/20/2001	1313.36			No access/Vandalized
WND-13S	S	3/19/2001	1313.55	12.71	1300.84	
WND-13S	S	8/20/2001	1313.55			No access
WND-14D	D	3/20/2001	1317.53	14.45	1303.08	
WND-14D	D	8/20/2001	1317.53	15.49	1302.04	
WND-14S	S	3/20/2001	1317.70	14.55	1303.15	
WND-14S	S	8/20/2001	1317.70	15.66	1302.04	
WND-15D	D	3/21/2001	1306.41	12.95	1293.46	
WND-15D	D	8/20/2001	1306.41	13.90	1292.51	
WND-15S	S	3/21/2001	1306.76	13.31	1293.45	
WND-15S	S	8/20/2001	1306.76	14.28	1292.48	
WND-16S	S	3/19/2001	1313.47	14.90	1301.19	Product present
WND-16S	S	8/21/2001	1313.47	15.18	1298.29	Product present
WND-17D	D	8/21/2001				Destroyed
WND-17S	S	8/21/2001				Destroyed
WND-18D	D	3/19/2001	1310.90	14.71	1296.19	
WND-18D	D	8/20/2001	1310.90	15.26	1295.64	
WND-18S	S	3/19/2001	1310.95	14.82	1296.13	
WND-18S	S	8/20/2001	1310.95	15.35	1295.60	
WND-19D	D	3/19/2001	1306.76	11.09	1295.67	
WND-19D	D	8/20/2001	1306.76	11.70	1295.06	
WND-19S	S	3/19/2001	1306.73	11.06	1295.67	
WND-19S	S	8/20/2001	1306.73	11.66	1295.07	
WND-20S	S	3/20/2001	1314.05	16.46	1297.59	
WND-20S	S	8/21/2001	1314.05	17.09	1296.96	
WND-21D	D	3/19/2001	1309.33	11.20	1298.13	
WND-21D	D	8/20/2001	1309.33	12.12	1297.21	
WND-21S	S	3/19/2001	1309.31	11.14	1298.17	
WND-21S	S	8/20/2001	1309.31	12.08	1297.23	
WND-22D	D	3/20/2001	1323.58	14.12	1309.46	
WND-22D	D	8/20/2001	1323.58	15.76	1307.82	
WND-22S	S	3/20/2001	1323.36	13.34	1310.02	
WND-22S	S	8/20/2001	1323.36	15.25	1308.11	
WND-23S	S	3/19/2001	1317.73	13.91	1303.82	
WND-23S	S	8/20/2001	1317.73	14.80	1302.93	
WND-24D	D	3/19/2001	1306.77	11.95	1294.82	
WND-24D	D	8/20/2001	1306.77	12.68	1294.09	
WND-24S	S	3/19/2001	1306.88	12.08	1294.80	
WND-24S	S	8/20/2001	1306.88	12.80	1294.08	
WND-25D	D	3/21/2001	1318.75	14.58	1304.17	
WND-25D	D	8/20/2001	1318.75	15.77	1302.98	
WND-25S	S	8/20/2001	1318.73	15.73	1303.00	
WND-26D	D	3/19/2001	1315.53	14.48	1301.05	
WND-26D	D	8/21/2001	1315.53	15.19	1300.34	
WND-26S	S	3/19/2001	1315.61	14.55	1301.06	
WND-26S	S	8/21/2001	1315.61	15.28	1300.33	

Table 4-1b
North Industrial Corridor (NIC) Site
Phase 2 Water Level Measurements (Mar 2001-Aug 2001)

Well ID	Nested Well Depth Zone	Date	Measuring Point Elevation* (feet msl)	Depth to Water (feet bmp)	Water Level Elevation (feet msl)	Comments
WND-27S	S	3/19/2001	1315.01	13.21	1301.80	
WND-27S	S	8/21/2001	1315.01	14.27	1300.74	
WND-28S	S	3/20/2001	1320.72	15.01	1305.71	
WND-28S	S	8/20/2001	1320.72	15.57	1305.15	
WND-29D	D	3/20/2001	1320.04	15.89	1304.15	
WND-29D	D	8/20/2001	1320.04	17.05	1302.99	
WND-29S	S	3/20/2001	1319.64	15.45	1304.19	
WND-29S	S	8/20/2001	1319.64	16.62	1303.02	
WND-30D	D	8/21/2001	1315.70	15.58	1300.12	
WND-31S	S	8/20/2001	1317.26	16.97	1300.29	
WND-32S	S	8/20/2001	1317.68	17.70	1299.98	
WND-33D	D	3/19/2001	1310.65	11.94	1298.71	
WND-33D	D	8/20/2001	1310.65	12.84	1297.81	
WND-33S	S	3/19/2001	1310.58	11.95	1298.63	
WND-33S	S	8/20/2001	1310.58	12.86	1297.72	
WND-34D	D	3/19/2001	1314.40	14.31	1300.09	
WND-34D	D	8/21/2001	1314.40	15.25	1299.15	
WND-34S	S	3/19/2001	1314.34	14.27	1300.07	
WND-34S	S	8/21/2001	1314.34	15.23	1299.11	
WND-35D	D	3/19/2001	1315.35	15.91	1299.44	
WND-35D	D	8/21/2001				No access
WND-35S	S	8/21/2001				Destroyed; No access
WND-36D	D	3/19/2001	1314.69	13.55	1301.14	
WND-36D	D	8/21/2001	1314.69	14.41	1300.28	
WND-36S	S	3/19/2001	1314.75	13.63	1301.12	
WND-36S	S	8/21/2001	1314.75	14.49	1300.26	
WND-37DR	D	3/19/2001	1314.75	15.17	1299.58	
WND-37DR	D	8/20/2001	1314.75	16.14	1298.61	
WND-38D	D	3/21/2001	1307.62	10.90	1296.72	
WND-38D	D	8/21/2001	1307.62	11.72	1295.90	
WND-38S	S	3/21/2001	1307.48	10.70	1296.78	
WND-38S	S	8/21/2001	1307.48	11.53	1295.95	
WND-39D	D	3/19/2001	1308.29	11.40	1296.89	
WND-39D	D	8/21/2001	1308.29	12.35	1295.94	
WND-39S	S	3/19/2001	1308.31	11.40	1296.91	
WND-39S	S	8/21/2001	1308.31	12.35	1295.96	
WND-40D	D	3/20/2001	1302.38	11.68	1290.70	
WND-40D	D	8/20/2001	1302.38	11.97	1290.41	
WND-40S	S	3/20/2001	1302.64	11.82	1290.82	
WND-40S	S	8/20/2001	1302.64	12.13	1290.51	
WND-41D	D	3/19/2001	1306.94	11.88	1295.06	
WND-41D	D	8/20/2001	1306.94	12.36	1294.58	
WND-41S	S	3/19/2001	1306.97	11.94	1295.03	
WND-41S	S	8/20/2001	1306.97	12.45	1294.52	
WND-42D	D	3/20/2001	1303.79	14.32	1289.47	
WND-42D	D	8/20/2001	1303.79	14.65	1289.14	
WND-42S	S	3/20/2001	1303.64	14.19	1289.45	
WND-42S	S	8/20/2001	1303.64	14.52	1289.12	
WND-43D	D	3/19/2001	1307.40	12.83	1294.57	
WND-43D	D	8/20/2001	1307.40	13.45	1293.95	
WND-43S	S	3/19/2001	1307.54	12.89	1294.65	
WND-43S	S	8/20/2001	1307.54	13.51	1294.03	

Table 4-1b
North Industrial Corridor (NIC) Site
Phase 2 Water Level Measurements (Mar 2001-Aug 2001)

Well ID	Nested Well Depth Zone	Date	Measuring Point Elevation* (feet msl)	Depth to Water (feet bmp)	Water Level Elevation (feet msl)	Comments
WND-44D	D	3/20/2001	1303.52	13.49	1290.03	
WND-44D	D	8/20/2001	1303.52	13.78	1289.74	
WND-44S	S	3/20/2001	1303.27	13.22	1290.05	
WND-44S	S	8/20/2001	1303.27	13.55	1289.72	
WND-45D	D	3/21/2001	1305.54	12.01	1293.53	
WND-45D	D	8/20/2001	1305.54	12.36	1293.18	
WND-45S	S	3/21/2001	1305.66	12.26	1293.40	
WND-45S	S	8/20/2001	1305.66	12.62	1293.04	
WND-46D	D	3/19/2001	1304.87	11.75	1293.12	
WND-46D	D	8/20/2001	1304.87	12.02	1292.85	
WND-46S	S	3/19/2001	1304.98	11.85	1293.13	
WND-46S	S	8/20/2001	1304.98	12.14	1292.84	
WND-47D	D	3/19/2001	1304.63	12.02	1292.61	
WND-47D	D	8/20/2001	1304.63	12.34	1292.29	
WND-47S	S	3/19/2001	1304.81	11.98	1292.83	
WND-47S	S	8/20/2001	1304.81	12.30	1292.51	
WND-48D	D	3/20/2001	1301.21	12.19	1289.02	
WND-48D	D	8/20/2001	1301.21	12.72	1288.49	
WND-48S	S	3/20/2001	1301.01	12.01	1289.00	
WND-48S	S	8/20/2001	1301.01	12.53	1288.48	
WND-49D	D	3/19/2001	1308.14	12.72	1295.42	
WND-49D	D	8/20/2001	1308.14	13.23	1294.91	
WND-49S	S	8/20/2001				Destroyed
WU-MW-04D	D	3/20/2001	1307.36	12.30	1295.06	
WU-MW-04D	D	8/21/2001	1307.36	12.88	1294.48	
WU-MW-04S	S	3/20/2001	1307.23	12.26	1294.97	
WU-MW-04S	S	8/21/2001	1307.23	12.81	1294.42	
WU-MW-05D	D	3/20/2001	1307.65	11.96	1295.69	
WU-MW-05D	D	8/21/2001	1307.65	12.59	1295.06	
WU-MW-05S	S	3/20/2001	1307.38	11.67	1295.71	
WU-MW-05S	S	8/21/2001	1307.38	12.30	1295.08	

Note: Table includes measurements taken by CDM (March 2001and August 2001) and measurements taken by Coastal-Derby in March 2001.
msl = Mean Sea Level Elevation
bmp = Below measuring point
* = The Phase 2 Measuring Point Elevation utilized surveyed measuring point elevations in NAVD 1983 and using a a site-wide survey control loop.

Table 4-1c
North Industrial Corridor (NIC) Site
Phase 2 Product Level Measurements (Mar 2001-Aug 2001)

Well ID	Nested Well Depth Zone	Date	Measuring Point Elevation* (feet msl)	Depth to Water (feet bmp)	Water Level Elevation (feet msl)	Depth to Product (feet bmp)	Product Thickness (feet)	Product Density	Adjusted Product Thickness (feet)	Potentiometric Elevation (feet msl)
DRB-04	S	3/25/2001	1313.95	17.10	1296.85	15.20	1.90	0.77	1.46	1298.31
DRB-04	S	8/21/2001	1313.95	18.87	1295.08	18.25	0.62	0.77	0.48	1295.56
DRB-MW-11	S	3/25/2001	1307.85	12.75	1295.10	11.90	0.85	0.77	0.65	1295.75
DRB-MW-11	S	8/21/2001	1307.85	13.78	1294.07	12.60	1.18	0.77	0.91	1294.98
DRB-MW-140	S	3/25/2001	1312.61	17.01	1295.60	16.90	0.11	0.77	0.08	1295.68
DRB-MW-140	S	8/21/2001	1312.61	18.13	1294.48	17.68	0.45	0.77	0.35	1294.83
DRB-MW-20	S	3/25/2001	1312.39	14.20	1298.19	14.19	0.01	0.77	0.01	1298.20
DRB-MW-20	S	8/21/2001	1312.39	16.52	1295.87	15.33	1.19	0.77	0.92	1296.79
WND-16S	S	3/19/2001	1313.47	14.90	1298.57	11.50	3.40	0.90	3.06	1301.63
WND-16S	S	8/21/2001	1313.47	15.18	1298.29	12.66	2.52	0.90	2.27	1300.56

NOTE: Only wells with measureable product thickness are included.
msl = Mean Sea Level Elevation
bmp = Below measuring point
* = The Phase 2 Measuring Point Elevation utilized surveyed measuring point elevations in NAVD 1983 and using a a site-wide survey control loop.
Adjusted Product Thicknes = Product thickness times the product density.
Potentiometric Elevation = Water level elevation plus the adjusted product thickness.
Product Density of DRB wells provided by Coastal-Derby.
Product Density of WND-16S estimated assuming no vertical gradient and water level elevation in well WNC-16D.

Table 4-1d
North Industrial Corridor (NIC) Site
Phase 2 Surface Water Level Measurements (Mar 2001-Aug 2001)

Station ID	Date	Measuring Point Elevation (feet msl)	Depth to Water (feet bmp)	Water Level Elevation (feet msl)	Comments
B-2ND	3/19/2001	1304.20	18.60	1285.60	
B-2ND	8/22/2001	1304.20	19.69	1284.51	
SWL-01	3/19/2001	1322.76	14.85	1307.91	
SWL-01	8/20/2001	1322.76	--	<1307.31	Dry > 15.45; AKA 33rd street bridge
SWL-02	3/19/2001	1316.39	11.64	1304.75	
SWL-02	8/19/2001	1316.39	11.44	1304.95	TD = 12.1, minnows
SWL-03	3/19/2001	1313.10	1.87	1311.23	DTW = 3.34-1.47 (Gauge)
SWL-03	8/19/2001	1313.10	3.39	1309.71	DTW = 3.34--0.05 (Estimated Below Gauge)
SWL-04	3/19/2001	1315.82	11.60	1304.22	
SWL-04	8/19/2001	1315.82	--	<1304.47	Dry > 11.35
SWL-05	3/19/2001	1316.85	18.85**	1298.00**	
SWL-05	8/21/2001	1316.85	22.24	1294.61	
SWL-06	3/19/2001	1314.84*	22.25	1292.59*	
SWL-06	8/21/2001	1314.84*	--	<1295.71*	Dry > 19.13
SWL-07	3/19/2001	1309.71	18.26	1291.45	
SWL-07	8/21/2001	1309.71	18.54	1291.17	
SWL-08	3/19/2001	1306.43	17.85	1288.58	
SWL-08	8/21/2001	1306.43	18.22	1288.21	
SWL-09	3/19/2001	1316.63	16.53	1300.10	
SWL-09	8/21/2001	1316.63	20.50	1296.13	
SWL-10	3/19/2001	1312.37	13.05	1299.32	
SWL-10	8/21/2001	1312.37	16.25	1296.12	
SWL-11	3/19/2001	1310.16	15.45	1294.71	
SWL-11	8/21/2001	1310.16	18.01	1292.15	
SWL-12	3/20/2001	1307.93	2.54	1305.39	DTW = 3.34-0.80 (Gauge)
SWL-12	8/20/2001	1307.93	3.33	<1304.60	Dry - DTW > 3.34-0.01 (Gauge)

*Measuring point believed to be incorrect since a water level elevation significantly below the local water table results;
This survey measuring point will be re-evaluated.
** Depth to water measurement believed to be incorrect.

CDM

Table 5-1a
North Industrial Corridor (NIC) Site
Surface Water Analytical Results, VOCs by EPA Method 8260

Station			**SW-06**	**SW-07**	**SW-08**	**SW-11**	**SW-12**	**SW-13**	**SW-13**	**SW-14**	**SW-15**	**SW-16**
Sample Date (Phase 2)			**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**
QC Sample Flag									**DUP**			
Compound	**Abbrev**	**Units**										
1,1,1-Trichloroethane	TCA	mg/L	<1.0 JH	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**1.5**
1,1,2,2-Tetrachloroethane	1122PCA	mg/L	<1.0 JH	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	112TCA	mg/L	<1.0 JH	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethane	11DCA	mg/L	**1.9 JH**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethene	11DCE	mg/L	**1.5 JH**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	12DCB	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethane	12DCA	mg/L	<1.0 JH	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloropropane	12DCP	mg/L	<1.0 JH	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	13DCB	mg/L	<1.0 JH	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	14DCB	mg/L	<1.0 JH	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	BEN	mg/L	**3.3 JH**	<1.0	<1.0	**2.4**	<1.0	<1.0	<1.0	<1.0	<1.0	**1.5**
Bromodichloromethane	BDCM	mg/L	<1.0 JH	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromoform	BFM	mg/L	<1.0 JH	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromomethane	BM	mg/L	<1.0 JH	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**1.3**
Carbon tetrachloride	CT	mg/L	<1.0 JH	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chlorobenzene	CBN	mg/L	<1.0 JH	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloroethane	CLE	mg/L	<1.0 JH	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloroform	CFM	mg/L	<1.0 JH	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloromethane	CM	mg/L	<1.0 JH	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
cis-1,2-Dichloroethene	C12DCE	mg/L	**30 JH**	<1.0	<1.0	<1.0	**3.5**	**9.8**	**10**	**18**	**7.5**	**11**
cis-1,3-Dichloropropene	C13DCP	mg/L	<1.0 JH	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dibromochloromethane	DBCM	mg/L	<1.0 JH	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	EBN	mg/L	<1.0 JH	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
m,p-Xylene	XYLMP	mg/L	<1.3 JH	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3
Methylene chloride	MECL	mg/L	<1.0 JH	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
o-Xylene	XYLO	mg/L	<1.1 JH	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1
Tetrachloroethene	PCE	mg/L	<1.0 JH	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**1.3**
Toluene	TOL	mg/L	**7.6 JH**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.3	<1.0	<1.0

Table 5-1a
North Industrial Corridor (NIC) Site
Surface Water Analytical Results, VOCs by EPA Method 8260

Station			**SW-06**	**SW-07**	**SW-08**	**SW-11**	**SW-12**	**SW-13**	**SW-13**	**SW-14**	**SW-15**	**SW-16**
Sample Date (Phase 2)			**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**
QC Sample Flag									**DUP**			
Compound	**Abbrev**	**Units**										
trans-1,2-Dichloroethene	T12DCE	mg/L	**2.6 JH**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
trans-1,3-Dichloropropene	T13DCP	mg/L	<1.0 JH	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethene	TCE	mg/L	<1.0 JH	<1.0	**1.2**	<1.0	**10**	**2.5**	**2.8**	**3.3**	**1.1**	**4.9**
Trichlorofluoromethane	TCFM	mg/L	<1.0 JH	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vinyl chloride	VC	mg/L	**33 JH**	<1.0	<1.0	<1.0	<1.0	<1.0	**1.0**	**4.3**	<1.0	<1.0

Bold text indicates results above analytical detection limits.
VOCs = Volatile Organic Compounds
DUP = Field duplicate sample.
JH = Estimated due to laboratory holding time exceedance.

Table 5-1b
North Industrial Corridor (NIC) Site
Surface Water Analytical Results, SVOCs by EPA Method 8270

Station		**SW-06**	**SW-07**	**SW-08**	**SW-11**	**SW-12**	**SW-13**	**SW-13**	**SW-15**	**SW-16**
Sample Date (Phase 2)		**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**
QC Sample Flag								**DUP**		
Compound	**Units**									
1,2,4-Trichlorobenzene	µg/L	<120	<10	<11	<10	<11	<11	<10	<10	<10
1,2-Dichlorobenzene	µg/L	<120	<10	<11	<10	<11	<11	<10	<10	<10
1,3-Dichlorobenzene	µg/L	<120 JH	<10	<11	<10	<11	<11	<10	<10	<10
1,4-Dichlorobenzene	µg/L	<120 JH	<10	<11	<10	<11	<11	<10	<10	<10
2,4,5-Trichlorophenol	µg/L	<580	<51	<53	<52	<53	<53	<51	<52	<50
2,4,6-Trichlorophenol	µg/L	<120	<10	<11	<10	<11	<11	<10	<10	<10
2,4-Dichlorophenol	µg/L	<120	<10	<11	<10	<11	<11	<10	<10	<10
2,4-Dimethylphenol	µg/L	<120	<10	<11	<10	<11	<11	<10	<10	<10
2,4-Dinitrophenol	µg/L	<580	<51	<53	<52	<53	<53	<51	<52	<50
2,4-Dinitrotoluene	µg/L	<120	<10	<11	<10	<11	<11	<10	<10	<10
2,6-Dinitrotoluene	µg/L	<120	<10	<11	<10	<11	<11	<10	<10	<10
2-Chloronaphthalene	µg/L	<120	<10	<11	<10	<11	<11	<10	<10	<10
2-Chlorophenol	µg/L	<120	<10	<11	<10	<11	<11	<10	<10	<10
2-Methylnaphthalene	µg/L	<120	<10	<11	<10	<11	<11	<10	<10	<10
2-Methylphenol	µg/L	<120	<10	<11	<10	<11	<11	<10	<10	<10
2-Nitroaniline	µg/L	<580	<51	<53	<52	<53	<53	<51	<52	<50
2-Nitrophenol	µg/L	<120	<10	<11	<10	<11	<11	<10	<10	<10
3,3'-Dichlorobenzidine	µg/L	<230	<20	<21	<21	<21	<21	<20	<21	<20
3-Nitroaniline	µg/L	<580	<51	<53	<52	<53	<53	<51	<52	<50
4,6-Dinitro-2-methylphenol	µg/L	<580	<51	<53	<52	<53	<53	<51	<52	<50
4-Bromophenylphenyl ether	µg/L	<120	<10	<11	<10	<11	<11	<10	<10	<10
4-Chloro-3-methylphenol	µg/L	<230	<20	<21	<21	<21	<21	<20	<21	<20
4-Chloroaniline	µg/L	<230	<20	<21	<21	<21	<21	<20	<21	<20
4-Chlorophenylphenyl ether	µg/L	<120	<10	<11	<10	<11	<11	<10	<10	<10
4-Methylphenol	µg/L	<120	<10	<11	<10	<11	<11	<10	<10	<10
4-Nitroaniline	µg/L	<580	<51	<53	<52	<53	<53	<51	<52	<50
4-Nitrophenol	µg/L	<580	<51	<53	<52	<53	<53	<51	<52	<50
Acenaphthene	µg/L	<120	<10	<11	<10	<11	<11	<10	<10	<10
Acenaphthylene	µg/L	<120	<10	<11	<10	<11	<11	<10	<10	<10
Anthracene	µg/L	<120	<10	<11	<10	<11	<11	<10	<10	<10
Benzo(a)anthracene	µg/L	<120	<10	<11	<10	<11	<11	<10	<10	<10
Benzo(a)pyrene	µg/L	<120	<10	<11	<10	<11	<11	<10	<10	<10
Benzo(b)fluoranthene	µg/L	<120	<10	<11	<10	<11	<11	<10	<10	<10
Benzo(g,h,i)perylene	µg/L	<120	<10	<11	<10	<11	<11	<10	<10	<10
Benzo(k)fluoranthene	µg/L	<120	<10	<11	<10	<11	<11	<10	<10	<10
Benzoic acid	µg/L	<580	<51	<53	<52	<53	<53	<51	<52	<50
Benzyl alcohol	µg/L	<230	<20	<21	<21	<21	<21	<20	<21	<20
bis(2-Chloroethoxy)methane	µg/L	<120	<10	<11	<10	<11	<11	<10	<10	<10
bis(2-Chloroethyl) ether	µg/L	<120	<10	<11	<10	<11	<11	<10	<10	<10
bis(2-Chloroisopropyl) ether	µg/L	<120	<10	<11	<10	<11	<11	<10	<10	<10
bis(2-Ethylhexyl)phthalate	µg/L	<120	<10	<11	<10	<11	<11	<10	<10	<10
Butylbenzylphthalate	µg/L	<120	<10	<11	<10	<11	<11	<10	<10	<10
Chrysene	µg/L	<120	<10	<11	<10	<11	<11	<10	<10	<10
Di-n-butylphthalate	µg/L	<120	<10	<11	<10	<11	<11	<10	<10	<10
Di-n-octylphthalate	µg/L	<120	<10	<11	<10	<11	<11	<10	<10	<10
Dibenz(a,h)anthracene	µg/L	<120	<10	<11	<10	<11	<11	<10	<10	<10
Dibenzofuran	µg/L	<120	<10	<11	<10	<11	<11	<10	<10	<10
Diethylphthalate	µg/L	<120	<10	<11	<10	<11	<11	<10	<10	<10
Dimethylphthalate	µg/L	<120	<10	<11	<10	<11	<11	<10	<10	<10
Fluoranthene	µg/L	<120	<10	<11	<10	<11	<11	<10	<10	<10
Fluorene	µg/L	<120	<10	<11	<10	<11	<11	<10	<10	<10

Table 5-1b
North Industrial Corridor (NIC) Site
Surface Water Analytical Results, SVOCs by EPA Method 8270

Station		**SW-06**	**SW-07**	**SW-08**	**SW-11**	**SW-12**	**SW-13**	**SW-13**	**SW-15**	**SW-16**
Sample Date (Phase 2)		**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**
QC Sample Flag								**DUP**		
Compound	**Units**									
Hexachloro-1,3-butadiene	µg/L	<120	<10	<11	<10	<11	<11	<10	<10	<10
Hexachlorobenzene	µg/L	<120	<10	<11	<10	<11	<11	<10	<10	<10
Hexachlorocyclopentadiene	µg/L	<120	<10	<11	<10	<11	<11	<10	<10	<10
Hexachloroethane	µg/L	<120	<10	<11	<10	<11	<11	<10	<10	<10
Indeno(1,2,3-cd)pyrene	µg/L	<120	<10	<11	<10	<11	<11	<10	<10	<10
Isophorone	µg/L	<120	<10	<11	<10	<11	<11	<10	<10	<10
N-Nitroso-di-n-propylamine	µg/L	<120	<10	<11	<10	<11	<11	<10	<10	<10
N-Nitrosodiphenylamine	µg/L	<120	<10	<11	<10	<11	<11	<10	<10	<10
Naphthalene	µg/L	<120	<10	<11	<10	<11	<11	<10	<10	<10
Nitrobenzene	µg/L	<120	<10	<11	<10	<11	<11	<10	<10	<10
Pentachlorophenol	µg/L	<580	<51	<53	<52	<53	<53	<51	<52	<50
Phenanthrene	µg/L	<120	<10	<11	<10	<11	<11	<10	<10	<10
Phenol	µg/L	<120	<10	<11	<10	<11	<11	<10	<10	<10
Pyrene	µg/L	<120	<10	<11	<10	<11	<11	<10	<10	<10

SVOCs = Semivolatile Organic Compounds
DUP = Field Duplicate Sample
JH = Estimated due to laboratory holding time exceedance.

Table 5-1c
North Industrial Corridor (NIC) Site
Surface Water Analytical Results, Pesticides/PCBs by EPA Method 8080

Station		**SW-06**	**SW-07**	**SW-08**	**SW-12**	**SW-13**	**SW-13**	**SW-15**
Sample Date (Phase 2)		**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**
QC Sample Flag							**DUP**	
Compound	**Units**							
4,4'-DDD	µg/L	<0.12	<0.11	<0.12	<0.11	<0.11	<0.11	<0.11
4,4'-DDE	µg/L	<0.043	<0.040	<0.042	<0.041	<0.040	<0.041	<0.040
4,4'-DDT	µg/L	<0.13	<0.12	<0.13	<0.12	<0.12	<0.12	<0.12
Aldrin	µg/L	<0.043	<0.040	<0.042	<0.041	<0.040	<0.041	<0.040
alpha-BHC	µg/L	<0.032	<0.030	<0.032	<0.031	<0.030	<0.031	<0.030
alpha-Chlordane	µg/L	<0.054	<0.050	<0.053	<0.052	<0.050	<0.051	<0.050
beta-BHC	µg/L	<0.065	<0.060	<0.063	<0.062	<0.060	<0.061	<0.060
Chlordane (Technical)	µg/L	<0.15	<0.14	**0.21**	<0.14	<0.14	<0.14	<0.14
delta-BHC	µg/L	<0.097	<0.090	<0.095	<0.093	<0.090	<0.092	<0.090
Dieldrin	µg/L	<0.022	<0.020	<0.021	<0.021	<0.020	<0.020	<0.020
Endosulfan I	µg/L	<0.15	<0.14	<0.15	<0.14	<0.14	<0.14	<0.14
Endosulfan II	µg/L	<0.043	<0.040	<0.042	<0.041	<0.040	<0.041	<0.040
Endosulfan sulfate	µg/L	<0.71	<0.66	<0.69	<0.68	<0.66	<0.67	<0.66
Endrin	µg/L	<0.065	<0.060	<0.063	<0.062	<0.060	<0.061	<0.060
Endrin aldehyde	µg/L	<0.25	<0.23	<0.24	<0.24	<0.23	<0.23	<0.23
Endrin ketone	µg/L	<0.11	<0.10	<0.11	<0.10	<0.10	<0.10	<0.10
gamma-BHC	µg/L	<0.043	<0.040	<0.042	<0.041	<0.040	<0.041	<0.040
gamma-Chlordane	µg/L	<0.054	<0.050	<0.053	<0.052	<0.050	<0.051	<0.050
Heptachlor	µg/L	<0.032	<0.030	<0.032	<0.031	<0.030	<0.031	<0.030
Heptachlor epoxide	µg/L	<0.11	<0.10	<0.11	<0.10	<0.10	<0.10	<0.10
Methoxychlor	µg/L	<1.9	<1.8	<1.9	<1.8	<1.8	<1.8	<1.8
Toxaphene	µg/L	<2.6	<2.4	<2.5	<2.5	<2.4	<2.4	<2.4
PCB-1016	µg/L	<1.1	<1.0	<1.1	<1.0	<1.0	<1.1	<1.0
PCB-1221	µg/L	<1.1	<1.0	<1.1	<1.0	<1.0	<1.1	<1.0
PCB-1232	µg/L	<1.1	<1.0	<1.1	<1.0	<1.0	<1.1	<1.0
PCB-1242	µg/L	<1.1	<1.0	<1.1	<1.0	<1.0	<1.1	<1.0
PCB-1248	µg/L	<1.1	<1.0	<1.1	<1.0	<1.0	<1.1	<1.0
PCB-1254	µg/L	<1.1	<1.0	<1.1	<1.0	<1.0	<1.1	<1.0
PCB-1260	µg/L	<1.1	<1.0	<1.1	<1.0	<1.0	<1.1	<1.0

Bold text indicates results above analytical detection limits.
DUP = Field duplicate sample.

Table 5-1d
North Industrial Corridor (NIC) Site
Surface Water Analytical Results, Total Metals

Station		**SW-06**	**SW-07**	**SW-08**	**SW-12**	**SW-13**	**SW-15**	**SW-16**
Sample Date (Phase 2)		**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**
Compound	**Units**							
(Total Metals)								
Aluminum	µg/L	**2210**	**108**	<75.0	<75.0	<75.0	<75.0	**103**
Antimony	µg/L	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
Arsenic	µg/L	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
Barium	µg/L	**84.2**	**20.5**	<4.00	<4.00	<4.00	<4.00	**47.3**
Beryllium	µg/L	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Cadmium	µg/L	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
Calcium	µg/L	**23200**	**21900**	<100	**671**	<100	<100	**48500**
Chromium	µg/L	<7.00	<7.00	<7.00	<7.00	<7.00	<7.00	<7.00
Cobalt	µg/L	<7.00	<7.00	<7.00	<7.00	<7.00	<7.00	<7.00
Copper	µg/L	**21.3**	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
Iron	µg/L	**4920**	**123**	<40.0	<40.0	<40.0	<40.0	**192**
Lead	µg/L	**42**	<5.00	<5.00	<5.00	<5.00	<5.00	**5.01**
Magnesium	µg/L	**4440**	**7830**	<50.0	**1520**	<50.0	<50.0	**23100**
Manganese	µg/L	**217**	<7.00	<7.00	<7.00	<7.00	<7.00	**109**
Mercury	µg/L	**0.63**	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200
Nickel	µg/L	<30.0	<30.0	<30.0	<30.0	<30.0	<30.0	<30.0
Potassium	µg/L	**1190**	<1000	<1000	<1000	<1000	<1000	**1390**
Selenium	µg/L	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
Silver	µg/L	<7.00	<7.00	<7.00	<7.00	<7.00	<7.00	<7.00
Sodium	µg/L	**12800**	**14800**	<150	**1160**	<150	<150	**23500**
Thallium	µg/L	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	**5.56**
Vanadium	µg/L	<12.0	<12.0	<12.0	<12.0	<12.0	<12.0	<12.0
Zinc	µg/L	**111**	<100	<100	<100	<100	<100	<100

Bold text indicates results above analytical detection limits.

Table 5-2a
North Industrial Corridor (NIC) Site
Sediment Sample Analytical Results, VOCs by EPA Method 8260

Station			**SD-01**	**SD-02**	**SD-03**	**SD-04**	**SD-05**	**SD-06**	**SD-07**	**SD-08**	**SD-09**	**SD-10**	**SD-11**	**SD-11**	**SD-12**
Sample Date			**5/15/01**	**5/15/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/15/01**
QC Sample Flag														**DUP**	
Compound	**Abbrev**	**Units**													
1,1,1-Trichloroethane	TCA	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1,2,2-Tetrachloroethane	1122PCA	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1,2-Trichloroethane	112TCA	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1-Dichloroethane	11DCA	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1-Dichloroethene	11DCE	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,2-Dichlorobenzene	12DCB	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,2-Dichloroethane	12DCA	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,2-Dichloropropane	12DCP	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,3-Dichlorobenzene	13DCB	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,4-Dichlorobenzene	14DCB	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Benzene	BEN	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Bromodichloromethane	BDCM	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Bromoform	BFM	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Bromomethane	BM	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Carbon tetrachloride	CT	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Chlorobenzene	CBN	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Chloroethane	CLE	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Chloroform	CFM	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Chloromethane	CM	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
cis-1,2-Dichloroethene	C12DCE	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
cis-1,3-Dichloropropene	C13DCP	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Dibromochloromethane	DBCM	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Ethylbenzene	EBN	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
m,p-Xylene	XYLMP	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Methylene chloride	MECL	µg/kg	<5.0	**6 UB**	<5.0	**5.3 UB**	**6 UB**	<5.0	<5.0	**6.2 UB**	<5.0	**8.6 UB**	<5.0	<5.0	<5.0
o-Xylene	XYLO	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Tetrachloroethene	PCE	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Toluene	TOL	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
trans-1,2-Dichloroethene	T12DCE	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
trans-1,3-Dichloropropene	T13DCP	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Trichloroethene	TCE	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Trichlorofluoromethane	TCFM	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Vinyl chloride	VC	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0

Bold text indicates results above analytical detection limits.
VOCs = Volatile Organic Compounds
DUP = Field duplicate sample.
UB = Not detected; contained in method blank.

CDM

Table 5-2b
North Industrial Corridor (NIC) Site
Sediment Sample Analytical Results, SVOCs by EPA Method 8270

Station		**SD-01**	**SD-02**	**SD-03**	**SD-04**	**SD-05**	**SD-06**	**SD-07**	**SD-08**	**SD-10**	**SD-11**	**SD-11**	**SD-12**
Sample Date		**5/15/01**	**5/15/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/15/01**
QC Sample Flag												**DUP**	
Compound	**Units**												
1,2,4-Trichlorobenzene	µg/kg	<330	<660	<660	<330	<330	<330	<330	<330	<330	<3300	<3300	<330
1,2-Dichlorobenzene	µg/kg	<330	<660	<660	<330	<330	<330	<330	<330	<330	<3300	<3300	<330
1,3-Dichlorobenzene	µg/kg	<330	<660	<660	<330	<330	<330	<330	<330	<330	<3300	<3300	<330
1,4-Dichlorobenzene	µg/kg	<330	<660	<660	<330	<330	<330	<330	<330	<330	<3300	<3300	<330
2,4,5-Trichlorophenol	µg/kg	<330	<660	<660	<330	<330	<330	<330	<330	<330	<3300	<3300	<330
2,4,6-Trichlorophenol	µg/kg	<330	<660	<660	<330	<330	<330	<330	<330	<330	<3300	<3300	<330
2,4-Dichlorophenol	µg/kg	<330	<660	<660	<330	<330	<330	<330	<330	<330	<3300	<3300	<330
2,4-Dimethylphenol	µg/kg	<330	<660	<660	<330	<330	<330	<330	<330	<330	<3300	<3300	<330
2,4-Dinitrophenol	µg/kg	<1600	<3200	<3200	<1600	<1600	<1600	<1600	<1600	<1600	<16000	<16000	<1600
2,4-Dinitrotoluene	µg/kg	<330	<660	<660	<330	<330	<330	<330	<330	<330	<3300	<3300	<330
2,6-Dinitrotoluene	µg/kg	<330	<660	<660	<330	<330	<330	<330	<330	<330	<3300	<3300	<330
2-Chloronaphthalene	µg/kg	<330	<660	<660	<330	<330	<330	<330	<330	<330	<3300	<3300	<330
2-Chlorophenol	µg/kg	<330	<660	<660	<330	<330	<330	<330	<330	<330	<3300	<3300	<330
2-Methylnaphthalene	µg/kg	<330	<660	<660	<330	<330	<330	<330	<330	<330	**2200 J**	**1600 J**	<330
2-Methylphenol	µg/kg	<330	<660	<660	<330	<330	<330	<330	<330	<330	<3300	<3300	<330
2-Nitroaniline	µg/kg	<1600	<3200	<3200	<1600	<1600	<1600	<1600	<1600	<1600	<16000	<16000	<1600
2-Nitrophenol	µg/kg	<330	<660	<660	<330	<330	<330	<330	<330	<330	<3300	<3300	<330
3,3'-Dichlorobenzidine	µg/kg	<660	<1300	<1300	<660	<660	<660	<660	<660	<660	<6600	<6600	<660
3-Nitroaniline	µg/kg	<1600	<3200	<3200	<1600	<1600	<1600	<1600	<1600	<1600	<16000	<16000	<1600
4,6-Dinitro-2-methylphenol	µg/kg	<1600	<3200	<3200	<1600	<1600	<1600	<1600	<1600	<1600	<16000	<16000	<1600
4-Bromophenylphenyl ether	µg/kg	<330	<660	<660	<330	<330	<330	<330	<330	<330	<3300	<3300	<330
4-Chloro-3-methylphenol	µg/kg	<660	<1300	<1300	<660	<660	<660	<660	<660	<660	<6600	<6600	<660
4-Chloroaniline	µg/kg	<660	<1300	<1300	<660	<660	<660	<660	<660	<660	<6600	<6600	<660
4-Chlorophenylphenyl ether	µg/kg	<330	<660	<660	<330	<330	<330	<330	<330	<330	<3300	<3300	<330
4-Methylphenol	µg/kg	<330	<660	<660	<330	<330	<330	<330	<330	<330	<3300	<3300	<330
4-Nitroaniline	µg/kg	<1600	<3200	<3200	<1600	<1600	<1600	<1600	<1600	<1600	<16000	<16000	<1600
4-Nitrophenol	µg/kg	<1600	<3200	<3200	<1600	<1600	<1600	<1600	<1600	<1600	<16000	<16000	<1600
Acenaphthene	µg/kg	<330	<660	<660	<330	<330	<330	<330	<330	<330	<3300	<3300	<330
Acenaphthylene	µg/kg	<330	<660	<660	<330	<330	<330	<330	<330	<330	<3300	<3300	<330
Anthracene	µg/kg	<330	<660	<660	<330	<330	<330	<330	<330	<330	<3300	<3300	<330
Benzo(a)anthracene	µg/kg	<330	**720**	**510 J**	<330	<330	<330	<330	<330	<330	<3300	<3300	<330
Benzo(a)pyrene	µg/kg	<330	**710**	**550 J**	<330	<330	**380**	<330	<330	<330	<3300	<3300	<330
Benzo(b)fluoranthene	µg/kg	<330	**960**	**790**	<330	<330	**660**	<330	<330	<330	<3300	<3300	**340**
Benzo(g,h,i)perylene	µg/kg	<330	**510 J**	**980**	<330	<330	**870**	<330	<330	<330	**1600 J**	**1600 J**	<330
Benzo(k)fluoranthene	µg/kg	<330	**360 J**	**360 J**	<330	<330	<330	<330	<330	<330	<3300	<3300	<330

Table 5-2b
North Industrial Corridor (NIC) Site
Sediment Sample Analytical Results, SVOCs by EPA Method 8270

Station		**SD-01**	**SD-02**	**SD-03**	**SD-04**	**SD-05**	**SD-06**	**SD-07**	**SD-08**	**SD-10**	**SD-11**	**SD-11**	**SD-12**
Sample Date		**5/15/01**	**5/15/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/15/01**
QC Sample Flag												**DUP**	
Compound	**Units**												
Benzoic acid	µg/kg	<1600	<3200	<3200	<1600	<1600	<1600	<1600	<1600	<1600	<16000	<16000	<1600
Benzyl alcohol	µg/kg	<660	<1300	<1300	<660	<660	<660	<660	<660	<660	<6600	<6600	<660
bis(2-Chloroethoxy)methane	µg/kg	<330	<660	<660	<330	<330	<330	<330	<330	<330	<3300	<3300	<330
bis(2-Chloroethyl) ether	µg/kg	<330	<660	<660	<330	<330	<330	<330	<330	<330	<3300	<3300	<330
bis(2-Chloroisopropyl) ether	µg/kg	<330	<660	<660	<330	<330	<330	<330	<330	<330	<3300	<3300	<330
bis(2-Ethylhexyl)phthalate	µg/kg	**410**	<660	**750**	<330	<330	<330	<330	<330	<330	<3300	<3300	**540**
Butylbenzylphthalate	µg/kg	<330	<660	<660	<330	<330	<330	<330	<330	<330	<3300	<3300	<330
Chrysene	µg/kg	<330	**830**	**1500**	<330	<330	530	<330	<330	<330	**1600 J**	**1700 J**	<330
Di-n-butylphthalate	µg/kg	<330	<660	<660	<330	<330	<330	<330	<330	<330	<3300	<3300	<330
Di-n-octylphthalate	µg/kg	<330	<660	<660	<330	<330	<330	<330	<330	<330	<3300	<3300	<330
Dibenz(a,h)anthracene	µg/kg	<330	<660	<660	<330	<330	<330	<330	<330	<330	<3300	<3300	<330
Dibenzofuran	µg/kg	<330	<660	<660	<330	<330	<330	<330	<330	<330	<3300	<3300	<330
Diethylphthalate	µg/kg	<330	<660	<660	<330	<330	<330	<330	<330	<330	<3300	<3300	<330
Dimethylphthalate	µg/kg	<330	<660	<660	<330	<330	<330	<330	<330	<330	<3300	<3300	<330
Fluoranthene	µg/kg	**400**	**1300**	**1100**	<330	<330	<330	<330	<330	<330	<3300	<3300	**440**
Fluorene	µg/kg	<330	<660	<660	<330	<330	<330	<330	<330	<330	<3300	<3300	<330
Hexachloro-1,3-butadiene	µg/kg	<330	<660	<660	<330	<330	<330	<330	<330	<330	<3300	<3300	<330
Hexachlorobenzene	µg/kg	<330	<660	<660	<330	<330	<330	<330	<330	<330	<3300	<3300	<330
Hexachlorocyclopentadiene	µg/kg	<330	<660	<660	<330	<330	<330	<330	<330	<330	<3300	<3300	<330
Hexachloroethane	µg/kg	<330	<660	<660	<330	<330	<330	<330	<330	<330	<3300	<3300	<330
Indeno(1,2,3-cd)pyrene	µg/kg	<330	**490 J**	**430 J**	<330	<330	<330	<330	<330	<330	<3300	<3300	<330
Isophorone	µg/kg	<330	<660	<660	<330	<330	<330	<330	<330	<330	<3300	<3300	<330
N-Nitroso-di-n-propylamine	µg/kg	<330	<660	<660	<330	<330	<330	<330	<330	<330	<3300	<3300	<330
N-Nitrosodiphenylamine	µg/kg	<330	<660	<660	<330	<330	<330	<330	<330	<330	<3300	<3300	<330
Naphthalene	µg/kg	<330	<660	<660	<330	<330	<330	<330	<330	<330	<3300	<3300	<330
Nitrobenzene	µg/kg	<330	<660	<660	<330	<330	<330	<330	<330	<330	<3300	<3300	<330
Pentachlorophenol	µg/kg	<1600	<3200	<3200	<1600	<1600	<1600	<1600	<1600	<1600	<16000	<16000	<1600
Phenanthrene	µg/kg	<330	**770**	**530 J**	<330	<330	<330	<330	<330	<330	<3300	<3300	<330
Phenol	µg/kg	<330	<660	<660	<330	<330	<330	<330	<330	<330	<3300	<3300	<330
Pyrene	µg/kg	**390**	**1400**	**1100**	<330	<330	**480**	<330	<330	<330	<3300	<3300	**430**

Bold text indicates results above analytical detection limits.
SVOCs = Semivolatile Organic Compounds
DUP = Field duplicate sample
J = Result estimated, value measured between the reporting limit and the detection limit

Table 5-2c
North Industrial Corridor (NIC) Site
Sediment Sample Analytical Results, Pesticides/PCBs by EPA Method 8270

Station		**SD-01**	**SD-02**	**SD-03**	**SD-04**	**SD-07**	**SD-08**	**SD-10**
Sample Date		**5/15/01**	**5/15/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**
Compound	**Units**							
4,4'-DDD	µg/kg	<34	<34	<33	<34	<34	<34	<33
4,4'-DDE	µg/kg	<13	<13	<13	<13	<13	<13	<13
4,4'-DDT	µg/kg	<40	<40	<39	<40	<40	<40	<39
Aldrin	µg/kg	<13	<13	<13	<13	<13	<13	<13
alpha-BHC	µg/kg	<9.9	<9.9	<9.8	<9.9	<9.9	<9.9	<9.9
alpha-Chlordane	µg/kg	**52**	<17	**31**	<17	<17	<17	<17
beta-BHC	µg/kg	<20	<20	<20	<20	<20	<20	<20
Chlordane (Technical)	µg/kg	**410**	<46	**310**	<46	<46	<46	<46
delta-BHC	µg/kg	<30	<30	<30	<30	<30	<30	<30
Dieldrin	µg/kg	<6.6	<6.6	<6.6	<6.6	<6.6	<6.6	<6.6
Endosulfan I	µg/kg	<46	<46	<46	<46	<46	<46	<46
Endosulfan II	µg/kg	<13	<13	<13	<13	<13	<13	<13
Endosulfan sulfate	µg/kg	<220	<220	<220	<220	<220	<220	<220
Endrin	µg/kg	<20	<20	<20	<20	<20	<20	<20
Endrin aldehyde	µg/kg	<76	<76	<76	<76	<76	<76	<76
Endrin ketone	µg/kg	<33	<33	<33	<33	<33	<33	<33
gamma-BHC	µg/kg	<13	<13	<13	<13	<13	<13	<13
gamma-Chlordane	µg/kg	**32**	<17	**28**	<17	<17	<17	<17
Heptachlor	µg/kg	<9.9	<9.9	<9.8	<9.9	<9.9	<9.9	<9.9
Heptachlor epoxide	µg/kg	<33	<33	<33	<33	<33	<33	<33
Methoxychlor	µg/kg	<580	<580	<580	<580	<580	<580	<580
Toxaphene	µg/kg	<790	<790	<790	<790	<790	<790	<790
PCB-1016	µg/kg	<33	<33	<330	<33	<33	<33	<33
PCB-1221	µg/kg	<33	<33	<330	<33	<33	<33	<33
PCB-1232	µg/kg	<33	<33	<330	<33	<33	<33	<33
PCB-1242	µg/kg	<33	<33	<330	<33	<33	<33	<33
PCB-1248	µg/kg	<33	<33	<330	<33	<33	<33	<33
PCB-1254	µg/kg	<33	<33	<330	<33	<33	<33	<33
PCB-1260	µg/kg	<33	<33	**650**	<33	<33	<33	<33

Bold text indicates results above analytical detection limits.

Table 5-2d
North Industrial Corridor (NIC) Site
Sediment Sample Analytical Results, Total Petroleum Hydrocarbons (TPH)

Station			**SD-11**	**SD-11**	**SD-12**
Sample Date			**5/16/01**	**5/16/01**	**5/15/01**
QC Sample Flag				**DUP**	
Compound	**Units**	**Analytical Method**			
TPH as Diesel	mg/kg	OA2	<49	<50	<9.9
TPH as Gasoline	mg/kg	OA1	<4.9	**20**	**5**
Fuel Oil	mg/kg	OA2	<49	<50	<9.9
Jet Fuel	mg/kg	OA2	<49	<50	<9.9
Kerosene	mg/kg	OA2	<49	<50	<9.9
Mineral Spirits	mg/kg	OA2	<49	<50	<9.9
Motor Oil	mg/kg	OA2	**5800**	**5500**	**410**

Bold text indicates results above analytical detection limits.
DUP = Field duplicate sample.

Table 5-2e
North Industrial Corridor (NIC) Site
Sediment Sample Analytical Results, Metals

Station			**SD-01**	**SD-02**	**SD-03**	**SD-04**	**SD-07**	**SD-08**	**SD-10**
Sample Date			**5/15/01**	**5/15/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**	**5/16/01**
Compound	**Units**	**EPA Method**							
Aluminum	mg/kg	EPA 6010	**7410**	**6340**	**3130**	**575**	**1820**	**972**	**731**
Antimony	mg/kg	EPA 6010	<0.943	<0.962	**1.28**	<0.962	<0.990	<0.952	<0.952
Arsenic	mg/kg	EPA 6010	**0.934**	**2.57**	**1.42**	<0.481	**1.9**	**1.08**	<0.476
Barium	mg/kg	EPA 6010	**86.5**	**128**	**71.8**	**22.3**	**211**	**117**	**13**
Beryllium	mg/kg	EPA 6010	**0.333**	**0.406**	**0.156**	<0.0962	**0.109**	<0.0952	<0.0952
Cadmium	mg/kg	EPA 6010	**0.62**	**0.842**	**1.29**	<0.481	<0.495	<0.476	<0.476
Calcium	mg/kg	EPA 6010	**9430**	**6890**	**21700**	**2610**	**12600**	**9000**	**2710**
Chromium	mg/kg	EPA 6010	**8.44**	**13.6**	**10**	**1.37**	**2.49**	**1.97**	**1.61**
Cobalt	mg/kg	EPA 6010	**3.56**	**4.33**	**2.3**	**1.55**	**2.38**	**1.7**	**1.12**
Copper	mg/kg	EPA 6010	**13.4**	**29.9**	**49.6**	**3.45**	**2.04**	**1.53**	**2.9**
Iron	mg/kg	EPA 6010	**7510**	**10100**	**7660**	**1970**	**2950**	**2810**	**1760**
Lead	mg/kg	EPA 6010	**43.9**	**180**	**92.9**	**5.85**	**3.55**	**6.16**	**9.73**
Magnesium	mg/kg	EPA 6010	**1880**	**2220**	**1580**	**236**	**2560**	**1190**	**496**
Manganese	mg/kg	EPA 6010	**121**	**182**	**144**	**44.1**	**261**	**149**	**29.8**
Mercury	mg/kg	EPA 7471	<0.154	<0.154	<0.154	<0.154	<0.154	<0.154	<0.154
Nickel	mg/kg	EPA 6010	**7.99**	**10.2**	**7.23**	<2.88	**3.96**	<2.86	<2.86
Potassium	mg/kg	EPA 6010	**1080**	**1300**	**605**	**97.9**	**461**	**262**	**186**
Selenium	mg/kg	EPA 6010	<0.943	<0.962	<0.971	<0.962	<0.990	<0.952	<0.952
Silver	mg/kg	EPA 6010	<0.660	<0.673	<0.680	<0.673	<0.693	<0.667	<0.667
Sodium	mg/kg	EPA 6010	**59.1**	**83.5**	**134**	**15.9**	**33.4**	**22.8**	**24.5**
Thallium	mg/kg	EPA 6010	<1.51	<1.54	<1.55	<1.54	<1.58	<1.52	<1.52
Vanadium	mg/kg	EPA 6010	**14.2**	**14.9**	**7.91**	**3.17**	**5.42**	**5.59**	**2.58**
Zinc	mg/kg	EPA 6010	**121**	**205**	**215**	**17.6**	**8.38**	**15**	**21.4**

Bold text indicates results above analytical detection limits.

Table 5-3a
North Industrial Corridor (NIC) Site
Surface Soil Sample Analytical Results, VOCs by EPA Method 8260

		Station	SSS-01	SSS-02	SSS-03C
		Sample Date	5/17/01	5/17/01	5/17/01
Investigation	**Compound**	**units**			
PH2B	1,1,1-Trichloroethane	µg/kg	<5.0	<5.0	<5.0
PH2B	1,1,2,2-Tetrachloroethane	µg/kg	<5.0	<5.0	<5.0
PH2B	1,1,2-Trichloroethane	µg/kg	<5.0	<5.0	<5.0
PH2B	1,1-Dichloroethane	µg/kg	<5.0	<5.0	<5.0
PH2B	1,1-Dichloroethene	µg/kg	<5.0	<5.0	<5.0
PH2B	1,2-Dichlorobenzene	µg/kg	<5.0	<5.0	<5.0
PH2B	1,2-Dichloroethane	µg/kg	<5.0	<5.0	<5.0
PH2B	1,2-Dichloropropane	µg/kg	<5.0	<5.0	<5.0
PH2B	1,3-Dichlorobenzene	µg/kg	<5.0	<5.0	<5.0
PH2B	1,4-Dichlorobenzene	µg/kg	<5.0	<5.0	<5.0
PH2B	Benzene	µg/kg	<5.0	<5.0	<5.0
PH2B	Bromodichloromethane	µg/kg	<5.0	<5.0	<5.0
PH2B	Bromoform	µg/kg	<5.0	<5.0	<5.0
PH2B	Bromomethane	µg/kg	<5.0	<5.0	<5.0
PH2B	Carbon tetrachloride	µg/kg	<5.0	<5.0	<5.0
PH2B	Chlorobenzene	µg/kg	<5.0	<5.0	<5.0
PH2B	Chloroethane	µg/kg	<5.0	<5.0	<5.0
PH2B	Chloroform	µg/kg	<5.0	<5.0	<5.0
PH2B	Chloromethane	µg/kg	<5.0	<5.0	<5.0
PH2B	cis-1,2-Dichloroethene	µg/kg	<5.0	<5.0	<5.0
PH2B	cis-1,3-Dichloropropene	µg/kg	<5.0	<5.0	<5.0
PH2B	Dibromochloromethane	µg/kg	<5.0	<5.0	<5.0
PH2B	Ethylbenzene	µg/kg	<5.0	<5.0	<5.0
PH2B	m,p-Xylene	µg/kg	<5.0	<5.0	<5.0
PH2B	Methylene chloride	µg/kg	<5.0	<5.0	<5.0
PH2B	o-Xylene	µg/kg	<5.0	<5.0	<5.0
PH2B	Tetrachloroethene	µg/kg	<5.0	<5.0	<5.0
PH2B	Toluene	µg/kg	<5.0	<5.0	<5.0
PH2B	trans-1,2-Dichloroethene	µg/kg	<5.0	<5.0	<5.0
PH2B	trans-1,3-Dichloropropene	µg/kg	<5.0	<5.0	<5.0
PH2B	Trichloroethene	µg/kg	<5.0	<5.0	<5.0
PH2B	Trichlorofluoromethane	µg/kg	<5.0	<5.0	<5.0
PH2B	Vinyl chloride	µg/kg	<5.0	<5.0	<5.0

Table 5-3b
North Industrial Corridor (NIC) Site
Surface Soil Sample Analytical Results, SVOCs by EPA Method 8270

		Station	SSS-01	SSS-02	SSS-03C
		Sample date	5/17/01	5/17/01	5/17/01
Investigation	**Compound**	**units**			
PH2B	1,2,4-Trichlorobenzene	µg/kg	<330	<330	<330
PH2B	1,2-Dichlorobenzene	µg/kg	<330	<330	<330
PH2B	1,3-Dichlorobenzene	µg/kg	<330	<330	<330
PH2B	1,4-Dichlorobenzene	µg/kg	<330	<330	<330
PH2B	2,4,5-Trichlorophenol	µg/kg	<330	<330	<330
PH2B	2,4,6-Trichlorophenol	µg/kg	<330	<330	<330
PH2B	2,4-Dichlorophenol	µg/kg	<330	<330	<330
PH2B	2,4-Dimethylphenol	µg/kg	<330	<330	<330
PH2B	2,4-Dinitrophenol	µg/kg	<1600	<1600	<1600
PH2B	2,4-Dinitrotoluene	µg/kg	<330	<330	<330
PH2B	2,6-Dinitrotoluene	µg/kg	<330	<330	<330
PH2B	2-Chloronaphthalene	µg/kg	<330	<330	<330
PH2B	2-Chlorophenol	µg/kg	<330	<330	<330
PH2B	2-Methylnaphthalene	µg/kg	<330	<330	<330
PH2B	2-Methylphenol	µg/kg	<330	<330	<330
PH2B	2-Nitroaniline	µg/kg	<1600	<1600	<1600
PH2B	2-Nitrophenol	µg/kg	<330	<330	<330
PH2B	3,3'-Dichlorobenzidine	µg/kg	<660	<660	<660
PH2B	3-Nitroaniline	µg/kg	<1600	<1600	<1600
PH2B	4,6-Dinitro-2-methylphenol	µg/kg	<1600	<1600	<1600
PH2B	4-Bromophenylphenyl ether	µg/kg	<330	<330	<330
PH2B	4-Chloro-3-methylphenol	µg/kg	<660	<660	<660
PH2B	4-Chloroaniline	µg/kg	<660	<660	<660
PH2B	4-Chlorophenylphenyl ether	µg/kg	<330	<330	<330
PH2B	4-Methylphenol	µg/kg	<330	<330	<330
PH2B	4-Nitroaniline	µg/kg	<1600	<1600	<1600
PH2B	4-Nitrophenol	µg/kg	<1600	<1600	<1600
PH2B	Acenaphthene	µg/kg	<330	<330	<330
PH2B	Acenaphthylene	µg/kg	<330	<330	<330
PH2B	Anthracene	µg/kg	<330	<330	<330
PH2B	Benzo(a)anthracene	µg/kg	<330	<330	<330
PH2B	Benzo(a)pyrene	µg/kg	<330	<330	<330
PH2B	Benzo(b)fluoranthene	µg/kg	<330	<330	<330
PH2B	Benzo(g,h,i)perylene	µg/kg	<330	<330	<330
PH2B	Benzo(k)fluoranthene	µg/kg	<330	<330	<330
PH2B	Benzoic acid	µg/kg	<1600	<1600	<1600
PH2B	Benzyl alcohol	µg/kg	<660	<660	<660
PH2B	bis(2-Chloroethoxy)methane	µg/kg	<330	<330	<330
PH2B	bis(2-Chloroethyl) ether	µg/kg	<330	<330	<330
PH2B	bis(2-Chloroisopropyl) ether	µg/kg	<330	<330	<330
PH2B	bis(2-Ethylhexyl)phthalate	µg/kg	<330	<330	<330
PH2B	Butylbenzylphthalate	µg/kg	<330	<330	<330

Table 5-3b
North Industrial Corridor (NIC) Site
Surface Soil Sample Analytical Results, SVOCs by EPA Method 8270

		Station	SSS-01	SSS-02	SSS-03C
		Sample date	5/17/01	5/17/01	5/17/01
Investigation	**Compound**	**units**			
PH2B	Chrysene	µg/kg	<330	<330	<330
PH2B	Di-n-butylphthalate	µg/kg	<330	<330	<330
PH2B	Di-n-octylphthalate	µg/kg	<330	<330	<330
PH2B	Dibenz(a,h)anthracene	µg/kg	<330	<330	<330
PH2B	Dibenzofuran	µg/kg	<330	<330	<330
PH2B	Diethylphthalate	µg/kg	<330	<330	<330
PH2B	Dimethylphthalate	µg/kg	<330	<330	<330
PH2B	Fluoranthene	µg/kg	<330	**330**	<330
PH2B	Fluorene	µg/kg	<330	<330	<330
PH2B	Hexachloro-1,3-butadiene	µg/kg	<330	<330	<330
PH2B	Hexachlorobenzene	µg/kg	<330	<330	<330
PH2B	Hexachlorocyclopentadiene	µg/kg	<330	<330	<330
PH2B	Hexachloroethane	µg/kg	<330	<330	<330
PH2B	Indeno(1,2,3-cd)pyrene	µg/kg	<330	<330	<330
PH2B	Isophorone	µg/kg	<330	<330	<330
PH2B	N-Nitroso-di-n-propylamine	µg/kg	<330	<330	<330
PH2B	N-Nitrosodiphenylamine	µg/kg	<330	<330	<330
PH2B	Naphthalene	µg/kg	<330	<330	<330
PH2B	Nitrobenzene	µg/kg	<330	<330	<330
PH2B	Pentachlorophenol	µg/kg	<1600	<1600	<1600
PH2B	Phenanthrene	µg/kg	<330	<330	<330
PH2B	Phenol	µg/kg	<330	<330	<330
PH2B	Pyrene	µg/kg	<330	<330	<330

Bold text indicates results above analytical detection limits.

Table 5-3c
North Industrial Corridor (NIC) Site
Surface Soil Sample Analytical Results, Metals

		Station	SSS-01	SSS-02	SSS-03C
		Sample date	5/17/01	5/17/01	5/17/01
Investigation	**Compound**	**Units**			
PH2B	Aluminum	mg/kg	6850	8150	6610
PH2B	Antimony	mg/kg	<0.917	<0.943	3.28
PH2B	Arsenic	mg/kg	1.88	2.27	5.26
PH2B	Barium	mg/kg	93.2	106	189
PH2B	Beryllium	mg/kg	0.41	0.436	0.522
PH2B	Cadmium	mg/kg	<0.459	<0.472	14.9
PH2B	Calcium	mg/kg	45400	6500	7380
PH2B	Chromium	mg/kg	8.53	8.98	127
PH2B	Cobalt	mg/kg	3.95	6.89	4.81
PH2B	Copper	mg/kg	11.6	10.5	60.1
PH2B	Iron	mg/kg	10600	9410	11600
PH2B	Lead	mg/kg	32	25.1	171
PH2B	Magnesium	mg/kg	7700	2010	1840
PH2B	Manganese	mg/kg	346	293	240
PH2B	Mercury	mg/kg	<0.154	<0.154	0.916
PH2B	Nickel	mg/kg	9.43	9.47	26.3
PH2B	Potassium	mg/kg	1430	1550	1560
PH2B	Selenium	mg/kg	<0.917	<0.943	<0.926
PH2B	Silver	mg/kg	<0.642	<0.660	6.88
PH2B	Sodium	mg/kg	104	36.8	68.9
PH2B	Thallium	mg/kg	<1.47	<1.51	<1.48
PH2B	Vanadium	mg/kg	15.5	18.3	18.1
PH2B	Zinc	mg/kg	64.3	51.2	282

Table 5-3d
North Industrial Corridor (NIC) Site
Subsurface Soil Sample Analytical Results, Total Organic Carbon (TOC)

Station	Sample Depth (feet)	Lithology	Sample Date	Total Organic Carbon	Units
NMW-01S	5-7	Clay w/ sand	12/12/2000	**11000**	mg/kg
NMW-01S	12-15	Silty sandy clay	12/12/2000	**7300**	mg/kg
NMW-01S	20-22	Silty sandy clay	12/12/2000	**6700**	mg/kg
NMW-01S	24-26	Sand	1/4/2001	**280***	mg/kg
NMW-01D	30-32	Sand	12/12/2000	<1100	mg/kg
NMW-01D	34-36	Sand	1/4/01	**290***	mg/kg
NMW-03S	4-6	Clayey silt	1/4/01	**16000**	mg/kg
NMW-03D	24-26	Clay	1/4/01	**7600**	mg/kg
NMW-03D	34-36	Sand w/ clay	1/4/01	**3600**	mg/kg
NMW-19S	16-18	Sand	1/8/01	**280***	mg/kg
NMW-19D	23-25	Sand	1/8/01	<1000	mg/kg
NMW-22S	6-8	Sand	1/5/01	<1000	mg/kg
NMW-22S	15-17	Sand**	1/5/01	**5500**	mg/kg
NMW-22D	22-24	Clay w/ sand	1/5/01	**3500**	mg/kg
NMW-22D	36-38	Sand	1/5/01	**380***	mg/kg
NMW-22D	38-40	Sand w/ silt	1/5/01	<1000	mg/kg
NMW-24D	22-24	Sand	1/8/01	**280***	mg/kg
NMW-24D	25-27	Sand	1/8/01	**280***	mg/kg
NMW-29	34-36	Sand	1/4/2001	**190***	mg/kg
NMW-31S	5-6	Sandy silty clay	12/11/00	**5600**	mg/kg
NMW-31S	6-7.4	Silty sand	12/11/00	<1200	mg/kg
NMW-31S	15-17	Sand	12/11/00	**3900**	mg/kg
NMW-31S	21-21.5	Silty sandy clay	12/11/00	<1200	mg/kg
NMW-31S	21.5-22.5	Sand	12/11/00	**26000**	mg/kg
NMW-35S	6-8	Sandy silt	1/8/01	**19000**	mg/kg
NMW-35S	16-18	Silty sand***	1/8/01	**5500**	mg/kg
NMW-35D	24-26	Sand	1/8/01	<1000	mg/kg
NMW-35D	33-35	Sand	1/8/01	**190***	mg/kg
NMW-47S	6-8	Silty sandy clay	12/11/00	**5500**	mg/kg
NMW-47S	15-18	Sand	12/11/00	**3800**	mg/kg
NMW-47D	30-30.5	Sand	12/12/00	**1400**	mg/kg
NMW-47D	38-38.5	Silty clay	12/12/00	**9400**	mg/kg
NWL-04S	6-8	Clay w/ sand	1/5/01	**2500**	mg/kg
NWL-04S	13-15	Sand	1/5/01	<1000	mg/kg
NWL-04S	24-26	Sand	1/5/01	**280***	mg/kg
NWL-04S	34-36	Sand	1/5/01	**270***	mg/kg
NWL-07D	10-12	Silt w/ clay	1/5/01	**5600**	mg/kg
NWL-07D	20-22	Sand	1/5/01	<1000	mg/kg
NWL-07D	25-27	Clay	1/5/01	**24000**	mg/kg

Bold text indicates results above analytical detection limits.
*** =** Samples were initially < 1000 mg/kg and reanalyzed on 12/06/01 with a lower detection limit of 100 mg/kg
** = EC suggested presence of clay or silt.
*** = Lithology estimated from EC. No sample availabe for lithological description.

Table 5-4
North Industrial Corridor (NIC) Site
Air Sample Analytical Results, VOCs by EPA Method TO-14

Compound	Units	AAQ-01 08/24/01	AAQ-02 08/24/01	AQ-01 09/18/01	AQ-02 08/24/01	AQ-02 08/24/01 DUP	AQ-03 08/23/01	AQ-04 09/18/01	AQ-05 09/18/01	AQ-07 09/18/01	AQ-08 09/18/01	AQ-09 08/23/01	AQ-10 09/18/01
1,1,1-Trichloroethane	$\mu g/m^3$	< 3.54	< 3.26	< 4.1	< 3.65	< 3.38	< 4.43	< 3.6	< 3.38	< 4.1	< 3.26	< 3.38	< 3.38
1,1,2,2-Tetrachloroethane	$\mu g/m^3$	< 3.92	< 3.64	< 4.62	< 4.05	< 3.78	< 4.97	< 3.99	< 3.78	< 4.62	< 3.64	< 3.78	< 3.78
1,1,2-Trichloroethane	$\mu g/m^3$	< 3.6	< 3.38	< 4.21	< 3.71	< 3.43	< 4.54	< 3.65	< 3.49	< 4.21	< 3.38	< 3.49	< 3.49
1,1,2-Trichlorotrifluoroethane	$\mu g/m^3$	< 6.07	< 5.68	< 7.16	< 6.31	< 5.84	< 7.71	< 6.23	< 5.92	< 7.16	< 5.68	< 5.92	< 5.92
1,1-Dichloroethane	$\mu g/m^3$	< 2.92	< 2.72	< 3.42	< 3.01	< 2.8	< 3.67	< 2.97	< 2.84	< 3.42	< 2.72	< 2.84	< 2.84
1,1-Dichloroethene	$\mu g/m^3$	< 2.86	< 2.66	< 3.35	< 2.95	< 2.74	< 3.59	< 2.91	< 2.78	< 3.35	< 2.66	< 2.78	< 2.78
1,2,4-Trichlorobenzene	$\mu g/m^3$	< 2.33	< 2.18	< 2.71	**2.26**	< 2.26	< 2.94	< 2.41	< 2.26	< 2.71	< 2.18	**2.41**	< 2.26
1,2,4-Trimethylbenzene	$\mu g/m^3$	< 3.55	< 3.3	**7.5**	< 3.65	< 3.4	< 4.45	< 3.59	< 3.45	**6.0**	**5.0**	< 3.45	< 3.45
1,2-Dibromoethane	$\mu g/m^3$	< 5.01	< 4.62	< 5.79	< 5.17	< 4.77	< 6.26	< 5.09	< 4.77	< 5.79	< 4.62	< 4.77	< 4.77
1,2-Dichlorobenzene	$\mu g/m^3$	< 4.34	< 4.04	< 5.08	< 4.47	< 4.16	< 5.45	< 4.41	< 4.22	< 5.08	< 4.04	< 4.22	< 4.22
1,2-Dichloroethane	$\mu g/m^3$	< 2.43	< 2.26	< 2.84	< 2.51	< 2.31	< 3.05	< 2.47	< 2.35	< 2.84	< 2.26	< 2.35	< 2.35
1,2-Dichloropropane	$\mu g/m^3$	< 2.58	< 2.4	< 3.01	< 2.68	< 2.44	< 3.24	< 2.63	< 2.49	< 3.01	< 2.4	< 2.49	< 2.49
1,3,5-Trimethylbenzene	$\mu g/m^3$	< 3.55	< 3.3	< 4.14	< 3.65	< 3.4	< 4.45	< 3.59	< 3.45	< 4.14	< 3.3	< 3.45	< 3.45
1,3-Dichlorobenzene	$\mu g/m^3$	< 2.69	< 2.51	< 3.18	< 2.81	< 2.57	< 3.43	< 2.75	< 2.63	< 3.18	< 2.51	< 2.63	< 2.63
1,4-Dichlorobenzene	$\mu g/m^3$	< 2.69	< 2.51	**2.26 J**	< 2.81	< 2.57	< 3.43	**5.08**	**7962.5**	**6.06**	**14.7**	< 2.63	**0.98 J**
Benzene	$\mu g/m^3$	**1 J**	**1.13 J**	**5.2**	**0.97 J**	**0.94 J**	**2.37 J**	**2.92**	**7.8**	**2.47**	**1.3 J**	**1.23 J**	**3.57**
Bromomethane	$\mu g/m^3$	< 6.16	< 5.75	< 7.16	< 6.33	< 5.83	< 7.75	< 6.33	< 6	< 7.16	< 5.75	< 6	< 6
Carbon tetrachloride	$\mu g/m^3$	**0.61 J**	< 3.72	< 4.68	**0.6 J**	**0.6 J**	< 5	< 4.04	< 3.85	< 4.68	< 3.72	**0.83 J**	< 3.85
Chlorobenzene	$\mu g/m^3$	< 2.91	< 2.73	< 3.43	< 3.01	< 2.77	< 3.67	< 2.96	< 2.82	< 3.43	< 2.73	< 2.82	< 2.82
Chloroethane	$\mu g/m^3$	< 2	< 1.86	< 2.32	< 2.05	< 1.89	< 2.51	< 2.05	< 1.95	< 2.32	< 1.86	< 1.95	< 1.95
Chloroform	$\mu g/m^3$	**0.69 J**	< 3.27	**1.33 J**	**1.19 J**	**0.94 J**	< 4.41	< 3.57	**2.42 J**	< 4.11	**0.84 J**	**0.59 J**	< 3.42
Chloromethane	$\mu g/m^3$	< 1.5	< 1.4	< 1.76	< 1.55	< 1.44	**2.01**	< 1.53	< 1.46	< 1.76	< 1.4	< 1.46	< 1.46
cis-1,2-Dichloroethene	$\mu g/m^3$	< 2.86	< 2.66	< 3.35	< 2.95	< 2.74	< 3.59	< 2.91	< 2.78	< 3.35	< 2.66	< 2.78	< 2.78
cis-1,3-Dichloropropene	$\mu g/m^3$	< 3.28	< 3.05	< 3.83	< 3.37	< 3.14	< 4.11	< 3.33	< 3.19	< 3.83	< 3.05	< 3.19	< 3.19
Dichlorodifluoromethane	$\mu g/m^3$	**4.78**	< 3.47	< 4.33	< 3.83	< 3.52	< 4.68	< 3.83	< 3.63	< 4.33	< 3.47	< 3.63	< 3.63
Dichlorotetrafluoroethane	$\mu g/m^3$	< 5.98	< 5.62	< 7.05	< 6.19	< 5.7	< 7.83	< 6.12	< 5.84	< 7.05	< 5.62	< 5.84	< 5.84
Ethylbenzene	$\mu g/m^3$	< 2.73	< 2.56	**5.74**	**3.22**	**3.18**	< 3.44	< 2.78	**3.62**	**10.6**	< 2.56	< 2.65	**16.78**
Hexachloro-1,3-butadiene	$\mu g/m^3$	< 2.06	< 1.95	< 2.39	< 2.17	< 1.95	< 2.61	< 2.17	< 2.06	< 2.39	< 1.95	< 2.06	< 2.06
m,p-Xylene	$\mu g/m^3$	< 2.6	< 2.42	**15.9**	**11.04**	**11.04**	< 3.26	**11.04**	**9.71**	**32.68**	< 2.42	**8.39**	**53**
Methylene chloride	$\mu g/m^3$	< 2.62	< 2.44	< 3.04	< 2.69	< 2.47	< 3.29	< 2.69	< 2.54	< 3.04	< 2.44	< 2.54	< 2.54
o-Xylene	$\mu g/m^3$	< 2.47	< 2.29	**4.85**	**3.13**	**3.09**	< 3.13	< 2.51	**3.26**	**8.83**	< 2.29	< 2.38	**13.25**

Table 5-4
North Industrial Corridor (NIC) Site
Air Sample Analytical Results, VOCs by EPA Method TO-14

Compound	Units	AAQ-01 08/24/01	AAQ-02 08/24/01	AQ-01 09/18/01	AQ-02 08/24/01	AQ-02 08/24/01 DUP	AQ-03 08/23/01	AQ-04 09/18/01	AQ-05 09/18/01	AQ-07 09/18/01	AQ-08 09/18/01	AQ-09 08/23/01	AQ-10 09/18/01
Styrene	$\mu g/m^3$	< 2.55	< 2.38	< 2.99	< 2.64	< 2.42	< 3.2	< 2.59	**4.24**	< 2.99	< 2.38	< 2.46	< 2.46
Tetrachloroethene	$\mu g/m^3$	< 4.91	< 4.56	< 5.74	**9.68**	< 4.7	**15.21**	< 4.98	< 4.77	< 5.74	< 4.56	< 4.77	< 4.77
Toluene	$\mu g/m^3$	**2.79**	**3.83**	**42.16**	**9.96**	**6.9**	**6.9**	**11.5**	**21.85**	**18.39**	**8.05**	**13.8**	**7.66**
trans-1,3-Dichloropropene	$\mu g/m^3$	< 3.42	< 3.19	< 3.97	< 3.51	< 3.23	< 4.3	< 3.51	< 3.33	< 3.97	< 3.19	< 3.33	< 3.33
Trichloroethene	$\mu g/m^3$	< 3.32	< 3.11	< 3.87	< 3.43	< 3.16	< 4.14	< 3.38	< 3.22	< 3.87	< 3.11	< 3.22	< 3.22
Trichlorofluoromethane	$\mu g/m^3$	< 4.39	< 4.1	< 5.13	< 4.56	< 4.16	< 5.53	< 4.5	< 4.22	< 5.13	< 4.1	< 4.22	< 4.22
Vinyl chloride	$\mu g/m^3$	< 1.94	< 1.81	< 2.25	< 1.99	< 1.83	< 2.44	< 1.99	< 1.89	< 2.25	< 1.81	< 1.89	< 1.89

Bold text indicates results above analytical detection limits.
DUP = Field Duplicate

Table 5-5a
North Industrial Corridor (NIC) Site
Sludge Pit Soil Sample Analytical Results, VOCs by EPA Method 8260

Station	**GP10C-01**	**GP10C-01**	**GP10C-02**	**GP10C-02**	**GP10C-03**	**GP10C-03**	**GP10D-01**	**GP10D-01**	**GP10D-02**	**GP10D-02**	**GP10D-03**	**GP10D-03**	**GP10D-04**	**GP10D-05**
Sample Depth in Feet	**0.5**	**2-4**	**0.5**	**3-5**	**0.5**	**7.5-9.5**	**0.5**	**8-10**	**0.5**	**8.5-10.5**	**0.2**	**8.5-10.5**	**0.5**	**0.4**
Sample date	**1/18/01**	**1/18/01**	**1/18/01**	**1/19/01**	**1/20/01**	**1/19/01**	**1/19/01**	**1/19/01**	**1/18/01**	**1/18/01**	**1/22/01**	**1/22/01**	**1/22/01**	**1/22/01**
Compound	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
1,1,1-Trichloroethane	<6.1	<910	<5.8	<980	<660	<26	<6.1	<700	<6.2	<6.0	<5.0	<620	<620	<5.0
1,1,2,2-Tetrachloroethane	<6.1	<910	<5.8	<980	<660	<26	<6.1	<700	<6.2	<6.0	<5.0	<620	<620	<5.0
1,1,2-Trichloroethane	<6.1	<910	<5.8	<980	<660	<26	<6.1	<700	<6.2	<6.0	<5.0	<620	<620	<5.0
1,1-Dichloroethane	<6.1	<910	<5.8	<980	<660	<26	<6.1	<700	<6.2	<6.0	<5.0	<620	<620	<5.0
1,1-Dichloroethene	<6.1	<910	<5.8	<980	<660	<26	<6.1	<700	<6.2	<6.0	<5.0	<620	<620	<5.0
1,2-Dichlorobenzene	<6.1	<910	<5.8	<980	<660	<26	<6.1	<700	<6.2	<6.0	<5.0	<620	<620	<5.0
1,2-Dichloroethane	<6.1	<910	<5.8	<980	<660	<26	<6.1	<700	<6.2	<6.0	<5.0	<620	<620	<5.0
1,2-Dichloropropane	<6.1	<910	<5.8	<980	<660	<26	<6.1	<700	<6.2	<6.0	<5.0	<620	<620	<5.0
1,3-Dichlorobenzene	<6.1	<910	<5.8	<980	<660	<26	<6.1	<700	<6.2	<6.0	<5.0	<620	<620	<5.0
1,4-Dichlorobenzene	<6.1	<910	<5.8	<980	<660	<26	<6.1	<700	<6.2	<6.0	<5.0	<620	<620	<5.0
Benzene	<6.1	<910	<5.8	<980	<660	<26	<6.1	<700	<6.2	<6.0	<5.0	<620	<620	<5.0
Bromodichloromethane	<6.1	<910	<5.8	<980	<660	<26	<6.1	<700	<6.2	<6.0	<5.0	<620	<620	<5.0
Bromoform	<6.1	<910	<5.8	<980	<660	<26	<6.1	<700	<6.2	<6.0	<5.0	<620	<620	<5.0
Bromomethane	<6.1	<910	<5.8	<980	<660	<26	<6.1	<700	<6.2	<6.0	<5.0	<620	<620	<5.0
Carbon tetrachloride	<6.1	<910	<5.8	<980	<660	<26	<6.1	<700	<6.2	<6.0	<5.0	<620	<620	<5.0
Chlorobenzene	<6.1	<910	<5.8	<980	<660	<26	<6.1	<700	<6.2	<6.0	<5.0	<620	<620	<5.0
Chloroethane	<6.1	<910	<5.8	<980	<660	<26	<6.1	<700	<6.2	<6.0	<5.0	<620	<620	<5.0
Chloroform	<6.1	<910	<5.8	<980	<660	<26	<6.1	<700	<6.2	<6.0	<5.0	<620	<620	<5.0
Chloromethane	<6.1	<910	<5.8	<980	<660	<26	<6.1	<700	<6.2	<6.0	<5.0	<620	<620	<5.0
cis-1,2-Dichloroethene	<6.1	<910	<5.8	<980	<660	<26	<6.1	<700	<6.2	<6.0	<5.0	<620	<620	<5.0
cis-1,3-Dichloropropene	<6.1	<910	<5.8	<980	<660	<26	<6.1	<700	<6.2	<6.0	<5.0	<620	<620	<5.0
Dibromochloromethane	<6.1	<910	<5.8	<980	<660	<26	<6.1	<700	<6.2	<6.0	<5.0	<620	<620	<5.0
Ethylbenzene	<6.1	<910	<5.8	**5400**	<660	<26	<6.1	**1400**	<6.2	**24**	<5.0	<620	<620	<5.0
m,p-Xylene	<6.1	<910	<5.8	**19000**	<660	**63**	<6.1	**920**	<6.2	**23**	**13 UB**	**1100**	<620	<5.0
Methylene chloride	<6.1	<910	<5.8	<980	<660	<26	<6.1	<700	<6.2	<6.0	**5.5**	<620	<620	**5.6 UB**
o-Xylene	<6.1	<910	<5.8	**2900**	<660	<26	<6.1	<700	<6.2	**26**	<5.0	**640**	<620	<5.0
Tetrachloroethene	<6.1	<910	<5.8	<980	<660	<26	<6.1	<700	<6.2	<6.0	<5.0	<620	<620	<5.0
Toluene	<6.1	<910	<5.8	**1400**	<660	<26	<6.1	<700	<6.2	**17**	**8.3**	<620	<620	<5.0
trans-1,2-Dichloroethene	<6.1	<910	<5.8	<980	<660	<26	<6.1	<700	<6.2	<6.0	<5.0	<620	<620	<5.0
trans-1,3-Dichloropropene	<6.1	<910	<5.8	<980	<660	<26	<6.1	<700	<6.2	<6.0	<5.0	<620	<620	<5.0
Trichloroethene	<6.1	<910	<5.8	<980	<660	<26	<6.1	<700	<6.2	<6.0	<5.0	<620	<620	<5.0
Trichlorofluoromethane	<6.1	<910	<5.8	<980	<660	<26	<6.1	<700	**7.2**	<6.0	<5.0	<620	<620	<5.0
Vinyl chloride	<6.1	<910	<5.8	<980	<660	<26	<6.1	<700	<6.2	<6.0	<5.0	<620	<620	<5.0

Bold text indicates results above analytical detection limits.
UB = Not detected; contained in method blank.

CDM

Table 5-5b
North Industrial Corridor (NIC) Site
Sludge Pit Soil Sample Analytical Results, SVOCs by EPA Method 8270

Station	**GP10C-01**	**GP10C-01**	**GP10C-01**	**GP10C-02**	**GP10C-02**	**GP10C-03**	**GP10C-03**	**GP10C-03**	**GP10C-03**	**GP10D-01**	**GP10D-01**	**GP10D-01**	**GP10D-02**	**GP10D-02**	**GP10D-03**	**GP10D-03**	**GP10D-04**	**GP10D-05**
Sample Depth in Feet	**0.5**	**11-13**	**15-17**	**0.5**	**3-5**	**0.5**	**2.5-4.5**	**7.5-9.5**	**12-14**	**0.5**	**8-10**	**13-15**	**0.5**	**8.5-10.5**	**0.2**	**8-10**	**0.5**	**0.4**
Sample date	**1/18/01**	**1/18/01**	**1/18/01**	**1/18/01**	**1/19/01**	**1/20/01**	**1/19/01**	**1/19/01**	**1/19/01**	**1/19/01**	**1/19/01**	**1/19/01**	**1/18/01**	**1/18/01**	**1/22/01**	**1/22/01**	**1/22/01**	**1/22/01**
Compound	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
1,2,4-Trichlorobenzene	<400	<410	<3800	<3800	<5200	<1400	<4500	<3400	<3800	<400	<3400	<3700	<4100	<380	<3300	<3300	<6600	<3300
1,2-Dichlorobenzene	<400	<410	<3800	<3800	<5200	<1400	<4500	<3400	<3800	<400	<3400	<3700	<4100	<380	<3300	<3300	<6600	<3300
1,3-Dichlorobenzene	<400	<410	<3800	<3800	<5200	<1400	<4500	<3400	<3800	<400	<3400	<3700	<4100	<380	<3300	<3300	<6600	<3300
1,4-Dichlorobenzene	<400	<410	<3800	<3800	<5200	<1400	<4500	<3400	<3800	<400	<3400	<3700	<4100	<380	<3300	<3300	<6600	<3300
2,4,5-Trichlorophenol	<400	<410	<3800	<3800	<5200	<1400	<4500	<3400	<3800	<400	<3400	<3700	<4100	<380	<3300	<3300	<6600	<3300
2,4,6-Trichlorophenol	<400	<410	<3800	<3800	<5200	<1400	<4500	<3400	<3800	<400	<3400	<3700	<4100	<380	<3300	<3300	<6600	<3300
2,4-Dichlorophenol	<400	<410	<3800	<3800	<5200	<1400	<4500	<3400	<3800	<400	<3400	<3700	<4100	<380	<3300	<3300	<6600	<3300
2,4-Dimethylphenol	<400	<410	<3800	<3800	<5200	<1400	<4500	<3400	<3800	<400	<3400	<3700	<4100	<380	<3300	<3300	<6600	<3300
2,4-Dinitrophenol	<1900	<2000	<18000	<18000	<25000	<6700	<22000	<16000	<19000	<1900	<16000	<18000	<20000	<1800	<16000	<16000	<32000	<16000
2,4-Dinitrotoluene	<400	<410	<3800	<3800	<5200	<1400	<4500	<3400	<3800	<400	<3400	<3700	<4100	<380	<3300	<3300	<6600	<3300
2,6-Dinitrotoluene	<400	<410	<3800	<3800	<5200	<1400	<4500	<3400	<3800	<400	<3400	<3700	<4100	<380	<3300	<3300	<6600	<3300
2-Chloronaphthalene	<400	<410	<3800	<3800	<5200	<1400	<4500	<3400	<3800	<400	<3400	<3700	<4100	<380	<3300	<3300	<6600	<3300
2-Chlorophenol	<400	<410	<3800	<3800	<5200	<1400	<4500	<3400	<3800	<400	<3400	<3700	<4100	<380	<3300	<3300	<6600	<3300
2-Methylnaphthalene	<400	<410	**3100**	<3800	**7900**	<1400	<4500	<3400	<3800	<400	**14000**	**5800**	<4100	**1500**	<3300	<3300	**25000**	<3300
2-Methylphenol	<400	<410	<3800	<3800	<5200	<1400	<4500	<3400	<3800	<400	<3400	<3700	<4100	<380	<3300	<3300	<6600	<3300
2-Nitroaniline	<1900	<2000	<18000	<18000	<25000	<6700	<22000	<16000	<19000	<1900	<16000	<18000	<20000	<1800	<16000	<16000	<32000	<16000
2-Nitrophenol	<400	<410	<3800	<3800	<5200	<1400	<4500	<3400	<3800	<400	<3400	<3700	<4100	<380	<3300	<3300	<6600	<3300
3,3'-Dichlorobenzidine	<800	<830	<7600	<7600	<10000	<2800	<9000	<6700	<7700	<800	<6800	<7400	<8200	<760	<6600	<6600	<13000	<6600
3-Nitroaniline	<1900	<2000	<18000	<18000	<25000	<6700	<22000	<16000	<19000	<1900	<16000	<18000	<20000	<1800	<16000	<16000	<32000	<16000
4,6-Dinitro-2-methylphenol	<1900	<2000	<18000	<18000	<25000	<6700	<22000	<16000	<19000	<1900	<16000	<18000	<20000	<1800	<16000	<16000	<32000	<16000
4-Bromophenylphenyl ether	<400	<410	<3800	<3800	<5200	<1400	<4500	<3400	<3800	<400	<3400	<3700	<4100	<380	<3300	<3300	<6600	<3300
4-Chloro-3-methylphenol	<800	<830	<7600	<7600	<10000	<2800	<9000	<6700	<7700	<800	<6800	<7400	<8200	<760	<6600	<6600	<13000	<6600
4-Chloroaniline	<800	<830	<7600	<7600	<10000	<2800	<9000	<6700	<7700	<800	<6800	<7400	<8200	<760	<6600	<6600	<13000	<6600
4-Chlorophenylphenyl ether	<400	<410	<3800	<3800	<5200	<1400	<4500	<3400	<3800	<400	<3400	<3700	<4100	<380	<3300	<3300	<6600	<3300
4-Methylphenol	<400	<410	<3800	<3800	<5200	<1400	<4500	<3400	<3800	<400	<3400	<3700	<4100	<380	<3300	<3300	<6600	<3300
4-Nitroaniline	<1900	<2000	<18000	<18000	<25000	<6700	<22000	<16000	<19000	<1900	<16000	<18000	<20000	<1800	<16000	<16000	<32000	<16000
4-Nitrophenol	<1900	<2000	<18000	<18000	<25000	<6700	<22000	<16000	<19000	<1900	<16000	<18000	<20000	<1800	<16000	<16000	<32000	<16000
Acenaphthene	<400	<410	<3800	<3800	<5200	<1400	<4500	<3400	<3800	<400	<3400	<3700	<4100	<380	<3300	<3300	<6600	<3300
Acenaphthylene	<400	<410	<3800	<3800	<5200	<1400	<4500	<3400	<3800	<400	<3400	<3700	<4100	<380	<3300	<3300	<6600	<3300
Anthracene	<400	<410	<3800	<3800	**2800 J**	<1400	<4500	<3400	<3800	<400	<3400	<3700	<4100	<380	<3300	<3300	**3300 J**	<3300
Benzo(a)anthracene	<400	<410	<3800	**1800**	<5200	<1400	<4500	<3400	<3800	<400	<3400	<3700	<4100	**380**	<3300	**1400 J**	<6600	<3300
Benzo(a)pyrene	<400	<410	<3800	**1800**	<5200	<1400	<4500	<3400	<3800	<400	<3400	<3700	<4100	<380	<3300	<3300	<6600	<3300
Benzo(b)fluoranthene	<400	<410	<3800	**3000**	<5200	<1400	<4500	<3400	<3800	<400	<3400	<3700	<4100	<380	<3300	<3300	<6600	<3300
Benzo(g,h,i)perylene	<400	<410	<3800	**2100**	<5200	<1400	<4500	<3400	<3800	<400	<3400	<3700	<4100	<380	<3300	<3300	<6600	<3300
Benzo(k)fluoranthene	<400	<410	<3800	**970**	<5200	<1400	<4500	<3400	<3800	<400	<3400	<3700	<4100	<380	<3300	<3300	<6600	<3300
Benzoic acid	<1900	<2000	<18000	<18000	<25000	<6700	<22000	<16000	<19000	<1900	<16000	<18000	<20000	<1800	<16000	<16000	<32000	<16000
Benzyl alcohol	<800	<830	<7600	<7600	<10000	<2800	<9000	<6700	<7700	<800	<6800	<7400	<8200	<760	<6600	<6600	<13000	<6600
bis(2-Chloroethoxy)methane	<400	<410	<3800	<3800	<5200	<1400	<4500	<3400	<3800	<400	<3400	<3700	<4100	<380	<3300	<3300	<6600	<3300
bis(2-Chloroethyl) ether	<400	<410	<3800	<3800	<5200	<1400	<4500	<3400	<3800	<400	<3400	<3700	<4100	<380	<3300	<3300	<6600	<3300
bis(2-Chloroisopropyl) ether	<400	<410	<3800	<3800	<5200	<1400	<4500	<3400	<3800	<400	<3400	<3700	<4100	<380	<3300	<3300	<6600	<3300
bis(2-Ethylhexyl)phthalate	<400	<410	<3800	<3800	<5200	<1400	<4500	<3400	<3800	<400	<3400	<3700	**35000 J**	<380	<3300	**2400 J**	<6600	**1800 J**
Butylbenzylphthalate	<400	<410	<3800	<3800	<5200	<1400	<4500	<3400	<3800	<400	<3400	<3700	**7500**	<380	<3300	<3300	<6600	**3900**
Chrysene	<400	<410	<3800	**2200**	**4500 J**	**900**	**3300 J**	<3400	<3800	<400	<3400	<3700	<4100	**860**	<3300	**2400 J**	**4000 J**	<3300
Di-n-butylphthalate	<400	<410	<3800	<3800	<5200	<1400	<4500	<3400	<3800	<400	<3400	<3700	<4100	<380	<3300	<3300	<6600	<3300
Di-n-octylphthalate	<400	<410	<3800	<3800	<5200	<1400	<4500	<3400	<3800	<400	<3400	<3700	<4100	<380	<3300	<3300	<6600	<3300

Table 5-5b
North Industrial Corridor (NIC) Site
Sludge Pit Soil Sample Analytical Results, SVOCs by EPA Method 8270

Station	**GP10C-01**	**GP10C-01**	**GP10C-01**	**GP10C-02**	**GP10C-02**	**GP10C-03**	**GP10C-03**	**GP10C-03**	**GP10C-03**	**GP10D-01**	**GP10D-01**	**GP10D-01**	**GP10D-02**	**GP10D-02**	**GP10D-03**	**GP10D-03**	**GP10D-04**	**GP10D-05**
Sample Depth in Feet	**0.5**	**11-13**	**15-17**	**0.5**	**3-5**	**0.5**	**2.5-4.5**	**7.5-9.5**	**12-14**	**0.5**	**8-10**	**13-15**	**0.5**	**8.5-10.5**	**0.2**	**8-10**	**0.5**	**0.4**
Sample date	**1/18/01**	**1/18/01**	**1/18/01**	**1/18/01**	**1/19/01**	**1/20/01**	**1/19/01**	**1/19/01**	**1/19/01**	**1/19/01**	**1/19/01**	**1/19/01**	**1/18/01**	**1/18/01**	**1/22/01**	**1/22/01**	**1/22/01**	**1/22/01**
Compound	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Dibenz(a,h)anthracene	<400	<410	<3800	<3800	<5200	<1400	<4500	<3400	<3800	<400	<3400	<3700	<4100	<380	<3300	<3300	<6600	<3300
Dibenzofuran	<400	<410	<3800	<3800	<5200	<1400	<4500	<3400	<3800	<400	<3400	<3700	<4100	<380	<3300	<3300	<6600	<3300
Diethylphthalate	<400	<410	<3800	<3800	<5200	<1400	<4500	<3400	<3800	<400	<3400	<3700	<4100	<380	<3300	<3300	<6600	<3300
Dimethylphthalate	<400	<410	<3800	<3800	<5200	<1400	<4500	<3400	<3800	<400	<3400	<3700	<4100	<380	<3300	<3300	<6600	<3300
Fluoranthene	<400	<410	<3800	**2100**	<5200	<1400	<4500	<3400	<3800	<400	<3400	<3700	<4100	<380	<3300	<3300	<6600	<3300
Fluorene	<400	<410	<3800	<3800	<5200	<1400	<4500	<3400	<3800	<400	<3400	<3700	<4100	**390**	<3300	<3300	<6600	<3300
Hexachloro-1,3-butadiene	<400	<410	<3800	<3800	<5200	<1400	<4500	<3400	<3800	<400	<3400	<3700	<4100	<380	<3300	<3300	<6600	<3300
Hexachlorobenzene	<400	<410	<3800	<3800	<5200	<1400	<4500	<3400	<3800	<400	<3400	<3700	<4100	<380	<3300	<3300	<6600	<3300
Hexachlorocyclopentadiene	<400	<410	<3800	<3800	<5200	<1400	<4500	<3400	<3800	<400	<3400	<3700	<4100	<380	<3300	<3300	<6600	<3300
Hexachloroethane	<400	<410	<3800	<3800	<5200	<1400	<4500	<3400	<3800	<400	<3400	<3700	<4100	<380	<3300	<3300	<6600	<3300
Indeno(1,2,3-cd)pyrene	<400	<410	<3800	**1300**	<5200	<1400	<4500	<3400	<3800	<400	<3400	<3700	<4100	<380	<3300	<3300	<6600	<3300
Isophorone	<400	<410	<3800	<3800	<5200	<1400	<4500	<3400	<3800	<400	<3400	<3700	<4100	<380	<3300	<3300	<6600	<3300
N-Nitroso-di-n-propylamine	<400	<410	<3800	<3800	<5200	<1400	<4500	<3400	<3800	<400	<3400	<3700	<4100	<380	<3300	<3300	<6600	<3300
N-Nitrosodiphenylamine	<400	<410	<3800	<3800	<5200	<1400	<4500	<3400	<3800	<400	<3400	<3700	<4100	<380	<3300	<3300	<6600	<3300
Naphthalene	<400	<410	<3800	<3800	<5200	<1400	<4500	<3400	<3800	<400	**5100**	**1700 J**	<4100	<380	<3300	<3300	**7100**	<3300
Nitrobenzene	<400	<410	<3800	<3800	<5200	<1400	<4500	<3400	<3800	<400	<3400	<3700	<4100	<380	<3300	<3300	<6600	<3300
Pentachlorophenol	<1900	<2000	<18000	<18000	<25000	<6700	<22000	<16000	<19000	<1900	<16000	<18000	<20000	<1800	<16000	<16000	<32000	<16000
Phenanthrene	<400	**1100**	**5000**	<3800	**14000**	**1800**	**11000**	**6200**	<3800	<400	**3500**	**1600 J**	<4100	**2100**	<3300	**2900 J**	**16000**	<3300
Phenol	<400	<410	<3800	<3800	<5200	<1400	<4500	<3400	<3800	<400	<3400	<3700	<4100	<380	<3300	<3300	<6600	<3300
Pyrene	<400	**520**	<3800	**3200**	**10000**	**1600**	**4200 J**	**1900 J**	<3800	<400	<3400	<3700	<4100	**1300**	<3300	**1700 J**	**13000**	<3300

Bold text indicates results above analytical detection limits.
J = Result estimated, value measured between the reporting limit and the detection limit

Table 5-5c
North Industrial Corridor (NIC) Site
Sludge Pit Soil Sample Analytical Results, Pesticides/PCBs by EPA Method 8080

Station	**GP10C-01**	**GP10C-01**	**GP10C-02**	**GP10C-03**	**GP10C-02**	**GP10C-03**	**GP10D-01**	**GP10D-01**	**GP10D-02**	**GP10D-02**	**GP10D-03**	**GP10D-03**	**GP10D-04**	**GP10D-05**
Sample Depth in Feet	**0.5**	**11-13**	**0.5**	**0.5**	**3-5**	**7.5-9.5**	**0.5**	**8-10**	**0.5**	**8.5-10.5**	**0.2**	**8-10**	**0.5**	**0.4**
Sample date	**1/18/01**	**1/18/01**	**1/18/01**	**1/20/01**	**1/19/01**	**1/19/01**	**1/19/01**	**1/19/01**	**1/18/01**	**1/18/01**	**1/22/01**	**1/22/01**	**1/22/01**	**1/22/01**
Compound	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
4,4'-DDD	<4.0	<42	<3.9	<35.	<52	<33	<4.1	<340	<4.2	<390	<3.3	<97	<910	<3.3
4,4'-DDE	<1.6	<17	<1.5	<14	<20	<13	<1.6	<130	<1.6	<150	<1.3	<38	<360	<1.3
4,4'-DDT	<4.7	<50	<4.6	<41	<61	<39	<4.8	<400	<4.9	<450	<3.9	<110	<1100	<3.9
Aldrin	<1.6	<17	<1.5	<14	<20	<13	<1.6	<130	<1.6	<150	<1.3	<38	<360	<1.3
alpha-BHC	<1.2	<12	<1.1	<10	<15	<9.9	<1.2	<100	<1.2	<110	<0.98	<29	<270	<0.97
alpha-Chlordane	<2.0	<21	<2.0	<18	<26.	<17	<2.1	<170	<2.1	<200	<1.7	<49	<460	<1.7
beta-BHC	<2.4	<25	<2.3	<21	<31	<20	<2.4	<200	<2.4	<230	<2.0	<57	<540	<1.9
Chlordane (Technical)	<5.5	<58	<5.3	<48	<72	<46	<5.6	<470	<5.7	<530	<4.6	<130	<1200	<4.5
delta-BHC	<3.5	<37	<3.4	<31	<46	<30	<3.6	<300	<3.7	<340	<2.9	<86.	<800	<2.9
Dieldrin	<0.78	<8.3	<0.76	<6.9	<10	<6.6	<0.80	<67	<0.82	<76	<0.65	<19	<180	<0.65
Endosulfan I	<5.5	<58	<5.3	<48	<72	<46	<5.6	<470	<5.7	<530	<4.6	<130	<1200	<4.5
Endosulfan II	<1.6	<17	<1.5	<14	<20	<13	<1.6	<130	<1.6	<150	<1.3	<38	<360	<1.3
Endosulfan sulfate	<26.	<270	<25	<230	<340	<220	<26.	<2200	<27	<2500	<22	<630	<5900	<21
Endrin	<2.4	<25	<2.3	<21	<31	<20	<2.4	<200	<2.4	<230	<2.0	<57	<540	<1.9
Endrin aldehyde	<9.0	<95	<8.8	<79	<120	<76	<9.2	<770	<9.4	<870	<7.5	<220	<2100	<7.4
Endrin ketone	<3.9	<41	<3.8	<34	<51	<33	<4.0	<340	<4.1	<380	<3.3	<95	<890	<3.2
gamma-BHC	<1.6	<17	<1.5	<14	<20	<13	<1.6	<130	<1.6	<150	<1.3	<38	<360	<1.3
gamma-Chlordane	<2.0	<21	<2.0	<18	<26.	<17	<2.1	<170	<2.1	<200	<1.7	<49	<460	<1.7
Heptachlor	<1.2	<12	<1.1	<10	<15	<9.9	<1.2	<100	<1.2	<110	<0.98	<29	<270	<0.97
Heptachlor epoxide	<3.9	<41	<3.8	<34	<51	<33	<4.0	<340	<4.1	<380	<3.3	<95	<890	<3.2
Methoxychlor	<69	<730	<67	<600	<900	<580	<70	<5900	<72	<6700	<58	<1700	<16000	<57
Toxaphene	<94	<990	<91	<820	<1200	<790	<96	<8000	<98	<9100	<78	<2300	<21000	<78
PCB-1016	<39	<410	<38	<34	<510	<33	<40	<34	<41	<380	<33	<950	<890	<32
PCB-1221	<39	<410	<38	<34	<510	<33	<40	<34	<41	<380	<33	<950	<890	<32
PCB-1232	<39	<410	<38	<34	<510	<33	<40	<34	<41	<380	<33	<950	<890	<32
PCB-1242	<39	<410	<38	<34	<510	<33	<40	<34	<41	<380	<33	<950	<890	<32
PCB-1248	<39	<410	<38	<34	<510	<33	**110**	<34	**7800**	<380	**170**	<950	**6100**	**1100**
PCB-1254	<39	<410	<38	<34	<51	<33	<40	<34	<41	<38	<33	<950	<890	<32
PCB-1260	**410**	**3300**	**1500**	<34	**440**	<33	<40	<34	**1800**	<38	45	<950	**390 J**	**500**

Bold text indicates results above analytical detection limits.
J = Result estimated, value mesured between the reporting limit and the detection limit

Table 5-5d
North Industrial Corridor (NIC) Site
Sludge Pit Soil Sample Analytical Results, Total Petroleum Hydrocarbons (TPH)

Station	**GP10C-01**	**GP10C-01**	**GP10C-01**	**GP10C-01**	**GP10C-02**	**GP10C-02**	**GP10C-03**	**GP10C-03**	**GP10C-03**	**GP10C-03**
Sample Depth in Feet	**0.5**	**2-4**	**11-13**	**15-17**	**0.5**	**3-5**	**0.5**	**2.5-4.5**	**7.5-9.5**	**12-14**
Sample date	**1/18/01**	**1/18/01**	**1/18/01**	**1/18/01**	**1/18/01**	**1/19/01**	**1/20/01**	**1/19/01**	**1/19/01**	**1/19/01**
Compound	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Fuel Oil	<11	--	<60	<100	<10	<1400	<92	<650	<89	<51
Jet Fuel	<11	--	<60	<100	<10	<1400	<92	<650	<89	<51
Kerosene	<11	--	<60	<100	<10	<1400	<92	<650	<89	<51
Mineral Spirits	<11	--	<60	<100	<10	<1400	<92	<650	<89	<51
Motor Oil	<11	--	<60	<100	**2700**	<1400	<92	<650	<89	<51
TPH as Diesel	<11	--	**6100**	**35000**	<10	**68000**	**25000**	**50000**	**11000**	**3800**
TPH as Gasoline	<6.1	**50**	--	**530**	<5.7	**870**	**48**	--	**14**	**21**

Station	**GP10D-01**	**GP10D-01**	**GP10D-01**	**GP10D-02**	**GP10D-02**	**GP10D-03**	**GP10D-03**	**GP10D-04**	**GP10D-05**
Sample Depth in Feet	**0.5**	**8-10**	**13-15**	**0.5**	**8.5-10.5**	**0.2**	**8-10**	**0.5**	**0.4**
Sample date	**1/19/01**	**1/19/01**	**1/19/01**	**1/18/01**	**1/18/01**	**1/22/01**	**1/22/01**	**1/22/01**	**1/22/01**
Compound	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Fuel Oil	<11	<45	<48	<52	<100	<8.6	<950	<2300	<9.1
Jet Fuel	<11	<45	<48	<52	<100	<8.6	<950	<2300	<9.1
Kerosene	<11	<45	<48	<52	<100	<8.6	<950	<2300	<9.1
Mineral Spirits	<11	<45	<48	<52	<100	<8.6	<950	<2300	<9.1
Motor Oil	<11	<45	<48	**5200**	<100	**1700**	<950	<2300	**720**
TPH as Diesel	<11	**7700**	**4900**	<52	**11000**	<8.6	**70000**	**85000**	<9.1
TPH as Gasoline	<6	**790**	**230**	<6.2	**88**	<5	**340**	**370**	<5

Bold text indicates results above analytical detection limits.

Table 5-5e
North Industrial Corridor (NIC) Site
Sludge Pit Soil Sample Analytical Results, Metals

Station	**GP10C-01**	**GP10C-01**	**GP10C-02**	**GP10C-02**	**GP10C-03**	**GP10C-03**	**GP10D-01**	**GP10D-01**	**GP10D-02**	**GP10D-02**	**GP10D-03**	**GP10D-03**	**GP10D-04**	**GP10D-05**
Sample Depth in Feet	**0.5**	**11-13**	**0.5**	**3-5**	**0.5**	**7.5-9.5**	**0.5**	**8-10**	**0.5**	**8.5-10.5**	**0.2**	**8-10**	**0.5**	**0.4**
Sample date	**1/18/01**	**1/18/01**	**1/18/01**	**1/19/01**	**1/20/01**	**1/19/01**	**1/19/01**	**1/19/01**	**1/18/01**	**1/18/01**	**1/22/01**	**1/22/01**	**1/22/01**	**1/22/01**
Compound	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Aluminum	**15800**	**5280**	**6870**	**12500**	**3280**	**982**	**12600**	**1180**	**52800**	**10800**	**4990**	**8440**	**352**	**8070**
Antimony	<1.15	**5.93**	<1.15	<1.48	<0.991	<1.00	<1.14	<0.998	**15.7**	<1.15	**1.51**	**21.7**	<0.971	**1.75**
Arsenic	**3.14**	**3.53**	**3.76**	<0.740	<0.495	<0.501	**3.12**	<0.499	**3.43**	**1.85**	**1.97**	**7.85**	**0.982**	**3.21**
Barium	**130**	**232**	**115**	**102**	**57.9**	**17.2**	**157**	**19.9**	**786**	**93.2**	**86.8**	**812**	**6.71**	**261**
Beryllium	**0.675**	**0.182**	**0.328**	**0.599**	**0.207**	<0.100	**0.713**	<0.0998	**0.317**	**0.432**	**0.441**	**0.293**	<0.0971	**0.462**
Cadmium	**0.845**	**1.82**	**1.74**	<0.740	<0.495	<0.501	**1.07**	<0.499	**15.3**	<0.575	**10.1**	**12.2**	<0.485	**5.3**
Calcium	**52700**	**12300**	**86300**	**5920**	**11800**	**649**	**17200**	**535**	**40600**	**3450**	**30400**	**22800**	**11800**	**12200**
Chromium	**20.9**	**19.7**	**28.7**	**13.6**	**4.02**	**1.38**	**14.8**	**1.71**	**93.7**	**10.1**	**11.4**	**89.6**	**1.9**	**22.8**
Cobalt	**6.26**	**4.85**	**4.14**	**6.86**	**2.54**	**1.2**	**7.69**	**1.33**	**11**	**4.97**	**4.03**	**13.9**	<0.680	**6.45**
Copper	**18.6**	**47.7**	**31.5**	**18.5**	**6.41**	**1.8**	**27**	**2.42**	**2570**	**170**	**93.9**	**477**	**22**	**75.8**
Iron	**15000**	**19600**	**13900**	**18800**	**4730**	**2240**	**15800**	**3120**	**35300**	**11500**	**9910**	**52900**	**1710**	**19100**
Lead	**38.2**	**685**	**210**	**973**	**14.7**	**3.43**	**54.1**	**2.48**	**1170**	**1380**	**195**	**1590**	**110**	**304**
Magnesium	**11300**	**1820**	**34600**	**3170**	**1150**	**332**	**3890**	**394**	**6320**	**2760**	**4870**	**2670**	**167**	**2410**
Manganese	**277**	**353**	**366**	**157**	**126**	**81.1**	**409**	**48.5**	**660**	**130**	**178**	**527**	**18.9**	**225**
Mercury	<0.188	<0.193	**0.391**	<0.241	<0.162	<0.157	<0.187	<0.158	**1.84**	<0.177	**0.322**	**0.289**	<0.154	**0.354**
Nickel	**15.4**	**8.9**	**11**	**14.3**	**5.2**	<3.01	**16.7**	<2.99	**187**	**10.6**	**16.9**	**146**	<2.91	**64.1**
Potassium	**3590**	**937**	**1600**	**2030**	**684**	**187**	**2580**	**214**	**1580**	**1690**	**1390**	**1220**	<97.1	**1330**
Selenium	<0.575	**4.44**	<0.577	**2.87**	**0.5**	<0.501	**2.24**	<0.499	**6.24**	**1.1**	<0.495	**9.22**	**1.56**	**3.13**
Silver	<0.805	**1.36**	<0.808	<1.04	<0.694	<0.702	<0.801	<0.698	**2.96**	<0.805	<0.693	**1.23**	<0.680	<0.648
Sodium	**202**	**230**	**208**	**425**	**137**	**167**	**90.6**	**259**	**511**	**171**	**525**	**1410**	**3250**	**202**
Thallium	<1.84	<1.88	<1.85	<2.37	<1.59	<1.60	<1.83	<1.60	**3.53**	<1.84	<1.58	**2.18**	<1.55	<1.48
Vanadium	**28.3**	**10.9**	**18**	**27.4**	**10.4**	**4.2**	**30.2**	**5.97**	**23.9**	**24.4**	**16**	**17.1**	**5.03**	**21.2**
Zinc	**85.7**	**836**	**165**	**44.3**	**25.8**	**10.5**	**155**	**8.71**	**4970**	**34.3**	**1790**	**3040**	**61.3**	**701**

Bold text indicates results above analytical detection limits.

CDM

Table 5-6a
North Industrial Corridor (NIC) Site
Sludge Pit Groundwater Sample Analytical Results, VOCs by EPA Method 8260

Station	**GP10C-01**	**GP10C-02**	**GP10C-03**	**GP10D-01**	**GP10D-02**	**GP10D-03**
Groundwater Depth Zone / Sample Depth in Feet	**S/18**	**S/18**	**S/16**	**S/16**	**S/16**	**S/18**
Sample date	**01/18/01**	**01/18/01**	**01/18/01**	**01/19/01**	**01/18/01**	**01/22/01**
Compound	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
1,1,1-Trichloroethane	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethane	**1.8**	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethane	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloropropane	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	**17**	**11**	<1.0	**8.7**	**13**	**3**
Bromodichloromethane	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromoform	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromomethane	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Carbon tetrachloride	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chlorobenzene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloroethane	**12**	**2.1**	<1.0	<1.0	<1.0	<1.0
Chloroform	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloromethane	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
cis-1,2-Dichloroethene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
cis-1,3-Dichloropropene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dibromochloromethane	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	<1.0	**2.4**	<1.0	**5.9**	<1.0	<1.0
m,p-Xylene	<1.3	**7.4**	<1.3	**8.2**	<1.3	<1.3
Methylene chloride	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
o-Xylene	<1.1	**2.4**	<1.1	**5.8**	**1.8**	<1.1
Tetrachloroethene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	<1.0	**1.4**	<1.0	**3.5**	<1.0	**2.7**
trans-1,2-Dichloroethene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
trans-1,3-Dichloropropene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichlorofluoromethane	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vinyl chloride	<1.0	<1.0	<1.0	<1.0	<1.0	**1.4**

Bold text indicates results above analytical detection limits.

Table 5-6b
North Industrial Corridor (NIC) Site
Sludge Pit Groundwater Sample Analytical Results, SVOCs by EPA Method 8270

Station	**GP10C-01**	**GP10C-02**	**GP10C-03**	**GP10D-01**	**GP10D-02**	**GP10D-03**
Groundwater Depth Zone / Sample Depth in Feet	**S/18**	**S/18**	**S/16**	**S/16**	**S/16**	**S/18**
Sample date	**01/18/01**	**01/18/01**	**01/18/01**	**01/19/01**	**01/18/01**	**01/22/01**
Compound	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
1,2,4-Trichlorobenzene	<11	<110	<12	<110	<11	<11
1,2-Dichlorobenzene	<11	<110	<12	<110	<11	<11
1,3-Dichlorobenzene	<11	<110	<12	<110	<11	<11
1,4-Dichlorobenzene	<11	<110	<12	<110	<11	<11
2,4,5-Trichlorophenol	<53	<570	<58	<540	<53	<57
2,4,6-Trichlorophenol	<11	<110	<12	<110	<11	<11
2,4-Dichlorophenol	<11	<110	<12	<110	<11	<11
2,4-Dimethylphenol	<11	<110	<12	<110	<11	<11
2,4-Dinitrophenol	<53	<570	<58	<540	<53	<57
2,4-Dinitrotoluene	<11	<110	<12	<110	<11	<11
2,6-Dinitrotoluene	<11	<110	<12	<110	<11	<11
2-Chloronaphthalene	<11	<110	<12	<110	<11	<11
2-Chlorophenol	<11	<110	<12	<110	<11	<11
2-Methylnaphthalene	**26**	<110	<12	**150**	<11	<11
2-Methylphenol	<11	<110	<12	<110	<11	<11
2-Nitroaniline	<53	<570	<58	<540	<53	<57
2-Nitrophenol	<11	<110	<12	<110	<11	<11
3,3'-Dichlorobenzidine	<21	<230	<23	<220	<21	<23
3-Nitroaniline	<53	<570	<58	<540	<53	<57
4,6-Dinitro-2-methylphenol	<53	<570	<58	<540	<53	<57
4-Bromophenylphenyl ether	<11	<110	<12	<110	<11	<11
4-Chloro-3-methylphenol	<21	<230	<23	<220	<21	<23
4-Chloroaniline	<21	<230	<23	<220	<21	<23
4-Chlorophenylphenyl ether	<11	<110	<12	<110	<11	<11
4-Methylphenol	<11	<110	<12	<110	<11	<11
4-Nitroaniline	<53	<570	<58	<540	<53	<57
4-Nitrophenol	<53	<570	<58	<540	<53	<57
Acenaphthene	<11	<110	<12	<110	<11	<11
Acenaphthylene	<11	<110	<12	<110	<11	<11
Anthracene	<11	<110	<12	<110	<11	<11
Benzo(a)anthracene	<11	<110	<12	<110	<11	<11
Benzo(a)pyrene	<11	<110	<12	<110	<11	<11
Benzo(b)fluoranthene	<11	<110	<12	<110	<11	<11
Benzo(g,h,i)perylene	<11	<110	<12	<110	<11	<11
Benzo(k)fluoranthene	<11	<110	<12	<110	<11	<11
Benzoic acid	<53	<570	<58	<540	<53	<57
Benzyl alcohol	<21	<230	<23	<220	<21	<23

Table 5-6b
North Industrial Corridor (NIC) Site
Sludge Pit Groundwater Sample Analytical Results, SVOCs by EPA Method 8270

Station	**GP10C-01**	**GP10C-02**	**GP10C-03**	**GP10D-01**	**GP10D-02**	**GP10D-03**
Groundwater Depth Zone / Sample Depth in Feet	**S/18**	**S/18**	**S/16**	**S/16**	**S/16**	**S/18**
Sample date	**01/18/01**	**01/18/01**	**01/18/01**	**01/19/01**	**01/18/01**	**01/22/01**
Compound	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
bis(2-Chloroethoxy)methane	<11	<110	<12	<110	<11	<11
bis(2-Chloroethyl) ether	<11	<110	<12	<110	<11	<11
bis(2-Chloroisopropyl) ether	<11	<110	<12	<110	<11	<11
bis(2-Ethylhexyl)phthalate	<11	<110	<12	<110	<11	<11
Butylbenzylphthalate	<11	<110	<12	<110	<11	<11
Chrysene	**11**	<110	<12	<110	<11	<11
Di-n-butylphthalate	<11	<110	<12	<110	<11	<11
Di-n-octylphthalate	<11	<110	<12	<110	<11	<11
Dibenz(a,h)anthracene	<11	<110	<12	<110	<11	<11
Dibenzofuran	<11	<110	<12	<110	<11	<11
Diethylphthalate	<11	<110	<12	<110	<11	<11
Dimethylphthalate	<11	<110	<12	<110	<11	<11
Fluoranthene	<11	<110	<12	<110	<11	<11
Fluorene	<11	<110	<12	<110	<11	<11
Hexachloro-1,3-butadiene	<11	<110	<12	<110	<11	<11
Hexachlorobenzene	<11	<110	<12	<110	<11	<11
Hexachlorocyclopentadiene	<11	<110	<12	<110	<11	<11
Hexachloroethane	<11	<110	<12	<110	<11	<11
Indeno(1,2,3-cd)pyrene	<11	<110	<12	<110	<11	<11
Isophorone	<11	<110	<12	<110	<11	<11
N-Nitroso-di-n-propylamine	<11	<110	<12	<110	<11	<11
N-Nitrosodiphenylamine	<11	<110	<12	<110	<11	<11
Naphthalene	<11	<110	<12	**150**	<11	<11
Nitrobenzene	<11	<110	<12	<110	<11	<11
Pentachlorophenol	<53	<570	<58	<540	<53	<57
Phenanthrene	**33**	<110	<12	<110	<11	<11
Phenol	<11	<110	<12	<110	<11	<11
Pyrene	**21**	<110	<12	<110	<11	<11

Bold text indicates results above analytical detection limits.

Table 5-6c
North Industrial Corridor (NIC) Site
Sludge Pit Groundwater Sample Analytical Results, Pesticides/PCBs by EPA Method 8080

Station	**GP10C-01**	**GP10C-02**	**GP10C-03**	**GP10D-01**	**GP10D-02**	**GP10D-03**
Groundwater Depth Zone / Sample Depth in Feet	**S/18**	**S/18**	**S/16**	**S/16**	**S/16**	**S/18**
Sample date	**01/18/01**	**01/18/01**	**01/18/01**	**01/19/01**	**01/18/01**	**01/22/01**
Compound	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
4,4'-DDD	<0.12	<1.1	<0.12	<0.12	<0.12	<0.12
4,4'-DDE	<0.043	<0.40	<0.044	<0.043	<0.043	<0.045
4,4'-DDT	<0.13	<1.2	<0.13	<0.13	<0.13	<0.14
Aldrin	<0.043	<0.40	<0.044	<0.043	<0.043	<0.045
alpha-BHC	<0.033	<0.30	<0.033	<0.032	<0.032	<0.034
alpha-Chlordane	<0.054	<0.50	<0.055	<0.054	<0.054	<0.057
beta-BHC	<0.065	<0.60	<0.066	<0.065	<0.065	<0.068
Chlordane (Technical)	<0.15	<1.4	<0.15	<0.15	<0.15	<0.16
delta-BHC	<0.098	<0.90	<0.099	<0.097	<0.097	<0.10
Dieldrin	<0.022	<0.20	<0.022	<0.022	<0.022	<0.023
Endosulfan I	<0.15	<1.4	<0.15	<0.15	<0.15	<0.16
Endosulfan II	<0.043	<0.40	<0.044	<0.043	<0.043	<0.045
Endosulfan sulfate	<0.72	<6.6	<0.73	<0.71	<0.71	<0.75
Endrin	<0.065	<0.60	<0.066	<0.065	<0.065	<0.068
Endrin aldehyde	<0.25	<2.3	<0.25	<0.25	<0.25	<0.26
Endrin ketone	<0.11	<1.0	<0.11	<0.11	<0.11	<0.11
gamma-BHC	<0.043	<0.40	<0.044	<0.043	<0.043	<0.045
gamma-Chlordane	<0.054	<0.50	<0.055	<0.054	<0.054	<0.057
Heptachlor	<0.033	<0.30	<0.033	<0.032	<0.032	<0.034
Heptachlor epoxide	<0.11	<1.0	<0.11	<0.11	<0.11	<0.11
Methoxychlor	<1.9	<18	<1.9	<1.9	<1.9	<2.0
Toxaphene	<2.6	<24	<2.6	<2.6	<2.6	<2.7
PCB-1016	<1.1	<10	<1.1	<1.1	<1.1	<1.1
PCB-1221	<1.1	<10	<1.1	<1.1	<1.1	<1.1
PCB-1232	<1.1	<10	<1.1	<1.1	<1.1	<1.1
PCB-1242	<1.1	<10	<1.1	<1.1	<1.1	<1.1
PCB-1248	<1.1	<10	<1.1	<1.1	<1.1	<1.1
PCB-1254	<1.1	<10	<1.1	<1.1	<1.1	<1.1
PCB-1260	<1.1	<10	<1.1	<1.1	<1.1	<1.1

Table 5-6d
North Industrial Corridor (NIC) Site
Sludge Pit Groundwater Sample Analytical Results, Total Petroleum Hydrocarbons (TPH)

Station	**GP10C-01**	**GP10C-02**	**GP10C-03**	**GP10D-01**	**GP10D-02**	**GP10D-03**
Groundwater Depth Zone / Sample Depth in Feet	**S/18**	**S/18**	**S/16**	**S/16**	**S/16**	**S/18**
Sample date	**01/18/01**	**01/18/01**	**01/18/01**	**01/19/01**	**01/18/01**	**01/22/01**
Compound	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
Fuel Oil	<0.40	<20	<0.40	<0.40	<0.40	<0.40
Jet Fuel	<0.40	<20	<0.40	<0.40	<0.40	<0.40
Kerosene	<0.40	<20	<0.40	<0.40	<0.40	<0.40
Mineral Spirits	<0.40	<20	<0.40	<0.40	<0.40	<0.40
Motor Oil	<0.40	<20	<0.40	<0.40	<0.40	<0.40
TPH as Diesel	**15**	**1200**	<0.40	**3.0**	**1.2**	<0.40
TPH as Gasoline	**0.567**	**4.08**	<0.50	**0.849**	**<0.50**	<0.50

Bold text indicates results above analytical detection limits.

Table 5-6e
North Industrial Corridor (NIC) Site
Sludge Pit Groundwater Sample Analytical Results, Dissolved Metals

Station	**GP10C-01**	**GP10C-02**	**GP10C-03**	**GP10D-01**	**GP10D-02**	**GP10D-03**
Groundwater Depth Zone / Sample Depth in Feet	**S/18**	**S/18**	**S/16**	**S/16**	**S/16**	**S/18**
Sample date	**01/18/01**	**01/18/01**	**01/18/01**	**01/19/01**	**01/18/01**	**01/22/01**
Compound	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
Aluminum	<75.0	**519**	<75.0	<75.0	**4190**	<75.0
Antimony	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
Arsenic	<5.00	<5.00	**9.94**	<5.00	**70.8**	**82.2**
Barium	**1620**	**992**	**1070**	**767**	**1300**	**493**
Beryllium	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Cadmium	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
Calcium	**119000**	**150000**	**136000**	**81000**	**150000**	**120000**
Chromium	<7.00	<7.00	<7.00	<7.00	<7.00	<7.00
Cobalt	<7.00	<7.00	<7.00	<7.00	<7.00	<7.00
Copper	<10.0	<10.0	<10.0	<10.0	**13.1**	<10.0
Iron	**36700**	**16900**	**5190**	**13000**	**65800**	**21700**
Lead	**7.15**	**19.3**	**<5.00**	**6.21**	**25.8**	**7.03**
Magnesium	**53600**	**94000**	**31700**	**26100**	**51200**	**31400**
Manganese	**1240**	**3770**	**2640**	**3370**	**651**	**5560**
Mercury	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200
Nickel	<30.0	<30.0	<30.0	<30.0	<30.0	<30.0
Potassium	**16400**	**9670**	**8310**	**2180**	**4430**	**2870**
Selenium	<10.0	<10.0	<10.0	<10.0	<10.0	<5.00
Silver	**7.81**	<7.00	<7.00	<7.00	**8.73**	<7.00
Sodium	**88600**	**34200**	**63400**	**82900**	**117000**	**69300**
Thallium	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
Vanadium	<12.0	<12.0	<12.0	<12.0	<12.0	<12.0
Zinc	**153**	**288**	**147**	**128**	**192**	<100

Bold text indicates results above analytical detection limits.

Table 5-7a
North Industrial Corridor (NIC) Site
Summary Statistics, Detected VOCs, SVOCs, TPH, Pesticides/PCBs, and Metals in Sludge Pit Soil Samples

Analytical Method	Compound	Abbrev	Units	Detects/ Samples	FOD	Minimum Detected Concentration	Average Detected Concentration	Maximum Detected Concentration
VOCs - 8021								
EPA 8021	Toluene	TOL	ug/kg	6 / 19	31.6%	58	810	2500
EPA 8021	Ethylbenzene	EBN	ug/kg	9 / 19	47.4%	95	1641	7700
EPA 8021	Xylene (Total)	XYLT	ug/kg	11 / 19	57.9%	160	4470	26000
VOCs - 8260								
EPA 8260	Ethylbenzene	EBN	ug/kg	4 / 16	25.0%	24	1712	5400
EPA 8260	m,p-Xylene	XYL-MP	ug/kg	8 / 16	50.0%	13	2651	19000
EPA 8260	Methylene chloride	MECL	ug/kg	2 / 16	12.5%	5.5	5.6	5.6
EPA 8260	o-Xylene	XYL-O	ug/kg	4 / 16	25.0%	26	898	2900
EPA 8260	Toluene	TOL	ug/kg	4 / 16	25.0%	8.3	361	1400
EPA 8260	Trichlorofluoromethane	TCFM	ug/kg	1 / 16	6.3%	7.2	7.2	7.2
TPH								
OA2	Motor Oil	TPH-MOIL	mg/kg	4 / 20	20.0%	720	2580	5200
OA2	TPH as Diesel	TPH-DIESEL	mg/kg	14 / 20	70.0%	3800	28536	85000
SVOCs								
EPA 8270	Anthracene	ANTH	ug/kg	2 / 20	10.0%	2800	3050	3300
EPA 8270	Benzo(a)anthracene	BAA	ug/kg	4 / 20	20.0%	380	990	1800
EPA 8270	Benzo(a)pyrene	BAP	ug/kg	1 / 20	5.0%	1800	1800	1800
EPA 8270	Benzo(b)fluoranthene	BBF	ug/kg	1 / 20	5.0%	3000	3000	3000
EPA 8270	Benzo(g,h,i)perylene	BGP	ug/kg	1 / 20	5.0%	2100	2100	2100
EPA 8270	Benzo(k)fluoranthene	BKF	ug/kg	1 / 20	5.0%	970	970	970
EPA 8270	Chrysene	CHRY	ug/kg	8 / 20	40.0%	860	2378	4500
EPA 8270	Fluoranthene	FLOUR	ug/kg	1 / 20	5.0%	2100	2100	2100
EPA 8270	Fluorene	FLUORENE	ug/kg	2 / 20	10.0%	390	390	390
EPA 8270	Indeno(1,2,3-cd)pyrene	IP	ug/kg	1 / 20	5.0%	1300	1300	1300
EPA 8270	Naphthalene	NAP	ug/kg	3 / 20	15.0%	1700	4633	7100
EPA 8270	Phenanthrene	PHEN	ug/kg	13 / 20	65.0%	1100	5654	16000

Table 5-7a
North Industrial Corridor (NIC) Site
Summary Statistics, Detected VOCs, SVOCs, TPH, Pesticides/PCBs, and Metals in Sludge Pit Soil Samples

Analytical Method	Compound	Abbrev	Units	Detects/ Samples	FOD	Minimum Detected Concentration	Average Detected Concentration	Maximum Detected Concentration
EPA 8270	Pyrene	PYR	ug/kg	11 / 20	55.0%	520	3693	13000
EPA 8270	2-Methylnaphthalene	2MN	ug/kg	7 / 20	35.0%	1500	8400	25000
EPA 8270	bis(2-Ethylhexyl)phthalate	BIS2EHP	ug/kg	3 / 20	15.0%	1800	13067	35000
EPA 8270	Butylbenzylphthalate	BBP	ug/kg	2 / 20	10.0%	3900	5700	7500
Pesticides/PCBs								
EPA 8082	PCB-1248	PCB-1248	ug/kg	5 / 16	31.3%	110	3056	7800
EPA 8082	PCB-1260	PCB-1260	ug/kg	8 / 16	50.0%	45	1048	3300
Metals								
EPA 6010	Aluminum	AL	mg/kg	16 / 16	100.0%	352	9733	52800
EPA 6010	Antimony	SB	mg/kg	5 / 16	31.3%	1.51	9.3	21.7
EPA 6010	Arsenic	AS	mg/kg	11 / 16	68.8%	0.982	3.2	7.85
EPA 6010	Barium	BA	mg/kg	16 / 16	100.0%	6.71	187	812
EPA 6010	Beryllium	BE	mg/kg	12 / 16	75.0%	0.182	0.42	0.713
EPA 6010	Cadmium	CD	mg/kg	8 / 16	50.0%	0.845	6.0	15.3
EPA 6010	Calcium	CA	mg/kg	16 / 16	100.0%	535	19547	86300
EPA 6010	Chromium	CR	mg/kg	16 / 16	100.0%	1.38	22	93.7
EPA 6010	Cobalt	CO	mg/kg	15 / 16	93.8%	1.2	5.4	13.9
EPA 6010	Copper	CU	mg/kg	16 / 16	100.0%	1.8	233	2570
EPA 6010	Iron	FE	mg/kg	16 / 16	100.0%	1710	14834	52900
EPA 6010	Lead	PB	mg/kg	16 / 16	100.0%	2.48	507	1590
EPA 6010	Magnesium	MG	mg/kg	16 / 16	100.0%	167	4934	34600
EPA 6010	Manganese	MN	mg/kg	16 / 16	100.0%	18.9	235	660
EPA 6010	Nickel	NI	mg/kg	12 / 16	75.0%	5.2	42	187
EPA 6010	Potassium	K	mg/kg	15 / 16	93.8%	187	1394	3590
EPA 6010	Selenium	SE	mg/kg	10 / 16	62.5%	0.5	3.2	9.22
EPA 6010	Silver	AG	mg/kg	3 / 16	18.8%	1.23	1.9	2.96
EPA 6010	Sodium	NA	mg/kg	16 / 16	100.0%	90.6	508	3250

Table 5-7a
North Industrial Corridor (NIC) Site
Summary Statistics, Detected VOCs, SVOCs, TPH, Pesticides/PCBs, and Metals in Sludge Pit Soil Samples

Analytical Method	Compound	Abbrev	Units	Detects/ Samples	FOD	Minimum Detected Concentration	Average Detected Concentration	Maximum Detected Concentration
EPA 6010	Thallium	TI	mg/kg	2 / 16	12.5%	2.18	2.9	3.53
EPA 6010	Vanadium	V	mg/kg	16 / 16	100.0%	4.2	17	30.2
EPA 6010	Zinc	ZN	mg/kg	16 / 16	100.0%	8.71	748	4970
EPA 7471	Mercury	HG	mg/kg	5 / 16	31.3%	0.289	0.6	1.84

NOTE: Only detected analytes presented.
MCL = Safe Drinking Water Act Maximum Contaminant Level in Drinking Water.
FOD = Frequency of Detection.

Table 5-7b
North Industrial Corridor (NIC) Site
Summary Statistics, Detected VOCs, SVOCs, TPH, and Metals in Sludge Pit Groundwater Samples

Analytical Method	Compound	MCL	Units	Detects/ Samples	FOD	Minimum Detected Concentration	Average Detected Concentration	Maximum Detected Concentration	Location of Maximum Reported Concentration
VOCs - 8260									
EPA 8260	1,1-Dichloroethane	--	µg/l	1 / 6	17%	1.8	1.8	1.8	GP10C-01
EPA 8260	Benzene	5	µg/l	5 / 6	83%	2.8	11	17	GP10C-01
EPA 8260	Chloroethane	--	µg/l	2 / 6	33%	2.1	7.1	12	GP10C-01
EPA 8260	Ethylbenzene	700	µg/l	2 / 6	33%	2.4	4.2	5.9	GP10D-01
EPA 8260	m,p-Xylene	10000	µg/l	2 / 6	33%	7.4	7.8	8.2	GP10D-01
EPA 8260	o-Xylene	10000	µg/l	3 / 6	50%	1.8	3.3	5.8	GP10D-01
EPA 8260	Toluene	1000	µg/l	3 / 6	50%	1.4	2.5	3.5	GP10D-01
EPA 8260	Vinyl chloride	2	µg/l	1 / 6	17%	1.3	1.3	1.3	GP10D-03
VOCs - 8021									
EPA 8021	Benzene	5	µg/l	5 / 6	83%	2.92	8.6	11.4	GP10C-01
EPA 8021	Toluene	1000	µg/l	2 / 6	33%	3.35	3.4	3.4	GP10D-01
EPA 8021	Ethylbenzene	700	µg/l	1 / 6	17%	4.58	4.6	4.58	GP10D-01
EPA 8021	Xylene (Total)	10000	µg/l	2 / 6	33%	13.5	18	22.9	GP10C-02
SVOCs									
EPA 8270	2-Methylnaphthalene	--	µg/l	2 / 6	33%	26	88	150	GP10D-01
EPA 8270	Chrysene	--	µg/l	1 / 6	17%	11	11	11	GP10C-01
EPA 8270	Naphthalene	--	µg/l	1 / 6	17%	150	150	150	GP10D-01
EPA 8270	Phenanthrene	--	µg/l	1 / 6	17%	33	33	33	GP10C-01
EPA 8270	Pyrene	--	µg/l	1 / 6	17%	21	21	21	GP10C-01
TPH									
OA2	TPH as Diesel	--	mg/l	4 / 6	67%	1.2	305	1200	GP10C-02
Metals									
EPA 6010	Aluminum	--	µg/l	3 / 6	50%	94.5	1601	4190	GP10D-02
EPA 6010	Arsenic	50	µg/l	3 / 6	50%	9.94	54	82.2	GP10D-03
EPA 6010	Barium	2000	µg/l	6 / 6	100%	493	1040	1620	GP10C-01
EPA 6010	Calcium	--	µg/l	6 / 6	100%	81000	126000	150000	GP10C-02,GP10D-02
EPA 6010	Copper	1300	µg/l	1 / 6	17%	13.1	13	13.1	GP10D-02
EPA 6010	Iron	--	µg/l	6 / 6	100%	5190	26548	65800	GP10D-02
EPA 6010	Lead	15	µg/l	5 / 6	83%	6.21	13	25.8	GP10D-02
EPA 6010	Magnesium	--	µg/l	6 / 6	100%	26100	48000	94000	GP10C-02

Table 5-7b
North Industrial Corridor (NIC) Site
Summary Statistics, Detected VOCs, SVOCs, TPH, and Metals in Sludge Pit Groundwater Samples

Analytical Method	Compound	MCL	Units	Detects/ Samples	FOD	Minimum Detected Concentration	Average Detected Concentration	Maximum Detected Concentration	Location of Maximum Reported Concentration
EPA 6010	Manganese	--	µg/l	6 / 6	100%	651	2867	5530	GP10D-03
EPA 6010	Potassium	--	µg/l	6 / 6	100%	2180	7313	16400	GP10C-01
EPA 6010	Silver	--	µg/l	2 / 6	33%	7.81	8.3	8.73	GP10D-02
EPA 6010	Sodium	--	µg/l	6 / 6	100%	34200	76000	117000	GP10D-02
EPA 6010	Zinc	10000	µg/l	5 / 6	83%	128	182	288	GP10C-02

NOTE: Only detected analytes presented.
MCL = Safe Drinking Water Act Maximum Contaminant Level in Drinking Water.
FOD = Frequency of Detection.

Table 5-8
North Industrial Corridor (NIC) Site
Geoprobe Groundwater Sample Analytical Results, Site VOCs* by EPA Method 8260

Station	Groundwater Depth Zone / Depth (feet)	Investigation Phase	Sample Date	QC Sample Flag	Units	PCE	TCE	C12DCE	VC	TCA	11DCA	11DCE	CT	CFM	BEN	Other Detected Compounds
GP#11-1	S/20	PH1	01/16/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP#11-2	S/20	PH1	01/15/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP#18-07A	S/17	PH2	08/29/00		µg/L	<1	78	57	1.1	<1	1.2	<1	<1	<1	<1	T12DCE 5.4
GP#18-07A	D/35	PH2	08/29/00		µg/L	<1	110	110	3.8	<1	1.5	<1	<1	<1	<1	T12DCE 8.1
GP#18-1	S/20	PH1	01/08/98		µg/L	<1	18	5.7	<1	110	7.5	26	<1	8.1	<1	12DCA 20, EBN 130, XYL-MP 110, XYL-O 1.7
GP#18-1	S/20	PH2	10/15/99		µg/L	<1	12	9.7	1	5.5	4.4	<1	<1	<1	<1	EBN 110, TOL 9.1, XYL-MP 38, XYL-O 10
GP#18-1	D/33	PH1	01/08/98		µg/L	1.9	62	17	<1	5.9	1	2.1	<1	<1	<1	EBN 27, XYL-MP 22
GP#18-2	S/20	PH1	01/08/98		µg/L	2.2	60	16	<1	5.9	<1	2.3	<1	<1	<1	EBN 27, XYL-MP 22
GP#18-2	S/20	PH2	10/15/99		µg/L	<1	26	9.2	<1	38	1	8.8	<1	1	<1	None
GP#18-2	D/32	PH1	01/08/98		µg/L	2.8	64	16	<1	5.4	1	1.8	<1	<1	<1	EBN 25, XYL-MP 21
GP#18-3	S/20	PH1	01/08/98		µg/L	<1	<1	4.8	21	<1	6	<1	<1	<1	8.2	EBN 1.2, XYL-MP 1.3
GP#18-3	D/33	PH1	01/08/98		µg/L	3.6	86	49	3.6	<1	1.8	1.1	<1	<1	<1	None
GP#18-4	S/20	PH1	01/08/98		µg/L	<1	11	17	15	8.3	23	13	<1	<1	1.4	None
GP#18-4	D/30	PH1	01/08/98		µg/L	<1	23	24	<1	64	6	34	<1	1.9	<1	None
GP#18-5	S/18	PH1	06/04/98		µg/L	<1	180	12	<1	110	12	33	<1	1.2	<1	MECL 2.4 UB
GP#18-5	S/18	PH2	10/15/99		µg/L	<1	120	10	<1	99	6.6	26	<1	2	<1	None
GP#18-5	D/30	PH1	06/04/98		µg/L	<1	39	10	<1	12	2.7	6	<1	<1	<1	MECL 1.6 UB
GP#18-6	S/18	PH1	06/04/98		µg/L	<1	50	8.9	<1	100	1.3	38	<1	9.9	<1	MECL 1 UB
GP#18-6	S/18	PH2	10/15/99		µg/L	<1	35	6.3	<1	180	3.4	52	<1	5.8	<1	None
GP#18-6	D/30	PH1	06/04/98		µg/L	<1	58	9.4	<1	2.1	<1	<1	<1	<1	<1	MECL 2 UB
GP#18-7	S/18	PH1	06/04/98		µg/L	<1	2.9	1.2	<1	2.6	<1	<1	<1	<1	<1	MECL 1 UB
GP#18-7	S/18	PH2	10/15/99		µg/L	<1	170	86	4.1	<1	1.4	2	<1	<1	<1	T12DCE 5.7
GP#18-7	D/30	PH1	06/04/98		µg/L	1.7	170	71	6.5	<1	2.3	2.7	<1	<1	<1	MECL 1.1 UB, T12DCE 3.2
GP#19-1	S/20	PH1	06/02/98		µg/L	<1	46	13	1	<1	<1	<1	<1	<1	<1	MECL 1.8 UB
GP#19-1	D/27	PH1	06/02/98		µg/L	1	220	46	5.3	1.1	3	6.8	<1	<1	<1	MECL 1.6 UB, T12DCE 3.8
GP#19-2	S/19	PH1	06/02/98		µg/L	<1	140	61	30	<1	1.5	1.9	<1	<1	<1	MECL 1.4 UB, T12DCE 2
GP#19-2	S/19	PH2	10/15/99		µg/L	<1	55	35	32	<1	1.3	<1	<1	<1	<1	CHEA 1.3, T12DCE 2.1
GP#19-2	D/30	PH1	06/02/98		µg/L	<1	240	58	7.1	<1	1.8	3.1	<1	<1	<1	T12DCE 2.7
GP#19-3	S/20	PH1	06/02/98		µg/L	<1	32	31	8.4	<1	1.4	<1	<1	<1	<1	MECL 1.7 UB
GP#19-3	D/28	PH1	06/02/98		µg/L	1.2	280	65	7.6	<1	2.9	5.3	<1	<1	<1	MECL 1.7 UB, T12DCE 5.3
GP#19-4	S/20	PH1	06/02/98		µg/L	<1	83	32	<1	<1	<1	<1	<1	<1	<1	MECL 2.6 UB, T12DCE 2.7
GP#19-4	D/28	PH1	06/02/98		µg/L	1	360	100	14	<1	6.4	9.7	<1	<1	<1	MECL 2.5 UB, T12DCE 6.6
GP#19-5	S/20	PH1	06/02/98		µg/L	<1	45	70	31	<1	1.2	1.4	<1	<1	<1	MECL 3 UB, T12DCE 1.9
GP#19-5	D/29	PH1	06/02/98		µg/L	1.2	330	56	4.5	<1	2.5	6.6	<1	<1	<1	MECL 2.7 UB, T12DCE 5.8
GP#19-6	S/20	PH1	06/01/98		µg/L	2.2	310	40	2.7	<1	1.7	2.5	<1	<1	<1	T12DCE 3
GP#19-6	S/20	PH2	10/15/99		µg/L	3.4	160	27	1.2	<1	<1	1.3	<1	<1	<1	T12DCE 2.3
GP#19-6	D/28	PH1	06/01/98		µg/L	1	440	66	2.7	<1	2.1	2.4	<1	<1	<1	T12DCE 4.4
GP#19-7	S/20	PH1	06/01/98		µg/L	1.6	170	25	<1	<1	<1	1.2	<1	<1	<1	MECL 1.5 UB, T12DCE 1.6
GP#19-7	D/29	PH1	06/01/98		µg/L	1.7	620	85	7.3	<1	2.5	5.9	<1	<1	<1	MECL 1.6, T12DCE 5.9
GP#19-8	M/22	PH1	06/01/98		µg/L	<1	190	26	<1	<1	<1	<1	<1	<1	<1	T12DCE 1.2
GP#19-8	D/30	PH1	06/01/98		µg/L	2.3	790	110	9.2	<1	4.2	9	<1	<1	<1	T12DCE 9.5
GP#23-1	S/18	PH1	06/02/98		µg/L	<1	22	7.2	<1	<1	<1	<1	<1	<1	<1	None
GP#23-1	D/32	PH1	06/02/98		µg/L	<1	250	70	16	1.9	4.5	16	<1	<1	<1	T12DCE 3.6
GP#28-1	S/20.5	PH1	12/22/97		µg/L	<1	1.4	<1	<1	<1	<1	<1	150	62	<1	CCL4 150
GP#28-1	D/36	PH1	12/22/97		µg/L	<1	14	6.6	<1	<1	<1	<1	18	19	<1	CCL4 18
GP#29-1	S/20	PH1	01/23/98		µg/L	<1	5.2	1.1	<1	<1	<1	<1	<1	<1	<1	None
GP#29-1	D/36	PH1	01/22/98		µg/L	<1	110	39	9.1	<1	1.3	2.5	<1	<1	<1	None
GP#32-1	S/20	PH1	01/22/98		µg/L	<1	140	73	17	1.7	4.2	11	<1	<1	<1	T12DCE 2
GP#32-1	S/20	PH2	10/21/99		µg/L	<1	5.8	5.9	1.4	<1	<1	<1	<1	<1	<1	None
GP#32-1	D/34	PH1	01/22/98		µg/L	<1	260	150	35	1.6	5.8	16	<1	<1	1.4	CM 2.5, T12DCE 3

Table 5-8
North Industrial Corridor (NIC) Site
Geoprobe Groundwater Sample Analytical Results, Site VOCs* by EPA Method 8260

Station	Groundwater Depth Zone / Depth (feet)	Investigation Phase	Sample Date	QC Sample Flag	Units	PCE	TCE	C12DCE	VC	TCA	11DCA	11DCE	CT	CFM	BEN	Other Detected Compounds
GP#34-1	S/20	PH1	01/22/98		µg/L	<1	**2**	**2.5**	<1	<1	<1	<1	<1	<1	<1	None
GP#34-1	D/37	PH1	01/22/98		µg/L	<1	**160**	**99 JS**	**73 JS**	<1	**6.2 JS**	**9.8 JS**	<1	<1	**2.4 JS**	CM 5.3 JS, MECL 1.5 JS, T12DCE 2.2 JS
GP#34-1	D/37	PH1	01/22/98	DUP	µg/L	<1	**170**	**110**	**81**	<1	**6.3**	**10**	<1	<1	**2.4**	CM 5.3, MECL 1.6, T12DCE 2.4
GP#34-10	S/18	PH1	06/08/98		µg/L	<1	**22**	**57**	**3.1**	<1	**2.3**	**5.1**	<1	<1	<1	T12DCE 1.1
GP#34-10	S/18	PH2	01/10/00		µg/L	<1	**6.4**	**120**	**8.4**	<1	**3.2**	**5.9**	<1	<1	<1	T12DCE 8.1
GP#34-10	D/36	PH1	06/08/98		µg/L	<1	**240**	**160**	**34**	**1.1**	**6.9**	**21**	<1	<1	<1	None
GP#34-2	S/20	PH1	01/22/98		µg/L	<1	**11**	**8.4**	**2.9**	<1	<1	<1	<1	<1	<1	None
GP#34-2	D/35	PH1	01/22/98		µg/L	<1	**220 JS**	**110 JS**	**110 JS**	<1	**7 JS**	**12 JS**	<1	<1	**2.6 JS**	CHEA 2.2 JS, T12DCE 2.1 JS
GP#34-3	S/20	PH1	01/20/98		µg/L	<1	**24**	**26**	<1	<1	<1	<1	<1	<1	<1	None
GP#34-3	D/39	PH1	01/20/98		µg/L	<1	**340**	**170**	**11**	**1.8**	**3.6**	**12**	<1	<1	<1	T12DCE 2.8
GP#34-4	S/20	PH1	01/20/98		µg/L	<1	**14**	**50**	<1	<1	<1	<1	<1	<1	<1	T12DCE 1.5
GP#34-4	D/37	PH1	01/20/98		µg/L	<1	**170**	**170**	**42**	<1	**6.4**	**18**	<1	<1	<1	T12DCE 4
GP#34-5	S/20	PH1	01/20/98		µg/L	<1	**<1**	<1	<1	<1	<1	<1	<1	<1	<1	None
GP#34-5	D/37	PH1	01/20/98		µg/L	<1	**56**	**150**	**25**	<1	**2.9**	**6.7**	<1	<1	<1	None
GP#34-5	D/37	PH1	01/20/98	DUP	µg/L	<1	**54**	**150**	**22**	<1	**2.7**	**6.6**	<1	<1	<1	None
GP#34-6	S/20	PH1	01/20/98		µg/L	<1	**35**	**79**	**5.2**	<1	**2.1**	**4.6**	<1	<1	<1	T12DCE 1.7
GP#34-6	D/36	PH1	01/20/98		µg/L	<1	**360**	**170**	**53**	**2.5**	**9.3**	**28**	<1	<1	**1.1**	12DCA 1
GP#34-7	S/18	PH1	06/08/98		µg/L	<1	**120**	**160**	**3.3**	<1	**4.3**	**8.6**	<1	<1	<1	MECL 1.2, T12DCE 3.4
GP#34-7	S/18	PH2	10/21/99		µg/L	<1	**37**	**55**	<1	<1	**1.4**	**1.7**	<1	<1	<1	T12DCE 3.1
GP#34-7	D/36	PH1	06/08/98		µg/L	<1	**52**	**220**	**18**	<1	**4.4**	**14**	<1	<1	<1	CM 1.6, MECL 1.4, T12DCE 3.4
GP#34-7	D/36	PH1	06/08/98	DUP	µg/L	<1	**51**	**220**	**17**	<1	**4.4**	**14**	<1	<1	<1	CM 1.4, MECL 1.3 UB, T12DCE 3.4
GP#34-8	S/18	PH1	06/08/98		µg/L	<1	**20**	**14**	<1	<1	<1	**1.7**	<1	<1	<1	MECL 1.2
GP#34-8	D/36	PH1	06/08/98		µg/L	<1	**150**	**130**	**30**	<1	**4.4**	**13**	<1	<1	<1	None
GP#34-9	S/18	PH1	06/08/98		µg/L	<1	**17**	**59**	**3.4**	<1	**1.5**	**2.7**	<1	<1	<1	None
GP#34-9	D/36	PH1	06/08/98		µg/L	<1	**97**	**130**	**30**	<1	**3.7**	**9.8**	<1	<1	<1	None
GP#35-1	S/16	PH1	06/08/98		µg/L	<1	**2**	<1	<1	<1	<1	<1	<1	<1	<1	None
GP#35-1	D/36	PH1	06/08/98		µg/L	<1	**190**	**59**	**1.1**	<1	<1	<1	<1	<1	<1	MECL 1.3
GP#35-2	S/20	PH2	10/19/99		µg/L	<1	**3.7**	<1	<1	<1	<1	<1	<1	<1	<1	None
GP#35-2	S/16	PH1	06/05/98		µg/L	<1	**61**	**14**	<1	<1	<1	<1	<1	<1	<1	TCFM 1.4
GP#35-2	D/36	PH1	06/05/98		µg/L	<1	**37**	**3**	<1	<1	<1	<1	<1	<1	<1	MECL 2.9 UB
GP#35-3	M/25	PH1	06/05/98		µg/L	<1	**41**	**12**	<1	<1	<1	**1.9**	<1	<1	<1	None
GP#35-3	D/36	PH1	06/05/98		µg/L	<1	**530**	**240**	**1.7**	**15**	**10**	**52**	**5.3**	**4**	**1.2**	12DCA 1.4, CCL4 5.3, MECL 1.3 UB, T12DCE 15
GP#35-4	S/20	PH1	06/08/98		µg/L	**1.7**	**490**	**170**	**25**	**6.4**	**14**	**48**	<1	<1	<1	T12DCE 30
GP#35-4	S/20	PH2	10/19/99		µg/L	<1	**220**	**78**	**12**	**2.7**	**5.3**	**15**	<1	<1	<1	T12DCE 14
GP#35-4	D/36	PH1	06/08/98		µg/L	<1	**890**	**310**	**54**	**10**	**21**	**77**	<1	<1	**4.1**	T12DCE 54
GP#35-5	S/20	PH1	06/08/98		µg/L	<1	**19**	**11**	**48**	<1	**4.4**	<1	<1	<1	**43**	None
GP#35-5	D/37	PH1	06/08/98		µg/L	<1	**460**	**100**	**5.4**	**11**	**5.4**	**30**	<1	**2.6**	**3.9**	T12DCE 3.7
GP#35-8	S/20	PH1	06/09/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	**100**	EBN 3.1, TOL 10, XYL-MP 34, XYL-O 6.7
GP#35-8	D/36	PH1	06/09/98		µg/L	<1	**2.3**	**21**	<1	<1	<1	<1	<1	<1	**9.2**	EBN 3.2, XYL-MP 2.3
GP#42-1	M/26	PH1	01/21/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP#42-1	D/39	PH1	01/21/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP#42-2	S/20	PH1	01/22/98		µg/L	**8**	**1.4**	<1	<1	<1	<1	<1	<1	<1	<1	None
GP#42-2	D/37	PH1	01/22/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP#42-3	S/20	PH1	01/21/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP#42-3	D/36	PH1	01/21/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP#42-4	S/20	PH1	01/21/98		µg/L	**17**	**5.1**	<1	<1	<1	<1	<1	<1	<1	<1	None
GP#42-4	D/36	PH1	01/21/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None

Table 5-8
North Industrial Corridor (NIC) Site
Geoprobe Groundwater Sample Analytical Results, Site VOCs* by EPA Method 8260

Station	Groundwater Depth Zone / Depth (feet)	Investigation Phase	Sample Date	QC Sample Flag	Units	PCE	TCE	C12DCE	VC	TCA	11DCA	11DCE	CT	CFM	BEN	Other Detected Compounds
GP#43-1	S/20	PH1	12/22/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP#43-1	D/33	PH1	12/22/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP#43-1	D/33	PH1	12/22/97	DUP	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP#44-1	S/20	PH1	01/16/98		µg/L	<1	<1	**23**	<1	<1	<1	<1	<1	<1	**2.9**	None
GP#44-1	D/31	PH1	01/16/98		µg/L	<1	**32**	**24**	<1	<1	<1	<1	<1	<1	<1	None
GP#44-2	S/20	PH1	01/16/98		µg/L	<1	**15**	**8.1**	<1	<1	**5.6**	<1	<1	<1	<1	T12DCE 1.3
GP#44-2	D/33	PH1	01/16/98		µg/L	<1	**17**	**29**	<1	<1	**2.7**	**1.8**	<1	<1	<1	None
GP#44-3	S/20	PH1	01/16/98		µg/L	<1	**18**	**12**	<1	<1	**4**	<1	<1	<1	<1	None
GP#44-3	D/33	PH1	01/16/98		µg/L	<1	**4**	**33**	**2.8**	<1	**1.9**	**1**	<1	<1	<1	T12DCE 2
GP#44-4	S/20	PH1	01/16/98		µg/L	<1	**23**	**14**	<1	**5.4**	**3**	<1	<1	<1	<1	None
GP#44-4	D/35	PH1	01/16/98		µg/L	<1	**11**	**41**	<1	<1	**2.4**	**1.4**	<1	<1	<1	T12DCE 3.4
GP#44-4	D/35	PH1	01/16/98	DUP	µg/L	<1	**9.7**	**41**	<1	<1	**2.4**	**1.6**	<1	<1	<1	T12DCE 3.7
GP#44-5	S/20	PH1	01/16/98		µg/L	<1	**30**	**21**	<1	<1	**2.3**	<1	<1	<1	<1	T12DCE 1.6
GP#44-5	D/32	PH1	01/16/98		µg/L	<1	**12**	**29**	**2.3**	<1	**2.1**	<1	<1	<1	<1	T12DCE 1.8
GP#44-6	S/20	PH1	01/16/98		µg/L	<1	**28**	**26**	<1	<1	**2.2**	<1	<1	<1	<1	T12DCE 2
GP#44-6	D/33	PH1	01/16/98		µg/L	<1	**23**	**32**	**1.2**	<1	**2.6**	<1	<1	<1	<1	T12DCE 2.4
GP#47-1	S/20	PH1	01/07/98		µg/L	**3.3**	**70**	**43**	**10**	<1	**3**	**5.3**	<1	<1	<1	T12DCE 1.1
GP#47-1	S/20	PH2	10/19/99		µg/L	**2.2**	**89**	**51**	**23**	<1	**6.1**	**10**	<1	<1	**1.5**	T12DCE 7.0
GP#47-1	D/33	PH1	01/07/98		µg/L	**1.7**	**550**	**150**	**60**	**6.8**	**19**	**40**	<1	<1	**6.9**	None
GP#47-2	S/20	PH1	01/07/98		µg/L	<1	**190**	**69**	**16**	**1.4**	**6.6**	**10**	<1	<1	<1	None
GP#47-2	D/33	PH1	01/07/98		µg/L	**1**	**710**	**140**	**68**	**7.8**	**15**	**46**	<1	<1	**2.7**	None
GP#47-3	S/20	PH1	01/07/98		µg/L	<1	**75**	**15**	<1	<1	**1.3**	<1	<1	<1	<1	None
GP#47-3	D/33	PH1	01/07/98		µg/L	<1	**480**	**100**	**39**	**4.2**	**8.1**	**26**	<1	<1	<1	T12DCE 4
GP#47-4	S/20	PH1	01/07/98		µg/L	<1	**19**	**25**	**2.6**	<1	**1.3**	<1	<1	<1	<1	None
GP#47-4	D/33	PH1	01/07/98		µg/L	<1	**320**	**70**	**30**	**5.2**	**8.6**	**26**	<1	<1	<1	T12DCE 4.1
GP#47-5	S/20	PH1	01/07/98		µg/L	<1	**69**	**13**	<1	<1	<1	<1	<1	<1	<1	None
GP#47-5	D/33	PH1	01/07/98		µg/L	**1.3**	**240**	**51**	**3**	**1**	**2**	**3.5**	<1	<1	<1	T12DCE 2
GP#47-6	S/20	PH1	01/08/98		µg/L	<1	**100**	**28**	**2.8**	<1	**1.6**	**2.5**	<1	<1	<1	None
GP#47-6	D/33	PH1	01/08/98		µg/L	<1	**290**	**67**	**31**	**3.2**	**6.2**	**19**	<1	<1	<1	T12DCE 4
GP#47-7	S/20	PH1	01/08/98		µg/L	<1	**180**	**66**	**8.7**	**1.7**	**4.8**	**7.1**	<1	<1	<1	T12DCE 1.9
GP#47-7	D/32	PH1	01/08/98		µg/L	**1**	**400**	**92**	**43**	**5**	**9.1**	**28**	<1	<1	<1	T12DCE 4.1
GP#47-8	S/20	PH1	01/07/98		µg/L	<1	**80**	**16**	<1	<1	<1	<1	<1	<1	<1	None
GP#47-8	D/30	PH1	01/07/98		µg/L	**1.2**	**260**	**52**	**4.9**	**1.5**	**2.3**	**5.5**	<1	<1	<1	T12DCE 2.4
GP#48-1	S/16	PH1	06/05/98		µg/L	<1	**1.9**	**1.1**	<1	<1	<1	<1	<1	<1	<1	MECL 1.2 UB
GP#48-1	D/32	PH1	06/05/98		µg/L	<1	<1	**2.8**	**9.4**	<1	<1	<1	<1	<1	**9.3**	CM 2.9, MECL 2.7 UB
GP#48-2	S/16	PH1	06/05/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP#48-2	D/36	PH1	06/05/98		µg/L	<1	**53**	**25**	**40**	<1	**3.6**	**2.3**	<1	<1	**140**	CM 8.2, EBN 2.4, TOL 1.2, XYL-MP 1.4
GP#48-2	D/36	PH1	06/05/98	DUP	µg/L	<1	**56**	**22**	**35**	<1	**3.2**	**2**	<1	<1	**140**	CM 6.3, EBN 2.1, TOL 1.1
GP#48-3	S/16	PH1	06/05/98		µg/L	<1	**360**	**360**	**1.9**	**7.6**	**14**	**39**	<1	<1	**2.2**	MECL 2.8 UB, T12DCE 38
GP#48-3	S/16	PH2	12/20/99		µg/L	<1	**220**	**280**	**14**	**2.3**	**11**	**21**	<1	**1.1**	**1.4**	T12DCE 41
GP#48-3	D/36	PH1	06/05/98		µg/L	<1	**590**	**200**	**2**	**15**	**11**	**45**	**5.8**	**4**	**1.4**	12DCA 1.6, CCL4 5.8, MECL 1 UB, T12DCE 11
GP#48-3	D/34	PH2	12/20/99		µg/L	<1	**87**	**44**	**61**	**1.8**	**6.7**	**13**	<1	**1.1**	**21**	12DCA 1.1, CHEA 5.3, T12DCE 32
GP#48-4	S/18	PH1	06/05/98		µg/L	<1	**12**	**3.2**	<1	<1	<1	<1	<1	<1	<1	None
GP#48-4	D/36	PH1	06/05/98		µg/L	<1	**56**	**5.5**	<1	<1	<1	**1.8**	<1	<1	<1	None
GP#48-5	S/18	PH1	06/05/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP#48-5	D/36	PH1	06/05/98		µg/L	**1.7**	**140**	**100**	**52**	<1	**5.7**	**11**	<1	<1	**2.2**	T12DCE 1.9
GP#48-6	S/18	PH1	06/05/98		µg/L	<1	**140**	**50**	**13**	**1**	**5.8**	**10**	<1	<1	<1	T12DCE 2.5
GP#48-6	D/36	PH1	06/05/98		µg/L	<1	**360**	**120**	**60**	**1.4**	**12**	**23**	<1	<1	**6.4**	T12DCE 3.4

Table 5-8
North Industrial Corridor (NIC) Site
Geoprobe Groundwater Sample Analytical Results, Site VOCs* by EPA Method 8260

Station	Groundwater Depth Zone / Depth (feet)	Investigation Phase	Sample Date	QC Sample Flag	Units	PCE	TCE	C12DCE	VC	TCA	11DCA	11DCE	CT	CFM	BEN	Other Detected Compounds
GP#48-7	S/18	PH1	06/05/98		µg/L	<1	**10**	**14**	<1	<1	<1	<1	<1	<1	<1	None
GP#48-7	D/36	PH1	06/05/98		µg/L	<1	**600**	**170**	**70**	**5.7**	**22**	**50**	<1	<1	**7.1**	T12DCE 27
GP#50-1	S/20	PH1	01/08/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP#50-1	D/39	PH1	01/08/98		µg/L	<1	**36**	17	**26**	<1	<1	<1	<1	<1	<1	None
GP#50-1	D/39	PH1	01/08/98	DUP	µg/L	<1	**33**	16	**25**	<1	<1	<1	<1	<1	<1	None
GP#50-2	S/20	PH1	01/08/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP#50-2	D/37	PH1	01/08/98		µg/L	<1	**42**	**25**	**21**	<1	<1	**1.1**	<1	<1	<1	CM 1.6
GP#50-3	S/20	PH1	01/09/98		µg/L	<1	**1.1 JS**	**1.7**	**1.4**	<1 JS	<1 JS	<1	<1 JS	<1	<1 JS	None
GP#50-3	S/20	PH2	10/19/99		µg/L	<1	<1	**1.3**	<1	<1	<1	<1	<1	<1	<1	None
GP#50-3	S/20	PH2	10/19/99	DUP	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP#50-3	D/39	PH1	01/09/98		µg/L	<1	**51 JS**	**26**	**21**	<1 JS	<1	**1.7**	<1 JS	<1	<1 JS	CM 3.4
GP#50-4	S/20	PH1	01/09/98		µg/L	<1	<1	**1.7**	**2.3**	<1	<1	<1	<1	<1	**5.3**	None
GP#50-4	D/36	PH1	01/09/98		µg/L	<1	**41**	**23**	**11**	<1	<1	**1.4**	<1	<1	<1	CM 1.8
GP#50-5	S/20	PH1	01/09/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP#50-5	D/39	PH1	01/09/98		µg/L	<1	**27**	**10**	**10**	<1	<1	<1	<1	<1	<1	None
GP#50-6	S/20	PH1	06/04/98		µg/L	<1 JH	<1 JH	<1 JH	**4 JH**	<1 JH	<1 JH	<1 JH	<1 JH	<1 JH	<1 JH	MECL 1.5 UB
GP#50-6	D/37	PH1	06/04/98		µg/L	<1	**27**	**20**	**6.8**	<1	<1	**1.3**	<1	<1	<1	MECL 1.1 UB
GP#53-1	S/18	PH1	06/03/98		µg/L	<1	**2.3**	<1	<1	<1	<1	<1	<1	<1	**1.1**	None
GP#53-1	D/36	PH1	06/03/98		µg/L	<5	**9.4**	<5	<5	<5	<5	<5	<5	<5	<5	MECL 9.1 UB
GP#53-2	S/18	PH1	06/03/98		µg/L	<1	<1	<1	<1	<1	**1.2**	<1	<1	<1	<1	MECL 0.99 UB
GP#53-2	D/36	PH1	06/03/98		µg/L	<1	**24**	**2**	<1	<1	<1	<1	<1	**2.7**	<1	MECL 1.3 UB
GP#53-3	S/15	PH1	06/03/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP#53-3	D/36	PH1	06/03/98		µg/L	<1	**6**	<1	<1	<1	<1	<1	<1	<1	<1	MECL 1.9 UB
GP#54-1	S/20	PH1	01/21/98		µg/L	**98**	**56**	**14**	<1	**7.7**	**4.1**	**2**	<1	**1.4**	**28**	None
GP#54-1	D/33	PH1	01/21/98		µg/L	**3.6**	**200**	**37**	<1	<1	<1	<1	**13**	**13**	**19**	CCL4 13
GP#54-2	S/20	PH1	01/21/98		µg/L	**130**	**120**	**22**	<1	**7.6**	**2.6**	<1	<1	<1	<1	None
GP#54-2	D/33	PH1	01/21/98		µg/L	**29**	**100**	**51**	**23**	**14**	**5.3**	**3.9**	<1	**40**	**110**	None
GP#54-3	S/20	PH1	01/21/98		µg/L	**24**	**53**	**59**	<1	**5.7**	**2.8**	<1	<1	<1	**2.7**	None
GP#54-3	D/34	PH1	01/21/98		µg/L	**40**	**110**	**38**	**11**	**22**	**4.1**	**4.5**	**19**	**35**	**170**	CCL4 19
GP#54-4	S/20	PH1	01/21/98		µg/L	<1	**1.1**	<1	<1	<1	<1	<1	<1	<1	<1	None
GP#54-4	D/36	PH1	01/21/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP#55-1	S/20	PH1	12/22/97		µg/L	<1	**600**	**81**	**1.3**	**17**	**5.4**	**39**	**3.5**	**1.8**	<1	CCL4 3.5, T12DCE 1.5
GP#55-1	S/20	PH2	10/19/99		µg/L	<1	**440**	**37**	<1	**11**	**1.9**	**13**	**9.2**	**4.2**	<1	CCL4 9.2, T12DCE 1.7
GP#55-1	S/20	PH2	11/04/99		µg/L	<1	**350 JH**	**33**	<1	**8.3**	**2.1**	**9.6**	**16**	**4.9**	<1	CCL4 16, T12DCE 1.5
GP#55-1	S/20	PH2	11/04/99	DUP	µg/L	<1	**320 JH**	**34**	<1	**9.5**	**2.1**	**9.6**	**17**	**4.5**	<1	CCL4 17, T12DCE 2.0
GP#55-1	D/43	PH1	12/22/97		µg/L	**1.9**	**940**	**120**	**3.6**	**27**	**8.2**	**64**	<1	<1	<1	T12DCE 1.5
GP#56-1	S/20	PH1	01/13/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	XYL-O 1.2
GP#56-1	D/39	PH1	01/13/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP#56-2	S/20	PH1	01/13/98		µg/L	<1	**200**	**30**	**2.2**	<1	<1	**1.2**	<1	<1	<1	CM 1.6, T12DCE 3.1
GP#56-2	S/20	PH2	10/20/99		µg/L	<1	**28**	**36**	<1	<1	<1	<1	<1	<1	<1	T12DCE 2.3
GP#56-2	D/39	PH1	01/13/98		µg/L	<1	**63**	**4.2**	<1	<1	<1	<1	<1	<1	<1	None
GP#56-3	S/20	PH1	01/13/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	**3.3**	EBN 310, TOL 1.3, XYL-MP 520, XYL-O 8.5
GP#56-3	D/38	PH1	01/13/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	EBN 42 JS, XYL-MP 70 JS, XYL-O 1.5
GP#56-4	S/20	PH1	01/13/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP#56-4	D/35	PH1	01/13/98		µg/L	<1	**7.8**	**4.2**	<1	<1	<1	<1	<1	<1	<1	None
GP#56-5	S/20	PH1	01/13/98		µg/L	<1	<1	**11**	**99**	<1	**5.5**	<1	<1	<1	**5.3**	T12DCE 1, XYL-MP 1.3
GP#56-5	D/37	PH1	01/13/98		µg/L	<1	**120**	**64**	**5.2**	<1	**2.5**	**1.3**	<1	<1	<1	T12DCE 1.7
GP#56-5	D/37	PH1	01/13/98	DUP	µg/L	<1	**140**	**70**	**5.3**	<1	**2.5**	**1.4**	<1	<1	<1	T12DCE 1.7

Table 5-8
North Industrial Corridor (NIC) Site
Geoprobe Groundwater Sample Analytical Results, Site VOCs* by EPA Method 8260

Station	Groundwater Depth Zone / Depth (feet)	Investigation Phase	Sample Date	QC Sample Flag	Units	PCE	TCE	C12DCE	VC	TCA	11DCA	11DCE	CT	CFM	BEN	Other Detected Compounds
GP#56-6	S/20	PH1	01/14/98		µg/L	<1	<1	**3.7**	**20**	<1	<1	<1	<1	<1	**210**	EBN 660, TOL 310, XYL-MP 2000, XYL-O 120
GP#56-6	D/39	PH1	01/14/98		µg/L	<1	**68**	**42**	**42**	<1	**6.9**	<1	<1	<1	**30**	EBN 66, TOL 29, XYL-MP 170, XYL-O 25
GP#56-7	S/20	PH1	01/14/98		µg/L	<1	<1	<1	**18**	<1	<1	<1	<1	<1	**9.5**	EBN 22, TOL 6, XYL-MP 34, XYL-O 9.2
GP#56-7	D/39	PH1	01/14/98		µg/L	<1	**31**	**67**	**62**	<1	**1.5**	<1	<1	<1	**6.3**	EBN 4.6, TOL 2.3, XYL-MP 13, XYL-O 4.5
GP#62-1	S/20	PH1	01/14/98		µg/L	**1**	**490**	**3000**	**350**	**7.5**	**39**	**11**	<1	<1	**8.2**	T12DCE 11
GP#62-1	D/42	PH1	01/14/98		µg/L	<1	**41**	**50**	**6.9**	<1	**1.6**	**1.1**	<1	<1	<1	None
GP#62-1	D/42	PH1	01/14/98	DUP	µg/L	<1	**40**	**48**	**5**	<1	**1.4**	<1	<1	<1	<1	None
GP#62-2	S/20	PH1	01/14/98		µg/L	<1	**35**	**20**	<1	<1	<1	<1	<1	<1	<1	None
GP#62-2	D/36	PH1	01/14/98		µg/L	<1	**130**	**21**	<1	<1	<1	<1	<1	<1	<1	None
GP#62-3	S/20	PH1	01/14/98		µg/L	**2.4**	**230**	**690**	**80**	**3**	**6.4**	**2.8**	<1	<1	**1.2**	T12DCE 2.3
GP#62-3	S/20	PH2	11/05/99		µg/L	<1	**480 JH**	**790 JH**	**19**	<1	**5.5**	**2.9**	<1	<1	<1	T12DCE 5.6
GP#62-3	D/32	PH1	01/14/98		µg/L	<1	**35**	**46**	**5.9**	<1	**1.1**	1	<1	<1	<1	None
GP#62-4	S/20	PH1	01/14/98		µg/L	<1	**54**	**9.9**	<1	<1	<1	<1	<1	<1	<1	None
GP#62-4	D/33	PH1	01/14/98		µg/L	<1	**220**	**41**	<1	<1	<1	<1	<1	<1	<1	None
GP#63-1	S/20	PH1	01/12/98		µg/L	<1	**61**	**7.7**	<1	<1	<1	<1	<1	<1	<1	None
GP#63-1	D/30	PH1	01/12/98		µg/L	<1	**42**	**7.1**	<1	<1	<1	<1	<1	<1	<1	None
GP#63-2	S/20	PH1	01/12/98		µg/L	<1	**1.4**	<1	<1	<1	<1	<1	<1	<1	<1	None
GP#63-2	D/33	PH1	01/12/98		µg/L	<1	**40**	**13**	<1	<1	<1	<1	<1	<1	<1	None
GP#67-1	S/20	PH1	01/15/98		µg/L	<1	<1	**2**	<1	<1	<1	<1	<1	<1	**3**	XYL-O 1.1
GP#67-1	D/39	PH1	01/15/98		µg/L	<1	<1	**1.3**	<1	<1	<1	<1	<1	<1	<1	None
GP#67-2	S/20	PH1	01/15/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP#67-2	D/37	PH1	01/15/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP#67-3	S/20	PH1	01/15/98		µg/L	<1	<1	**1.6**	**12**	<1	**1.1**	<1	<1	<1	**59**	EBN 2.8, TOL 3.7, XYL-MP 2.3, XYL-O 3
GP#67-3	D/33	PH1	01/15/98		µg/L	<1	<1	<1	**6.1**	<1	<1	<1	<1	<1	<1	None
GP#67-4	S/20	PH1	01/15/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	**39**	1122PCA 49, 112TCA 6.4, 12DCP 4.3, CBN
GP#67-4	D/32	PH1	01/15/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	**2.6**	None
GP#67-5	S/20	PH1	01/15/98		µg/L	<1	<1	<1	**3.6**	<1	<1	<1	<1	<1	**51**	1122PCA 27, 112TCA 1.5, 12DCP 1.4, CBN 2.1, CM 6.5, TOL 1.1
GP#67-5	D/32	PH1	01/15/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP#70-1	S/20	PH1	01/20/98		µg/L	<1	**1.6**	**1.2**	<1	<1	<1	<1	<1	<1	<1	None
GP#70-1	D/36	PH1	01/20/98		µg/L	<1	**3.3**	**1.3**	<1	<1	<1	<1	<1	<1	<1	None
GP#73-1	S/20	PH1	01/23/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP#73-1	D/40	PH1	01/23/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP02A-01	M/23	PH2	03/08/00		µg/L	<1	**36**	**2**	<1	<1	<1	<1	<1	<1	<1	None
GP02A-01	D/32	PH2	03/08/00		µg/L	<1	**47**	<1	<1	<1	<1	<1	<1	<1	<1	None
GP02A-02	S/17	PH2	03/08/00		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP02A-02	D/39	PH2	03/08/00		µg/L	<1	**3.9**	<1	<1	<1	<1	<1	<1	<1	<1	None
GP02A-02	D/28	PH2	03/08/00		µg/L	<1	**27**	<1	<1	<1	<1	<1	<1	<1	<1	None
GP02A-03	S/17	PH2	03/08/00		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP02A-03	D/31	PH2	03/08/00		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP02A-04	S/17	PH2	10/28/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP02A-04	D/27	PH2	10/28/99		µg/L	<1	**64 JH**	**12**	<1	<1	<1	<1	<1	<1	<1	None
GP02A-05	S/17	PH2	10/28/99		µg/L	<1	**5**	<1	<1	<1	<1	<1	<1	<1	<1	None
GP02A-05	D/35	PH2	10/28/99		µg/L	<1	**20**	<1	<1	<1	<1	<1	<1	<1	<1	None
GP02A-06	S/17	PH2	10/28/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP02A-06	D/44	PH2	10/28/99		µg/L	<1	**9**	<1	<1	<1	<1	<1	<1	<1	<1	None
GP02A-07	S/17	PH2	01/17/00		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP02A-07	D/28	PH2	01/17/00		µg/L	<1	**440**	**9.8**	<1	**1.1**	<1	**3.4**	<1	**2.5**	<1	None

Table 5-8
North Industrial Corridor (NIC) Site
Geoprobe Groundwater Sample Analytical Results, Site VOCs* by EPA Method 8260

Station	Groundwater Depth Zone / Depth (feet)	Investigation Phase	Sample Date	QC Sample Flag	Units	PCE	TCE	C12DCE	VC	TCA	11DCA	11DCE	CT	CFM	BEN	Other Detected Compounds
GP02B-01	S/17	PH2	10/21/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP02B-01	D/37	PH2	10/21/99		µg/L	<1	**17**	<1	<1	<1	<1	<1	<1	<1	<1	None
GP02B-02	S/17	PH2	12/15/99		µg/L	<1	**5.6**	<1	<1	<1	<1	<1	<1	<1	<1	None
GP02B-02	D/32	PH2	12/15/99		µg/L	<1	**210**	**10**	<1	**2.4**	<1	**3.8**	<1	<1	<1	None
GP02B-03	S/17	PH2	12/13/99		µg/L	<1	**32**	<1	<1	<1	<1	<1	<1	<1	<1	None
GP02B-03	D/33	PH2	12/13/99		µg/L	<1	**96**	**5.8**	<1	**1.7**	<1	**1.8**	<1	<1	<1	None
GP02B-03	D/33	PH2	12/13/99	DUP	µg/L	<1	**86**	**5.7**	<1	**1.6**	<1	**1.6**	<1	<1	<1	None
GP02B-04	S/17	PH2	12/15/99		µg/L	<1	**4.4**	<1	<1	<1	<1	<1	<1	<1	<1	None
GP02B-04	D/32	PH2	12/15/99		µg/L	<1	**68**	**2.9**	<1	<1	<1	<1	<1	<1	<1	None
GP02B-05	S/17	PH2	12/17/99		µg/L	<1	**43**	**7.7**	<1	**1.2**	<1	**1.3**	<1	<1	<1	None
GP02B-05	D/37	PH2	12/17/99		µg/L	**2.2**	**500 JH**	**95 JH**	**2.9**	**12**	**4.5**	**36**	**18**	**1.8**	<1	CCL4 18, T12DCE 16
GP02B-06	S/17	PH2	12/20/99		µg/L	<1	**80**	**42**	<1	**1.9**	**1.2**	**3.5**	<1	**1.3**	<1	T12DCE 2.9
GP02B-06	D/39	PH2	12/20/99		µg/L	<1	**300**	**40**	**1.9**	**11**	**4.4**	**31**	**16**	**2.5**	<1	CCL4 16, T12DCE 3.2
GP02B-07	S/17	PH2	12/20/99		µg/L	<1	**56**	**2.5**	<1	**1**	<1	<1	<1	<1	<1	None
GP02B-07	D/39	PH2	12/20/99		µg/L	<1	**250**	**31**	<1	**5.6**	**2.4**	**10**	<1	<1	<1	T12DCE 4.2
GP02C-01	M/23	PH2	12/09/99		µg/L	<5	**110**	**38**	<5	<5	**2.6 J**	<5	<5	<5	<5	None
GP02C-01	D/28	PH2	12/09/99		µg/L	<10	**320**	**110**	<10	<10	**4.8 J**	**15**	<10	<10	<10	T12DCE 9.3 J
GP02C-02	S/17	PH2	12/02/99		µg/L	<1	**9**	**1**	<1	<1	<1	<1	<1	<1	<1	None
GP02C-02	D/35	PH2	12/02/99		µg/L	<1	**360**	**130**	**15**	**8.6**	**7.3**	**37**	**2.8**	**1.9**	**2.2**	CCL4 2.8, T12DCE 27
GP02C-03	S/17	PH2	11/10/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP02C-03	D/38	PH2	11/10/99		µg/L	**1.1**	**710 JH**	**250 JH**	**24**	**11**	**10**	**40**	**1.5**	**1.9**	**3.1**	CCL4 1.5, CM 1.6, T12DCE 36
GP02C-03	D/38	PH2	11/10/99	DUP	µg/L	<1	**760 JH**	**290 JH**	**24**	**10**	**10**	**39**	**1.2**	**1.9**	**3**	CCL4 1.2, T12DCE 32
GP02C-04	S/20	PH2	11/01/99		µg/L	<1	<1	**18**	<1	<1	<1	<1	<1	<1	<1	None
GP02C-04	D/32	PH2	11/01/99		µg/L	<1	**480**	**150**	**2.2**	**9.6**	**6.5**	**26**	<1	**2.5**	<1	T12DCE 15
GP02C-05	S/17	PH2	01/14/00		µg/L	<1	<1	<1	**2.7**	<1	<1	<1	<1	<1	**98**	TOL 1.6
GP02C-05	M/26	PH2	01/14/00		µg/L	<1	<1	**15**	**86**	<1	**4.5**	<1	<1	<1	**270**	CHEA 2.7, EBN 1.4, TOL 9.7, XYL-MP 3.7, XYL-O 1.1
GP02C-05	D/35	PH2	01/14/00		µg/L	<1	**330**	**100**	**16**	**7**	**6.9**	**31**	<1	**1.7**	**7.6**	12DCA 1.1, T12DCE 20
GP02C-06	S/17	PH2	10/29/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP02C-06	D/29	PH2	10/29/99		µg/L	<1	**370**	**120**	**39**	**1.3**	**11**	**22**	<1	<1	**2.3**	CHEA 2.5, CM 1.8, T12DCE 21
GP02C-07	S/17	PH2	11/01/99		µg/L	<1	**6.1**	**39**	**78**	<1	**4.2**	**1.5**	<1	<1	<1	T12DCE 4.9
GP02C-07	D/32	PH2	11/01/99		µg/L	<1	**470**	**170**	**37**	**5.8**	**12**	**33**	<1	<1	**2.1**	CHEA 2.0, CM 1.5, T12DCE 34
GP02C-08	S/17	PH2	11/01/99		µg/L	<1	**240**	**94**	**7.9**	**2.6**	**5.1**	**11**	<1	<1	<1	T12DCE 16
GP02C-08	D/35	PH2	11/01/99		µg/L	<1	**660**	**220**	**37**	**8.4**	**13**	**40**	<1	<1	**2.8**	12DCA 1.4, CHEA 1.4, CM 1.6, T12DCE 41
GP02C-09	M/23	PH2	11/01/99		µg/L	<1	<1	**150**	**12**	<1	**2.9**	**3.6**	<1	<1	**9.2**	12DCA 1.2, EBN 270, T12DCE 3.0, TOL 8.3, XYL-MP 160, XYL-O 9.5
GP02C-09	D/32	PH2	11/01/99		µg/L	<1	**570**	**190**	**32**	**7.6**	**11**	**34**	<1	<1	**1**	CHEA 1.5, CM 1.6, T12DCE 33
GP02C-10	S/17	PH2	10/29/99		µg/L	<1	**79**	**36**	**3.2**	<1	**2.5**	**3.9**	<1	<1	<1	T12DCE 6.0
GP02C-10	D/28	PH2	10/29/99		µg/L	<1	**460**	**170**	**41**	**4.6**	**13**	**34**	<1	<1	**1.6**	CM 1.3, T12DCE 27
GP02C-11	S/17	PH2	11/01/99		µg/L	<1	**90**	**41**	**1.6**	<1	**2.2**	**4**	<1	<1	<1	T12DCE 7.2
GP02C-11	D/32	PH2	11/01/99		µg/L	<1	**400**	**140**	**36**	**3.9**	**11**	**30**	<1	<1	**1.5**	CHEA 2.4, CM 1.2, T12DCE 27
GP02E-01	S/17	PH2	10/21/99		µg/L	<1	**27**	**17**	<1	<1	<1	<1	<1	<1	<1	None
GP02E-01	D/32	PH2	10/21/99		µg/L	<1	**280**	**51**	**3.4**	**1**	**2.5**	**4.9**	<1	<1	<1	T12DCE 5.6
GP02E-02	S/17	PH2	10/27/99		µg/L	<1	**67**	**13**	<1	<1	<1	<1	<1	<1	<1	T12DCE 1.7
GP02E-02	D/32	PH2	10/27/99		µg/L	**1.6**	**500**	**33**	**5.1**	<1	**3.4**	**3.8**	<1	<1	<1	T12DCE 9.4
GP02E-03	S/17	PH2	11/02/99		µg/L	<1	**21**	**22**	<1	<1	<1	<1	<1	<1	<1	T12DCE 1.7
GP02E-03	D/31	PH2	11/02/99		µg/L	<1	**420**	**55**	**2.3**	<1	**2.1**	**2.5**	<1	<1	<1	T12DCE 6.8
GP02E-05	S/17	PH2	11/11/99		µg/L	<1	**2.7**	<1	<1	<1	<1	<1	<1	<1	<1	None
GP02E-05	D/29	PH2	11/11/99		µg/L	<1	**230 JH**	**52 JH**	**1.6**	<1	**1.5**	**1.5**	<1	<1	<1	T12DCE 3.9

Table 5-8
North Industrial Corridor (NIC) Site
Geoprobe Groundwater Sample Analytical Results, Site VOCs* by EPA Method 8260

Station	Groundwater Depth Zone / Depth (feet)	Investigation Phase	Sample Date	QC Sample Flag	Units	PCE	TCE	C12DCE	VC	TCA	11DCA	11DCE	CT	CFM	BEN	Other Detected Compounds
GP02E-06	S/17	PH2	11/01/99		µg/L	<1	**7.1**	<1	<1	<1	<1	<1	<1	<1	<1	None
GP02E-06	D/32	PH2	11/01/99		µg/L	<1	**490**	**82**	**3.6**	<1	**2.6**	**3.6**	<1	<1	<1	T12DCE 7.5
GP02E-06	D/32	PH2	11/01/99	DUP	µg/L	<1	**410**	**76**	**3.5**	<1	**2.6**	**3.4**	<1	<1	<1	T12DCE 6.1
GP02E-07	S/17	PH2	11/12/99		µg/L	<1	**51**	**5.1**	<1	<1	<1	<1	<1	<1	<1	None
GP02E-07	D/25	PH2	11/12/99		µg/L	**1.7**	**540**	**74**	**6.2**	<1	**3.9**	**4.3**	<1	<1	<1	T12DCE 6.7
GP02E-08	S/17	PH2	11/12/99		µg/L	<1	**110**	**14**	<1	<1	<1	<1	<1	<1	<1	T12DCE 1.7
GP02E-08	D/26	PH2	11/12/99		µg/L	**1.2**	**350**	**48**	**3.2**	<1	**1.9**	**2.5**	<1	<1	<1	T12DCE 3.8
GP02E-09	S/17	PH2	10/27/99		µg/L	<1	**11**	<1	<1	<1	<1	<1	<1	<1	<1	None
GP02E-09	D/31	PH2	10/27/99		µg/L	**1.5**	**640**	**88**	**5.7**	<1	**3.9**	**3.9**	<1	<1	<1	T12DCE 11
GP02F-01	S/17	PH2	11/02/99		µg/L	<1	**13**	**32**	<1	<1	<1	<1	<1	<1	<1	T12DCE 2.6
GP02F-01	D/29	PH2	11/02/99		µg/L	<1	**520**	**84**	**7.8**	<1	**4.9**	**4.4**	<1	<1	<1	T12DCE 6.2
GP02F-02	S/17	PH2	10/21/99		µg/L	<1	**14**	**3.3**	<1	<1	<1	<1	<1	<1	<1	None
GP02F-02	D/31	PH2	10/21/99		µg/L	<1	**280**	**48**	**5.4**	<1	**2.5**	**3.5**	<1	<1	<1	T12DCE 6.2
GP02F-03	S/17	PH2	11/01/99		µg/L	<1 JH	**19 JH**	**5.8 JH**	<1 JH	<1 JH	<1 JH	<1 JH	<1 JH	<1 JH	<1 JH	None
GP02F-03	D/31	PH2	11/01/99		µg/L	<1	**470**	**69**	**4.3**	<1	**2.9**	**3.6**	<1	<1	<1	T12DCE 6.4
GP02F-04	S/20	PH2	10/29/99		µg/L	<1	**53**	**20**	<1	<1	<1	<1	<1	<1	<1	T12DCE 1.4
GP02F-04	D/29	PH2	10/29/99		µg/L	<1	**370**	**72**	**5.9**	<1	**2.5**	**2.8**	<1	<1	<1	T12DCE 6.0
GP02F-04	D/29	PH2	10/29/99	DUP	µg/L	<1	**380 JH**	**68 JH**	**5.6**	<1	**2.5**	**2.6**	<1	<1	<1	T12DCE 5.3
GP02F-05	S/17	PH2	10/29/99		µg/L	<1	**20**	**1.9**	<1	<1	<1	<1	<1	<1	<1	None
GP02F-05	D/31	PH2	10/29/99		µg/L	<1	**410 JH**	**78 JH**	**7.4**	<1	**3**	**2.9**	<1	<1	<1	T12DCE 9.5
GP02F-06	S/17	PH2	10/29/99		µg/L	<1	**22**	**2.8**	<1	<1	<1	<1	<1	<1	<1	None
GP02F-06	D/32	PH2	10/29/99		µg/L	<1	**350 JH**	**60 JH**	**3.4**	<1	**2.4**	**2.4**	<1	<1	<1	T12DCE 7.0
GP02G-01	S/17	PH2	10/21/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP02G-01	S/17	PH2	10/21/99	DUP	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP02G-01	D/35	PH2	10/21/99		µg/L	<1	**10**	<1	<1	<1	<1	<1	<1	<1	<1	None
GP02G-02	S/17	PH2	10/26/99		µg/L	<1	**44**	**5.9**	<1	**2.2**	<1	<1	<1	<1	<1	None
GP02G-02	D/35	PH2	10/26/99		µg/L	<1	**320**	**46**	**4.6**	**1.6**	**2.8**	**6.5**	<1	<1	<1	T12DCE 4.4
GP02G-03	S/17	PH2	11/02/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP02G-03	D/29	PH2	11/02/99		µg/L	<1	**77**	**11**	<1	**1.5**	**1**	<1	<1	<1	<1	None
GP02G-04	S/17	PH2	11/02/99		µg/L	<1	**4.4**	<1	<1	<1	<1	<1	<1	<1	<1	None
GP02G-04	D/38	PH2	11/02/99		µg/L	<1	**320**	**67**	**3.5**	**1.1**	**2.6**	**5**	<1	<1	<1	T12DCE 5.4
GP02G-05	S/17	PH2	11/02/99		µg/L	<1	**9.2**	<1	<1	<1	<1	<1	<1	<1	<1	None
GP02G-05	D/35	PH2	11/02/99		µg/L	<1	**270 JH**	**49 JH**	**2.7**	<1	**2**	**3.3**	<1	<1	<1	T12DCE 4.9
GP02G-06	S/17	PH2	11/02/99		µg/L	<1	**10**	<1	<1	<1	<1	<1	<1	<1	<1	None
GP02G-06	D/35	PH2	11/02/99		µg/L	<1	**220 JH**	**44 JH**	**2.7**	<1	**1.9**	**3.5**	<1	<1	<1	T12DCE 4.9
GP02G-07	S/17	PH2	11/05/99		µg/L	<1	**11**	<1	<1	<1	<1	<1	<1	<1	<1	None
GP02G-07	D/26	PH2	11/05/99		µg/L	<1	**47**	**7.8**	<1	<1	<1	<1	<1	<1	<1	MECL 1.2
GP02G-08	S/17	PH2	11/02/99		µg/L	<1	**1.3**	<1	<1	<1	<1	<1	<1	**12**	<1	None
GP02G-08	D/38	PH2	11/02/99		µg/L	<1	**170 JH**	**38**	**1.9**	**1.8**	**1.9**	**2.7**	<1	<1	<1	T12DCE 2.0
GP02H-01	S/17	PH2	10/21/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP02H-01	D/39	PH2	10/21/99		µg/L	<1	**2.8**	**5.2**	<1	<1	<1	<1	<1	<1	<1	None
GP02H-02	S/19	PH2	10/21/99		µg/L	<1	**72**	**46**	<1	<1	<1	<1	<1	<1	<1	T12DCE 2.5
GP02H-02	D/36	PH2	10/21/99		µg/L	<1	**1.5**	<1	<1	<1	<1	<1	<1	<1	<1	None
GP02H-03	S/17	PH2	10/28/99		µg/L	<1	**3.8**	<1	<1	<1	<1	<1	<1	<1	<1	None
GP02H-03	D/35	PH2	10/28/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP02H-03	D/35	PH2	10/28/99	DUP	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP02H-04	S/17	PH2	10/22/99		µg/L	<1	**16**	**68 JP**	<1	<1	<1	<1	<1	<1	<1	T12DCE 9.5
GP02H-04	D/33	PH2	10/22/99		µg/L	<1	**1.2**	**17**	<1	<1	<1	<1	<1	<1	<1	None

Table 5-8
North Industrial Corridor (NIC) Site
Geoprobe Groundwater Sample Analytical Results, Site VOCs* by EPA Method 8260

Station	Groundwater Depth Zone / Depth (feet)	Investigation Phase	Sample Date	QC Sample Flag	Units	PCE	TCE	C12DCE	VC	TCA	11DCA	11DCE	CT	CFM	BEN	Other Detected Compounds
GP02H-05	S/17	PH2	11/02/99		µg/L	<1	**13**	<1	<1	<1	<1	<1	<1	**1.5**	<1	None
GP02H-05	D/38	PH2	11/02/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP02H-06	S/17	PH2	11/11/99		µg/L	<1	**5.8**	<1	<1	<1	<1	<1	<1	<1	<1	None
GP02H-06	D/27	PH2	11/11/99		µg/L	<1	<1	**1.4**	<1	<1	<1	<1	<1	<1	<1	None
GP02H-07	S/17	PH2	11/11/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP02H-07	D/28	PH2	11/11/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP02H-08	S/17	PH2	11/11/99		µg/L	**2.7**	**4.1**	<1	<1	<1	<1	<1	<1	<1	<1	None
GP02H-08	D/38	PH2	11/11/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP02H-09	S/17	PH2	11/11/99		µg/L	**3.9**	**370**	**43**	<1	<1	<1	<1	<1	<1	<1	T12DCE 2.0
GP02H-09	D/35	PH2	11/11/99		µg/L	<1	**14**	<1	<1	<1	<1	<1	<1	<1	<1	None
GP02I-01	S/17	PH2	11/05/99		µg/L	<1	<1	**46**	**3.1**	<1	**9.2**	<1	<1	<1	**3**	None
GP02I-01	D/31	PH2	11/05/99		µg/L	<1	**130 JH**	**22**	**1.3**	<1	**1.3**	<1	<1	<1	<1	T12DCE 1.3
GP02I-02	S/17	PH2	01/14/00		µg/L	<1	<1	**5.5**	**3.1**	<1	<1	<1	<1	<1	<1	None
GP02I-02	D/29	PH2	01/14/00		µg/L	**20**	**86**	**51**	**32**	<1	**6.3**	<1	<1	<1	<1	CM 1.4, T12DCE 2.7
GP02I-03	S/17	PH2	11/29/99		µg/L	**1.6**	**14**	**6.3**	<1	**1.2**	<1	<1	<1	<1	<1	None
GP02I-03	D/34	PH2	11/29/99		µg/L	**7.5**	**360**	**91**	**12**	<1	**4.2**	**2.7**	<1	<1	<1	12DCP 1.4, T12DCE 9.0
GP02I-03	D/34	PH2	11/29/99	DUP	µg/L	**5.4**	**310**	**85**	**12**	<1	**3.9**	**2.6**	<1	<1	<1	12DCP 1.3, T12DCE 8.9
GP02I-04	S/17	PH2	11/22/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP02I-04	M/26	PH2	11/22/99		µg/L	<1	**3.5**	**32**	**2**	<1	<1	<1	<1	<1	<1	None
GP02I-04	D/35	PH2	01/25/00		µg/L	**8.2**	**270**	**56**	**11**	<1	**3.4**	**2.7**	<1	<1	<1	T12DCE 6.1
GP02I-05	S/17	PH2	01/10/00		µg/L	<1	**30**	**60**	**18**	<1	**3.6**	<1	<1	<1	<1	T12DCE 2.9
GP02I-05	D/30	PH2	01/10/00		µg/L	**8.2**	**230**	**82**	**15**	<1	**8.3**	**2.3**	<1	<1	<1	T12DCE 5.6
GP02I-06	S/17	PH2	01/10/00		µg/L	**4.8**	**100**	**43**	**2.8**	<1	**2.9**	<1	<1	<1	<1	T12DCE 4.3
GP02I-06	D/30	PH2	01/10/00		µg/L	**13**	**310**	**91**	**23**	<1	**6.1**	**2.9**	<1	<1	<1	T12DCE 5.6
GP02I-07	S/17	PH2	01/25/00		µg/L	**5.5**	**40**	**20**	<1	<1	**1.4**	<1	<1	<1	<1	T12DCE 2.1
GP02I-08	S/17	PH2	01/25/00		µg/L	**3.3**	**38**	**72**	**28**	<1	**5.4**	<1	<1	<1	<1	T12DCE 2.8
GP03A-01	S/17	PH2	11/05/99		µg/L	<1	**56**	**4.7**	<1	<1	<1	<1	<1	<1	<1	None
GP03A-01	D/29	PH2	11/05/99		µg/L	**1.5**	**140 JH**	**20**	<1	<1	<1	<1	<1	<1	<1	T12DCE 1.1
GP03A-05	S/17	PH2	03/08/00		µg/L	<1	**40**	**6.5**	<1	<1	<1	<1	<1	<1	<1	None
GP03A-05	D/32	PH2	03/08/00		µg/L	<1	**48**	**17**	<1	<1	<1	<1	<1	<1	<1	None
GP03A-06	S/17	PH2	03/08/00		µg/L	**1.7**	**64**	**12**	<1	<1	<1	<1	<1	<1	<1	None
GP03A-06	D/29	PH2	03/08/00		µg/L	**4.8**	**130**	**24**	<1	<1	<1	<1	<1	<1	<1	T12DCE 2.2
GP03A-07	S/17	PH2	03/08/00		µg/L	<1	**17**	**2.1**	<1	<1	<1	<1	<1	<1	<1	CBN 3.4
GP03A-07	D/36	PH2	03/08/00		µg/L	**7.8**	**240**	**41**	<1	<1	<1	<1	<1	<1	<1	T12DCE 3.8
GP03B-01	S/17	PH2	10/26/99		µg/L	<1	**1.2**	<1	<1	<1	<1	<1	<1	<1	<1	None
GP03B-01	D/35	PH2	10/26/99		µg/L	<1	**110**	<1	**8.6**	<1	**1.9**	**4.2**	<1	**35**	<1	T12DCE 2.7
GP03B-02	S/17	PH2	10/26/99		µg/L	<1	**12**	<1	<1	<1	<1	<1	<1	<1	<1	None
GP03B-02	D/35	PH2	10/26/99		µg/L	<1	**150**	**38**	**11**	<1	**3**	**8.5**	<1	<1	<1	T12DCE 2.4
GP03B-03	S/17	PH2	11/10/99		µg/L	<1 JH	**10 JH**	**8 JH**	<1 JH	<1 JH	<1 JH	<1 JH	<1 JH	<1 JH	<1 JH	None
GP03B-03	D/35	PH2	11/10/99		µg/L	<1 JH	**200 JH**	**41 JH**	**8 JH**	**1.1 JH**	**2.6 JH**	**6.9 JH**	<1 JH	<1 JH	<1 JH	T12DCE 2.5 JH
GP03B-04	S/17	PH2	10/27/99		µg/L	<1	<1	**33**	<1	<1	<1	<1	<1	<1	<1	None
GP03B-04	D/29	PH2	10/27/99		µg/L	<1	**65**	**9.2**	<1	<1	<1	<1	<1	<1	<1	None
GP03B-05	S/17	PH2	11/12/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP03B-05	D/28	PH2	11/12/99		µg/L	<1	**12**	<1	<1	<1	<1	<1	<1	<1	<1	None
GP03B-06	M/23	PH2	11/12/99		µg/L	<1	**110**	**15**	<1	<1	<1	<1	<1	<1	<1	T12DCE 1.1
GP03B-06	D/29	PH2	11/12/99		µg/L	<1 JIS	**1.5 JIS**	<1 JIS	<1 JIS	<1 JIS	<1 JIS	<1 JIS	<1 JIS	<1 JIS	<1 JIS	None
GP03B-07	S/20	PH2	11/11/99		µg/L	<1	**17**	**4.6**	<1	<1	<1	<1	<1	<1	<1	None
GP03B-07	D/28	PH2	11/11/99		µg/L	<1.7	**43**	**6**	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	None

Table 5-8
North Industrial Corridor (NIC) Site
Geoprobe Groundwater Sample Analytical Results, Site VOCs* by EPA Method 8260

Station	Groundwater Depth Zone / Depth (feet)	Investigation Phase	Sample Date	QC Sample Flag	Units	PCE	TCE	C12DCE	VC	TCA	11DCA	11DCE	CT	CFM	BEN	Other Detected Compounds
GP03B-08	S/14	PH2	08/29/00		µg/L	<1	**1.7**	<1	<1	<1	<1	<1	<1	<1	<1	None
GP03B-08	D/35	PH2	08/29/00		µg/L	<1	**120**	**44**	**9.2**	<1	**2**	**4**	<1	<1	<1	T12DCE 2.5
GP03B-09	S/14	PH2	08/29/00		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP03C-01	S/20	PH2	10/26/99		µg/L	<1	**25**	**5.3**	<1	<1	<1	<1	<1	<1	<1	None
GP03C-01	D/28	PH2	10/26/99		µg/L	<1	**240**	**42**	**6.9**	<1	**2.2**	**4.9**	<1	<1	<1	T12DCE 6.0
GP03C-01	D/28	PH2	10/26/99	DUP	µg/L	<1	**240**	**43**	**5.2**	<1	**2**	**3.6**	<1	<1	<1	T12DCE 4.1
GP03C-02	S/20	PH2	10/27/99		µg/L	<1	**32**	**10**	<1	<1	<1	<1	<1	<1	<1	None
GP03C-02	D/29	PH2	10/27/99		µg/L	<1	**140**	**46**	**20**	<1	**3**	**5.2**	<1	<1	<1	T12DCE 3.5
GP03C-03	S/17	PH2	11/12/99		µg/L	<1	**2.4**	**2**	<1	<1	<1	<1	<1	<1	<1	None
GP03C-03	D/27	PH2	11/12/99		µg/L	<1	**64**	**27**	**6**	<1	<1	**1.3**	<1	<1	<1	T12DCE 1.2
GP03C-04	S/17	PH2	11/12/99		µg/L	<1	**9.2**	**1**	<1	<1	<1	<1	<1	<1	<1	None
GP03C-04	D/27	PH2	11/12/99		µg/L	<1	**120**	**31**	**6.8**	<1	**1.8**	**3.2**	<1	<1	<1	T12DCE 2.3
GP03C-05	S/20	PH2	11/22/99		µg/L	<1	**14**	**2.6**	<1	<1	<1	<1	<1	<1	<1	None
GP03C-05	D/34	PH2	11/22/99		µg/L	<1	**190**	**81**	**41**	<1	**3.2**	**6.6**	<1	<1	<1	T12DCE 1.8
GP03C-06	S/20	PH2	11/12/99		µg/L	<1	**17**	**2.5**	<1	<1	<1	<1	<1	<1	<1	None
GP03C-06	D/35	PH2	11/12/99		µg/L	<1 JH	**120 JH**	**58 JH**	**16 JH**	<1 JH	**3.1 JH**	**6.7 JH**	<1 JH	<1 JH	<1 JH	T12DCE 1.6 JH
GP03C-07	S/20	PH2	11/12/99		µg/L	<1	**14**	**4.1**	<1	<1	<1	<1	<1	<1	<1	None
GP03C-07	D/34	PH2	11/12/99		µg/L	<1 JH	**130 JH**	**43 JH**	**12 JH**	<1 JH	**2.4 JH**	**4.5 JH**	<1 JH	<1 JH	<1 JH	T12DCE 2.3 JH
GP03C-07	D/34	PH2	11/12/99	DUP	µg/L	<1 JH	**160 JH**	**47 JH**	**12 JH**	<1 JH	**2.4 JH**	**5 JH**	<1 JH	<1 JH	<1 JH	T12DCE 2.1 JH
GP03D-01	S/17	PH2	10/22/99		µg/L	<1	<1	<1	**2.9**	<1	**1.3**	<1	<1	<1	**3.3**	None
GP03D-01	D/30	PH2	10/22/99		µg/L	<1	**210 JP**	**41**	**2.3**	**1.4**	**1.6**	**3.7**	<1	<1	<1	T12DCE 2.7
GP03D-02	S/17	PH2	01/20/00		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	**3.1**	None
GP03D-02	D/32	PH2	01/20/00		µg/L	<1	**190**	**31**	**3.3**	<1	**1.4**	**1.5**	<1	<1	<1	T12DCE 3.5
GP03D-03	S/17	PH2	11/11/99		µg/L	<1	<1	**1.4**	**1.1**	<1	<1	<1	<1	<1	**1.4**	CM 1.3, TOL 1.3, XYL-MP 5.7
GP03D-03	D/32	PH2	11/11/99		µg/L	<1	**160**	**29**	**1.3**	<1	<1	**1.6**	<1	<1	<1	T12DCE 2.4
GP03D-03	D/32	PH2	11/11/99	DUP	µg/L	<1	**160**	**30**	**1.5**	<1	<1	**1.8**	<1	<1	<1	T12DCE 2.2
GP03D-04	S/17	PH2	01/13/00		µg/L	<1	**30**	**17**	**2.1**	<1	<1	<1	<1	<1	<1	None
GP03D-04	D/32	PH2	01/13/00		µg/L	<1	**200**	**45**	**7.7**	**1.1**	**2.4**	**7.6**	<1	<1	<1	T12DCE 2.9
GP03D-05	S/17	PH2	01/18/00		µg/L	<1	**3.6**	**4.8**	<1	<1	<1	<1	<1	<1	<1	None
GP03D-05	D/29	PH2	01/18/00		µg/L	<1	**120**	**49**	**8.1**	<1	**1.2**	**1.8**	<1	<1	<1	T12DCE 4.4
GP03D-06	S/17	PH2	11/22/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	**55**	None
GP03D-06	D/31	PH2	11/22/99		µg/L	<1	**110**	**94**	**24**	<1	<1	<1	<1	<1	**19**	T12DCE 1.7
GP03D-07	S/17	PH2	11/22/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	**1.9**	None
GP03D-07	D/29	PH2	11/22/99		µg/L	<1	**220**	**50**	**8.2**	<1	<1	**2.5**	<1	<1	**4.5**	T12DCE 1.6
GP03D-08	S/17	PH2	01/14/00		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP03D-08	D/32	PH2	01/14/00		µg/L	<1	**210**	**42**	**5.1**	<1	**1.6**	**3.9**	<1	<1	<1	T12DCE 2.8
GP03D-09	S/17	PH2	01/14/00		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP03D-09	D/32	PH2	01/14/00		µg/L	<1	**190**	**53**	**9.1**	<1	**1.7**	**3.7**	<1	<1	<1	T12DCE 4.0
GP03E-01	S/17	PH2	10/26/99		µg/L	**3.4**	**3.1**	<1	<1	<1	<1	<1	<1	<1	<1	MECL 1.6
GP03E-01	D/35	PH2	10/26/99		µg/L	<1	**190 JP**	**58 JP**	**3.4**	**1.9**	**2.5**	**4.9**	<1	<1	<1	T12DCE 4.0
GP03E-02	S/17	PH2	10/26/99		µg/L	**6.6**	**41**	**4.4**	<1	<1	<1	<1	<1	<1	<1	None
GP03E-02	D/34	PH2	10/26/99		µg/L	<1	**260 JP**	**46**	**2.9**	**1.1**	**1.5**	**2.7**	<1	<1	<1	T12DCE 2.7
GP03E-03	S/17	PH2	06/26/99		µg/L	**1.5**	**76 JP**	**13**	<1	<1	<1	<1	<1	<1	<1	T12DCE 1.5
GP03E-03	D/26	PH2	10/26/99		µg/L	<1	**530 JP**	**36**	**1.5**	<1	**1.2**	**1.5**	<1	<1	<1	T12DCE 2.6
GP03E-05	S/17	PH2	10/26/99		µg/L	**4.1**	**12**	**11**	<1	<1	<1	<1	<1	<1	<1	None
GP03E-05	D/32	PH2	10/26/99		µg/L	**5.1**	**560 JP**	**83 JP**	**5.9**	<1	**2.7**	**2.3**	<1	<1	<1	T12DCE 5.3
GP03E-06	S/17	PH2	10/26/99		µg/L	**7**	**76 JP**	**12**	<1	<1	<1	<1	<1	<1	<1	None
GP03E-06	D/24	PH2	10/26/99		µg/L	**7.9**	**250 JP**	**33**	**1.6**	<1	<1	<1	<1	<1	<1	T12DCE 3.1

Table 5-8
North Industrial Corridor (NIC) Site
Geoprobe Groundwater Sample Analytical Results, Site VOCs* by EPA Method 8260

Station	Groundwater Depth Zone / Depth (feet)	Investigation Phase	Sample Date	QC Sample Flag	Units	PCE	TCE	C12DCE	VC	TCA	11DCA	11DCE	CT	CFM	BEN	Other Detected Compounds
GP03E-07	S/17	PH2	10/25/99		µg/L	2.9	100 JP	12	<1	<1	<1	<1	<1	<1	<1	None
GP03E-07	D/25	PH2	10/26/99		µg/L	<1	130 JP	48 JP	2.2	<1	1.7	1.9	<1	<1	<1	T12DCE 4.0
GP03E-08	S/17	PH2	10/26/99		µg/L	17	56	120	12	<1	15	2.1	<1	<1	<1	T12DCE 12
GP03E-08	D/32	PH2	10/26/99		µg/L	<1	350	59	9.4	1.7	2.9	3.7	<1	<1	<1	T12DCE 7.2
GP03E-09	S/17	PH2	10/26/99		µg/L	<1	44 JP	16	<1	<1	<1	<1	<1	<1	<1	T12DCE 1.2
GP03E-09	D/29	PH2	10/26/99		µg/L	2.9	220 JP	65 JP	5.1	1.1	2.8	3.7	<1	<1	<1	T12DCE 7.2
GP03E-10	S/20	PH2	11/22/99		µg/L	5.3	48	10	<1	<1	<1	<1	<1	<1	<1	None
GP03E-10	D/31	PH2	11/22/99		µg/L	<1	640	75	8.9	<1	2.2	3.8	<1	<1	<1	T12DCE 3.8
GP03E-11	S/17	PH2	11/22/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP03E-11	D/35	PH2	11/22/99		µg/L	<1	120	19	<1	<1	<1	<1	<1	<1	<1	None
GP03E-13	S/17	PH2	11/22/99		µg/L	3.4	110	11	<1	<1	<1	<1	<1	<1	<1	None
GP03E-13	M/24	PH2	01/25/00		µg/L	2.5	350	51	4.4	<1	2.7	2.7	<1	<1	<1	T12DCE 4.8
GP03E-13	D/35	PH2	11/22/99		µg/L	1.4	1400	110	14	<1	3.3	5.3	<1	<1	<1	T12DCE 7.0
GP03E-13	D/35	PH2	01/25/00		µg/L	2.3	580	77	9.7	<1	3.2	5.8	<1	<1	<1	T12DCE 7.9
GP03E-14	S/17	PH2	11/22/99		µg/L	2.8	62	6.1	<1	<1	<1	<1	<1	<1	<1	None
GP03E-14	D/29	PH2	11/22/99		µg/L	<1	630	85	9.2	<1	4.1	3.8	<1	<1	<1	T12DCE 4.7
GP03F-01	S/17	PH2	11/22/99		µg/L	<1	170	13	<1	68	4.4	19	<1	<1	<1	None
GP03F-01	D/25	PH2	11/22/99		µg/L	<1	48	7.2	<1	20	2.4	8.6	<1	<1	<1	None
GP03F-02	S/17	PH2	11/23/99		µg/L	15	1100	110	<1	140	10	32	<1	1.3	<1	T12DCE 8.0
GP03F-02	D/35	PH2	11/23/99		µg/L	<1	91	30	1.8	6.9	1.7	4	<1	<1	<1	T12DCE 1.1
GP03F-03	S/17	PH2	12/01/99		µg/L	3.1	420	30	<1	70	7.5	11	11	1.3	<1	12DCP 1.3, CCL4 11, T12DCE 3.7
GP03F-03	D/32	PH2	12/01/99		µg/L	<1	71	16	<1	52	7.5	20	12	1.3	<1	CCL4 12, T12DCE 1.2
GP03F-04	S/17	PH2	12/01/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	12DCB 2.4
GP03F-04	D/30	PH2	12/01/99		µg/L	<1	11	5.8	<1	<1	<1	<1	<1	<1	<1	None
GP03G-01	S/17	PH2	11/29/99		µg/L	<1	2.1	1.8	<1	<1	<1	<1	<1	<1	<1	None
GP03G-01	D/30	PH2	11/29/99		µg/L	<1	7.5	7.9	<1	<1	<1	<1	<1	<1	<1	T12DCE 1.5
GP03G-02	S/17	PH2	12/01/99		µg/L	18	1.6	1.7	<1	<1	<1	<1	<1	<1	<1	None
GP03G-02	D/30	PH2	12/01/99		µg/L	1.4	12	13	<1	<1	<1	<1	<1	<1	<1	T12DCE 1.1
GP03G-03	S/17	PH2	11/29/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP03G-03	D/33	PH2	11/29/99		µg/L	<1	15	10	<1	<1	<1	<1	<1	<1	<1	T12DCE 1.3
GP03G-04	S/20	PH2	11/23/99		µg/L	<1	22	15	<1	<1	5.2	<1	<1	<1	<1	T12DCE 2.9
GP03G-04	D/31	PH2	11/23/99		µg/L	<1	24	33	1.5	<1	1.2	<1	<1	<1	<1	T12DCE 2.8
GP03G-04	D/31	PH2	11/23/99	DUP	µg/L	<1	22	33	1.6	<1	1.2	<1	<1	<1	<1	T12DCE 2.6
GP03G-05	S/17	PH2	11/23/99		µg/L	<1	11	20	1.1	<1	1.4	<1	<1	<1	<1	T12DCE 2.4
GP03G-05	D/30	PH2	11/23/99		µg/L	<1	6.5	16	<1	<1	1.1	<1	<1	<1	<1	None
GP03G-06	S/17	PH2	11/24/99		µg/L	<1	15	15	<1	<1	3.3	<1	<1	<1	<1	T12DCE 3.1
GP03G-06	D/32	PH2	11/24/99		µg/L	<1	17	42	1	<1	1.7	<1	<1	<1	<1	T12DCE 3.1
GP03G-07	S/17	PH2	11/24/99		µg/L	<1	4.4	10	<1	<1	<1	<1	<1	<1	<1	T12DCE 4.0
GP03G-07	D/32	PH2	11/24/99		µg/L	<1	33	42	2.8	<1	1.7	<1	<1	<1	<1	T12DCE 3.3
GP03G-08	S/17	PH2	12/01/99		µg/L	<1	<1	<1	<1	6.7	<1	<1	<1	<1	<1	None
GP03G-08	D/32	PH2	12/01/99		µg/L	<1	14	16	<1	<1	1.1	<1	<1	<1	<1	T12DCE 2.5
GP03G-09	S/17	PH2	12/01/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	MECL 1.7
GP03G-09	D/32	PH2	12/01/99		µg/L	<1	12	13	<1	<1	<1	<1	<1	<1	<1	T12DCE 1.9
GP04B-01	M/23	PH2	11/03/99		µg/L	<1	150 JH	110 JH	<1	2.6	1.3	3.4	<1	<1	<1	T12DCE 3.9
GP04B-01	D/41	PH2	11/03/99		µg/L	<1	210 JH	81 JH	1.2	3.2	1.5	7.4	<1	<1	<1	T12DCE 1.2
GP04B-02	S/20	PH2	11/03/99		µg/L	<1	200 JH	110 JH	<1	1.7	3.8	9.9	<1	<1	<1	T12DCE 4.9
GP04B-02	D/41	PH2	11/03/99		µg/L	1.3	440 JH	59	<1	11	4	26	<1	<1	<1	T12DCE 5.2
GP04B-03	M/26	PH2	11/05/99		µg/L	<1	33	15	<1	<1	<1	<1	<1	<1	<1	TOL 1.2
GP04B-03	D/41	PH2	11/05/99		µg/L	<1	480 JH	66 JH	1.5	12	4	27	<1	<1	<1	T12DCE 1.5

Table 5-8
North Industrial Corridor (NIC) Site
Geoprobe Groundwater Sample Analytical Results, Site VOCs* by EPA Method 8260

Station	Groundwater Depth Zone / Depth (feet)	Investigation Phase	Sample Date	QC Sample Flag	Units	PCE	TCE	C12DCE	VC	TCA	11DCA	11DCE	CT	CFM	BEN	Other Detected Compounds
GP04B-04	M/23	PH2	11/03/99		µg/L	<1	**83 JH**	**35**	**1.3**	<1	**3.7**	**3.6**	<1	<1	<1	None
GP04B-04	D/41	PH2	11/03/99		µg/L	<1	**100 JH**	**19**	<1	**1.1**	**1**	**3.8**	<1	**4.6**	<1	None
GP04B-05	M/26	PH2	11/03/99		µg/L	<1	**65**	**29**	<1	<1	<1	**1.5**	<1	<1	<1	None
GP04B-05	D/44	PH2	11/03/99		µg/L	<1	**230**	**38**	<1	**2.8**	**1.5**	**10**	<1	**2.3**	<1	None
GP04B-06	M/26	PH2	11/04/99		µg/L	<1	**100 JH**	**12**	<1	**1.8**	<1	**2.2**	<1	<1	<1	T12DCE 1.2
GP04B-06	D/37	PH2	11/04/99		µg/L	<1	**70 JH**	**20**	<1	**1.5**	<1	**1.9**	<1	<1	<1	T12DCE 2.0
GP04B-07	M/23	PH2	11/04/99		µg/L	<1	**170**	**23**	<1	**2**	**1.6**	**3.2**	<1	<1	<1	T12DCE 2.2
GP04B-07	D/41	PH2	11/04/99		µg/L	<1	**33**	**1.4**	<1	<1	<1	<1	<1	<1	<1	None
GP04B-08	S/20	PH2	11/03/99		µg/L	<1	**240**	**36**	**1**	**3.9**	**1.2**	**6.3**	<1	<1	<1	T12DCE 1.3
GP04B-08	D/44	PH2	11/03/99		µg/L	**2.9**	**530 JH**	**78 JH**	**2.8**	**7.5**	**2.9**	**17**	<1	<1	<1	T12DCE 5.1
GP04B-08	D/44	PH2	11/03/99	DUP	µg/L	**2.5**	**560 JH**	**80 JH**	**2.9**	**7.4**	**2.9**	**17**	<1	<1	<1	T12DCE 5.4
GP04B-09	S/16	PH2	02/10/00		µg/L	<1	<1	**15**	<1	<1	<1	<1	<1	<1	<1	None
GP04B-09	M/26	PH2	11/03/99		µg/L	<1	**830 JH**	**120 JH**	**1.5**	**11**	**5.5**	**22**	<1	<1	<1	T12DCE 5.5
GP04B-09	D/44	PH2	11/03/99		µg/L	**2.4**	**700 JH**	**86 JH**	**2.5**	**16**	**6.2**	**42**	<1	<1	<1	T12DCE 3.2
GP04B-10	S/20	PH2	11/04/99		µg/L	<1	**190 JH**	**32**	<1	**2.9**	**2**	**7.3**	<1	<1	<1	T12DCE 1.5
GP04B-10	D/41	PH2	11/04/99		µg/L	<1	**180 JH**	**45 JH**	<1	**3.4**	**1.3**	**7**	<1	<1	<1	T12DCE1.7
GP04B-11	S/17	PH2	01/17/00		µg/L	<1	<1	**2.6**	**3.6**	<1	<1	<1	<1	<1	<1	None
GP04B-11	D/32	PH2	01/17/00		µg/L	<1	**51**	**29**	**6.8**	<1	**6.6**	**4**	<1	<1	<1	T12DCE 1.3
GP04B-12	D/40	PH2	11/04/99		µg/L	<1	**150 JH**	**16**	<1	**3.4**	**1.1**	**6.1**	<1	<1	<1	None
GP04B-12	D/29	PH2	11/04/99		µg/L	<1	**180 JH**	**38**	<1	**4.3**	**2.5**	**8.1**	<1	<1	<1	T12DCE 1.5
GP04B-13	S/17	PH2	01/17/00		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	**130**	EBN 230, TOL 110, XYL-MP 300, XYL-O 34
GP04B-13	D/35	PH2	01/17/00		µg/L	<1	**57**	**40**	**11**	<1	**4.3**	**1.8**	<1	<1	<1	EBN 30, T12DCE 1.4, TOL 8.1, XYL-MP 45, XYL-O 3.8
GP04B-14	S/20	PH2	11/04/99		µg/L	<1	**57**	**3.8**	<1	<1	<1	<1	**3.7**	**1.9**	<1	CCL4 3.7
GP04B-14	D/44	PH2	11/04/99		µg/L	**2.6**	**640 JH**	**98 JH**	**3.4**	**13**	**4.4**	**28**	<1	<1	<1	T12DCE 9.3
GP04C-01	S/17	PH2	11/24/99		µg/L	**1.2**	**3**	**3.7**	**1.7**	<1	<1	<1	<1	<1	<1	None
GP04C-01	D/38	PH2	11/24/99		µg/L	<1	**17**	**14**	**6.1**	<1	<1	<1	<1	<1	<1	EBN 5.4, T12DCE 1.1, XYL-MP 1.6
GP04C-02	S/17	PH2	11/24/99		µg/L	<1	**4.8**	**21**	<1	<1	<1	<1	<1	<1	<1	None
GP04C-02	D/31	PH2	11/24/99		µg/L	<1	**29**	**56**	**9.7**	<1	<1	**2.5**	<1	<1	<1	None
GP04C-03	S/17	PH2	11/24/99		µg/L	<1	**7.6**	**51**	**2.3**	<1	**1.2**	**1.3**	<1	<1	<1	T12DCE 1.5
GP04C-03	D/31	PH2	11/24/99		µg/L	<1	**29**	**31**	**6.9**	<1	<1	**1.4**	<1	<1	<1	112TCA 1.1, CM 1.4, T12DCE 1.9
GP04C-04	S/20	PH2	01/14/00		µg/L	<1	**12**	**58**	**3.9**	<1	**1.4**	**2**	<1	<1	<1	T12DCE 1.8
GP04C-04	D/29	PH2	01/14/00		µg/L	<1	<1	**58**	**5.3**	<1	<1	**2.3**	<1	<1	<1	CM 1.2
GP04D-01	S/20	PH2	10/26/99		µg/L	<1	<1	**3**	**2.2**	<1	<1	<1	<1	<1	<1	None
GP04D-01	D/32	PH2	10/26/99		µg/L	<1	**16**	**32**	**7.5**	<1	<1	<1	<1	<1	<1	None
GP04E-01	S/17	PH2	10/26/99		µg/L	**7.9**	**1.5**	<1	<1	<1	<1	<1	<1	<1	<1	None
GP04E-01	D/29	PH2	10/26/99		µg/L	<1	**49**	**33**	**2.6**	<1	<1	<1	<1	<1	<1	T12DCE 1.5
GP04E-01	D/29	PH2	10/26/99	DUP	µg/L	<1	**61**	**31**	**2.5**	<1	<1	<1	<1	<1	<1	T12DCE 1.5
GP04E-02	S/17	PH2	10/28/99		µg/L	<1	**7.1**	<1	<1	<1	<1	<1	<1	<1	<1	None
GP04E-02	D/40	PH2	10/26/99		µg/L	<1	**67**	**37**	**3.3**	<1	**1.1**	**1.5**	<1	<1	<1	T12DCE 3.1
GP04E-03	S/17	PH2	11/10/99		µg/L	<1	**25**	**12**	<1	<1	<1	<1	<1	<1	<1	None
GP04E-03	D/38	PH2	11/10/99		µg/L	<1	**430 JH**	**110 JH**	**5.5**	<1	**2.9**	**5.2**	<1	<1	<1	T12DCE 6.8
GP04E-04	S/17	PH2	10/27/99		µg/L	<1	**54 JH**	**33**	**1.3**	<1	**1.1**	**1.7**	<1	<1	<1	T12DCE 3.1
GP04E-04	D/34	PH2	10/27/99		µg/L	<1	**200**	**110**	**3.5**	<1	**3.2**	**4.6**	<1	<1	<1	T12DCE 5.9
GP04E-05	S/17	PH2	10/27/99		µg/L	<1	**14**	**13**	<1	<1	<1	<1	<1	<1	<1	None
GP04E-05	D/38	PH2	10/27/99		µg/L	<1	**120**	**69**	**1.7**	<1	**1.8**	**1.9**	<1	<1	<1	T12DCE 2.0
GP04E-06	S/17	PH2	12/03/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP04E-06	D/44	PH2	12/03/99		µg/L	<1	**8.4**	**22**	<1	<1	<1	<1	<1	<1	<1	T12DCE 1.9

Table 5-8
North Industrial Corridor (NIC) Site
Geoprobe Groundwater Sample Analytical Results, Site VOCs* by EPA Method 8260

Station	Groundwater Depth Zone / Depth (feet)	Investigation Phase	Sample Date	QC Sample Flag	Units	PCE	TCE	C12DCE	VC	TCA	11DCA	11DCE	CT	CFM	BEN	Other Detected Compounds
GP04E-07	S/17	PH2	12/09/99		µg/L	<1	**1.2**	**2.5**	<1	<1	<1	<1	<1	<1	<1	None
GP04E-07	D/30	PH2	12/09/99		µg/L	<1	**62**	**17**	**1.3**	<1	**0.58 J**	<1	<1	<1	<1	T12DCE 0.65 J
GP04E-07	D/30	PH2	12/09/99	DUP	µg/L	<1	**54**	**16**	**1.2**	<1	**0.57 J**	<1	<1	<1	<1	None
GP04E-08	S/17	PH2	12/02/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP04E-08	D/37	PH2	12/02/99		µg/L	<1	**40**	**43**	**5.2**	<1	<1	**1.5**	<1	<1	<1	T12DCE 1.1
GP04F-01	S/17	PH2	11/29/99		µg/L	<1	**340**	**52**	<1	<1	<1	<1	<1	<1	<1	12DCP 1.6, T12DCE 6.1
GP04F-01	D/34	PH2	11/29/99		µg/L	<1	**5.4**	**2.4**	<1	<1	<1	<1	<1	<1	<1	None
GP04F-02	S/17	PH2	11/29/99		µg/L	<1	**7.1**	<1	<1	<1	<1	<1	<1	<1	<1	None
GP04F-02	D/38	PH2	11/29/99		µg/L	<1	<1	**1.2**	<1	<1	<1	<1	<1	<1	<1	None
GP04F-03	S/17	PH2	12/02/99		µg/L	<1	**7.2**	**1.1**	<1	<1	<1	<1	<1	<1	<1	None
GP04F-03	D/35	PH2	12/02/99		µg/L	<1	**1.2**	**2.1**	<1	<1	<1	<1	<1	<1	<1	None
GP04G-01	S/17	PH2	11/10/99		µg/L	<1	**2.2**	<1	<1	<1	<1	<1	<1	<1	<1	None
GP04G-01	D/35	PH2	11/10/99		µg/L	<1	**52**	**33**	<1	<1	<1	<1	<1	<1	<1	T12DCE 1.8
GP04G-02	S/17	PH2	11/10/99		µg/L	<1	**4.1**	<1	<1	<1	<1	<1	<1	<1	<1	None
GP04G-02	D/26	PH2	11/10/99		µg/L	<1	**8.5**	**10**	<1	<1	<1	<1	<1	<1	<1	None
GP04G-04	S/17	PH2	12/16/99		µg/L	<1	**2**	<1	<1	<1	<1	<1	<1	<1	<1	None
GP04G-04	D/28	PH2	12/16/99		µg/L	<1	**66**	**25**	<1	<1	<1	<1	<1	<1	<1	None
GP04G-05	S/17	PH2	12/02/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	**2**	<1	None
GP04G-05	D/35	PH2	12/02/99		µg/L	<1	**54**	**28**	<1	<1	**1.1**	<1	<1	<1	<1	T12DCE 2.7
GP04G-05	D/35	PH2	12/02/99	DUP	µg/L	<1	**47**	**27**	<1	<1	**1**	<1	<1	<1	<1	T12DCE 2.0
GP04G-08	S/17	PH2	12/02/99		µg/L	**1.3**	**7.9**	<1	<1	<1	<1	<1	<1	<1	<1	None
GP04G-08	D/36	PH2	12/02/99		µg/L	<1	**7.9**	**14**	<1	<1	<1	<1	<1	<1	<1	None
GP04H-01	S/17	PH2	10/26/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP04H-01	D/32	PH2	10/26/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP04H-02	S/17	PH2	10/28/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	**2.3**	<1	None
GP04H-02	D/34	PH2	10/28/99		µg/L	<1	**14**	**9**	<1	<1	**1.8**	<1	<1	<1	<1	None
GP04H-03	S/17	PH2	12/03/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP04H-03	D/32	PH2	12/03/99		µg/L	<1	**6.8**	**13**	<1	<1	**1.4**	<1	<1	<1	<1	None
GP04H-04	S/17	PH2	12/16/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP04H-04	D/32	PH2	12/16/99		µg/L	<1	**4.5**	**8.8**	<1	<1	<1	<1	<1	<1	<1	None
GP04H-05	S/17	PH2	12/03/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP04H-05	D/31	PH2	12/03/99		µg/L	<1	**13**	**9.8**	<1	<1	**1.6**	**1.2**	<1	<1	<1	None
GP04H-06	S/20	PH2	12/03/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP04H-06	D/29	PH2	12/07/99		µg/L	<1	**11**	**6.4**	<1	<1	**1.2**	<1	<1	<1	<1	None
GP04H-07	S/20	PH2	12/03/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP04H-07	D/34	PH2	12/03/99		µg/L	<1	**8.8**	**7.8**	<1	<1	**1.1**	<1	<1	<1	<1	T12DCE 1.0
GP04H-08	S/20	PH2	12/03/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP04H-08	D/29	PH2	12/03/99		µg/L	**3.1**	**12**	**14**	<1	<1	**2**	<1	<1	<1	<1	T12DCE 1.4
GP05A-01	S/17	PH2	12/13/99		µg/L	<1	<1	**4.6**	<1	<1	<1	<1	<1	<1	<1	None
GP05A-01	D/28	PH2	12/13/99		µg/L	<1	**90**	**39**	**8.7**	<1	<1	<1	<1	<1	<1	T12DCE 1.3
GP05A-02	S/17	PH2	01/17/00		µg/L	<1	<1	**58**	<1	<1	<1	<1	<1	<1	<1	EBN 9.7, TOL 14, XYL-MP 3.4
GP05A-02	D/31	PH2	01/17/00		µg/L	<1	**150**	**3.2**	<1	<1	<1	<1	<1	<1	<1	EBN 1.6
GP05A-03	S/17	PH2	01/17/00		µg/L	<1	**30**	**7**	<1	<1	<1	<1	<1	<1	<1	None
GP05A-03	D/29	PH2	01/17/00		µg/L	<1	**88**	**23**	**4.7**	<1	<1	<1	<1	<1	<1	None
GP05A-04	S/17	PH2	01/17/00		µg/L	<1	**45**	**21**	<1	<1	<1	<1	<1	<1	<1	T12DCE 2.8, TOL 1.9
GP05A-04	D/29	PH2	01/17/00		µg/L	<1	**94**	**12**	<1	<1	<1	<1	<1	<1	<1	None
GP05A-04	D/29	PH2	01/17/00	DUP	µg/L	<1	**120**	**8.3**	<1	<1	<1	<1	<1	<1	<1	None
GP05B-01	S/17	PH2	12/09/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP05B-01	D/35	PH2	12/09/99		µg/L	<1	**5.1**	**4.3**	<1	<1	<1	<1	<1	<1	<1	None

Table 5-8
North Industrial Corridor (NIC) Site
Geoprobe Groundwater Sample Analytical Results, Site VOCs* by EPA Method 8260

Station	Groundwater Depth Zone / Depth (feet)	Investigation Phase	Sample Date	QC Sample Flag	Units	PCE	TCE	C12DCE	VC	TCA	11DCA	11DCE	CT	CFM	BEN	Other Detected Compounds
GP05B-02	S/17	PH2	11/05/99		µg/L	<1	<1	**40**	**9.3**	<1	<1	<1	<1	<1	**1.6**	None
GP05B-02	D/35	PH2	11/05/99		µg/L	<1	**11**	**7.2**	<1	<1	<1	<1	<1	<1	<1	None
GP05B-03	S/20	PH2	11/05/99		µg/L	<1	**41**	**32**	**1.4**	<1	<1	<1	<1	<1	<1	T12DCE 1.8
GP05B-03	D/35	PH2	11/05/99		µg/L	<1	**90 JH**	**16**	<1	<1	<1	<1	<1	<1	<1	T12DCE 1.5
GP05B-04	S/17	PH2	12/09/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP05B-04	D/35	PH2	12/09/99		µg/L	<1	**6.9**	**4.9**	<1	<1	<1	<1	<1	<1	<1	None
GP05B-05	S/17	PH2	12/09/99		µg/L	<1	<1	**7.8**	**1**	<1	<1	<1	<1	<1	<1	None
GP05B-05	D/35	PH2	12/09/99		µg/L	<1	**7.1**	**4.6**	<1	<1	<1	<1	<1	<1	<1	None
GP05B-06	S/17	PH2	12/09/99		µg/L	<1	**69**	**280**	**34**	**1.1**	**2.9**	<1	<1	<1	<1	T12DCE 12
GP05B-06	D/35	PH2	12/09/99		µg/L	<1	**44**	**160**	**33**	<1	**2.3**	<1	<1	<1	<1	T12DCE 1.5
GP05B-07	S/17	PH2	12/09/99		µg/L	<1	**9**	**14**	<1	<1	<1	<1	<1	<1	**83**	12DCA 3.9
GP05B-07	D/38	PH2	12/09/99		µg/L	<1	**77**	**14**	<1	<1	<1	<1	<1	<1	**1.7**	None
GP05C-01	S/20	PH2	11/10/99		µg/L	<1	**2.9**	**97**	**1.8**	<1	**2.1**	**2.3**	<1	<1	<1	T12DCE 5.2
GP05C-01	D/31	PH2	11/10/99		µg/L	<1	**150**	**75**	**39**	<1	**8**	**6.4**	<1	<1	**5**	CHEA 1.5, CM 5.0, T12DCE 4.4
GP05C-02	S/17	PH2	11/10/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP05C-02	D/29	PH2	11/10/99		µg/L	<1	**290**	**120**	**34**	**1.9**	**9.7**	**18**	<1	<1	**1**	CHEA 2.8, T12DCE 21
GP05C-03	S/20	PH2	01/25/00		µg/L	<1	**50**	**14**	**2.6**	<1	**1.7**	**1.6**	<1	<1	<1	T12DCE 1.7
GP05C-03	D/32	PH2	01/25/00		µg/L	<1	**83**	**39**	**38**	<1	**4.4**	**4.2**	<1	<1	**4**	CHEA 1.7, T12DCE 2.1
GP05C-04	D/35	PH2	01/26/00		µg/L	<1	**190**	**57**	**36**	<1	**7.9**	**11**	<1	**2**	**4.1**	CHEA 4.0, T12DCE 5.0
GP05C-05	S/20	PH2	01/26/00		µg/L	<1	**9.8**	**1.4**	<1	<1	<1	<1	<1	<1	<1	None
GP05C-05	D/35	PH2	01/26/00		µg/L	<1	**91**	**38**	**31**	<1	**4.8**	**5.8**	<1	<1	**5.8**	CHEA 3.4, T12DCE 2.7
GP05C-06	S/17	PH2	01/25/00		µg/L	<1	**130**	**62**	**21**	<1	**6.8**	**6.7**	<1	<1	<1	T12DCE 7.4
GP05C-06	D/38	PH2	01/25/00		µg/L	<1	**160**	**51**	**40**	<1	**6.2**	**7.6**	<1	<1	**3.1**	CHEA 1.7, T12DCE 3.4
GP05C-07	S/17	PH2	01/25/00		µg/L	<1	**68**	**22**	**3.2**	<1	**2.4**	**2.1**	<1	<1	<1	T12DCE 2.9
GP05C-07	D/29	PH2	01/25/00		µg/L	<1	**110**	**57**	**37**	<1	**7.4**	**6.5**	<1	<1	**2.4**	CHEA 2.1, T12DCE 6.4
GP05C-08	S/17	PH2	01/25/00		µg/L	<1	**150**	**52**	**15**	<1	**4.5**	**7.6**	<1	<1	<1	CHEA 1.2, T12DCE 10
GP05C-08	D/29	PH2	01/25/00		µg/L	<1	**380**	**130**	**49**	**1.1**	**12**	**26**	<1	<1	**2**	CHEA 3.6, T12DCE 27
GP05D-01	S/20	PH2	12/16/99		µg/L	<1	**1.2**	<1	<1	<1	<1	<1	<1	<1	<1	None
GP05D-01	D/32	PH2	12/16/99		µg/L	<1	**400**	**91**	**2.7**	**6.5**	**3.7**	**20**	**3.4**	<1	<1	CCL4 3.4, T12DCE 5.3
GP05D-02	S/20	PH2	12/16/99		µg/L	<1	**20**	<1	<1	<1	<1	<1	<1	<1	<1	None
GP05D-02	D/32	PH2	12/16/99		µg/L	<1	**530**	**150**	**13**	**6.8**	**6**	**26**	**2.1**	**1.4**	**1.6**	CCL4 2.1, T12DCE 17
GP06B-01	S/17	PH2	10/28/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP06B-01	D/44	PH2	10/28/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP06B-02	S/17	PH2	12/08/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP06B-02	D/36	PH2	12/08/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP06B-03	S/17	PH2	12/08/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP06B-03	D/35	PH2	12/08/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP06B-04	S/17	PH2	12/08/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP06B-04	D/35	PH2	12/08/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP06B-05	S/17	PH2	12/08/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP06B-05	D/35	PH2	12/08/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP06D-01	S/17	PH2	12/15/99		µg/L	<1	**58**	**23**	<1	<1	<1	<1	<1	<1	<1	None
GP06D-01	D/32	PH2	12/15/99		µg/L	<1	**140**	**8.7**	<1	**1.6**	<1	**3.1**	<1	<1	<1	None
GP06D-02	S/17	PH2	01/18/00		µg/L	<1	**130**	**27**	<1	**2.2**	<1	**2.8**	<1	<1	<1	T12DCE 1.6
GP06D-02	D/35	PH2	01/18/00		µg/L	<1	**520**	**210**	**27**	**5.6**	**5.3**	**20**	<1	**1.1**	**4.3**	T12DCE 25
GP06D-03	S/17	PH2	01/18/00		µg/L	<1	**7.2**	<1	<1	<1	<1	<1	<1	<1	<1	None
GP06D-03	D/35	PH2	01/18/00		µg/L	<1	**690**	**220**	**20**	**7.3**	**4.9**	**21**	<1	<1	**2.4**	T12DCE 21
GP06F-01	S/17	PH2	11/01/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP06F-01	D/35	PH2	11/01/99		µg/L	<1	**470**	**170**	**42**	**3.7**	**14**	**32**	<1	<1	**1.8**	CM 1.7, T12DCE 26

Table 5-8
North Industrial Corridor (NIC) Site
Geoprobe Groundwater Sample Analytical Results, Site VOCs* by EPA Method 8260

Station	Groundwater Depth Zone / Depth (feet)	Investigation Phase	Sample Date	QC Sample Flag	Units	PCE	TCE	C12DCE	VC	TCA	11DCA	11DCE	CT	CFM	BEN	Other Detected Compounds
GP06F-02	S/17	PH2	10/29/99		µg/L	<1	**250**	**140**	**14**	**1.8**	**10**	**22**	<1	<1	<1	T12DCE 20
GP06F-02	D/32	PH2	10/29/99		µg/L	<1	**520**	**190**	**42**	**5.4**	**14**	**35**	<1	<1	**1.5**	12DCA 1.1, CM 1.4, T12DCE 29
GP06F-03	S/17	PH2	11/01/99		µg/L	<1	**1**	<1	**3.3**	<1	**1.3**	<1	<1	<1	**4.1**	12DCA 2.4, EBN 2.7, TOL 79, XYL-MP 7.1, XYL-O 4.8
GP06F-03	D/32	PH2	11/01/99		µg/L	**2.3**	**240**	**120**	**38**	<1	**10**	**16**	<1	<1	**1.1**	CHEA 1.1, T12DCE 11, TOL 8.8
GP06F-04	S/20	PH2	01/14/00		µg/L	<1	**74**	**170**	**17**	<1	**8.2**	**25**	<1	<1	<1	T12DCE 12
GP06F-04	D/32	PH2	01/14/00		µg/L	<1	**420**	**200**	**56**	**5.5**	**13**	**46**	<1	<1	<1	CHEA 2.4, T12DCE 35
GP06F-05	S/20	PH2	01/14/00		µg/L	<1	**240**	**120**	**37**	**1.9**	**11**	**29**	<1	<1	<1	CM 2.5, T12DCE 15
GP06F-05	D/31	PH2	01/14/00		µg/L	<1	**270**	**110**	**48**	**1.6**	**13**	**24**	<1	<1	**1.3**	CM 3.8, T12DCE 19
GP06F-06	S/17	PH2	12/09/99		µg/L	**2.4**	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP06F-06	D/29	PH2	12/09/99		µg/L	<1	**120**	**110**	**39**	<1	**9.2**	**9.1**	<1	<1	**0.78 J**	CM 2.1, T12DCE 9.4
GP06F-07	S/20	PH2	01/14/00		µg/L	<1	**180**	**160**	**30**	**4.3**	**11**	**46**	<1	<1	<1	CM 1.9, T12DCE 30
GP06F-07	D/29	PH2	01/14/00		µg/L	<1	**35**	**520**	**23**	**3.7**	**9.9**	**44**	<1	<1	<1	CM 2.1, T12DCE 27
GP06G-01	S/17	PH2	12/16/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP06G-01	D/38	PH2	12/16/99		µg/L	<1	**4.6**	**5**	**4.2**	<1	<1	<1	<1	<1	<1	None
GP06H-01	S/17	PH2	12/07/99		µg/L	**3.7**	**3.9**	<1	<1	<1	<1	<1	<1	<1	<1	None
GP06H-01	D/28	PH2	12/07/99		µg/L	**7.5**	**13**	**5.6**	<1	<1	**5.3**	**4**	<1	<1	<1	None
GP06H-02	S/20	PH2	12/08/99		µg/L	**2.8**	**3.7**	<1	<1	<1	<1	<1	<1	<1	<1	None
GP06H-02	D/31	PH2	12/08/99		µg/L	**4.1**	**6.4**	**2.5**	<1	<1	**2.5**	**1.7**	<1	<1	<1	None
GP06H-03	S/20	PH2	12/08/99		µg/L	<1	**1.4**	<1	<1	<1	<1	<1	<1	<1	<1	None
GP06H-03	D/31	PH2	12/08/99		µg/L	**4.5**	**5.7**	**2.2**	<1	<1	**2.2**	**1.5**	<1	<1	<1	None
GP06H-03	D/31	PH2	12/08/99	DUP	µg/L	**3.4**	**5.4**	**2.3**	<1	<1	**2.3**	**1.5**	<1	<1	<1	None
GP06I-01	S/17	PH2	10/26/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP06I-01	D/41	PH2	10/26/99		µg/L	<1	**46**	**53**	**7.3**	<1	**1.1**	**2.3**	<1	<1	<1	T12DCE 2.4
GP06I-02	M/23	PH2	10/27/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	**4.2**	<1	BDCM 2.6, DBCM 1.2
GP06I-02	D/35	PH2	10/27/99		µg/L	<1	**24**	**16**	<1	<1	<1	<1	<1	<1	<1	T12DCE 1.1
GP06I-03	M/26	PH2	10/27/99		µg/L	<1	**1.7**	<1	<1	<1	<1	<1	<1	<1	<1	None
GP06I-03	D/34	PH2	10/27/99		µg/L	<1	**53**	**28**	**2.7**	<1	**1.1**	**2.3**	<1	<1	<1	T12DCE 1.9
GP06I-04	S/20	PH2	12/16/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP06I-04	D/41	PH2	12/16/99		µg/L	<1	**65**	**64**	**8.5**	<1	**1.5**	**2.4**	<1	<1	<1	None
GP06K-01	M/23	PH2	10/26/99		µg/L	<1	**24**	**12**	<1	<1	<1	<1	<1	<1	<1	None
GP06K-01	D/32	PH2	10/26/99		µg/L	<1	**30**	**39**	<1	<1	<1	<1	<1	<1	<1	T12DCE 2.4
GP08B-01	S/17	PH2	12/13/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP08B-01	D/29	PH2	12/13/99		µg/L	<1	**5.9**	<1	<1	<1	<1	<1	<1	<1	<1	EBN 1.3, XYL-MP 4.3, XYL-O 1.1
GP08B-02	S/20	PH2	12/10/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	CM 1.6
GP08B-02	D/28	PH2	12/10/99		µg/L	<1	**2.3**	<1	<1	<1	<1	<1	<1	<1	**1.1**	None
GP08B-03	S/20	PH2	12/10/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	**1.1**	CM 1.9
GP08B-03	D/29	PH2	12/10/99		µg/L	<1	**2.4**	<1	<1	<1	<1	<1	<1	<1	**0.71 J**	CM 1.1
GP08B-04	S/17	PH2	12/10/99		µg/L	<1	<1	**4.1**	<1	<1	**1.5**	**1.3**	<1	<1	**1.1**	None
GP08B-04	D/30	PH2	12/10/99		µg/L	<1	**6.9**	**9.6**	<1	<1	**1.4**	<1	<1	<1	**0.7 J**	None
GP08B-05	S/17	PH2	12/10/99		µg/L	<1	**2.8**	<1	**2.7**	<1	**36**	**13**	<1	<1	**1.9**	None
GP08B-05	D/34	PH2	12/10/99		µg/L	<1	**13**	**3.1**	<1	<1	<1	<1	<1	<1	<1	None
GP08B-06	S/20	PH2	12/10/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP08B-06	D/26	PH2	12/10/99		µg/L	<1	**4.9**	**1.6**	<1	<1	<1	<1	<1	<1	**0.87 J**	None
GP08C-01	S/17	PH2	12/17/99		µg/L	**2.6**	**150**	**63**	**3**	<1	**3.1**	**1.1**	<1	<1	<1	T12DCE 5.6
GP08C-01	D/29	PH2	12/17/99		µg/L	**2.9**	**130 JH**	**61 JH**	**3.7**	<1	**3.8**	**1.6**	<1	<1	<1	T12DCE 7.1
GP08C-01	D/29	PH2	12/17/99	DUP	µg/L	**2.1**	**130 JH**	**61 JH**	**3.7**	<1	**3.6**	**1.5**	<1	<1	<1	T12DCE 6.7
GP08C-02	S/17	PH2	12/17/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP08C-02	D/29	PH2	12/17/99		µg/L	**5.7**	**230 JH**	**81 JH**	**6.3**	<1	**5**	**2.3**	<1	<1	<1	T12DCE 11

Table 5-8
North Industrial Corridor (NIC) Site
Geoprobe Groundwater Sample Analytical Results, Site VOCs* by EPA Method 8260

Station	Groundwater Depth Zone / Depth (feet)	Investigation Phase	Sample Date	QC Sample Flag	Units	PCE	TCE	C12DCE	VC	TCA	11DCA	11DCE	CT	CFM	BEN	Other Detected Compounds
GP08C-03	S/17	PH2	12/17/99		µg/L	**1.3**	**48**	**22**	<1	<1	**1.1**	<1	<1	<1	<1	T12DCE 1.7
GP08C-03	D/29	PH2	12/17/99		µg/L	**6.7**	**210 JH**	**77 JH**	**9.6**	<1	**4.5**	**2.1**	<1	<1	<1	T12DCE 12
GP08C-04	S/17	PH2	12/17/99		µg/L	<1	**1.9**	<1	<1	**50**	<1	**2.9**	<1	<1	<1	None
GP08C-04	D/29	PH2	12/17/99		µg/L	**6.9**	**190 JH**	**66 JH**	**7.1**	**1.9**	**4.2**	**2.1**	<1	<1	<1	T12DCE 9.1
GP08C-05	S/17	PH2	12/17/99		µg/L	<1	**2.3**	**1.1**	<1	**8.1**	<1	<1	<1	<1	<1	None
GP08C-05	D/26	PH2	12/17/99		µg/L	**5.2**	**140 JH**	**57 JH**	**3.4**	<1	**3.5**	**1.2**	<1	<1	<1	T12DCE 8.7
GP08C-06	S/15	PH2	08/29/00		µg/L	<1	**85**	**61**	**2**	<1	<1	<1	<1	<1	<1	T12DCE 4.8
GP08C-06	D/35	PH2	08/29/00		µg/L	<1	**140**	**120**	**5.7**	<1	**1.8**	2	<1	<1	<1	T12DCE 8.5
GP08C-07	S/17	PH2	08/30/00		µg/L	<1	**1.9**	<1	<1	**1.5**	<1	<1	<1	<1	<1	None
GP08C-07	D/35	PH2	08/30/00		µg/L	<1	**140**	**130**	**4.3**	<1	**1.8**	**1.8**	<1	<1	<1	T12DCE 7.1
GP08C-08	S/16	PH2	08/30/00		µg/L	<1	**2.2**	<1	<1	<1	<1	<1	<1	<1	<1	None
GP08C-09	S/16	PH2	08/30/00		µg/L	<1	**4.1**	**1.3**	<1	<1	<1	<1	<1	<1	<1	None
GP08E-01	S/17	PH2	12/20/99		µg/L	<1	**40**	**55**	<1	<1	**4.3**	**2.6**	<1	<1	<1	T12DCE 7.9
GP08E-01	D/35	PH2	12/20/99		µg/L	<1	**35**	**45**	**17**	<1	**8.4**	**5.2**	<1	**1.6**	**24**	12DCA 1.2, CHEA 4.8, T12DCE 3.5
GP08E-02	S/17	PH2	12/20/99		µg/L	<1	**37**	**30**	<1	<1	<1	**1.3**	<1	<1	<1	T12DCE 1.6
GP08E-02	D/35	PH2	12/20/99		µg/L	<1	**290 JH**	**71 JH**	**17**	**3.2**	**5.6**	**19**	<1	**2.4**	**6.1**	CHEA 1.9, CM 1.8, T12DCE 11
GP08E-02	D/35	PH2	12/20/99	DUP	µg/L	<1	**260 JH**	**61 JH**	**18**	**3.3**	**6**	**18**	<1	**2.5**	**6.2**	CHEA 2.0, CM 1.4, T12DCE 9.7
GP08E-03	S/17	PH2	12/20/99		µg/L	<1	**42**	**82 JH**	**34**	<1	**2.3**	**2.3**	<1	<1	<1	T12DCE 4.5
GP08E-03	D/33	PH2	12/20/99		µg/L	**1.1**	**350 JH**	**160 JH**	**33**	**5.4**	**5.3**	**26**	<1	<1	**4.4**	CM 1.8, T12DCE 36
GP10C-01	S/18	PH2-Sludge Area	01/18/01		µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	**1.8**	<1.0	<1.0	<1.0	**17**	2MN 26, CHEA 12, CHRY 11, PHEN 33, PYR 21, TPH-GAS 567
GP10C-02	S/18	PH2-Sludge Area	01/18/01		µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**11**	CHEA 2.1, EBN 2.4, TOL 1.4, TPH-GAS 4080, XYL-MP 7.4, XYL-O 2.4, XYLT 22.9
GP10C-03	S/16	PH2-Sludge Area	01/18/01		µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
GP10D-01	S/16	PH2-Sludge Area	01/19/01		µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**8.7**	2MN 150, EBN 5.9, NAP 150, TOL 3.5, TPH-GAS 849, XYL-MP 8.2, XYL-O 5.8, XYLT 13.5
GP10D-02	S/16	PH2-Sludge Area	01/18/01		µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**13**	XYL-O 1.8
GP10D-03	S/18	PH2-Sludge Area	01/22/01		µg/L	<1.0	<1.0	<1.0	**1.3**	<1.0	<1.0	<1.0	<1.0	<1.0	**2.8**	TOL 2.6, TOL 3.4
GP10D-03	S/18	PH2-Sludge Area	01/22/01	DUP	µg/L	<1.0	<1.0	<1.0	**1.4**	<1.0	<1.0	<1.0	<1.0	<1.0	**3**	TOL 2.7, TOL 3.1
GP10F-01	S/18	PH2	03/10/00		µg/L	<1	<1	<1	**<1**	<1	<1	<1	<1	<1	**250**	CM 13, EBN 40, TOL 40, XYL-MP 56, XYL-O 9.1
GP10F-01	M/26	PH2	03/10/00		µg/L	<1	**20**	**23**	**3.3**	<1	<1	<1	<1	<1	**74**	CM 2.7, EBN 40, TOL 5.9, XYL-MP 20
GP10F-01	D/37	PH2	03/10/00		µg/L	<1	**84**	**25**	**1.6**	<1	<1	<1	<1	<1	**19**	EBN 38, TOL 4.1, XYL-MP 14
GP10F-02	M/26	PH2	03/10/00		µg/L	<1	<1	**1.5**	<1	<1	<1	<1	<1	<1	<1	None
GP10F-02	D/35	PH2	03/10/00		µg/L	**1.8**	**130**	**29**	<1	<1	<1	<1	<1	<1	<1	T12DCE 3.2
GP10F-03	S/17	PH2	03/09/00		µg/L	**52**	**70**	**26**	**1.6**	**2.7**	**1.7**	<1	**20**	**28**	**32**	112TCA 2.0, 12DCA 1.4, CCL4 20, MECL 1.5, T12DCE 1.3
GP10F-03	M/26	PH2	03/09/00		µg/L	**7.1**	**68**	**16**	<1	<1	<1	<1	**15**	**15**	**26**	CCL4 15
GP10F-03	D/36	PH2	03/09/00		µg/L	**1.7**	**70**	**21**	<1	<1	<1	<1	**2.2**	**2**	**1.3**	CCL4 2.2, T12DCE 2.2
GP10F-04	S/20	PH2	03/09/00		µg/L	<1	<1	**4.6**	**1.7**	<1	**1.1**	<1	<1	<1	**310**	EBN 380, TOL 28, XYL-MP 63, XYL-O 6.1
GP10F-04	M/26	PH2	03/09/00		µg/L	**70**	**37**	**36**	**6.7**	<1	**5.1**	**2.8**	<1	<1	**24**	12DCA 2.2, CHEA 1.2, EBN 23, T12DCE 2.6, TOL 1.8, XYL-MP 4.3
GP10F-04	D/35	PH2	03/09/00		µg/L	**1.6**	**8.3**	**54**	**13**	<1	**2.8**	<1	<1	<1	**3.1**	EBN 1.5, T12DCE 2.0
GP10F-05	S/17	PH2	03/09/00		µg/L	<1	<1	<1	<1	<1	**5.3**	<1	<1	<1	**1500**	12DCA 45, EBN 250, TOL 85, XYL-MP 210, XYL-O 18
GP10F-05	M/24	PH2	03/09/00		µg/L	<1	**3.9**	**2.4**	**3.1**	**11**	**8.6**	<1	<1	**1.6**	**40**	EBN 46, TOL 2.5
GP10F-05	D/35	PH2	03/09/00		µg/L	**3.5**	**260**	**42**	<1	<1	<1	<1	<1	<1	**2**	T12DCE 4.5

Table 5-8
North Industrial Corridor (NIC) Site
Geoprobe Groundwater Sample Analytical Results, Site VOCs* by EPA Method 8260

Station	Groundwater Depth Zone / Depth (feet)	Investigation Phase	Sample Date	QC Sample Flag	Units	PCE	TCE	C12DCE	VC	TCA	11DCA	11DCE	CT	CFM	BEN	Other Detected Compounds
GP10F-06	M/26	PH2	03/14/00		µg/L	<1	<1	**1.1**	**1.7**	<1	<1	<1	<1	<1	**310**	12DCP 4.6, CM 1.1, EBN 210, TOL 13, XYL-MP 32, XYL-O 2.8
GP10F-06	D/38	PH2	03/14/00		µg/L	<1	**79**	**25**	<1	<1	<1	<1	<1	<1	**6.4**	EBN 16, XYL-MP 1.5
GP10F-07	D/36	PH2	03/14/00		µg/L	<1	**32**	**34**	**3.6**	<1	<1	<1	<1	<1	**20**	CM 2.9, EBN 22, TOL 26, XYL-MP 45, XYL-O 22
GP10F-07	D/28	PH2	03/14/00		µg/L	<1	<1	**26**	**16**	<1	<1	<1	<1	<1	**1500**	12DCA 39, CM 13, EBN 240, TOL 160, XYL-MP 340, XYL-O 130
GP10F-08	S/17	PH2	03/09/00		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	**290**	EBN 38, TOL 8.1, XYL-MP 21
GP10F-08	D/39	PH2	03/09/00		µg/L	<1	**3.3**	**16**	**2.9**	<1	<1	<1	<1	<1	**280**	CHEA 2.3, EBN 150, TOL 33, XYL-MP 200, XYL O 6.6
GP10F-08	D/28	PH2	03/09/00		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	**160**	EBN 180, TOL 130, XYL-MP 220, XYL-O 38
GP10F-09	M/26	PH2	03/14/00		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	**98**	EBN 50, TOL 25, XYL-MP 76, XYL-O 70
GP10F-09	D/39	PH2	03/14/00		µg/L	**14**	**38**	**82**	**62**	**35**	**20**	**4.6**	<1	**3.9**	**11**	CM 2.9, EBN 1.6, T12DCE 2.2, XYL-MP 2.4, XYL-O 2.0
GPA01-1	S/20	PH1	12/11/97		µg/L	<1	<1	<1	<1	<1	**1.5**	<1	<1	<1	<1	None
GPA01-1	D/38	PH1	12/11/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA01-2	S/20	PH1	12/12/97		µg/L	<1	**1.5**	<1	<1	**6**	**4.5**	**2.1**	<1	<1	<1	None
GPA01-2	D/36	PH1	12/12/97		µg/L	<1	<1	<1	<1	**19**	**6.8**	**6**	<1	<1	<1	None
GPA01-3	S/20	PH1	12/12/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA01-3	D/38	PH1	12/12/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA01-4	S/15	PH1	06/03/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA01-4	D/36	PH1	06/03/98		µg/L	<1	**1.8**	<1	<1	<1	<1	<1	<1	<1	<1	MECL 1.1 UB
GPA01-5	S/18	PH1	06/02/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA01-5	D/38	PH1	06/02/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	MECL 1 UB
GPA01-6	S/19	PH1	06/03/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	MECL 1.2 UB
GPA01-6	D/38	PH1	06/03/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	MECL 1.3 UB
GPA02-2	S/20	PH1	12/12/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA02-3	M/24	PH1	12/12/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA03-1	S/20	PH1	12/12/97		µg/L	<1	<1	<1	<1	<1	**1.3**	<1	<1	<1	<1	None
GPA03-1	S/20	PH2	10/15/99		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA03-1	D/41	PH1	12/12/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA03-2	S/20	PH1	12/15/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA03-2	D/39	PH1	12/15/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA03-3	S/20	PH1	12/15/97		µg/L	<1	<1	<1 JS	<1 JS	<1	<1 JS	<1 JS	<1	<1 JS	<1	None
GPA03-3	D/36	PH1	12/15/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA04-2	S/20	PH1	12/15/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA04-2	D/39	PH1	12/15/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA04-2	D/39	PH1	12/15/97	DUP	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA04-3	S/20	PH1	12/15/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA04-3	D/30	PH1	12/15/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA05-1	D/33	PH1	12/15/97		µg/L	<1	<1	<1	**6.3**	<1	**2.7**	<1	<1	<1	<1	CHEA 2.4
GPA05-2	S/20	PH1	12/15/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA05-2	D/33	PH1	12/15/97		µg/L	<1	**40**	**29**	**8.9**	<1	**1.4**	<1	<1	<1	**2**	T12DCE 1.4
GPA05-3	S/20	PH1	12/15/97		µg/L	<1	**260**	**3.9**	<1	<1	<1	<1	<1	<1	<1	None
GPA05-3	S/20	PH2	10/15/99		µg/L	<1	**160**	**6.4**	<1	<1	<1	<1	<1	<1	<1	None
GPA05-3	D/33	PH1	12/15/97		µg/L	<1	**29**	**1.8**	<1	<1	<1	<1	**1.7**	**3.3**	<1	CCL4 1.7
GPA05-4	S/20	PH1	12/15/97		µg/L	<1	**310**	**410**	**3.6**	**4.4**	**1.2**	**7.6**	<1	<1	<1	T12DCE 1.6
GPA05-4	D/34	PH1	12/15/97		µg/L	<1	**160**	**27**	<1	**5.2**	**1.3**	**8.1**	<1	<1	<1	None

Table 5-8
North Industrial Corridor (NIC) Site
Geoprobe Groundwater Sample Analytical Results, Site VOCs* by EPA Method 8260

Station	Groundwater Depth Zone / Depth (feet)	Investigation Phase	Sample Date	QC Sample Flag	Units	PCE	TCE	C12DCE	VC	TCA	11DCA	11DCE	CT	CFM	BEN	Other Detected Compounds
GPA05-5	S/20	PH1	12/15/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA05-5	D/35	PH1	12/15/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA06-1	D/30	PH1	12/16/97		µg/L	<1	**6.4**	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA06-2	S/20	PH1	12/16/97		µg/L	<1	<1	**1.2**	<1	<1	<1	<1	<1	<1	**6**	EBN 26, XYL-MP 33, XYL-O 4.2
GPA06-2	D/33	PH1	12/16/97		µg/L	<1	**44**	**11**	<1	<1	<1	<1	<1	<1	<1	XYL-MP 1.3
GPA06-2	D/33	PH1	12/16/97	DUP	µg/L	<1	**60**	**12**	<1	<1	<1	<1	<1	<1	<1	None
GPA06-3	S/20	PH1	12/16/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA06-3	S/20	PH1	06/02/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	MECL 1.7 UB
GPA06-3	M/27	PH1	12/16/97		µg/L	<1	**42**	**6**	<1	<1	<1	<1	<1	<1	<1	None
GPA06-3	D/38	PH1	06/02/98		µg/L	**5.7**	**250**	**46**	<1	<1	<1	<1	<1	<1	<1	MECL 1.6 UB, TCFM 1.5
GPA06-4	S/20	PH1	12/16/97		µg/L	<1	**4.6**	**1.3**	<1	<1	<1	<1	<1	<1	<1	None
GPA06-4	M/24	PH1	12/16/97		µg/L	<1	**11**	**2.6**	<1	<1	<1	<1	<1	<1	<1	None
GPA06-4	M/23	PH1	06/11/98		µg/L	<1	**11**	**1.7**	<1	<1	<1	<1	<1	<1	<1	TOL 1.8
GPA06-4	D/28	PH1	06/11/98		µg/L	<1	**15**	**2**	<1	<1	<1	<1	<1	<1	<1	TOL 1.1
GPA06-5	S/20	PH1	06/03/98		µg/L	<1	**2**	<1	<1	<1	<1	<1	<1	<1	<1	MECL 1 UB
GPA06-5	D/36	PH1	06/03/98		µg/L	**2.2**	**280**	**39**	<1	<1	<1	<1	<1	<1	<1	T12DCE 1.3
GPA06-5	D/36	PH1	06/03/98	DUP	µg/L	<1	**310**	**45**	<1	<1	<1	<1	<1	<1	<1	T12DCE 1.3
GPA06-6	S/20	PH1	06/04/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA06-6	D/36	PH1	06/04/98		µg/L	**3.6**	**180**	**43**	<1	<1	<1	<1	<1	<1	<1	MECL 1.3
GPA06-7	S/18	PH1	06/03/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	MECL 1 UB
GPA06-7	D/36	PH1	06/03/98		µg/L	<1	**15**	**2.4**	<1	<1	<1	<1	<1	<1	<1	MECL 1.1 UB
GPA07-1	S/20	PH1	12/16/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA07-1	D/33	PH1	12/16/97		µg/L	<1	**1.1**	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA07-2	S/20	PH1	12/16/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA07-2	D/33	PH1	12/16/97		µg/L	<1	**1.1**	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA07-3	M/21	PH1	12/16/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	**92**	EBN 17, TOL 1.6, XYL-MP 36, XYL-O 3
GPA07-3	D/36	PH1	12/16/97		µg/L	<1	**13**	**7.3**	**35**	<1	<1	<1	<1	<1	**90**	EBN 35, TOL 8.3, XYL-MP 31, XYL-O 9.2
GPA07-4	S/20	PH1	12/17/97		µg/L	<1	<1	**25**	**3.8**	<1	<1	<1	<1	<1	**1800 JS**	EBN 400 JS, TOL 160 JS, XYL-MP 610 JS, XYL O 42
GPA07-4	D/33	PH1	12/17/97		µg/L	<1	**110 JS**	**50**	**26**	<1	**7.2**	**4.8**	<1	<1	**180 JS**	EBN 140 JS, TOL 40 JS, XYL-MP 180 JS, XYL-O 22
GPA07-5	S/20	PH1	12/17/97		µg/L	<1	**25**	**1.1**	<1	<1	<1	<1	<1	<1	<1	None
GPA07-5	D/34	PH1	12/17/97		µg/L	<1	**55**	**3.4**	<1	**1.4**	<1	**1.4**	<1	<1	<1	None
GPA07-6	S/20	PH1	12/17/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	**29**	EBN 290, TOL 29, XYL-MP 220, XYL-O 17
GPA07-6	D/35	PH1	12/17/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	EBN 11, XYL-MP 7.5
GPA07-7	S/20	PH1	12/17/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA07-7	D/33	PH1	12/17/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA08-1	S/20	PH1	12/17/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA08-1	D/31	PH1	12/17/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA08-2	S/20	PH1	12/17/97		µg/L	**5**	**450**	**560**	**47**	**2.5**	**4.8**	**3**	<1	<1	<1	T12DCE 3.5
GPA08-2	S/20	PH2	10/19/99		µg/L	<1	**45**	**74**	**7.4**	<1	<1	<1	<1	<1	<1	T12DCE 2.4
GPA08-2	D/36	PH1	12/17/97		µg/L	<1	**56**	**110**	**12**	<1	**2**	**1.2**	<1	<1	<1	T12DCE 1.1
GPA08-3	S/20	PH1	12/17/97		µg/L	<1	**92**	**16**	<1	<1	<1	<1	<1	<1	**83**	12DCA 2.7, CM 2.2, EBN 1.7, TOL 1.8
GPA08-3	D/33	PH1	12/17/97		µg/L	**1.5**	**300**	**59**	<1	<1	<1	<1	<1	<1	**8.4**	None
GPA08-4	S/20	PH1	12/17/97		µg/L	**1.5**	**230**	**34**	<1	<1	<1	<1	<1	<1	<1	None
GPA08-4	S/20	PH2	10/19/99		µg/L	**1.7**	**130**	**24**	<1	<1	<1	<1	<1	<1	<1	T12DCE 1.1
GPA08-4	D/31	PH1	12/17/97		µg/L	**2.4**	**450**	**66**	<1	<1	<1	<1	<1	<1	<1	T12DCE 1

Table 5-8
North Industrial Corridor (NIC) Site
Geoprobe Groundwater Sample Analytical Results, Site VOCs* by EPA Method 8260

Station	Groundwater Depth Zone / Depth (feet)	Investigation Phase	Sample Date	QC Sample Flag	Units	PCE	TCE	C12DCE	VC	TCA	11DCA	11DCE	CT	CFM	BEN	Other Detected Compounds
GPA09-1	S/20	PH1	12/29/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA09-1	D/35	PH1	12/29/97		µg/L	**1.4**	**120**	**15**	<1	<1	<1	<1	<1	<1	<1	None
GPA09-1	D/35	PH1	12/29/97	DUP	µg/L	**1**	**100**	**16**	<1	<1	<1	<1	<1	<1	<1	None
GPA09-2	S/20	PH1	12/29/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA09-2	D/36	PH1	12/29/97		µg/L	**2.4**	**220**	**36**	<1	<1	<1	<1	<1	<1	<1	None
GPA09-3	S/20	PH1	12/29/97		µg/L	<1	**9.2**	<1	<1	<1	<1	<1	**35**	**18**	<1	CCL4 35
GPA09-3	D/36	PH1	12/29/97		µg/L	<1	**190**	**26**	<1	<1	<1	<1	<1	<1	<1	None
GPA09-4	S/20	PH1	12/30/97		µg/L	<1	**1.5**	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA09-4	D/42	PH1	12/30/97		µg/L	**2.8**	**300**	**52**	<1	<1	<1	<1	<1	<1	<1	None
GPA09-5	S/20	PH1	12/30/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA09-5	D/35	PH1	12/30/97		µg/L	**1.1**	**160**	**53**	<1	<1	<1	<1	<1	<1	**22**	CBN 1.3, CM 1.5
GPA10-1	M/22	PH1	12/18/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA10-1	D/35	PH1	12/18/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA10-2	M/22	PH1	12/18/97		µg/L	**6.8**	**2.1**	<1	<1	<1	**6.2**	<1	<1	<1	<1	None
GPA10-2	D/36	PH1	12/18/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA10-2	D/36	PH1	12/18/97	DUP	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA10-3	M/23	PH1	12/18/97	SPLIT	µg/L	<1	**1.4**	**1.2**	**22**	<1	**5**	<1	<1	<1	<1	None
GPA10-3	D/36	PH1	12/18/97	SPLIT	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA10-4	S/18	PH1	06/09/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA10-4	D/36	PH1	06/09/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA10-5	S/18	PH1	06/11/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	MECL 1.3 UB
GPA10-5	D/34	PH1	06/11/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	MECL 1.5 UB
GPA10-6	S/20	PH1	06/11/98		µg/L	<1	<1	<1	<1	<1	**1.5**	<1	<1	<1	**66**	12DCA 3.6, CBN 1.5, CM 2.9, MECL 2.2 UB, XYL-MP 1.6
GPA10-6	D/32	PH1	06/11/98		µg/L	<1	**20**	**32**	**5.7**	<1	<1	<1	<1	**3.2**	**46**	12DCA 1.9, CM 1.3, MECL 1.8 UB
GPA10-7	M/21	PH1	06/11/98		µg/L	<1	<1	**9.5**	**3.2**	<1	**5.7**	<1	<1	<1	**12**	CM 1.3, MECL 1.6 UB
GPA10-7	D/35	PH1	06/11/98		µg/L	**5.9**	**25**	**65**	**17**	**1.7**	**1.7**	**2.7**	**13**	**35**	**68**	12DCA 2.5, CCL4 13, CM 8.1, MECL 5.1 UB
GPA10-8	S/20	PH1	06/11/98		µg/L	<1	<1	**11**	**35**	<1	**30**	<1	<1	<1	**420**	12DCA 16, CHEA 2.8, CM 1.5, EBN 1.1, MECL 3.7 UB, TOL 4.3, XYL-O 1.4
GPA10-8	D/32	PH1	06/11/98		µg/L	**12**	**210**	**72**	**8.3**	**19**	**17**	**17**	**30**	**150**	**180**	12DCA 6.2, CCL4 30, EBN 1.7, MECL 5 UB, TOL 10, XYL-MP 2.6, XYL-O 1.6
GPA11-1	S/20	PH1	12/30/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	**12**	<1	None
GPA11-1	D/37	PH1	12/30/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA11-2	S/20	PH1	01/09/98		µg/L	<1	**1.4 JS**	**11**	**3**	<1 JS	<1	<1	<1 JS	<1	<1 JS	None
GPA11-2	D/36	PH1	01/09/98		µg/L	<1	**68 JS**	**96**	**36**	<1	**2.9**	**3.4**	<1	<1	**1.1**	CM 5.2, T12DCE 1.5
GPA11-3	S/20	PH1	12/30/97		µg/L	<1	**96**	**66**	**4.2**	<1	**3.5**	**10**	<1	<1	<1	T12DCE 4.7
GPA11-3	D/36	PH1	12/30/97		µg/L	<1	**690**	**240**	**10**	**15**	**13**	**55**	<1	**2.1**	**3.3**	12DCA 1.4, T12DCE 28
GPA12-1	S/20	PH1	12/30/97		µg/L	<1	<1	**9.7**	**44**	<1	**2.6**	<1	<1	<1	<1	None
GPA12-1	D/36	PH1	12/30/97		µg/L	<1	**240**	**23**	<1	**6.1**	**2**	**8.9**	<1	<1	<1	None
GPA12-2	S/20	PH1	01/09/98		µg/L	<1	<1 JS	<1 JS	<1 JS	<1 JS	<1 JS	<1 JS	<1 JS	<1 JS	**2300 JS**	EBN 670 JS, TOL 320 JS, XYL-MP 810 JS, XYL-O 81 JS
GPA12-2	D/36	PH1	01/09/98		µg/L	<1	**55**	**6**	<1	**1.3 JS**	<1	**2.5**	<1 JS	<1	**650 JS**	EBN 320 JS, TOL 230 JS, XYL-MP 780 JS, XYL-O 64

Table 5-8
North Industrial Corridor (NIC) Site
Geoprobe Groundwater Sample Analytical Results, Site VOCs* by EPA Method 8260

Station	Groundwater Depth Zone / Depth (feet)	Investigation Phase	Sample Date	QC Sample Flag	Units	PCE	TCE	C12DCE	VC	TCA	11DCA	11DCE	CT	CFM	BEN	Other Detected Compounds
GPA12-3	S/20	PH1	12/30/97		µg/L	<1	<1 JS	**3.1**	<1	<1 JS	<1	<1	<1 JS	<1	**3200 JS**	CM 9.5, EBN 260, TOL 54, XYL-MP 48, XYL-O 8.2
GPA12-3	D/33	PH1	12/30/97		µg/L	<1	**5.2**	**22**	**3.6**	<1	**1.2 JS**	<1	<1	<1	**230 JS**	CM 1, EBN 210 JS, TOL 14 JS, XYL-MP 62 JS, XYL-O 4.6 JS
GPA12-3	D/33	PH1	12/30/97	DUP	µg/L	<1	**5.4**	**23**	**3.4**	<1	**1.1**	<1	<1	<1	**210 JS**	EBN 190 JS, TOL 17 JS, XYL-MP 78 JS, XYL-O 5.8
GPA12-4	S/20	PH1	12/30/97		µg/L	<1	<1 JS	**4.8**	**1.8**	<1 JS	<1	<1	<1 JS	<1	**3600 JS**	CM 1.8, EBN 550 JS, TOL 360 JS, XYL-MP 1300 JS, XYL-O 120
GPA12-4	D/33	PH1	12/30/97		µg/L	<1	**19**	**44**	**28**	<1	<1	<1	<1	<1	**160 JS**	CM 1.5, EBN 140 JS, TOL 44 JS, XYL-MP 300 JS, XYL-O 26
GPA12-5	S/20	PH1	12/30/97		µg/L	<1	<1	<1	**50**	<1	<1	<1	<1	<1	**5900**	EBN 180, TOL 650, XYL-MP 630, XYL-O 260
GPA12-5	D/31	PH1	12/30/97		µg/L	<1	**9.1**	**63**	**37**	<1	<1	<1	<1	<1	**91**	EBN 8.5, TOL 29, XYL-MP 29, XYL-O 11
GPA12-6	S/20	PH1	12/31/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	**19000**	EBN 4500, TOL 23000, XYL-MP 16000, XYL-O 7000
GPA12-6	D/30	PH1	12/31/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	**180**	EBN 240, TOL 800, XYL-MP 850, XYL-O 390
GPA12-7	S/20	PH1	12/31/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA12-7	D/27	PH1	12/31/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA12-8	S/20	PH1	01/22/98		µg/L	<1	**350**	**86**	**21**	**4.7**	**8.6**	**24**	<1	<1	<1	T12DCE 9.1
GPA12-8	D/34	PH1	01/22/98		µg/L	<1	**520**	**150**	**120**	**5.9**	**15**	**38**	<1	<1	**5.7**	12DCA 1.4, CHEA 1.1, CM 2.9, T12DCE 16
GPA12-9	S/20	PH1	01/22/98		µg/L	<1	**94**	**57**	**8.8**	<1	**4.5**	**8.9**	<1	<1	<1	T12DCE 16
GPA12-9	D/36	PH1	01/22/98		µg/L	<1	**790**	**230**	**70**	**11**	**17**	**60**	<1	**1.2**	**1.6**	12DCA 1.6,CM 2.9, T12DCE 35
GPA13-1	S/20	PH1	12/31/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA13-1	D/39	PH1	12/31/97		µg/L	<1	**6.8**	**2.9**	<1	<1	<1	<1	<1	<1	<1	None
GPA13-2	D/36	PH1	12/31/97		µg/L	<1	**14**	**23**	**15**	<1	<1	<1	<1	<1	<1	None
GPA13-3	S/20	PH1	01/06/98		µg/L	<1	<1	**260**	**11**	<1	**6.6**	**12**	<1	<1	**1.1**	T12DCE 4.3
GPA13-3	D/37	PH1	01/06/98		µg/L	<1	**110**	**180**	**32**	<1	**4.6**	**11**	<1	<1	<1	CM 2.9, T12DCE 2.7
GPA13-4	S/20	PH1	01/07/98		µg/L	<1	**36**	**58**	**13**	<1	**2.2**	**5.2**	<1	<1	<1	None
GPA13-4	D/35	PH1	01/07/98		µg/L	<1	**100**	**120**	**49**	<1	**3.9**	**7.8**	<1	<1	<1	None
GPA13-4	D/35	PH1	01/07/98	DUP	µg/L	<1	**95**	**110**	**45**	<1	**3.8**	**7.3**	<1	<1	<1	None
GPA14-1	S/20	PH1	01/06/98		µg/L	<1	**56**	**18**	<1	<1	<1	<1	<1	<1	<1	T12DCE 1.1
GPA14-1	D/33	PH1	01/06/98		µg/L	<1	**360**	**110**	**59**	**2.8**	**8.7**	**25**	<1	<1	**1.3**	CM 3.5, T12DCE 3.6
GPA14-2	S/20	PH1	01/06/98		µg/L	<1	**360**	**110**	**42**	**5**	**13**	**32**	<1	<1	<1	T12DCE 9.3
GPA14-2	D/33	PH1	01/06/98		µg/L	<1	**640**	**160**	**64**	**8.9**	**23**	**65**	<1	**1.1**	**6.7**	12DCA 1.9, CHEA 1.1, T12DCE 15
GPA14-3	S/20	PH1	01/06/98		µg/L	<1	**270**	**98**	**25**	**2.7**	**11**	**24**	<1	<1	<1	CM 1.4, T12DCE 8.7
GPA14-3	D/30	PH1	01/06/98		µg/L	<1	**650**	**180**	**54**	**8.9**	**20**	**58**	<1	<1	**1.4**	12DCA 1.5, CM 3, T12DCE 27
GPA15-1	M/27	PH1	01/06/98		µg/L	<1	**31 JS**	**130**	**11**	<1	**6.6**	**8.4**	<1	<1	<1	CM 1.7, T12DCE 2.1
GPA15-1	D/36	PH1	01/06/98		µg/L	<1	**170**	**80**	**11**	**3.7**	**4.9**	**12**	<1	<1	<1	T12DCE 1.7
GPA15-2	S/20	PH1	01/06/98		µg/L	**3.2**	**11**	**5.3**	<1	**1.5**	**5.6**	**3.7**	<1	<1	<1	None
GPA15-2	S/20	PH2	10/19/99		µg/L	<1	**5.1**	**1.9**	<1	<1	**2.5**	<1	<1	<1	<1	None
GPA15-2	D/31	PH1	01/06/98		µg/L	**5.9**	**13**	**5.1**	<1	1	**5.3**	**4.1**	<1	<1	<1	None
GPA15-3	S/20	PH1	01/07/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA15-3	D/30	PH1	01/07/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA16-1	S/20	PH1	12/09/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA16-1	D/45	PH1	12/09/97		µg/L	<1	**2.2**	**1**	<1	<1	<1	<1	<1	<1	<1	None
GPA16-2	S/20	PH1	12/10/97		µg/L	<1	**1.1**	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA16-2	D/41	PH1	12/10/97		µg/L	<1	**60**	**41**	**9.4**	<1	**1.3**	**2.3**	<1	<1	<1	None

Table 5-8
North Industrial Corridor (NIC) Site
Geoprobe Groundwater Sample Analytical Results, Site VOCs* by EPA Method 8260

Station	Groundwater Depth Zone / Depth (feet)	Investigation Phase	Sample Date	QC Sample Flag	Units	PCE	TCE	C12DCE	VC	TCA	11DCA	11DCE	CT	CFM	BEN	Other Detected Compounds
GPA16-3	S/20	PH1	12/10/97		µg/L	<1	**2**	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA16-3	D/38	PH1	12/10/97		µg/L	<1	**670**	**160**	**42**	**6.8**	**12**	**40**	<1	<1	**2.2**	T12DCE 6.5
GPA16-4	S/18	PH1	06/09/98		µg/L	<1	**5.8**	**1.3**	<1	<1	<1	<1	<1	<1	<1	None
GPA16-4	D/38	PH1	06/09/98		µg/L	<1	**320**	**89**	**13**	**2.9**	**5**	**18**	<1	<1	<1	T12DCE 2.6
GPA16-5	S/18	PH1	06/11/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	TOL 2
GPA16-5	D/38	PH1	06/11/98		µg/L	<1	**340**	**110**	**30**	**2.7**	**6.8**	**26**	<1	<1	**1.2**	TOL 5
GPA16-6	S/18	PH1	06/09/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA16-6	D/38	PH1	06/09/98		µg/L	<1	**60**	**18**	**3.7**	<1	**1.1**	**3.6**	<1	<1	<1	None
GPA17-1	S/20	PH1	12/03/97		µg/L	**1.3**	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA17-1	D/33	PH1	12/03/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA17-2	S/20	PH1	12/03/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA17-2	D/33	PH1	12/03/97		µg/L	<1	**2**	**11**	<1	<1	**1.2**	<1	<1	<1	<1	None
GPA18-1	S/20	PH1	12/10/97		µg/L	<1	**4.1**	**1.4**	<1	<1	<1	<1	<1	<1	<1	None
GPA18-1	D/35	PH1	12/10/97		µg/L	<1	**3.6**	**1.5**	<1	<1	<1	<1	<1	<1	<1	None
GPA18-2	S/20	PH1	12/19/97		µg/L	<1 JH	**4.9**	**1**	<1 JH	<1 JH	<1 JH	<1 JH	<1 JH	<1 JH	<1 JH	None
GPA18-2	D/37	PH1	12/19/97		µg/L	<1 JH	**35**	**35**	**3.4 JH**	<1 JH	<1 JH	**1.4 JH**	<1 JH	<1 JH	<1 JH	None
GPA18-3	S/20	PH1	12/10/97		µg/L	<1	**6.9**	**2.8**	<1	**1.7**	<1	<1	<1	<1	<1	None
GPA18-3	D/38	PH1	12/10/97		µg/L	<1	**240**	**120**	**20**	**1.4**	**6**	**19**	<1	<1	<1	T12DCE 4.1
GPA18-4	S/20	PH1	12/29/97		µg/L	<1	**39**	**11**	<1	<1	<1	<1	<1	<1	<1	None
GPA18-4	S/20	PH2	10/15/99		µg/L	<1	**27**	**5.2**	<1	<1	<1	<1	<1	<1	<1	None
GPA18-4	D/36	PH1	12/29/97		µg/L	<1	**220**	**73**	**5.2**	<1	**2.1**	**5.4**	<1	<1	<1	T12DCE 1.9
GPA19-1	S/20	PH1	12/10/97		µg/L	<1	<1	<1	<1	**16**	**9**	<1	<1	<1	<1	None
GPA19-1	D/41	PH1	12/10/97		µg/L	<1	**55**	**22**	**1.5**	<1	<1	2.1	<1	<1	<1	None
GPA19-2	S/20	PH1	12/10/97		µg/L	<1	**18**	<1	<1	<1	<1	<1	<1	<1	<1	14DCB 1.1
GPA19-2	D/35	PH1	12/10/97		µg/L	<1	**240**	**38**	**2.2**	**1.6**	**1.9**	**5.1**	<1	<1	<1	T12DCE 2.3
GPA19-2	D/35	PH1	12/10/97	DUP	µg/L	<1	**230**	**35**	**2.3**	**1.5**	**1.7**	**4.3**	<1	<1	<1	T12DCE 2.4
GPA20-1	S/20	PH1	12/10/97		µg/L	**1.2**	**260**	**39**	**4.1**	**1.5**	**1.9**	**5.2**	<1	<1	<1	T12DCE 2.4
GPA20-1	D/35	PH1	12/10/97		µg/L	<1	**320**	**44**	**3.7**	**2.3**	**2.4**	**7**	<1	<1	<1	T12DCE 2.6
GPA20-2	S/20	PH1	12/11/97		µg/L	<1	**49**	**9.3**	<1	<1	<1	<1	<1	<1	<1	None
GPA20-2	D/33	PH1	12/11/97		µg/L	<1	**330**	**46**	**5.1**	**1.9**	**2.5**	**6.9**	<1	<1	<1	T12DCE 2.5
GPA21-1	S/18	PH1	12/09/97		µg/L	<1	**1.2**	**1.6**	<1	<1	**3.2**	**1.1**	<1	<1	<1	None
GPA21-1	D/30	PH1	12/09/97		µg/L	**1.3**	**5.2**	**3.9**	<1	<1	**5.3**	**2.8**	<1	<1	<1	None
GPA21-2	S/20	PH1	12/09/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA21-2	D/30	PH1	12/09/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA22-1	M/23.5	PH1	12/03/97		µg/L	**1.1**	**2**	**7.3**	<1	<1	<1	<1	<1	<1	<1	None
GPA22-1	D/33	PH1	12/03/97		µg/L	**1.7**	**3.5**	**14**	<1	<1	**1.1**	<1	<1	<1	<1	None
GPA22-1	D/33	PH1	12/03/97	DUP	µg/L	**1.8**	**3.1**	**12**	<1	<1	**1.2**	<1	<1	<1	<1	None
GPA22-2	S/20	PH1	12/03/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA22-2	D/41.5	PH1	12/03/97		µg/L	<1	**1.3**	**8.6**	<1	<1	**1.1**	<1	<1	<1	<1	None
GPA23-1	S/20	PH1	12/11/97		µg/L	<1	**3.6**	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA23-1	D/36	PH1	12/11/97		µg/L	<1	**6.7**	**1.4**	<1	<1	<1	<1	<1	<1	<1	None
GPA23-2	S/20	PH1	12/11/97		µg/L	<1	**2.4**	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA23-2	D/35	PH1	12/11/97		µg/L	<1	**360**	**120**	**7.5**	<1	**3.6**	**8.6**	<1	<1	<1	T12DCE 4.7
GPA24-1	S/20	PH1	12/11/97		µg/L	<1	**12 JDB**	**4.8**	<1	**2.8**	**1.2**	<1	<1	<1	<1	None
GPA24-1	D/39	PH1	12/11/97		µg/L	<1	**460**	**170**	**22**	<1	**3.4**	**4.3**	<1	<1	**1.8**	T12DCE 5.7
GPA24-2	S/20	PH1	12/11/97		µg/L	<1	**180**	**23**	**1.3**	<1	<1	**1.1**	<1	<1	<1	T12DCE 1.2
GPA24-2	S/20	PH2	10/15/99		µg/L	<1	**15**	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA24-2	D/36	PH1	12/11/97		µg/L	<1	**580**	**100**	**11**	<1	**3.7**	**6.4**	<1	<1	<1	T12DCE 6
GPA24-2	D/36	PH1	12/11/97	DUP	µg/L	**1.3**	**550**	**98**	**11**	**1.4**	**3.3**	**7.7**	<1	<1	<1	T12DCE 6.7

Table 5-8
North Industrial Corridor (NIC) Site
Geoprobe Groundwater Sample Analytical Results, Site VOCs* by EPA Method 8260

Station	Groundwater Depth Zone / Depth (feet)	Investigation Phase	Sample Date	QC Sample Flag	Units	PCE	TCE	C12DCE	VC	TCA	11DCA	11DCE	CT	CFM	BEN	Other Detected Compounds
GPA24-3	S/20	PH1	12/11/97		µg/L	**2.1**	**310**	**44**	**2.2**	<1	**1.7**	**1.7**	<1	<1	<1	T12DCE 4.5
GPA24-3	D/30	PH1	12/11/97		µg/L	**2.2**	**830**	**110**	**6.9**	<1	**3.8**	**5.6**	<1	<1	<1	T12DCE 8.3
GPA24-4	S/20	PH1	12/11/97		µg/L	<1	**410**	**74**	**6.9**	<1	**3.9**	**3.7**	<1	<1	<1	T12DCE 5.6
GPA24-4	D/33	PH1	12/11/97		µg/L	**2**	**770**	**120**	**12**	<1	**6.3**	**7.3**	<1	<1	<1	T12DCE 10
GPA25-1	S/20	PH1	12/09/97		µg/L	**1.3**	**510**	**96**	**13**	<1	**3.8**	**4.9**	<1	<1	<1	T12DCE 5.6
GPA25-1	S/20	PH2	10/15/99		µg/L	<1	**290**	**59**	**7.4**	<1	**2.2**	**4.1**	<1	<1	<1	T12DCE 5.3
GPA25-1	D/29	PH1	12/09/97		µg/L	**1.3**	**460**	**89**	**16**	<1	**4.5**	**6.1**	<1	<1	<1	T12DCE 5.2
GPA25-2	S/20	PH1	12/09/97		µg/L	<1	**6 JDB**	**430**	**11**	<1	**3.2**	**5**	<1	<1	<1	T12DCE 7.7
GPA25-2	D/28	PH1	12/09/97		µg/L	<1	**4.2**	**390**	**11**	<1	**3.2**	**4.7**	<1	<1	<1	T12DCE 6.8
GPA25-2	D/28	PH1	12/09/97	DUP	µg/L	<1	**4.2**	**410**	<1	<1	**3.2**	**5.1**	<1	<1	<1	T12DCE 7.7
GPA25-3	M/23	PH1	12/09/97		µg/L	<1	<1	2.2	<1	<1	<1	<1	<1	<1	<1	None
GPA25-3	D/28	PH1	12/09/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA25-4	S/20	PH1	06/02/98		µg/L	<1	**5.6**	**160**	**1.4**	<1	**2**	**3.7**	<1	<1	<1	MECL 1.5 UB, T12DCE 4.2
GPA25-4	D/28	PH1	06/02/98		µg/L	<1	**4**	**310**	**3.7**	<1	**2.8**	**5.4**	<1	<1	<1	MECL 1.3 UB, T12DCE 4.1
GPA25-5	S/20	PH1	06/02/98		µg/L	<1	**190**	**38**	**1.7**	<1	**2.3**	**2.5**	<1	<1	<1	MECL 1.1 UB, T12DCE 1.9
GPA25-5	D/29	PH1	06/02/98		µg/L	**1.1**	**270**	**58**	**3.3**	**1.2**	**2.7**	**6.5**	<1	<1	<1	MECL 1.6 UB, T12DCE 3.6
GPA25-5	D/29	PH1	06/02/98	DUP	µg/L	**1.2**	**300**	**50**	**3.4**	<1	**2.8**	**6.6**	<1	<1	<1	MECL 1.8 UB, T12DCE 3.6
GPA26-1	S/20	PH1	12/03/97		µg/L	<1	<1	2.2	<1	<1	<1	<1	<1	<1	<1	None
GPA26-1	D/30	PH1	12/03/97		µg/L	<1	**3.5**	**12**	<1	<1	1	<1	<1	<1	<1	None
GPA26-2	S/20	PH1	12/03/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA26-2	D/42	PH1	12/03/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA27-1	S/20	PH1	12/19/97		µg/L	<1 JH	<1 JH	<1 JH	<1 JH	<1 JH	<1 JH	<1 JH	<1 JH	<1 JH	<1 JH	None
GPA27-1	D/35	PH1	12/19/97		µg/L	<1 JH	**13**	**7.9**	<1 JH	<1 JH	<1 JH	<1 JH	<1 JH	<1 JH	<1 JH	None
GPA27-2	S/20	PH1	12/19/97		µg/L	<1 JH	**36**	**9.9**	<1 JH	<1 JH	<1 JH	<1 JH	<1 JH	<1 JH	<1 JH	None
GPA27-2	D/33	PH1	12/19/97		µg/L	<1 JH	**110 JH**	**41**	<1 JH	<1 JH	**2.5 JH**	**1.8 JH**	<1 JH	<1 JH	<1 JH	T12DCE 1.1
GPA27-3	S/20	PH1	12/22/97		µg/L	<1	**4**	**14**	<1	<1	<1	<1	<1	<1	<1	CBN 1.8
GPA27-3	D/39	PH1	12/22/97		µg/L	<1	**300**	**100**	**10**	<1	**1.9**	**2.6**	<1	<1	<1	T12DCE 2.7
GPA27-4	M/23	PH1	12/29/97		µg/L	<1	**27**	**8.2**	<1	**1.2**	**1.2**	<1	<1	<1	<1	None
GPA27-4	D/40	PH1	12/29/97		µg/L	<1	**180**	**80**	**6.4**	**1.2**	**2.4**	**2.3**	<1	<1	<1	T12DCE 2
GPA28-1	S/20	PH1	12/08/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	**5.9**	None
GPA28-1	D/25	PH1	12/08/97		µg/L	<1	**11**	**17**	**5.1**	<1	**3.1**	<1	<1	<1	1	None
GPA28-2	S/20	PH1	12/08/97		µg/L	**5.4**	**160**	**38**	<1	<1	<1	<1	<1	**1.5**	<1	T12DCE 2
GPA28-2	S/20	PH1	12/08/97	DUP	µg/L	**5**	**130**	**35**	<1	<1	<1	<1	<1	**1.3**	<1	T12DCE 2.1
GPA28-2	S/20	PH2	10/15/99		µg/L	**6.8**	**60**	**14**	<1	<1	<1	<1	<1	<1	<1	None
GPA28-2	D/27	PH1	12/08/97		µg/L	<1	**250**	**69**	**1.9**	<1	**2.1**	**1.4**	<1	<1	<1	T12DCE 2.3
GPA28-3	S/20	PH1	12/08/97		µg/L	<1	**240**	**140**	**3.5**	<1	**3.5**	**2.2**	<1	<1	<1	T12DCE 3.7
GPA28-3	S/20	PH2	10/20/99		µg/L	**9.3**	**130**	**92**	<1	<1	**1.1**	<1	<1	<1	<1	T12DCE 6.6
GPA28-3	D/29	PH1	12/08/97		µg/L	<1	**250**	**73**	**4.9**	<1	**3.1**	**2.8**	<1	<1	<1	T12DCE 2
GPA28-4	M/23	PH1	12/09/97		µg/L	<1	**75**	**19**	**1.3**	<1	**1.1**	<1	<1	<1	<1	None
GPA28-4	D/30	PH1	12/09/97		µg/L	<1	**320**	**70**	**6.7**	<1	**4.2**	**3.8**	<1	<1	<1	T12DCE 1.8
GPA28-5	S/20	PH1	12/09/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA28-5	D/30	PH1	12/09/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA28-6	S/20	PH1	06/02/98		µg/L	<1	**4**	**84**	**1.5**	<1	**1.2**	**1.4**	<1	<1	<1	MECL 1.8 UB
GPA28-6	D/29	PH1	06/02/98		µg/L	<1	**17**	**160**	**2.8**	<1	**2.3**	**3**	<1	<1	<1	MECL 1.8 UB, T12DCE 1.9
GPA29-1	S/20	PH1	12/04/97		µg/L	<1	<1	**1.8**	<1	<1	<1	<1	<1	<1	<1	None
GPA29-1	D/35	PH1	12/04/97		µg/L	<1	**1.3**	**5.4**	<1	<1	<1	<1	<1	<1	<1	None
GPA29-2	S/20	PH1	12/04/97		µg/L	<1	**9.6**	**52**	<1	<1	<1	<1	<1	<1	<1	EBN 95, TOL 5, XYL-MP 78, XYL-O 51
GPA29-2	D/35	PH1	12/04/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	EBN 2.8, XYL-MP 2.5, XYL-O 1.4

Table 5-8
North Industrial Corridor (NIC) Site
Geoprobe Groundwater Sample Analytical Results, Site VOCs* by EPA Method 8260

Station	Groundwater Depth Zone / Depth (feet)	Investigation Phase	Sample Date	QC Sample Flag	Units	PCE	TCE	C12DCE	VC	TCA	11DCA	11DCE	CT	CFM	BEN	Other Detected Compounds
GPA29-3	S/20	PH1	12/04/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA29-3	D/35	PH1	12/04/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA29-4	S/20	PH1	05/29/98		µg/L	**1.6**	**180**	**8.8**	<1	<1	<1	<1	<1	<1	<1	None
GPA29-4	S/20	PH2	12/16/99		µg/L	<1	**42**	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA29-4	D/39	PH1	05/29/98		µg/L	<1	**1.7**	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA29-5	S/20	PH1	05/29/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA29-5	D/36	PH1	05/29/98		µg/L	<1	<1	**1.3**	<1	<1	<1	<1	<1	<1	<1	None
GPA29-6	S/20	PH1	05/29/98		µg/L	<1	**30**	<1	<1	**1.6**	<1	<1	<1	<1	<1	None
GPA29-6	S/20	PH2	10/20/99		µg/L	<1	**43**	<1	<1	**1.8**	<1	<1	<1	<1	<1	None
GPA29-6	D/33	PH1	05/29/98		µg/L	<1	**1.1**	**1.9**	<1	<1	<1	<1	<1	<1	<1	None
GPA29-7	S/20	PH1	05/29/98		µg/L	<1	**1.3**	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA29-7	D/37	PH1	05/29/98		µg/L	<1	<1	**2.4**	<1	<1	<1	<1	<1	<1	<1	None
GPA29-7	D/37	PH1	05/29/98	DUP	µg/L	<1	<1	**2.4**	<1	<1	<1	<1	<1	<1	<1	None
GPA29-8	S/20	PH1	05/29/98		µg/L	<1	<1	**250**	<1	<1	<1	<1	<1	<1	<1	T12DCE 5.3
GPA29-8	D/36	PH1	05/29/98		µg/L	<1	**7.6**	**36**	<1	<1	<1	<1	<1	<1	<1	None
GPA30-1	S/20	PH1	12/19/97		µg/L	<1 JH	<1 JH	<1 JH	<1 JH	<1 JH	<1 JH	<1 JH	<1 JH	<1 JH	<1 JH	None
GPA30-1	D/35	PH1	12/19/97		µg/L	<1 JH	<1 JH	<1 JH	<1 JH	<1 JH	<1 JH	<1 JH	<1 JH	<1 JH	<1 JH	None
GPA30-2	S/20	PH1	01/05/98		µg/L	<1	**1.4**	**1.9**	<1	<1	<1	<1	<1	<1	<1	None
GPA30-2	D/34	PH1	01/05/98		µg/L	<1	**83**	**32**	**3.5**	<1	<1	**1.6**	<1	<1	<1	T12DCE 1.1
GPA30-3	S/20	PH1	01/05/98		µg/L	<1	**13**	**4.5**	<1	<1	<1	<1	<1	<1	<1	None
GPA30-3	S/20	PH2	10/15/99		µg/L	<1	**2.3**	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA30-3	D/36	PH1	01/05/98		µg/L	<1	**110**	**29**	<1	<1	**1.6**	**1.2**	<1	<1	<1	None
GPA30-4	S/20	PH1	01/05/98		µg/L	<1	**6.8**	**4.3**	<1	<1	<1	<1	**480**	**300**	<1	CCL4 480, MECL 2.2
GPA30-4	D/36	PH1	01/05/98		µg/L	<1	**66**	**35**	<1	<1	<1	**1**	**1.8**	**3.8**	<1	CCL4 1.8
GPA30-4	D/36	PH1	01/05/98	DUP	µg/L	<1	**56**	**35**	<1	<1	<1	<1	**2.6**	**4.3**	<1	CCL4 2.6
GPA31-1	S/20.5	PH1	12/22/97		µg/L	<1	**43**	**19**	<1	<1	<1	<1	<1	<1	<1	None
GPA31-1	S/20	PH2	10/15/99		µg/L	<1	**66**	**40**	<1	<1	<1	<1	<1	<1	<1	T12DCE 3.5
GPA31-1	D/35	PH1	12/22/97		µg/L	**1.3**	**250**	**110**	**12**	<1	**3.8**	**3**	<1	<1	<1	T12DCE 4.1
GPA31-10	S/20	PH1	05/29/98		µg/L	**2.2**	**86**	**61**	**4.2**	<1	**3.2**	**1.7**	<1	<1	<1	T12DCE 2.2
GPA31-10	D/27	PH1	05/29/98		µg/L	**6.8**	**230**	**100**	**12**	**2.3**	**9.1**	**3**	<1	<1	<1	T12DCE 3.7
GPA31-2	S/20.5	PH1	12/22/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	**11**	<1	None
GPA31-2	D/31	PH1	12/22/97		µg/L	**1.9**	**110**	**19**	<1	<1	<1	<1	<1	**8.1**	<1	T12DCE 1.4
GPA31-3	S/20	PH1	12/23/97		µg/L	**3.5**	**550**	**81**	**5**	<1	**3.8**	**2.7**	<1	<1	<1	T12DCE 4.4
GPA31-3	S/20	PH2	10/20/99		µg/L	**9.2**	**260**	**50**	**2.7**	<1	**1.6**	**1.2**	<1	<1	<1	T12DCE 5.4
GPA31-3	D/30	PH1	12/23/97		µg/L	**1.4**	**400**	**79**	**7.7**	<1	**4.3**	**3.8**	<1	<1	<1	T12DCE 3
GPA31-4	S/18	PH1	06/11/98		µg/L	**11**	**44**	**22**	<1	<1	<1	<1	<1	<1	<1	TOL 1.4
GPA31-4	D/30	PH1	06/11/98		µg/L	**6.7**	**270**	**54**	<1	<1	**2.1**	**1.5**	<1	<1	<1	T12DCE 3.3, TOL 3.8
GPA31-4	D/30	PH1	06/11/98	DUP	µg/L	**8.7**	**280**	**58**	**2.3**	<1	**2.6**	**1.9**	<1	<1	<1	T12DCE 3.8, TOL 3.3
GPA31-5	S/20	PH1	05/29/98		µg/L	**3.2**	**53**	**22**	<1	<1	<1	<1	<1	<1	<1	T12DCE 1.3
GPA31-5	D/28	PH1	05/29/98		µg/L	**7.5**	**350**	**65**	**2.9**	<1	<1	**2.1**	<1	<1	<1	T12DCE 3.8
GPA31-6	S/20	PH1	05/29/98		µg/L	**9**	**360**	**72**	**5.1**	<1	**2.5**	**2.6**	<1	<1	<1	T12DCE 4.3
GPA31-6	S/20	PH2	01/10/00		µg/L	**5.6**	**92**	**23**	<1	**1.3**	**1.1**	<1	<1	<1	<1	T12DCE 2.3
GPA31-6	S/17	PH2	01/10/00		µg/L	<1	**1.4**	**6.9**	<1	<1	<1	<1	<1	<1	<1	None
GPA31-6	D/26	PH1	05/29/98		µg/L	**11 JS**	**380**	**69**	**4.9 JS**	**<1 JS**	**2.5 JS**	**2.8 JS**	**<1 JS**	**<1 JS**	**<1 JS**	T12DCE 4.4 JS
GPA31-7	S/20	PH1	05/29/98		µg/L	**2.8**	**23**	**6.6**	<1	**1.5**	<1	<1	<1	<1	<1	None
GPA31-7	D/30	PH1	05/29/98		µg/L	**6.7**	**260**	**57**	**2.7**	<2	<2	<2	<2	<2	<2	MECL 9.7, T12DCE 2.8
GPA31-8	M/23	PH1	05/29/98		µg/L	**1.2**	**48**	**24**	<1	<1	<1	<1	<1	<1	<1	MECL 2.5
GPA31-8	D/35	PH1	05/29/98		µg/L	**22**	**480**	**80**	**8.8**	<1	**2.7**	**4**	<1	<1	<1	MECL 1.7, T12DCE 5.8

Table 5-8
North Industrial Corridor (NIC) Site
Geoprobe Groundwater Sample Analytical Results, Site VOCs* by EPA Method 8260

Station	Groundwater Depth Zone / Depth (feet)	Investigation Phase	Sample Date	QC Sample Flag	Units	PCE	TCE	C12DCE	VC	TCA	11DCA	11DCE	CT	CFM	BEN	Other Detected Compounds
GPA31-9	S/20	PH1	05/29/98		µg/L	<1	**22**	**4.7**	<1	<1	<1	<1	<1	**4.3**	<1	BDCM 1.3
GPA31-9	D/27	PH1	05/29/98		µg/L	**1.3**	**70**	**21**	<1	<1	<1	<1	<1	<1	<1	None
GPA32-1	S/20	PH1	12/08/97		µg/L	**1.1**	**110**	**80**	**1.7**	<1	**2**	**1.1**	<1	<1	<1	T12DCE 2.2
GPA32-1	D/27	PH1	12/08/97		µg/L	<1	**56**	**48**	<1	<1	1	<1	<1	<1	<1	None
GPA32-2	S/20	PH1	12/08/97		µg/L	<1	**11**	**24**	<1	<1	<1	<1	<1	<1	<1	None
GPA32-2	D/27	PH1	12/08/97		µg/L	<1	**24**	**35**	<1	<1	<1	<1	<1	<1	<1	None
GPA33-1	M/23	PH1	12/04/97		µg/L	**55**	**43**	**20**	<1	<1	<1	<1	<1	<1	<1	T12DCE 1.7
GPA33-1	D/33	PH1	12/04/97		µg/L	**28**	**42**	**4.2**	<1	<1	<1	<1	<1	<1	<1	None
GPA33-2	S/20	PH1	12/04/97		µg/L	**1**	**8.5**	**18**	<1	<1	<1	<1	<1	<1	<1	None
GPA33-2	D/39	PH1	12/04/97		µg/L	<1	**3.8**	**25**	<1	<1	<1	<1	<1	<1	<1	None
GPA33-3	S/20	PH1	12/04/97		µg/L	<1	**4.4**	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA33-3	D/35	PH1	12/04/97		µg/L	<1	**1.9**	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA33-4	S/20	PH1	12/04/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA33-4	D/35	PH1	12/04/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA34-1	S/20	PH1	12/23/97		µg/L	<1	**5.7**	**3.6**	<1	<1	<1	<1	<1	<1	<1	None
GPA34-1	D/36	PH1	12/23/97		µg/L	<1	**35**	**22**	<1	<1	<1	<1	<1	<1	<1	None
GPA34-2	M/23	PH1	12/23/97		µg/L	<1	**2.6**	**11**	**1.6**	<1	**2.7**	<1	<1	<1	<1	None
GPA34-2	M/23	PH1	12/23/97	DUP	µg/L	<1	**2.6**	**12**	**1.7**	<1	**3.2**	<1	<1	<1	<1	None
GPA34-2	D/36	PH1	12/23/97		µg/L	**1.5**	**33**	**21**	**1.3**	<1	<1	<1	<1	<1	<1	None
GPA34-3	S/20	PH1	12/29/97		µg/L	**2.1**	**150**	**41**	**1.2**	**51**	**12**	**19**	<1	<1	<1	T12DCE 2.0
GPA34-3	S/20	PH2	10/20/99		µg/L	**1.6**	**180**	**47**	**3.5**	**52**	**12**	**13**	<1	<1	<1	None
GPA34-3	D/33	PH1	12/29/97		µg/L	<1	**73**	**31**	<1	**97**	**6.1**	**27**	<1	**1.1**	<1	None
GPA34-4	S/20	PH1	12/29/97		µg/L	<1	<1	**3**	<1	<1	<1	<1	<1	<1	<1	None
GPA34-4	D/30	PH1	12/29/97		µg/L	<1	**1**	**6.3**	<1	<1	<1	<1	<1	<1	<1	None
GPA34-5	S/20	PH1	05/28/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA34-5	D/27	PH1	05/28/98		µg/L	<1	<1	**2.2**	<1	<1	<1	<1	<1	<1	<1	None
GPA34-6	S/20	PH1	05/28/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA34-6	D/29	PH1	05/28/98		µg/L	<1	<1	**1.1**	<1	<1	<1	<1	<1	<1	<1	None
GPA34-7	S/20	PH1	05/29/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA34-7	D/27	PH1	05/29/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA34-8	S/20	PH1	05/28/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	**1.6**	<1	None
GPA34-8	D/27	PH1	05/29/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA35-1	M/21	PH1	12/08/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA35-1	D/29	PH1	12/08/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA35-2	S/20	PH1	12/08/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA35-2	D/27	PH1	12/08/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA36-1	S/20	PH1	12/18/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA36-1	D/35	PH1	12/18/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA36-2	S/20	PH1	12/04/97		µg/L	**1.3**	**25**	**3.3**	<1	<1	<1	<1	<1	<1	<1	None
GPA36-2	S/20	PH1	12/04/97	DUP	µg/L	**1.3**	**26**	**3.5**	<1	<1	<1	<1	<1	<1	<1	None
GPA36-2	D/34	PH1	12/04/97		µg/L	<1	**1.5**	**32**	<1	<1	<1	<1	<1	<1	<1	None
GPA36-3	S/20	PH1	12/05/97		µg/L	**2.3**	**1.4**	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA36-3	D/33.5	PH1	12/05/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA37-1	S/20	PH1	12/05/97		µg/L	<1	**4.5**	**1.3**	<1	<1	<1	<1	<1	<1	<1	EBN 230, TOL 1.8, XYL-MP 320, XYL-O 39
GPA37-1	D/30	PH1	12/05/97		µg/L	<1	**7.6**	**16**	<1	<1	**2.1**	<1	<1	<1	<1	EBN 130, XYL-MP 210, XYL-O 32
GPA37-2	M/23	PH1	12/05/97		µg/L	<1	**3.1**	**1.1**	<1	<1	<1	<1	<1	<1	<1	None
GPA37-2	D/30	PH1	12/05/97		µg/L	<1	**39**	**16**	<1	<1	**3.2**	**2**	<1	<1	<1	T12DCE 1.1
GPA37-3	S/20	PH1	12/05/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	**11**	<1	None
GPA37-3	D/30	PH1	12/05/97		µg/L	<1	**2.9**	**1.2**	<1	<1	<1	<1	<1	<1	<1	None

Table 5-8
North Industrial Corridor (NIC) Site
Geoprobe Groundwater Sample Analytical Results, Site VOCs* by EPA Method 8260

Station	Groundwater Depth Zone / Depth (feet)	Investigation Phase	Sample Date	QC Sample Flag	Units	PCE	TCE	C12DCE	VC	TCA	11DCA	11DCE	CT	CFM	BEN	Other Detected Compounds
GPA38-1	S/20	PH1	12/05/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA38-1	D/30	PH1	12/05/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA38-2	S/20	PH1	12/05/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	MECL 1.6 UB
GPA38-2	D/27	PH1	12/05/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	MECL 1.7 UB
GPA38-3	S/20	PH1	12/05/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	MECL 1.5 UB
GPA38-3	D/27	PH1	12/05/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	MECL 1.5 UB
GPA39-1	S/20	PH1	12/05/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	MECL 1.2 UB
GPA39-1	D/27	PH1	12/05/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA39-2	M/21	PH1	12/08/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA39-2	D/27	PH1	12/08/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA39-3	S/20	PH1	12/18/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA39-3	D/33	PH1	12/18/97		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA40-1	S/20	PH1	05/28/98		µg/L	<1	**22**	**8**	<1	<1	**2**	**1.5**	<1	**1.2**	<1	None
GPA40-1	S/20	PH2	10/19/99		µg/L	<1	**11**	**5.1**	<1	<1	**1**	<1	<1	<1	<1	None
GPA40-1	D/30	PH1	05/28/98		µg/L	<1	**42**	**17**	<1	<1	**3.8**	**3.3**	<1	<1	<1	T12DCE 1.2
GPA40-2	S/20	PH1	05/28/98		µg/L	<1	**1.3**	<1	<1	<1	<1	<1	<1	<1	<1	T12DCE 2.7
GPA40-2	D/29	PH1	05/28/98		µg/L	<1	**8.8**	**24**	<1	<1	**3**	**1.4**	<1	<1	<1	None
GPA40-3	S/20	PH1	05/28/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA40-3	D/28	PH1	05/28/98		µg/L	<1	**2.3**	**1.1**	<1	<1	<1	<1	<1	<1	<1	None
GPA40-4	S/20	PH1	05/28/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA40-4	D/29	PH1	05/28/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA41-1	S/20	PH1	05/27/98		µg/L	**25**	**13**	**3.8**	<1	<1	<1	<1	<1	<1	<1	None
GPA41-1	D/32	PH1	05/27/98		µg/L	<1	**8.3**	**15**	<1	<1	<1	<1	<1	<1	<1	None
GPA41-2	S/20	PH1	05/27/98		µg/L	<1	**27**	**78**	<1	<1	<1	<1	<1	<1	<1	T12DCE 2.7
GPA41-2	D/31	PH1	05/27/98		µg/L	<1	**50**	**56**	<1	<1	<1	<1	<1	<1	<1	T12DCE 1.8
GPA42-1	S/20	PH1	05/27/98		µg/L	**8**	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA42-1	D/36	PH1	05/27/98		µg/L	<1	<1	**8.5**	<1	<1	<1	<1	<1	<1	<1	None
GPA42-2	S/20	PH1	05/27/98		µg/L	**11**	**1.2**	**3.2**	<1	<1	<1	<1	<1	<1	<1	None
GPA42-2	D/32	PH1	05/27/98		µg/L	**2.2**	**3**	**6.6**	<1	<1	<1	<1	<1	<1	<1	None
GPA42-3	S/20	PH1	05/27/98		µg/L	<1	**32**	**18**	<1	<1	<1	<1	<1	<1	<1	None
GPA42-3	D/30	PH1	05/27/98		µg/L	<1	**65**	**35**	<1	<1	<1	<1	<1	<1	<1	T12DCE 1.3
GPA42-3	D/30	PH1	05/27/98	DUP	µg/L	<1	**55**	**30**	<1	<1	<1	<1	<1	<1	<1	T12DCE 1.4
GPA43-1	S/20	PH1	05/27/98		µg/L	**10**	**4.9**	**18**	<1	<1	<1	<1	<1	<1	<1	None
GPA43-1	D/30	PH1	05/27/98		µg/L	**1.1**	**1.4**	**9.9**	<1	<1	<1	<1	<1	<1	<1	TOL 1
GPA43-2	S/20	PH1	05/27/98		µg/L	<1	**42**	**12**	<1	<1	<1	<1	<1	<1	<1	None
GPA43-2	D/31	PH1	05/27/98		µg/L	<1	**60**	**15**	<1	<1	<1	<1	<1	<1	<1	None
GPA43-3	S/20	PH1	05/27/98		µg/L	**3.2**	**4.4**	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA43-3	D/27	PH1	05/27/98		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GPA44-1	S/20	PH1	06/04/98		µg/L	**1.9**	**23**	**8.3**	<1	<1	<1	<1	<1	<1	<1	CM 1.2, MECL 1.5 UB
GPA44-1	D/34	PH1	06/04/98		µg/L	<1	**26**	**53**	<1	<1	<1	<1	<1	<1	<1	MECL 1.2, T12DCE 1.3
GPA44-1	D/34	PH1	06/04/98	DUP	µg/L	<1	**22**	**50**	<1	<1	<1	<1	<1	<1	<1	MECL 1.1, T12DCE 1.3
GPA44-2	S/20	PH1	06/11/98		µg/L	**1.3**	**21**	**3.1**	<1	<1	<1	<1	<1	<1	<1	MECL 1.4 UB, TOL 4.8
GPA44-2	D/31	PH1	06/11/98		µg/L	<1	**20**	**18**	<1	<1	<1	<1	<1	<1	<1	MECL 1.5 UB, TOL 3.4
GP-HCI-02	S/17	PH2	02/14/00		µg/L	**15**	**14**	<1	<1	**11**	<1	<1	<1	**1.3**	<1	12DCA 1.3
GP-HCI-05	S/17	PH2	02/14/00		µg/L	**78**	**31**	**29**	<1	**7**	**18**	**2**	<1	<1	<1	T12DCE 2.0
GP-HCI-06	S/17	PH2	02/14/00		µg/L	**1300**	**110**	**210**	<1	**14**	**98**	**7.6**	<1	<1	<1	12DCA 9.3, T12DCE 6.0
GP-HCI-07	S/17	PH2	02/14/00		µg/L	**33**	**69**	<1	<1	**8.5**	<1	<1	<1	**2.5**	<1	None
GP-HDP-01	S/16	PH2	09/06/00		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None

Table 5-8
North Industrial Corridor (NIC) Site
Geoprobe Groundwater Sample Analytical Results, Site VOCs* by EPA Method 8260

Station	Groundwater Depth Zone / Depth (feet)	Investigation Phase	Sample Date	QC Sample Flag	Units	PCE	TCE	C12DCE	VC	TCA	11DCA	11DCE	CT	CFM	BEN	Other Detected Compounds
GP-HDP-02	S/14	PH2	09/06/00		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP-HDP-02	D/39	PH2	09/06/00		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP-HDP-03	S/15	PH2	09/06/00		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
GP-WFS-06	S/19	PH2	07/19/01		µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
GP-WFS-07	M/21	PH2	07/19/01		µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
GP-WFS-08	S/19	PH2	07/19/01		µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
GP-WFS-08	D/31	PH2	07/19/01		µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
GP-WFS-09	S/19	PH2	07/17/01		µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
GP-WFS-10	S/19	PH2	07/17/01		µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
GP-WFS-11	S/19	PH2	07/17/01		µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
GP-WFS-11	D/33	PH2	07/17/01		µg/L	<1.0	**2.2**	**6.7**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
GP-WFS-12	S/19	PH2	07/18/01		µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
GP-WFS-13	S/19	PH2	07/18/01		µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
GP-WFS-13	D/32	PH2	07/18/01		µg/L	<1.0	<1.0	**2.3**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
GP-WFS-14	S/19	PH2	07/18/01		µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
GP-WFS-15	S/20	PH2	07/19/01		µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
GP-WW-01	S/14	PH2	07/18/00		µg/L	<1	**2.9**	**1**	<1	<1	<1	<1	<1	<1	<1	None
GP-WW-01	D/30	PH2	07/18/00		µg/L	<1	**250**	**80**	**23**	<1	**4.2**	**8.8**	<1	<1	<1	T12DCE 9.8
GP-WW-03	S/14	PH2	07/18/00		µg/L	<1	**2.2**	<1	<1	<1	<1	<1	<1	<1	<1	None
GP-WW-03	D/30	PH2	07/18/00		µg/L	<1	**140**	**43**	**18**	<1	**3.7**	**9**	<1	<1	<1	T12DCE 6.2
GP-WW-04	S/14	PH2	07/18/00		µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None

* Site VOCs are the "groundwater target compounds" discussed in Section 5.5.3.1 of the RI Report.

PCE = Tetrachloroethene
TCE = Trichloroethene
C12DCE = cis-1,2-dichloroethene
VC = Vinyl chloride
TCA = 1,1,1-Trichloroethane
11DCA = 1,1-Dichloroethane
11DCE = 1,1-Dichloroethene
CT = Carbon tetrachloride
CFM = Chloroform
BEN = Benzene

Bold text indicates results above analytical detection limits.
DUP = Field duplicate sample.
J = Estimated, value measured between the reporting limit and the detection limit
JS = Estimated due to surrogate recoveries outside of control limits.
JH = Estimated due to holding time violations.
JP = Estimated due to poor performance standard results.
JIS = Estimated due to low internal standard area.

Other Detected Compounds:

T12DCE = trans-1,2-Dichloroethene
12DCA = 1,2-Dichloroethane
EBN = Ethylbenzene
XYL-MP = m,p-Xylene
XYL-O = o-Xylene
TOL = Toluene
MECL = Methylene Chloride
CCL4 = Carbon Tetrachloride
NAP = Naphthalene
CHEA = Chloroethane
CM = Chloromethane
TCFM = Trichlorofluoromethane
1122PCA = 1,1,2,2-Tetrachloroethane
112TCA = 1,1,2-Trichloroethane
12DCP = 1,2-Dichloropropane
CBN = Chlorobenzene
12DCB = 1,2-Dichlorobenzene
BDCM = Bromodichloromethane
PYR = Pyrene
TPH-GAS = TPH as Gasoline
XYLT = Xylene (Total)
14DCB = 1,4-Dichlorobenzene

Table 5-9a
North Industrial Corridor (NIC) Site
Monitoring Well Groundwater Sample Analytical Results, Site VOCs* by EPA Method 8260

Station	Groundwater Depth Zone	Sample Date	Units	PCE	TCE	C12DCE	VC	TCA	11DCA	11DCE	CT	CFM	BEN	Other Detected Compounds
DRB-MW-02	S	07/25/01	µg/L	**2.1**	**60**	**14**	**1.2**	<1.0	<1.0	**1.1**	**9.1**	**4.3**	**6.5**	CCL4 9.1, MECL 1.2, TCFM 1.5
DRB-MW-11	S	07/26/01	µg/L	<1.0	<1.0	**13**	**12**	<1.0	<1.0	<1.0	<1.0	<1.0	**9.9**	124TMB 44, 135TMB 7.8, EBN 3.1, IPB 1.4, NAP 18, NPB 1.9, SBB 1.2, XYL-MP 25, XYL-O 1.1
DRB-MW-20	S	07/26/01	µg/L	<1.0	**13**	**9.6**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**560**	124 TMB 40, 135 TMB 8.4, CHEA 1.1, EBN 35, IPB 5.9, NAP 30, NPB 10, PIPT 1.0, SBB 1.2, TOL 28, XYL-MP 98, XYL-O 38
DRB-MW-250	D	07/26/01	µg/L	<1.0	<1.0	**33**	**24**	<1.0	<1.0	<1.0	<1.0	<1.0	**170**	IPB 1.2
DRB-MW-30	S	07/25/01	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**32**	124 TMB 29, 135 TMB 16, EBN 32, IPB 24, NAP 27, NBB 13, NPB 22, PIPT 11, SBB 9.7, TBB 3.5, TOL 31, XYL-MP 62, XYL-O 21
EXC-MW-01A	S	06/16/98	µg/L	<1	**13**	**17**	<1	<1	<1	<1	<1	<1	<1	MECL 1.1 UB
EXC-MW-02A	S	12/08/97	µg/L	<1	**42 JDB**	**2.6 JDB**	<1	<1	<1	<1	<1	<1	<1	XYL-MP 1.9
EXC-MW-02B	D	12/08/97	µg/L	<1	**23 JDB**	**1.5 JDB**	<1	<1	<1	<1	<1	<1	<1	XYL-MP 1.5
EXC-MW-03A	S	06/15/98	µg/L	<1	**4.8**	**2**	<1	<1	<1	<1	<1	<1	<1	MECL 1 UB
EXC-MW-03B	D	06/15/98	µg/L	<1	**100**	**21**	<1	**1.9**	**1.6**	**5.5**	<1	**1.9**	<1	MECL 1.1 UB
EXC-MW-04A	S	06/15/98	µg/L	**1.5**	**330**	**86**	<1	**3.9**	**3.5**	**18**	<1	<1	<1	MECL 1 UB, T12DCE 1.1, TOL 1.5
EXC-MW-04A	S	05/02/01	µg/L	**1.4**	**290**	**91**	**2.4**	**2.4**	**2.7**	**15**	<1.0	<1.0	<1.0	T12DCE 1.3
EXC-MW-04B	D	06/15/98	µg/L	<1	**19**	**1.6**	<1	<1	<1	**1.1**	<1	<1	<1	MECL 1 UB
EXC-MW-04B	D	05/02/01	µg/L	<1.0	**39**	**7.0**	<1.0	<1.0	<1.0	**1.9**	<1.0	<1.0	<1.0	None
EXC-MW-05B	D	06/15/98	µg/L	<1	**270**	**38**	<1	**5**	**2**	**17**	<1	<1	<1	MECL 1.1 UB
EXC-MW-05B	D	05/02/01	µg/L	<1.0	**62**	**8.7**	<1.0	<1.0	<1.0	**2.4**	<1.0	<1.0	<1.0	None
EXC-MW-06A	S	06/16/98	µg/L	<1	**100**	**9.9**	<1	**2.2**	<1	**5.3**	<1	<1	<1	MECL 1.5 UB
EXC-MW-06B	D	06/16/98	µg/L	<1	**92**	**7.1**	<1	**1.7**	<1	**5.3**	<1	<1	<1	MECL 1.3 UB
EXC-MW-07B	D	06/16/98	µg/L	<1	**99**	**25**	<1	**2.0**	<1	**6.4**	<1	<1	<1	MECL 1.4 UB
EXC-MW-07B	D	05/02/01	µg/L	<1.0	**51**	**18**	<1.0	<1.0	**1.3**	**2.1**	<1.0	<1.0	<1.0	None
EXC-MW-08A	S	12/08/97	µg/L	<1	**78 JDB**	**10 JDB**	<1	**1.2**	<1	**1.8**	<1	<1	<1	None
EXC-MW-08B	D	12/08/97	µg/L	<1	**240**	**17 JDB**	<1	**5.1**	**1.5**	**10**	<1	<1	<1	None
GRR-MW-04	S	12/02/97	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
HRI-MW-03D	D	12/09/97	µg/L	**68 JS**	**230**	**47 JDB**	**11**	**24**	**3.5**	**5.8**	**13**	**26 JTB**	**410**	12DCA 13, CCL4 13, CM 3.4, XYL-MP 1.3
NMW-01D	D	05/01/01	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-01S	S	05/01/01	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-02D	D	05/02/01	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-02S	S	05/02/01	µg/L	**41**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None

Table 5-9a
North Industrial Corridor (NIC) Site
Monitoring Well Groundwater Sample Analytical Results, Site VOCs* by EPA Method 8260

Station	Groundwater Depth Zone	Sample Date	Units	PCE	TCE	C12DCE	VC	TCA	11DCA	11DCE	CT	CFM	BEN	Other Detected Compounds
NMW-03D	D	05/09/01	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-03S	S	05/09/01	µg/L	<1.0	**1.2**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-04D	D	05/07/01	µg/L	<1.0	**140**	**42**	**14**	<1.0	**5.4**	**8.7**	<1.0	<1.0	**1.2**	T12DCE 1.9
NMW-04S	S	05/07/01	µg/L	<1.0	**60**	**67**	**36**	<1.0	**5.2**	**5.8**	**1.4**	**1.6**	**2**	CCL4 1.4, T12DCE 20
NMW-05D	D	05/09/01	µg/L	<1.0	**16**	**23**	**1.6**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-05S	S	05/09/01	µg/L	**7.8**	**250**	**500**	**86**	<1.0	**10**	**3.7**	<1.0	<1.0	**1.9**	T12DCE 5.4
NMW-06D	D	05/07/01	µg/L	<1.0	**80**	**49**	**24**	<1.0	**3.6**	**3.3**	<1.0	<1.0	<1.0	None
NMW-06S	S	05/07/01	µg/L	<1.0	<1.0	**2.1**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-07D	D	05/02/01	µg/L	<1.0	**2.2**	**1.7**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-07S	S	05/02/01	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-08D	D	05/10/01	µg/L	<1.0	**230**	**110**	**34**	<1.0	**7.9**	**18**	<1.0	<1.0	**1.2**	T12DCE 11
NMW-08S	S	05/10/01	µg/L	<1.0	**130**	**65**	**17**	<1.0	**4.3**	**9.4**	<1.0	<1.0	<1.0	T12DCE 5.0, TOL 120
NMW-09D	D	05/10/01	µg/L	<1.0	**290**	**130**	**25**	**2.3**	**8.4**	**27**	<1.0	<1.0	<1.0	MTBE 1.5, T12DCE 20
NMW-09S	S	05/10/01	µg/L	<1.0	**190**	**180**	**14**	<1.0	**6.8**	**20**	<1.0	<1.0	<1.0	T12DCE 12
NMW-10D	D	05/09/01	µg/L	<1.0	**140**	**51**	**20**	<1.0	**4**	**6.5**	<1.0	**1.3**	<1.0	T12DCE 1.6
NMW-10S	S	05/09/01	µg/L	<1.0	**150**	**53**	**18**	<1.0	**4.6**	**7.5**	<1.0	<1.0	<1.0	T12DCE 1.4
NMW-11D	D	05/03/01	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-11S	S	05/03/01	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-12D	D	05/08/01	µg/L	<1.0	**3.1**	**180**	**4.5**	<1.0	**1.9**	**5**	<1.0	<1.0	<1.0	T12DCE 2.6
NMW-12S	S	05/08/01	µg/L	<1.0	**70**	**88**	**2.5**	<1.0	**1.7**	**3.1**	<1.0	<1.0	<1.0	T12DCE 1.6
NMW-13D	D	05/10/01	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-13S	S	05/10/01	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**320**	EBN 95, TOL 140, XYL-MP 310, XYL O 84
NMW-14D	D	05/09/01	µg/L	<1.0	**8.9**	**200**	**2.4**	<1.0	**1.7**	**1.9**	<1.0	<1.0	<1.0	T12DCE 3.6
NMW-14S	S	05/09/01	µg/L	<1.0	**3.8**	**130**	**1.7**	<1.0	**1.4**	**1.3**	<1.0	<1.0	<1.0	T12DCE 2.6
NMW-15D	D	05/08/01	µg/L	<1.0	**20**	**59**	<1.0	<1.0	**1.1**	<1.0	<1.0	<1.0	<1.0	None
NMW-15S	S	05/08/01	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-16D	D	05/04/01	µg/L	**7.3**	**2.4**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-16S	S	05/04/01	µg/L	**3.5**	**1.7**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-17D	D	05/03/01	µg/L	<1.0	**1.4**	**6.7**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-17S	S	05/03/01	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-18D	D	05/08/01	µg/L	<1.0	**1.5**	**10**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-18S	S	05/08/01	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-19D	D	05/08/01	µg/L	<1.0	**110**	**68**	**3.7**	<1.0	**1.5**	**3.6**	<1.0	<1.0	<1.0	T12DCE 1.4
NMW-19S	S	05/08/01	µg/L	<1.0	**1.7**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-20D	D	05/03/01	µg/L	<1.0	<1.0	**4.5**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-20S	S	05/03/01	µg/L	**40**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None

Table 5-9a
North Industrial Corridor (NIC) Site
Monitoring Well Groundwater Sample Analytical Results, Site VOCs* by EPA Method 8260

Station	Groundwater Depth Zone	Sample Date	Units	PCE	TCE	C12DCE	VC	TCA	11DCA	11DCE	CT	CFM	BEN	Other Detected Compounds
NMW-21D	D	05/04/01	µg/L	<1.0	<1.0	**5.8**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-21S	S	05/04/01	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-22D	D	05/07/01	µg/L	**2.8**	**1.8**	**2.3**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-22S	S	05/07/01	µg/L	**19**	**1.7**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-23D	D	05/03/01	µg/L	<1.0	**3.5**	**2**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-23S	S	05/03/01	µg/L	<1.0	**50**	**7.4**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-24D	D	05/04/01	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-24S	S	05/04/01	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**2**	<1.0	None
NMW-25D	D	05/08/01	µg/L	<1.0	**19**	**20**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-25S	S	05/08/01	µg/L	**1.2**	**21**	**18**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-26D	D	05/08/01	µg/L	**1.2**	**11**	**34**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-26S	S	05/08/01	µg/L	**2.2**	**13**	**14**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-27D	D	05/04/01	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-27S	S	05/04/01	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-28D	D	05/04/01	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-28S	S	05/04/01	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-29D	D	05/08/01	µg/L	<1.0	**18**	**9.1**	<1.0	<1.0	**1.4**	**1.0**	<1.0	<1.0	<1.0	None
NMW-29S	S	05/08/01	µg/L	<1.0	**6.2**	**2.9**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-30D	D	05/04/01	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-30S	S	05/04/01	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-31D	D	05/09/01	µg/L	**4**	**200**	**43**	**3.3**	<1.0	**1.9**	**1**	<1.0	<1.0	<1.0	T12DCE 5.2
NMW-31S	S	05/09/01	µg/L	**3**	**55**	**11**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.3
NMW-32D	D	05/08/01	µg/L	**5.2**	**270**	**55**	**3.1**	<1.0	**2.1**	**2.3**	<1.0	<1.0	<1.0	T12DCE 3.0
NMW-32S	S	05/08/01	µg/L	**4.5**	**220**	**40**	**2.3**	<1.0	**1.7**	**1.6**	<1.0	<1.0	<1.0	T12DCE 2.7
NMW-33D	D	05/07/01	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-33S	S	05/07/01	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-34D	D	05/07/01	µg/L	<1.0	**55**	**11**	**23**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-34S	S	05/07/01	µg/L	<1.0	**30**	**62**	**2.1**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	T12DCE 2.4
NMW-35D	D	05/08/01	µg/L	<1.0	**270**	**95**	**4.5**	<1.0	**2.5**	**5.7**	<1.0	<1.0	<1.0	T12DCE 3.0
NMW-35S	S	05/08/01	µg/L	<1.0	**68**	**29**	<1.0	<1.0	<1.0	**1.5**	<1.0	<1.0	<1.0	None
NMW-36D	D	07/27/01	µg/L	<1.0	**5.8**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NAP 2.4
NMW-37D	D	07/27/01	µg/L	**1.3**	**66**	**17**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NAP 21
NMW-38D	D	07/27/01	µg/L	<1.0	**9.9**	**1.2**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NAP 1.4
NMW-39D	D	05/09/01	µg/L	<1.0	**220**	**260**	**18**	**1.9**	**6.2**	**17**	<1.0	**1.1**	**1.6**	T12DCE 13
NMW-39S	S	05/09/01	µg/L	<1.0	**37**	**360**	**26**	<1.0	**8.4**	**24**	<1.0	<1.0	<1.0	T12DCE 17
NMW-40D	D	05/08/01	µg/L	<1.0	**150**	**56**	**22**	<1.0	**5.2**	**7.7**	<1.0	<1.0	**2.6**	T12DCE 4.0
NMW-40S	S	05/08/01	µg/L	<1.0	**190**	**77**	**25**	<1.0	**7.2**	**14**	<1.0	<1.0	<1.0	T12DCE 10

Table 5-9a
North Industrial Corridor (NIC) Site
Monitoring Well Groundwater Sample Analytical Results, Site VOCs* by EPA Method 8260

Station	Groundwater Depth Zone	Sample Date	Units	PCE	TCE	C12DCE	VC	TCA	11DCA	11DCE	CT	CFM	BEN	Other Detected Compounds
NMW-41D	D	05/08/01	µg/L	<1.0	**170**	**38**	**5.7**	<1.0	**2**	**4**	<1.0	<1.0	<1.0	T12DCE 2.6
NMW-41S	S	05/08/01	µg/L	<1.0	**250**	**55**	**3.8**	<1.0	**1.7**	**3.2**	<1.0	<1.0	<1.0	T12DCE 2.2
NMW-42D	D	07/26/01	µg/L	**2.2**	**99**	**35**	**1.1**	<1.0	<1.0	**1.1**	**1.4**	<1.0	<1.0	CCL4 1.4, MECL 1.2, TCFM 1.4
NMW-42S	S	07/25/01	µg/L	**13**	**62**	**16**	**1.4**	**1.3**	<1.0	**1.3**	**5.5**	**8.6**	<1.0	CCL4 5.5, NAP 1.6, TCFM 1.4
NMW-43D	D	07/25/01	µg/L	<1.0	**8.4**	**64**	**15**	<1.0	<1.0	<1.0	<1.0	<1.0	**82**	124TMB 2.8, EBN 4.7, IPB 3.7, NAP 3.5, NPB 3.0, TOL 7.5, XYL-MP 15, XYL-O 1.1
NMW-44D	D	07/26/01	µg/L	<1.0	**13**	**39**	**18**	<1.0	<1.0	**1.6**	<1.0	<1.0	**8.5**	IPB 3.3, NPB 6.9, TBB 1.3
NMW-45D	D	07/26/01	µg/L	<1.0	**32**	**17**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**11**	124TMB 1.2, MTBE 6.8
NMW-46D	D	07/25/01	µg/L	<1.0	**6.9**	**43**	**4.4**	<1.0	<1.0	<1.0	<1.0	<1.0	**1.9**	MTBE 10, NAP 1.5
NMW-47D	D	05/09/01	µg/L	<1.0	**77**	**270**	**33**	<1.0	**2.5**	**1.1**	<1.0	<1.0	<1.0	None
NMW-47S	S	05/09/01	µg/L	<1.0	**25**	**62**	**11**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-48D	D	07/27/01	µg/L	<1.0	**5**	**5.7**	**3.4**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-48S	S	07/27/01	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
UPRF-MW-03	S	07/27/01	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NAP 1.2 UB
UPRF-MW-09	S	07/27/01	µg/L	<1.0	**2.8**	**1**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NAP 44, NPD 1.2
UPRF-MW-16	S	07/27/01	µg/L	<1.0	**28**	**4.3**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
VCM-MW-01	S	05/02/01	µg/L	<1.0	**9.2**	**17**	<1.0	<1.0	**1.5**	<1.0	<1.0	<1.0	<1.0	T12DCE 1.4
VCM-MW-02B	S	05/02/01	µg/L	<1.0	**15**	**7.5**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
VCM-MW-03	S	05/02/01	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
VCM-MW-04	D	05/02/01	µg/L	<1.0	**11**	**28**	<1.0	<1.0	**1.7**	<1.0	<1.0	<1.0	<1.0	T12DCE 2.0
VCM-MW-06	D	05/02/01	µg/L	<1.0	**71**	**37**	**1.7**	<1.0	**1.4**	**1**	<1.0	<1.0	<1.0	T12DCE 2.4
VCM-MW-07	D	05/02/01	µg/L	<1.0	**6.1**	**6**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	TOL 1.6
WNC-05D	D	05/10/01	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WNC-06D	D	05/01/01	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WNC-09D	D	05/02/01	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**1.1**	None
WNC-09SR	S	05/02/01	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WNC-10D	D	05/01/01	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WNC-11D	D	05/09/01	µg/L	<1.0	**37**	**2.4**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WNC-16D	D	05/10/01	µg/L	<1.0	**6.4**	**3.2**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WNC-23D	D	05/08/01	µg/L	<1.0	**33**	**3.7**	<1.0	<1.0	<1.0	**1.1**	<1.0	<1.0	<1.0	None
WNC-31D	D	07/27/01	µg/L	<1.0	**48**	**7.8**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NAP 6.9
WNC-32D	D	07/27/01	µg/L	**1.1**	**69**	**12**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NAP 3.0 UB
WNC-37SR	S	05/07/01	µg/L	<1.0	**37**	**22**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WNC-49SR	S	05/10/01	µg/L	<1.0	<1.0	<1.0	<1.0	**1**	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-01S	S	05/08/01	µg/L	<1.0	**380**	**180**	**5.1**	**14**	**8.6**	**19**	<1.0	<1.0	<1.0	None

Table 5-9a
North Industrial Corridor (NIC) Site
Monitoring Well Groundwater Sample Analytical Results, Site VOCs* by EPA Method 8260

Station	Groundwater Depth Zone	Sample Date	Units	PCE	TCE	C12DCE	VC	TCA	11DCA	11DCE	CT	CFM	BEN	Other Detected Compounds
WND-02D	D	12/01/97	µg/L	<1	**48 JDB**	**23 JDB**	**24**	<1	**1.2**	**2**	<1	<1	<1	XYL-MP 1.9
WND-02D	D	05/10/01	µg/L	<1.0	**6.9**	**6.9**	**2.3**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-02S	S	12/01/97	µg/L	<1	**7.8 JDB**	**1.9 JDB**	<1	<1	**2**	**2.3**	<1	<1	<1	XYL-MP 2.6, XYL-O 1.2
WND-02S	S	05/10/01	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-03S	S	06/16/98	µg/L	<1	**72**	**760**	**3.3**	<1	**6.9**	**25**	<1	<1	**7.4**	CM 5.1, EBN 40, T12DCE 92, TOL 6.7, XYL-MP 27, XYL-O 3.2
WND-03S	S	05/02/01	µg/L	<1.0	**30**	**240**	**46**	<1.0	**2.5**	**12**	<1.0	<1.0	**5.7**	EBN 13, TOL 2.7, XYL-MP 6.4
WND-04S	S	06/15/98	µg/L	**1.1**	**550**	**77**	**1.2**	**12**	**3.9**	**31**	<1	<1	<1	MECL 1.6 UB
WND-04S	S	05/02/01	µg/L	<1.0	**120**	**41**	<1.0	**1.5**	<1.0	**5.1**	<1.0	<1.0	<1.0	12DBE 1.1
WND-05S	S	05/10/01	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	EBN 1.0, IPB 84, NAP 14, NBB 5.7, NPB 94, SBB 28, TBB 3.0
WND-06S	S	05/01/01	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-07S	S	12/05/97	µg/L	**5.5**	**55 JDB**	**8.2 JDB**	<1	<1	<1	<1	<1	<1	<1	None
WND-07S	S	05/09/01	µg/L	<1.0	**5.4**	**6.4**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-08S	S	05/08/01	µg/L	<1.0	**5.5**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-10S	S	05/01/01	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**1.5**	<1.0	<1.0	CCL4 1.5
WND-11S	S	05/09/01	µg/L	<1.0	**7**	**56**	**3.8**	<1.0	**5.4**	**1.8**	<1.0	<1.0	<1.0	T12DCE 1.0
WND-12D	D	12/01/97	µg/L	<1	**37 JDB**	**3.3 JDB**	<1	**2.1**	**4.9**	**5.7**	**2.2**	**4.2**	<1	CCL4 2.2, XYL-MP 2.4, XYL-O 1.3
WND-12D	D	05/03/01	µg/L	<1.0	**18**	**1.4**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-12S	S	12/01/97	µg/L	**3.4**	**13 JDB**	**3.7 JDB**	**16**	**100**	**670**	**300**	<1	**2.3**	**2.2**	12DCP 5.1, CHEA 35, EBN 2.6, TOL 2.2, XYL-MP 3.8, XYL-O 3.6
WND-12S	S	05/03/01	µg/L	<1.0	**1.4**	**3.7**	**7.1**	**1.5**	**43**	**33**	<1.0	<1.0	<1.0	CHEA 8.8
WND-13D	D	06/16/98	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	None
WND-13S	S	06/16/98	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	MECL 1.2 UB
WND-14D	D	05/07/01	µg/L	**1.4**	**51**	**11**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-14S	S	05/07/01	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-15D	D	12/04/97	µg/L	<1	**24 JDB**	**2 JDB**	<1	<1	<1	<1	**1.6**	**2.4**	<1	CCL4 1.6, XYL-MP 1.6
WND-15D	D	05/04/01	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-15S	S	12/04/97	µg/L	<1	**13 JDB**	<1	<1	<1	<1	<1	<1	<1	<1	XYL-MP 1.3
WND-15S	S	05/04/01	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-16S	S	05/10/01	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**25**	124TMB 2.8, 135TMB 31, EBN 18, IPB 17, NAP 790, NBB 6.9, NPB 26, PIPT 3.5, SBB 3.2, TBB 1.1, TOL 2.3, XYL-MP 28, XYL-O 1.7
WND-18D	D	12/05/97	µg/L	<1	**360**	**90 JDB**	**9.1**	**3.3**	**4.5**	**15**	<1	<1	<1	T12DCE 2.6, XYL-MP 1.5
WND-18D	D	05/09/01	µg/L	<1.0	**170**	**80**	**15**	<1.0	**4.8**	**14**	<1.0	<1.0	<1.0	T12DCE 2.4
WND-18S	S	12/05/97	µg/L	<1	**13 JDB**	<1	<1	<1	<1	<1	<1	<1	<1	XYL-MP 2.5, XYL-O 1.1
WND-18S	S	05/09/01	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None

Table 5-9a
North Industrial Corridor (NIC) Site
Monitoring Well Groundwater Sample Analytical Results, Site VOCs* by EPA Method 8260

Station	Groundwater Depth Zone	Sample Date	Units	PCE	TCE	C12DCE	VC	TCA	11DCA	11DCE	CT	CFM	BEN	Other Detected Compounds
WND-19D	D	12/03/97	µg/L	<1	**330**	**51 JDB**	**2.3**	<1	**1.3**	**3.6**	<1	<1	<1	T12DCE 3.3, XYL-MP 1.4
WND-19D	D	05/09/01	µg/L	<1.0	**150**	**37**	**5.5**	<1.0	**1.7**	**5.2**	<1.0	<1.0	<1.0	T12DCE 1.3
WND-19S	S	12/03/97	µg/L	<1	**110**	**17 JDB**	<1	<1	<1	<1	<1	<1	<1	BDCM 1.1, XYL-MP 1.8
WND-19S	S	05/09/01	µg/L	<1.0	**14**	**1.6**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-20S	S	12/03/97	µg/L	<1	**29 JDB**	**3.9 JDB**	**1.1**	<1	<1	<1	<1	<1	<1	XYL-MP 2
WND-20S	S	05/08/01	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-21D	D	12/02/97	µg/L	<1	**400**	**77 JDB**	**1.2**	**12**	**5.4**	**32**	**2.9**	**1.8**	<1	12DCA 2.1, CCL4 2.9, T12DCE 4.3, XYL-MP 2
WND-21D	D	05/04/01	µg/L	<1.0	**230**	**86**	**22**	**2.9**	**7.5**	**21**	**1.5**	**1.6**	**5.2**	CCL4 1.5, T12DCE 12
WND-21S	S	12/02/97	µg/L	<1	**14 JDB**	**92 JDB**	<1	<1	**2.5**	**5.5**	<1	<1	<1	T12DCE 2.1, XYL-MP 2.2
WND-21S	S	05/04/01	µg/L	<1.0	**2.9**	**55**	**1.4**	<1.0	**1.2**	**3.1**	<1.0	<1.0	<1.0	T12DCE 1.7
WND-22D	D	12/02/97	µg/L	<1	**5.1 JDB**	<1	<1	<1	<1	<1	<1	<1	<1	XYL-MP 2
WND-22D	D	05/01/01	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-22S	S	12/02/97	µg/L	<1	**10 JDB**	<1	<1	<1	<1	<1	<1	<1	<1	XYL-MP 2.9, XYL-O 1.5
WND-22S	S	05/01/01	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-23S	S	05/08/01	µg/L	<1.0	**9.5**	**5.2**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-24D	D	12/08/97	µg/L	<1 JS	**220**	**49 JDB**	**6.5**	**2**	<1	**7.6**	<1	<1	<1	T12DCE 1.8
WND-24D	D	05/09/01	µg/L	<1.0	**130**	**44**	**6.8**	<1.0	**1.7**	**3.1**	<1.0	<1.0	<1.0	T12DCE 1.1
WND-24S	S	12/08/97	µg/L	<1	**50 JDB**	**13 JDB**	<1	<1	<1	<1	<1	<1	<1	XYL-MP 1.5
WND-24S	S	05/09/01	µg/L	<1.0	**79**	**24**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-25D	D	05/10/01	µg/L	<1.0	**56**	**3.7**	<1.0	<1.0	<1.0	**1.7**	<1.0	<1.0	<1.0	None
WND-25S	S	05/10/01	µg/L	<1.0	**46**	**1.2**	<1.0	<1.0	<1.0	<1.0	<1.0	**1.8**	<1.0	None
WND-26D	D	05/04/01	µg/L	<1.0	**6.4**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-26S	S	05/04/01	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-27S	S	12/09/97	µg/L	**6.8**	**21 JDB**	<1	<1	<1	<1	<1	<1	<1	**6.2**	XYL-MP 1.5
WND-27S	S	05/09/01	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-28S	S	12/01/97	µg/L	<1	**12 JDB**	**1 JDB**	<1	<1	<1	<1	<1	<1	<1	XYL-MP 3.8, XYL-O 1.9
WND-28S	S	05/01/01	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-29D	D	05/03/01	µg/L	<1.0	**4.6**	<1.0	<1.0	<1.0	<1.0	<1.0	**1.3**	<1.0	<1.0	CCL4 1.3
WND-29S	S	05/03/01	µg/L	<1.0	**1.1**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-30D	D	07/25/01	µg/L	**1.9**	**53**	**17**	**1.2**	<1.0	<1.0	**1.1**	**7.4**	**3.5**	**3.3**	CCL4 7.4, IPB 1.0, NAP 4.8, TCFM 1.5
WND-31S	S	07/27/01	µg/L	<1.0	**3.2**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**6.6**	<1.0	NAP 2.8 UB
WND-32S	S	07/27/01	µg/L	<1.0	**9.7**	**1**	<1.0	<1.0	<1.0	<1.0	**12**	**39**	<1.0	CCL4 12, NAP 1.4 UB

Table 5-9a
North Industrial Corridor (NIC) Site
Monitoring Well Groundwater Sample Analytical Results, Site VOCs* by EPA Method 8260

Station	Groundwater Depth Zone	Sample Date	Units	PCE	TCE	C12DCE	VC	TCA	11DCA	11DCE	CT	CFM	BEN	Other Detected Compounds
WND-33D	D	12/03/97	µg/L	<1	**380**	**150**	**110**	**2**	**12**	**25**	<1	<1	**5.4**	CHEA 7.9, T12DCE 7.4, TOL 1.2, XYL-MP 2.1, XYL-O 1.1
WND-33D	D	05/07/01	µg/L	<1.0	**43**	**72**	<1.0	<1.0	**4.3**	<1.0	<1.0	<1.0	<1.0	None
WND-33S	S	12/03/97	µg/L	<1	**370**	**120**	**70**	**1.8**	**14**	**27**	<1	<1	**4**	CHEA 4.6, T12DCE 5.9, XYL-MP 2.6, XYL-O 1.4
WND-33S	S	05/07/01	µg/L	<1.0	**160**	**100**	**9.4**	<1.0	**3.5**	**2.4**	<1.0	<1.0	<1.0	T12DCE 1.9
WND-34D	D	06/16/98	µg/L	<1	**160**	**74**	**31**	<1	**7.1**	**10**	<1	**5.2**	**230**	12DCA 7.2, CHEA 1, CM 7.9, EBN 1.3, T12DCE 2.2, TOL 1.4
WND-34D	D	05/04/01	µg/L	<1.0 JIH	**32 JIH**	**23 JIH**	<1.0 JIH	<1.0 JIH	**1.7 JIH**	**1.4 JIH**	<1.0 JIH	<1.0 JIH	**64 JIH**	None
WND-34S	S	06/16/98	µg/L	<1	**17**	**33**	**79**	<1	**8.5**	**2.9**	<1	<1	**120**	12DCA 4.6, CM 5.9, T12DCE 2.7, TOL 1.3
WND-34S	S	05/04/01	µg/L	<1.0	**11**	**7.3**	**5**	<1.0	**2.3**	<1.0	<1.0	<1.0	**160**	MECL 4.4, TOL 1.5
WND-36D	D	12/05/97	µg/L	<1	**400**	**76 JDB**	**22**	**7.8**	**6.7**	**35**	<1	**2.1**	**2.7**	None
WND-36D	D	05/04/01	µg/L	<1.0	**44**	**49**	**15**	<1.0	**2.2**	**2.5**	<1.0	<1.0	**1.2**	T12DCE 1.1
WND-36S	S	12/05/97	µg/L	<1	<1	**4.7 JDB**	**52**	<1	**9.2**	<1	<1	<1	**180**	EBN 72, TOL 18, XYL-MP 45, XYL-O 12
WND-36S	S	05/04/01	µg/L	<1.0	**3.2**	**1.1**	<1.0	<1.0	**4.6**	<1.0	<1.0	<1.0	**100**	EBN 54, TOL 31, XYL-MP 73, XYL-O 10
WND-37DR	D	06/16/98	µg/L	**1.4**	**900**	**220**	**12**	**21**	**12**	**70**	**2.6**	**3.1**	**2.9**	12DCA 1.7, CCL4 2.6, CM 1.3, MECL 1.2, T12DCE 20, TOL 1.2
WND-37DR	D	05/07/01	µg/L	<1.0	**120**	**37**	<1.0	<1.0	**5.3**	**11**	<1.0	<1.0	**3.3**	CHEA 1.1, T12DCE 2.8
WND-38D	D	12/04/97	µg/L	<1	**140**	**26 JDB**	**4.3**	**1.3**	**1.6**	**5.6**	<1	<1	<1	BDCM 1.5
WND-38D	D	05/08/01	µg/L	<1.0	**22**	**8.1**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-38S	S	12/04/97	µg/L	<1	**16 JDB**	<1	<1	<1	<1	<1	<1	<1	<1	XYL-MP 1.5
WND-38S	S	05/08/01	µg/L	<1.0	**3.3**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-39D	D	12/08/97	µg/L	<1	**610**	**120 JS**	**54 JS**	**5**	**12 JS**	**34 JS**	<1	<1	**5.4**	CM 2.5 JS, T12DCE 3.7 JS, XYL-MP 1.7
WND-39D	D	05/08/01	µg/L	<1.0	**32**	**13**	**1.8**	<1.0	**2.5**	**1.3**	<1.0	<1.0	<1.0	None
WND-39S	S	12/08/97	µg/L	<1	**47 JDB**	**7.4 JDB**	<1	<1	<1	<1	<1	<1	<1	XYL-MP 2.3 JS, XYL-O 1.1
WND-39S	S	05/08/01	µg/L	<1.0	**29**	**3**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-40D	D	05/02/01	µg/L	**1.4**	**54**	**21**	<1.0	**9.5**	**1.9**	**6.2**	<1.0	<1.0	<1.0	None
WND-40S	S	05/02/01	µg/L	<1.0	**36**	**9.6**	<1.0	**9.7**	**1.8**	**6**	<1.0	<1.0	<1.0	None
WND-41D	D	05/03/01	µg/L	**3.2**	**45**	**4.2**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-41S	S	05/03/01	µg/L	**2.3**	**7.2**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-42D	D	05/03/01	µg/L	<1.0	**3.3**	**41**	**2**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	T12DCE 1.6
WND-42S	S	05/03/01	µg/L	<1.0	<1.0	**4.9**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-43D	D	05/09/01	µg/L	<1.0	**99**	**37**	**6.5**	<1.0	**1.2**	**2.7**	<1.0	<1.0	**1.1**	T12DCE 1.1
WND-43S	S	05/09/01	µg/L	<1.0	<1.0	**1.7**	**1.2**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None

Table 5-9a
North Industrial Corridor (NIC) Site
Monitoring Well Groundwater Sample Analytical Results, Site VOCs* by EPA Method 8260

Station	Groundwater Depth Zone	Sample Date	Units	PCE	TCE	C12DCE	VC	TCA	11DCA	11DCE	CT	CFM	BEN	Other Detected Compounds
WND-44D	D	12/04/97	µg/L	<1	**21 JDB**	**7.7 JDB**	<1	<1	<1	<1	<1	<1	<1	XYL-MP 1.9
WND-44D	D	05/08/01	µg/L	<1.0	**18**	**17**	**2.7**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-44S	S	12/04/97	µg/L	<1	**28 JDB**	**6.7 JDB**	**15**	<1	**2.1**	<1	<1	<1	**1.8**	XYL-MP 2.5, XYL-O 1.3
WND-44S	S	05/08/01	µg/L	<1.0	<1.0	**1.3**	**23**	<1.0	**1.8**	<1.0	<1.0	<1.0	**2.3**	None
WND-45D	D	12/04/97	µg/L	<1	**300**	**110**	**8.8**	<1	**1.9**	**4.1**	<1	<1	<1	T12DCE 2.7, XYL-MP 1.3
WND-45D	D	05/10/01	µg/L	<1.0	**220**	**54**	**3.4**	<1.0	**2.0**	**7.2**	<1.0	<1.0	<1.0	DCDFM 7.3, T12DCE 1.9
WND-45S	S	12/04/97	µg/L	<1	**20 JDB**	**5.6 JDB**	<1	<1	<1	<1	<1	<1	<1	XYL-MP 1.8
WND-45S	S	05/10/01	µg/L	<1.0	**26**	**7.9**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-46D	D	05/10/01	µg/L	<1.0	**130**	**65**	**3.2**	**1.9**	**3.3**	**3.2**	<1.0	<1.0	<1.0	T12DCE 2.7
WND-46S	S	05/10/01	µg/L	<1.0	**8.8**	**2.8**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-47D	D	12/03/97	µg/L	**2.4**	**590**	**88 JDB**	**7.5**	<1	**4.3**	**5.1**	<1	<1	<1	T12DCE 6.3, XYL-MP 1.5
WND-47D	D	05/09/01	µg/L	**7.4**	**340**	**51**	**6.1**	<1.0	**2.5**	**4.6**	<1.0	<1.0	<1.0	T12DCE 4.7
WND-47S	S	12/03/97	µg/L	**9.7**	**170**	**26 JDB**	**1.1**	<1	**1**	**1.2**	<1	<1	<1	12DCP 1.3, T12DCE 1.6, XYL-MP 1.8
WND-47S	S	05/09/01	µg/L	**6.8**	**180**	**27**	**1.1**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	T12DCE 1.4
WND-48D	D	05/08/01	µg/L	<1.0	**35**	**10**	<1.0	**12**	**2.9**	**7.1**	<1.0	<1.0	<1.0	None
WND-48S	S	05/08/01	µg/L	<1.0	**1.2**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-49D	D	05/09/01	µg/L	<1.0	**44**	**47**	**2.1**	**8.6**	**2.9**	**3.8**	<1.0	<1.0	**1.9**	T12DCE 1.0

* Site VOCs are the "groundwater target compounds" discussed in Section 5.5.3.1 of the RI Report.
Bold text indicates results above analytical detection limits.

PCE = Tetrachloroethene
TCE = Trichloroethene
C12DCE = cis-1,2-dichloroethene
VC = Vinyl chloride
TCA = 1,1,1-Trichloroethane

11DCA = 1,1-Dichloroethane
11DCE = 1,1-Dichloroethene
CT = Carbon tetrachloride
CFM = Chloroform
BEN = Benzene

JS = Estimated due to surrogate recoveries outside of control limits.
JH = Estimated due to holding time violations.
JIH = Estimated due to elevated internal standard area
JTB = Estimated due to contamination detected in the travel blank.
JDB = Estimated due to contamination detected in the decontamination blank.

Other Detected Compounds:

T12DCE = trans-1,2-Dichloroethene
CCL4 = Carbon Tetrachloride
NBB = n-Butylbenzene
PIPT = p-Isopropyltoluene
SBB = sec-Butylbenzene
12DCA = 1,2-Dichloroethane

CHEA = Chloroethane
NAP = Naphthalene
MECL = Methylene Chloride
TCFM = Trichlorofluoromethane
CM = Chloromethane
12DBE = 1,2-Dibromoethane

12DCP = 1,2-Dichloropropane
IPB = Isopropylbenzene
NPB = n-Propylbenzene
TBB = tert-Butylbenzene
124TMB = 1,2,4-Trimethylbenzene
135TMB = 1,3,5-Trimethylbenzene

BDCM = Bromodichloromethane
DCDFM = Dichlorodifluoromethane
TOL = Toluene
MTBE = Methyl-tert-butyl ether
EBN = Ethylbenzene
XYL-MP = m,p-Xylene
XYL-O = o-Xylene

Table 5-9b
North Industrial Corridor (NIC) Site
Monitoring Well Groundwater Sample Analytical Results, SVOCs by EPA Method 8270

Station		**NMW-09D**	**NMW-09S**	**NMW-22D**	**NMW-22S**	**NMW-29S**	**NMW-31S**	**WNC-05D**	**WNC-06D**	**WNC-16D**	**WND-02S**	**WND-05S**	**WND-06S**	**WND-16S**	**WND-22D**	**WND-22S**	**WND-45D**	**WND-45D**
Groundwater Depth Zone		**D**	**S**	**D**	**S**	**S**	**S**	**D**	**D**	**D**	**S**	**S**	**S**	**S**	**D**	**S**	**D**	**D**
Sample Date (Phase 2B)		**5/10/01**	**5/10/01**	**5/7/01**	**5/7/01**	**5/8/01**	**5/9/01**	**5/10/01**	**5/1/01**	**5/10/01**	**5/10/01**	**5/10/01**	**5/1/01**	**5/10/01**	**5/1/01**	**5/1/01**	**5/10/01**	**5/10/2001**
QC Sample Flag																		**DUP**
Compound	**Units**																	
1,2,4-Trichlorobenzene	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	<10	<10	<10	<10	<10
1,2-Dichlorobenzene	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	<10	<10	<10	<10	<10
1,3-Dichlorobenzene	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	<10	<10	<10	<10	<10
1,4-Dichlorobenzene	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	<10	<10	<10	<10	<10
2,4,5-Trichlorophenol	µg/L	<50	<50	<52	<50	<50	<50	<50	<53	<50	<52	<54	<50	<50	<51	<50	<50	<50
2,4,6-Trichlorophenol	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	<10	<10	<10	<10	<10
2,4-Dichlorophenol	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	<10	<10	<10	<10	<10
2,4-Dimethylphenol	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	<10	<10	<10	<10	<10
2,4-Dinitrophenol	µg/L	<50	<50	<52	<50	<50	<50	<50	<53	<50	<52	<54	<50	<50	<51	<50	<50	<50
2,4-Dinitrotoluene	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	<10	<10	<10	<10	<10
2,6-Dinitrotoluene	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	<10	<10	<10	<10	<10
2-Chloronaphthalene	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	<10	<10	<10	<10	<10
2-Chlorophenol	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	<10	<10	<10	<10	<10
2-Methylnaphthalene	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	**460**	<10	<10	<10	<10
2-Methylphenol	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	<10	<10	<10	<10	<10
2-Nitroaniline	µg/L	<50	<50	<52	<50	<50	<50	<50	<53	<50	<52	<54	<50	<50	<51	<50	<50	<50
2-Nitrophenol	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	<10	<10	<10	<10	<10
3,3'-Dichlorobenzidine	µg/L	<20	<20	<21	<20	<20	<20	<20	<21	<20	<21	<22	<20	<20	<20	<20	<20	<20
3-Nitroaniline	µg/L	<50	<50	<52	<50	<50	<50	<50	<53	<50	<52	<54	<50	<50	<51	<50	<50	<50
4,6-Dinitro-2-methylphenol	µg/L	<50	<50	<52	<50	<50	<50	<50	<53	<50	<52	<54	<50	<50	<51	<50	<50	<50
4-Bromophenylphenyl ether	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	<10	<10	<10	<10	<10
4-Chloro-3-methylphenol	µg/L	<20	<20	<21	<20	<20	<20	<20	<21	<20	<21	<22	<20	<20	<20	<20	<20	<20
4-Chloroaniline	µg/L	<20	<20	<21	<20	<20	<20	<20	<21	<20	<21	<22	<20	<20	<20	<20	<20	<20
4-Chlorophenylphenyl ether	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	<10	<10	<10	<10	<10
4-Methylphenol	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	<10	<10	<10	<10	<10
4-Nitroaniline	µg/L	<50	<50	<52	<50	<50	<50	<50	<53	<50	<52	<54	<50	<50	<51	<50	<50	<50
4-Nitrophenol	µg/L	<50	<50	<52	<50	<50	<50	<50	<53	<50	<52	<54	<50	<50	<51	<50	<50	<50
Acenaphthene	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	**12**	<10	<10	<10	<10
Acenaphthylene	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	<10	<10	<10	<10	<10
Anthracene	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	<10	<10	<10	<10	<10
Benzo(a)anthracene	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	<10	<10	<10	<10	<10
Benzo(a)pyrene	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	<10	<10	<10	<10	<10
Benzo(b)fluoranthene	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	<10	<10	<10	<10	<10
Benzo(g,h,i)perylene	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	<10	<10	<10	<10	<10
Benzo(k)fluoranthene	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	<10	<10	<10	<10	<10
Benzoic acid	µg/L	<50	<50	<52	<50	<50	<50	<50	<53	<50	<52	<54	<50	<50	<51	<50	<50	<50
Benzyl alcohol	µg/L	<20	<20	<21	<20	<20	<20	<20	<21	<20	<21	<22	<20	<20	<20	<20	<20	<20
bis(2-Chloroethoxy)methane	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	<10	<10	<10	<10	<10
bis(2-Chloroethyl) ether	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	<10	<10	<10	<10	<10

Table 5-9b
North Industrial Corridor (NIC) Site
Monitoring Well Groundwater Sample Analytical Results, SVOCs by EPA Method 8270

Station		**NMW-09D**	**NMW-09S**	**NMW-22D**	**NMW-22S**	**NMW-29S**	**NMW-31S**	**WNC-05D**	**WNC-06D**	**WNC-16D**	**WND-02S**	**WND-05S**	**WND-06S**	**WND-16S**	**WND-22D**	**WND-22S**	**WND-45D**	**WND-45D**
Groundwater Depth Zone		**D**	**S**	**D**	**S**	**S**	**S**	**D**	**D**	**D**	**S**	**S**	**S**	**S**	**D**	**S**	**D**	**D**
Sample Date (Phase 2B)		**5/10/01**	**5/10/01**	**5/7/01**	**5/7/01**	**5/8/01**	**5/9/01**	**5/10/01**	**5/1/01**	**5/10/01**	**5/10/01**	**5/10/01**	**5/1/01**	**5/10/01**	**5/1/01**	**5/1/01**	**5/10/01**	**5/10/2001**
QC Sample Flag																		**DUP**
Compound	**Units**																	
bis(2-Chloroisopropyl) ether	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	<10	<10	<10	<10	<10
bis(2-Ethylhexyl)phthalate	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	<10	<10	<10	<10	<10
Butylbenzylphthalate	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	<10	<10	<10	<10	<10
Chrysene	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	<10	<10	<10	<10	<10
Di-n-butylphthalate	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	<10	<10	<10	<10	<10
Di-n-octylphthalate	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	<10	<10	<10	<10	<10
Dibenz(a,h)anthracene	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	<10	<10	<10	<10	<10
Dibenzofuran	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	<10	<10	<10	<10	<10
Diethylphthalate	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	<10	<10	<10	<10	<10
Dimethylphthalate	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	<10	<10	<10	<10	<10
Fluoranthene	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	<10	<10	<10	<10	<10
Fluorene	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	**10**	<10	<10	<10	<10
Hexachloro-1,3-butadiene	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	<10	<10	<10	<10	<10
Hexachlorobenzene	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	<10	<10	<10	<10	<10
Hexachlorocyclopentadiene	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	<10	<10	<10	<10	<10
Hexachloroethane	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	<10	<10	<10	<10	<10
Indeno(1,2,3-cd)pyrene	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	<10	<10	<10	<10	<10
Isophorone	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	<10	<10	<10	<10	<10
N-Nitroso-di-n-propylamine	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	<10	<10	<10	<10	<10
N-Nitrosodiphenylamine	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	<10	<10	<10	<10	<10
Naphthalene	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	**500**	<10	<10	<10	<10
Nitrobenzene	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	<10	<10	<10	<10	<10
Pentachlorophenol	µg/L	<50	<50	<52	<50	<50	<50	<50	<53	<50	<52	<54	<50	<50	<51	<50	<50	<50
Phenanthrene	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	**21**	<10	<10	<10	<10
Phenol	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	<10	<10	<10	<10	<10
Pyrene	µg/L	<10	<10	<10	<10	<10	<10	<10	<11	<10	<10	<11	<10	<10	<10	<10	<10	<10

Bold text indicates results above analytical detection limits.
DUP = Field duplicate sample

Table 5-9c
North Industrial Corridor (NIC) Site
Monitoring Well Groundwater Sample Analytical Results, Pesticides/PCBs by EPA Method 8080

Station		**NMW-09D**	**NMW-09S**	**NMW-22D**	**NMW-22S**	**NMW-29S**	**NMW-31S**	**WNC-06D**	**WNC-16D**
Groundwater Depth Zone		**D**	**S**	**D**	**S**	**S**	**S**	**D**	**D**
Sample Date(Phase 2B)		**5/10/01**	**5/10/01**	**5/7/01**	**5/7/01**	**5/8/01**	**5/9/01**	**5/1/01**	**5/10/01**
QC Sample Flag									
Compound	**Units**								
4,4'-DDD	µg/L	<0.14	<0.14	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11
4,4'-DDE	µg/L	<0.051	<0.051	<0.041	<0.041	<0.040	<0.040	<0.042	<0.040
4,4'-DDT	µg/L	<0.15	<0.15	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12
Aldrin	µg/L	<0.051	<0.051	<0.041	<0.041	<0.040	<0.040	<0.042	<0.040
alpha-BHC	µg/L	<0.038	<0.038	<0.031	<0.031	<0.030	<0.030	<0.031	<0.030
alpha-Chlordane	µg/L	<0.064	<0.064	<0.052	<0.051	<0.050	<0.050	<0.052	<0.050
beta-BHC	µg/L	<0.077	<0.077	<0.062	<0.061	<0.060	<0.060	<0.062	<0.060
Chlordane (Technical)	µg/L	<0.18	<0.18	<0.14	<0.14	<0.14	<0.14	<0.15	<0.14
delta-BHC	µg/L	<0.12	<0.12	<0.093	<0.092	<0.090	<0.090	<0.094	<0.090
Dieldrin	µg/L	<0.026	<0.026	<0.021	<0.020	<0.020	<0.020	<0.021	<0.020
Endosulfan I	µg/L	<0.18	<0.18	<0.14	<0.14	<0.14	<0.14	<0.15	<0.14
Endosulfan II	µg/L	<0.051	<0.051	<0.041	<0.041	<0.040	<0.040	<0.042	<0.040
Endosulfan sulfate	µg/L	<0.85	<0.85	<0.68	<0.67	<0.66	<0.66	<0.69	<0.66
Endrin	µg/L	<0.077	<0.077	<0.062	<0.061	<0.060	<0.060	<0.062	<0.060
Endrin aldehyde	µg/L	<0.29	<0.29	<0.24	<0.23	<0.23	<0.23	<0.24	<0.23
Endrin ketone	µg/L	<0.13	<0.13	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
gamma-BHC	µg/L	<0.051	<0.051	<0.041	<0.041	<0.040	<0.040	<0.042	<0.040
gamma-Chlordane	µg/L	<0.064	<0.064	<0.052	<0.051	<0.050	<0.050	<0.052	<0.050
Heptachlor	µg/L	<0.038	<0.038	<0.031	<0.031	<0.030	<0.030	<0.031	<0.030
Heptachlor epoxide	µg/L	<0.13	<0.13	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Methoxychlor	µg/L	<2.3	<2.3	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8
Toxaphene	µg/L	<3.1	<3.1	<2.5	<2.4	<2.4	<2.4	<2.5	<2.4
PCB-1016	µg/L	<1.3	<1.3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
PCB-1221	µg/L	<1.3	<1.3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
PCB-1232	µg/L	<1.3	<1.3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
PCB-1242	µg/L	<1.3	<1.3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
PCB-1248	µg/L	<1.3	<1.3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
PCB-1254	µg/L	<1.3	<1.3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
PCB-1260	µg/L	<1.3	<1.3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

DUP = Field duplicate sample.
NA = Not analyzed

Table 5-9c
North Industrial Corridor (NIC) Site
Monitoring Well Groundwater Sample Analytical Results, Pesticides/PCBs by EPA Method 8080

Station		**WND-02S**	**WND-05S**	**WND-06S**	**WND-16S**	**WND-22D**	**WND-22S**	**WND-45D**	**WND-45D**
Groundwater Depth Zone		**S**	**S**	**S**	**S**	**D**	**S**	**D**	**D**
Sample Date(Phase 2B)		**5/10/01**	**5/10/01**	**5/1/01**	**5/10/01**	**5/1/01**	**5/1/01**	**5/10/01**	**5/10/2001**
QC Sample Flag									**DUP**
Compound	**Units**								
4,4'-DDD	µg/L	<0.12	<1.5	<0.11	<0.14	<0.11	NA	<0.11	<0.11
4,4'-DDE	µg/L	<0.045	<0.56	<0.040	<0.051	<0.041	NA	<0.040	<0.040
4,4'-DDT	µg/L	<0.14	<1.7	<0.12	<0.15	<0.12	NA	<0.12	<0.12
Aldrin	µg/L	<0.045	<0.56	<0.040	<0.051	<0.041	NA	<0.040	<0.040
alpha-BHC	µg/L	<0.034	<0.42	<0.030	<0.038	<0.031	NA	<0.030	<0.030
alpha-Chlordane	µg/L	<0.057	<0.69	<0.050	<0.064	<0.052	NA	<0.050	<0.050
beta-BHC	µg/L	<0.068	<0.83	<0.060	<0.077	<0.062	NA	<0.060	<0.060
Chlordane (Technical)	µg/L	<0.16	<1.9	<0.14	<0.18	<0.14	NA	<0.14	<0.14
delta-BHC	µg/L	<0.10	<1.2	<0.090	<0.12	<0.093	NA	<0.090	<0.090
Dieldrin	µg/L	<0.023	<0.28	<0.020	<0.026	<0.021	NA	<0.020	<0.020
Endosulfan I	µg/L	<0.16	<1.9	<0.14	<0.18	<0.14	NA	<0.14	<0.14
Endosulfan II	µg/L	<0.045	<0.56	<0.040	<0.051	<0.041	NA	<0.040	<0.040
Endosulfan sulfate	µg/L	<0.75	<9.2	<0.66	<0.85	<0.68	NA	<0.66	<0.66
Endrin	µg/L	<0.068	<0.83	<0.060	<0.077	<0.062	NA	<0.060	<0.060
Endrin aldehyde	µg/L	<0.26	<3.2	<0.23	<0.29	<0.24	NA	<0.23	<0.23
Endrin ketone	µg/L	<0.11	<1.4	<0.10	<0.13	<0.10	NA	<0.10	<0.10
gamma-BHC	µg/L	<0.045	<0.56	<0.040	<0.051	<0.041	NA	<0.040	<0.040
gamma-Chlordane	µg/L	<0.057	<0.69	<0.050	<0.064	<0.052	NA	<0.050	<0.050
Heptachlor	µg/L	0.041	<0.42	<0.030	<0.038	<0.031	NA	<0.030	<0.030
Heptachlor epoxide	µg/L	<0.11	<1.4	<0.10	<0.13	<0.10	NA	<0.10	<0.10
Methoxychlor	µg/L	<2.0	<24	<1.8	<2.3	<1.8	NA	<1.8	<1.8
Toxaphene	µg/L	<2.7	<33	<2.4	<3.1	<2.5	NA	<2.4	<2.4
PCB-1016	µg/L	<1.1	<1.4	<1.0	<1.3	<1.0	<1.0	<1.0	<1.0
PCB-1221	µg/L	<1.1	<1.4	<1.0	<1.3	<1.0	<1.0	<1.0	<1.0
PCB-1232	µg/L	<1.1	<1.4	<1.0	<1.3	<1.0	<1.0	<1.0	<1.0
PCB-1242	µg/L	<1.1	<1.4	<1.0	<1.3	<1.0	<1.0	<1.0	<1.0
PCB-1248	µg/L	<1.1	<1.4	<1.0	<1.3	<1.0	<1.0	<1.0	<1.0
PCB-1254	µg/L	<1.1	<1.4	<1.0	<1.3	<1.0	<1.0	<1.0	<1.0
PCB-1260	µg/L	<1.1	<1.4	<1.0	<1.3	<1.0	<1.0	<1.0	<1.0

DUP = Field duplicate sample.
NA = Not analyzed

Table 5-9d
North Industrial Corridor (NIC) Site
Monitoring Well Groundwater Sample Analytical Results, TPH by EPA Method 8015M

Station **Groundwater Depth Zone** **Sample Date(Phase 2B)** **Compound**	**Units**	**NMW-09D** **D** **5/10/01**	**NMW-09S** **S** **5/10/01**	**NMW-42D** **D** **7/26/01**	**NMW-44D** **D** **7/26/01**	**NMW-45D** **D** **7/26/01**	**NMW-46D** **D** **7/25/01**	**NMW-48S** **S** **7/27/01**	**WNC-16D** **D** **5/10/01**	**WNC-37SR** **S** **5/7/01**	**WND-05S** **S** **5/10/01**	**WND-12S** **S** **5/3/01**	**WND-16S** **S** **5/10/01**	**WND-22S** **S** **5/1/01**
Extractable Hydrocarbons														
Fuel Oil	mg/L	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Jet Fuel	mg/L	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Kerosene	mg/L	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Mineral Spirits	mg/L	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Motor Oil	mg/L	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
TPH as Diesel	mg/L	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	**7.7**	<0.40
TPH as Gasoline	mg/L	--	--	--	--	--	--	--	--	--	**1.5**	--	--	--
Purgeable Hydrocarbons														
TPH as Gasoline	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**3.69**	<0.50	**14.3**	<0.50

Bold text indicates results above analytical detection limits.

Table 5-9e
North Industrial Corridor (NIC) Site
Monitoring Well Groundwater Sample Analytical Results, Total and Dissolved Metals

Station	Groundwater Depth Zone	Sample Date	Units	Aluminum		Antimony		Arsenic		Barium		Beryllium	
				Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved
NMW-09D	D	5/10/01	µg/L	<75.0	<75.0	<10.0	<10.0	**21.9**	**28.9**	**107**	**115**	<1.00	<1.00
NMW-09S	S	5/10/01	µg/L	**744**	<75.0	<10.0	<10.0	<5.00	<5.00	**99.5**	**97.8**	<1.00	<1.00
NMW-22D	D	5/7/01	µg/L	**207**	<75.0	<10.0	<10.0	<5.00	<5.00	**111**	**115**	<1.00	<1.00
NMW-22S	S	5/7/01	µg/L	**350**	<75.0	<10.0	<10.0	<5.00	<5.00	**117**	**120**	<1.00	<1.00
NMW-29S	S	5/8/01	µg/L	**410**	<75.0	<10.0	<10.0	<5.00	<5.00	**76.8**	**76.6**	<1.00	<1.00
NMW-31S	S	5/9/01	µg/L	<75.0	<75.0	<10.0	<10.0	<5.00	<5.00	**65**	**62.3**	<1.00	<1.00
WNC-06D	D	5/1/01	µg/L	<75.0	<75.0	<10.0	<10.0	<5.00	<5.00	**81.5**	**84.4**	<1.00	<1.00
WNC-16D	D	5/10/01	µg/L	<75.0	<75.0	<10.0	<10.0	<5.00	<5.00	**70.4**	**74.4**	<1.00	<1.00
WND-02S	S	5/10/01	µg/L	**36800**	<75.0	<10.0	<10.0	**70.9**	**19.4**	**1310**	**330**	**2.43**	<1.00
WND-05S	S	5/10/01	µg/L	**19300**	<75.0	<10.0	<10.0	**7.33**	<5.00	**667**	**351**	**1.38**	<1.00
WND-06S	S	5/1/01	µg/L	<75.0	<75.0	<10.0	<10.0	<5.00	<5.00	**104**	**104**	<1.00	<1.00
WND-16S	S	5/10/01	µg/L	**859**	<75.0	<10.0	<10.0	<5.00	<5.00	**693**	**665**	<1.00	<1.00
WND-22D	D	5/1/01	µg/L	<75.0	<75.0	<10.0	<10.0	<5.00	<5.00	**89**	**94.3**	<1.00	<1.00
WND-22S	S	5/1/01	µg/L	<75.0	<75.0	<10.0	<10.0	<5.00	<5.00	**150**	**146**	<1.00	<1.00
WND-45D	D	5/10/01	µg/L	**86500**	<75.0	<10.0	<10.0	**61.2**	<5.00	**2230**	**96.1**	**7.22**	<1.00
WND-45D-DUP	D	5/10/01	µg/L	**75700**	<75.0	<10.0	<10.0	**54.7**	<5.00	**1740**	**87.8**	**6.17**	<1.00

Bold text indicates results above analytical detection limits.
DUP = Field duplicate sample.

Table 5-9e
North Industrial Corridor (NIC) Site
Monitoring Well Groundwater Sample Analytical Results, Total and Dissolved Metals

Station	Groundwater Depth Zone	Sample Date	Units	Cadmium		Calcium		Chromium		Cobalt		Copper	
				Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved
NMW-09D	D	5/10/01	µg/L	<5.00	<5.00	**110000**	**120000**	<7.00	<7.00	<7.00	<7.00	<10.0	**16.5**
NMW-09S	S	5/10/01	µg/L	<5.00	<5.00	**138000**	**140000**	<7.00	<7.00	<7.00	<7.00	<10.0	<10.0
NMW-22D	D	5/7/01	µg/L	<5.00	<5.00	**142000**	**155000**	<7.00	<7.00	<7.00	<7.00	<10.0	<10.0
NMW-22S	S	5/7/01	µg/L	<5.00	<5.00	**132000**	**135000**	<7.00	<7.00	<7.00	<7.00	<10.0	<10.0
NMW-29S	S	5/8/01	µg/L	<5.00	<5.00	**120000**	**125000**	<7.00	<7.00	<7.00	<7.00	<10.0	<10.0
NMW-31S	S	5/9/01	µg/L	<5.00	<5.00	**127000**	**124000**	<7.00	<7.00	**9.86**	**9.68**	<10.0	**40.3**
WNC-06D	D	5/1/01	µg/L	<5.00	<5.00	**99700**	**104000**	<7.00	<7.00	<7.00	<7.00	<10.0	**56.6**
WNC-16D	D	5/10/01	µg/L	<5.00	<5.00	**116000**	**122000**	**7.34**	<7.00	<7.00	<7.00	<10.0	<10.0
WND-02S	S	5/10/01	µg/L	**5.15**	<5.00	**129000**	**105000**	**31.5**	<7.00	**32.5**	<7.00	**86.3**	<10.0
WND-05S	S	5/10/01	µg/L	<5.00	<5.00	**78700**	**70500**	**16.2**	<7.00	**20.4**	<7.00	**39.1**	<10.0
WND-06S	S	5/1/01	µg/L	<5.00	<5.00	**117000**	**109000**	<7.00	<7.00	<7.00	<7.00	**12.1**	<10.0
WND-16S	S	5/10/01	µg/L	<5.00	<5.00	**106000**	**105000**	<7.00	<7.00	<7.00	<7.00	<10.0	<10.0
WND-22D	D	5/1/01	µg/L	<5.00	<5.00	**103000**	**102000**	<7.00	<7.00	<7.00	<7.00	<10.0	<10.0
WND-22S	S	5/1/01	µg/L	<5.00	<5.00	**83400**	**81400**	<7.00	<7.00	<7.00	<7.00	<10.0	<10.0
WND-45D	D	5/10/01	µg/L	<5.00	<5.00	**162000**	**129000**	**112**	<7.00	**72.2**	<7.00	**163**	<10.0
WND-45D-DUP	D	5/10/01	µg/L	<5.00	<5.00	**142000**	**120000**	**96.5**	<7.00	**61**	<7.00	**138**	<10.0

Bold text indicates results above analytical detection
DUP = Field duplicate sample.

Table 5-9e
North Industrial Corridor (NIC) Site
Monitoring Well Groundwater Sample Analytical Results, Total and Dissolved Metals

Station	Groundwater Depth Zone	Sample Date	Units	Iron		Lead		Magnesium		Manganese		Mercury	
				Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved
NMW-09D	D	5/10/01	µg/L	**5390**	**5690**	**5.27**	**5.44**	**33300**	**36000**	**935**	**1020**	<0.200	<0.200
NMW-09S	S	5/10/01	µg/L	**4690**	**4220**	**9.39**	**8.09**	**42700**	**44500**	**1360**	**1360**	<0.200	<0.200
NMW-22D	D	5/7/01	µg/L	**1630**	**1020**	**8.03**	**8.65**	**27700**	**29600**	**200**	**207**	<0.200	<0.200
NMW-22S	S	5/7/01	µg/L	**308**	<40.0	<5.00	<5.00	**15600**	**15600**	**18.4**	<7.00	<0.200	<0.200
NMW-29S	S	5/8/01	µg/L	**482**	<40.0	**6.05**	**6.76**	**19500**	**20000**	**81.1**	**79.2**	<0.200	<0.200
NMW-31S	S	5/9/01	µg/L	**64.2**	<40.0	**10.6**	**15.2**	**30100**	**30000**	**187**	**183**	<0.200	<0.200
WNC-06D	D	5/1/01	µg/L	**65.4**	<40.0	<5.00	<5.00	**41400**	**42400**	<7.00	<7.00	<0.200	<0.200
WNC-16D	D	5/10/01	µg/L	**532**	**494**	<5.00	<5.00	**30100**	**31700**	**1970**	**2030**	<0.200	<0.200
WND-02S	S	5/10/01	µg/L	**87000**	**11400**	**131**	**20.4**	**32300**	**20700**	**5060**	**4010**	<0.200	<0.200
WND-05S	S	5/10/01	µg/L	**57100**	**13000**	**41.4**	<5.00	**16100**	**10500**	**4790**	**4150**	<0.200	<0.200
WND-06S	S	5/1/01	µg/L	**<40.0**	<40.0	<5.00	<5.00	**56200**	**52700**	**161**	**108**	<0.200	<0.200
WND-16S	S	5/10/01	µg/L	**6550**	**5330**	<5.00	<5.00	**25800**	**24700**	**2330**	**2290**	<0.200	<0.200
WND-22D	D	5/1/01	µg/L	**190**	<40.0	<5.00	<5.00	**31000**	**29800**	**158**	**41.5**	<0.200	<0.200
WND-22S	S	5/1/01	µg/L	**115**	**120**	**5.19**	<5.00	**23400**	**23000**	**401**	**387**	<0.200	<0.200
WND-45D	D	5/10/01	µg/L	**114100**	**473**	**152**	**13.4**	**56100**	**25200**	**1340**	**100**	<0.200	<0.200
WND-45D-DUP	D	5/10/01	µg/L	**118000**	**486**	**130**	**16.1**	**47100**	**23400**	**1120**	**95.2**	<0.200	<0.200

Bold text indicates results above analytical detection
DUP = Field duplicate sample.

Table 5-9e
North Industrial Corridor (NIC) Site
Monitoring Well Groundwater Sample Analytical Results, Total and Dissolved Metals

Station	Groundwater Depth Zone	Sample Date	Units	Nickel		Potassium		Selenium		Silver		Sodium	
				Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved
NMW-09D	D	5/10/01	µg/L	<30.0	<30.0	**8410**	**9180**	<10.0	<10.0	<7.00	<7.00	**64700**	**70600**
NMW-09S	S	5/10/01	µg/L	<30.0	<30.0	**4270**	**4580**	**10.1**	<10.0	<7.00	<7.00	**103000**	**105000**
NMW-22D	D	5/7/01	µg/L	<30.0	<30.0	**5080**	**6010**	**13.6**	<10.0	<7.00	<7.00	**110000**	**120000**
NMW-22S	S	5/7/01	µg/L	<30.0	<30.0	**7080**	**7940**	<10.0	<10.0	<7.00	<7.00	**58400**	**59200**
NMW-29S	S	5/8/01	µg/L	<30.0	<30.0	**4630**	**4510**	**10.7**	<10.0	<7.00	<7.00	**71900**	**75900**
NMW-31S	S	5/9/01	µg/L	<30.0	<30.0	**2960**	**2940**	**16.3**	<10.0	<7.00	<7.00	**130000**	**127000**
WNC-06D	D	5/1/01	µg/L	<30.0	<30.0	**2680**	**3190**	<10.0	**13.4**	<7.00	<7.00	**35000**	**36700**
WNC-16D	D	5/10/01	µg/L	<30.0	<30.0	**2140**	**2270**	<10.0	<10.0	<7.00	<7.00	**47900**	**50000**
WND-02S	S	5/10/01	µg/L	**45.7**	<30.0	**9390**	**1820**	**11.6**	**21.3**	**13.6**	**8.2**	**241000**	**235000**
WND-05S	S	5/10/01	µg/L	<30.0	<30.0	**5240**	**1370**	<10.0	<10.0	<7.00	<7.00	**38900**	**37000**
WND-06S	S	5/1/01	µg/L	<30.0	<30.0	**2510**	**1600**	<10.0	<10.0	<7.00	<7.00	**40400**	**37800**
WND-16S	S	5/10/01	µg/L	<30.0	<30.0	**6910**	**6400**	<10.0	<10.0	<7.00	<7.00	**26000**	**26000**
WND-22D	D	5/1/01	µg/L	<30.0	<30.0	**2140**	**2040**	<10.0	<10.0	<7.00	<7.00	**24900**	**24500**
WND-22S	S	5/1/01	µg/L	<30.0	<30.0	<1000	<1000	**11.1**	<10.0	<7.00	<7.00	**66400**	**64500**
WND-45D	D	5/10/01	µg/L	**150**	<30.0	**20600**	**3830**	<10.0	**14.1**	**12.9**	<7.00	**175000**	**179000**
WND-45D-DUP	D	5/10/01	µg/L	**127**	<30.0	**17300**	**3160**	<10.0	**10.2**	**10.9**	<7.00	**156000**	**168000**

Bold text indicates results above analytical detection
DUP = Field duplicate sample.

Table 5-9e
North Industrial Corridor (NIC) Site
Monitoring Well Groundwater Sample Analytical Results, Total and Dissolved Metals

Station	Groundwater Depth Zone	Sample Date	Units	Thallium		Vanadium		Zinc	
				Total	Dissolved	Total	Dissolved	Total	Dissolved
NMW-09D	D	5/10/01	µg/L	<5.00	<5.00	<12.0	<12.0	<100	<100
NMW-09S	S	5/10/01	µg/L	<5.00	<5.00	<12.0	<12.0	<100	<100
NMW-22D	D	5/7/01	µg/L	<5.00	<5.00	<12.0	<12.0	<100	<100
NMW-22S	S	5/7/01	µg/L	<5.00	<5.00	<12.0	<12.0	<100	<100
NMW-29S	S	5/8/01	µg/L	<5.00	**7.2**	<12.0	<12.0	<100	<100
NMW-31S	S	5/9/01	µg/L	<5.00	<5.00	<12.0	<12.0	<100	<100
WNC-06D	D	5/1/01	µg/L	<5.00	<5.00	<12.0	<12.0	<100	<100
WNC-16D	D	5/10/01	µg/L	<5.00	<5.00	<12.0	<12.0	<100	<100
WND-02S	S	5/10/01	µg/L	**7.81**	<5.00	**100**	<12.0	**259**	<100
WND-05S	S	5/10/01	µg/L	<5.00	<5.00	**61.9**	<12.0	**105**	<100
WND-06S	S	5/1/01	µg/L	<5.00	**6.98**	<12.0	<12.0	<100	<100
WND-16S	S	5/10/01	µg/L	<5.00	<5.00	<12.0	<12.0	<100	<100
WND-22D	D	5/1/01	µg/L	<5.00	<5.00	<12.0	<12.0	<100	<100
WND-22S	S	5/1/01	µg/L	<5.00	<5.00	<12.0	<12.0	<100	<100
WND-45D	D	5/10/01	µg/L	**8.44**	<5.00	**279**	<12.0	**373**	<100
WND-45D-DUP	D	5/10/01	µg/L	**8.98**	<5.00	**240**	<12.0	**320**	<100

Bold text indicates results above analytical detection
DUP = Field duplicate sample.

Table 5-9f
North Industrial Corridor (NIC) Site
Monitoring Well Groundwater Sample Analytical Results, Inorganic Parameters

Station		**DRB-MW-20**	**DRB-MW-250**	**EXC-MW-04B**	**EXC-MW-05B**	**EXC-MW-07B**	**NMW-06D**	**NMW-06S**	**NMW-08D**	**NMW-08S**
Groundwater Depth zone		**S**	**D**	**D**	**D**	**D**	**D**	**S**	**D**	**S**
Sample Date (Phase 2B)		**7/26/01**	**7/26/01**	**5/2/01**	**5/2/01**	**5/2/01**	**5/7/01**	**5/7/01**	**5/10/01**	**5/10/01**
QC Sample Flag										
Compound	**Units**									
Alkalinity, Carbonate (CaCO)	mg/L	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	NA	<1.00	<1.00
Alkalinity, Hydroxide (CaCO)	mg/L	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	NA	<1.00	<1.00
Alkalinity, Total	mg/L	**595**	**412**	**297**	**294**	**300**	**608**	NA	**370**	**308**
Alkalinity,Bicarbonate (CaCO3)	mg/L	**595**	**412**	**297**	**294**	**300**	**608**	NA	**370**	**308**
Chloride	mg/L	**109**	**69.8**	**68.2**	**53.5**	**38.5**	**132**	NA	**256**	**95.4**
Nitrogen, Ammonia	mg/L	**0.692**	**0.382**	<0.256	<0.252	<0.244	<0.264	<0.268	<0.256	**0.344**
Nitrogen, Kjeldahl, Total	mg/L	**2.56**	**0.544**	**0.438**	**0.49**	**1.47**	**0.389**	NA	**0.447**	<0.200
Nitrogen, Nitrate	mg/L	**3.33**	<0.500	**4.02**	**3.18**	**2.85**	<0.500	**7.21**	<0.500	<0.500
Nitrogen, Nitrite	mg/L	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
Nitrogen, NO2 plus NO3	mg/L	**3.38**	<0.500	**4.04**	**3.2**	**2.87**	<0.500	**7.23**	<0.500	<0.500
Sulfate	mg/L	**58.1**	**80**	**162**	**260**	**147**	**235**	NA	**122**	**112**
Total Dissolved Solids	mg/L	**957**	**675**	**700**	**822**	**627**	**1200**	NA	**1100**	**726**
Total Organic Carbon	mg/L	**22**	**4.6**	**2.2**	**2.7**	**3.3**	**9.2**	NA	**4.7**	**6.8**
Total Suspended Solids	mg/L	**9**	**2760**	**23**	<5.00	<5.00	<5.00	NA	**14**	<5.00

Bold text indicates results
above analytical detection limits.
NA = Not Analyzed.

Table 5-9f
North Industrial Corridor (NIC) Site
Monitoring Well Groundwater Sample Analytical Results, Inorganic Parameters

Station	**NMW-10D**	**NMW-10S**	**NMW-14D**	**NMW-18D**	**NMW-18S**	**NMW-19D**	**NMW-25D**	**NMW-25S**	**NMW-29D**	**NMW-29D**	**NMW-31D**
Groundwater Depth zone	**D**	**S**	**D**	**D**	**S**	**D**	**D**	**S**	**D**	**D**	**D**
Sample Date (Phase 2B)	**5/9/01**	**5/9/01**	**5/9/01**	**5/8/01**	**5/8/01**	**5/8/01**	**5/8/01**	**5/8/01**	**5/8/01**	**5/8/01**	**5/9/01**
QC Sample Flag										**DUP**	
Compound											
Alkalinity, Carbonate (CaCO)	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Alkalinity, Hydroxide (CaCO)	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Alkalinity, Total	**338**	**307**	**289**	**332**	**357**	**461**	**388**	**435**	**375**	**375**	**354**
Alkalinity,Bicarbonate (CaCO3)	**338**	**307**	**289**	**332**	**357**	**461**	**388**	**435**	**367**	**375**	**354**
Chloride	**92.8**	**96.6**	**90.5**	**98.6**	**99.8**	**154**	**129**	**126**	**103**	**102**	**108**
Nitrogen, Ammonia	<0.260	<0.256	<0.276	<0.274	<0.276	<0.240	<0.248	<0.250	<0.276	<0.250	<0.264
Nitrogen, Kjeldahl, Total	<0.200	**0.326**	**0.584**	**0.356**	**0.266**	<0.200	**0.334**	**0.309**	**0.229**	**0.35**	<0.200
Nitrogen, Nitrate	<0.500	<0.500	<0.500	<0.500	**1.8**	<0.500	<0.500	**2.82**	**0.798**	**0.741**	<0.500
Nitrogen, Nitrite	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
Nitrogen, NO2 plus NO3	<0.500	<0.500	<0.500	<0.500	**1.8**	<0.500	<0.500	**2.84**	**0.755**	**0.755**	<0.500
Sulfate	**142**	**133**	**182**	**159**	**150**	**136**	**210**	**159**	**175**	**175**	**249**
Total Dissolved Solids	**800**	**713**	**771**	**720**	**735**	**909**	**917**	**874**	**788**	**788**	**951**
Total Organic Carbon	**4.9**	**4**	**2**	**2**	**2.3**	**4.1**	**2**	**1.9**	**2**	**2**	**2.3**
Total Suspended Solids	**9**	**9**	**45**	**5**	**16**	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00

Bold text indicates results
above analytical detection limits.
NA = Not Analyzed.

Table 5-9f
North Industrial Corridor (NIC) Site
Monitoring Well Groundwater Sample Analytical Results, Inorganic Parameters

Station	**NMW-31S**	**NMW-44D**	**NMW-45D**	**WNC-06D**	**WNC-16D**	**WNC-23D**	**WNC-37SR**	**WND-03S**	**WND-04S**	**WND-06S**	**WND-14D**
Groundwater Depth zone	**S**	**D**	**D**	**D**	**D**	**D**	**S**	**S**	**S**	**S**	**D**
Sample Date (Phase 2B)	**5/9/01**	**7/26/01**	**7/26/01**	**5/1/01**	**5/10/01**	**5/8/01**	**5/7/01**	**5/2/01**	**5/2/01**	**5/1/01**	**5/7/01**
QC Sample Flag											
Compound											
Alkalinity, Carbonate (CaCO)	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	NA	<1.00	<1.00	<1.00	<1.00
Alkalinity, Hydroxide (CaCO)	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	NA	<1.00	<1.00	<1.00	<1.00
Alkalinity, Total	**334**	**383**	**372**	**333**	**415**	**293**	NA	**494**	**367**	**376**	**368**
Alkalinity,Bicarbonate (CaCO3)	**334**	**383**	**372**	**333**	**415**	**293**	NA	**494**	**367**	**376**	**368**
Chloride	**88.9**	**81.8**	**67.4**	**33**	**28.7**	**47.5**	NA	**24.4**	**55**	**50.3**	**64.2**
Nitrogen, Ammonia	<0.256	<0.240	<0.256	<0.236	<0.260	**4.19**	<0.248	<0.236	<0.248	<0.272	<0.268
Nitrogen, Kjeldahl, Total	**0.448**	**0.787**	**1.08**	<0.200	<0.200	**4.42**	NA	<0.200	<0.200	**0.215**	<0.200
Nitrogen, Nitrate	**3.71**	<0.500	**11.6**	**6.24**	<0.500	**3.22**	**5.1**	<0.500	**2.99**	**6.64**	**2.13**
Nitrogen, Nitrite	<0.500	<0.500	<5.00	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
Nitrogen, NO2 plus NO3	**3.71**	**0.521**	**11.7**	**6.26**	<0.500	**3.22**	**5.12**	<0.500	**3.02**	**6.66**	**2.15**
Sulfate	**200**	**99.5**	**94.5**	**85.8**	**76.7**	**234**	NA	**19**	**223**	**97.1**	**349**
Total Dissolved Solids	**872**	**719**	**763**	**589**	**645**	**725**	NA	**591**	**841**	**675**	**1090**
Total Organic Carbon	**2.1**	**5.3**	**4.4**	**1.4**	**6.1**	**3**	NA	**2.6**	**3.6**	**1.8**	**1.6**
Total Suspended Solids	<5.00	**1700**	**402**	<5.00	<5.00	<5.00	NA	**9**	<5.00	<5.00	**8**

Bold text indicates results
above analytical detection limits.
NA = Not Analyzed.

Table 5-9f
North Industrial Corridor (NIC) Site
Monitoring Well Groundwater Sample Analytical Results, Inorganic Parameters

Station	**WND-16S**	**WND-21D**	**WND-21S**	**WND-22D**	**WND-22S**	**WND-23S**	**WND-33D**	**WND-33S**	**WND-34D**	**WND-34S**	**WND-36D**
Groundwater Depth zone	**S**	**D**	**S**	**D**	**S**	**S**	**D**	**S**	**D**	**S**	**D**
Sample Date (Phase 2B)	**5/10/01**	**5/4/01**	**5/4/01**	**5/1/01**	**5/1/01**	**5/8/01**	**5/7/01**	**5/7/01**	**5/4/01**	**5/4/01**	**5/4/01**
QC Sample Flag											
Compound											
Alkalinity, Carbonate (CaCO)	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	NA	NA	<1.00
Alkalinity, Hydroxide (CaCO)	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	NA	NA	<1.00
Alkalinity, Total	**355**	**486**	**462**	**261**	**307**	**222**	**655**	**497**	NA	NA	**488**
Alkalinity,Bicarbonate (CaCO3)	**355**	**486**	**462**	**261**	**307**	**222**	**655**	**497**	NA	NA	**488**
Chloride	**38.1**	**42.7**	**42.6**	**46.1**	**48.4**	**44**	**132**	**100**	NA	NA	**71.7**
Nitrogen, Ammonia	**1.45**	<0.260	**3.18**	<0.236	<0.268	**6.54**	**0.374**	<0.256	<0.264	**0.603**	**2.16**
Nitrogen, Kjeldahl, Total	**2.01**	**0.335**	**3.14**	<0.200	<0.200	**8.54**	**0.642**	<0.200	NA	NA	**2.3**
Nitrogen, Nitrate	<0.500	**1.07**	<0.500	**0.569**	<0.500	**1.04**	<0.500	<0.500	<0.500	<0.500	<0.500
Nitrogen, Nitrite	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
Nitrogen, NO2 plus NO3	<0.500	**1.1**	<0.500	**0.604**	<0.500	**1.04**	<0.500	**0.518**	<0.500	<0.500	<0.500
Sulfate	**5.13**	**98.5**	**98.6**	**110**	**56.4**	**208**	**226**	**164**	NA	NA	**142**
Total Dissolved Solids	**513**	**695**	**793**	**532**	**485**	**600**	**1260**	**874**	NA	NA	**782**
Total Organic Carbon	**13**	**3.5**	**4.3**	**1.8**	**2.6**	**2.1**	**11**	**6.6**	NA	NA	**5.9**
Total Suspended Solids	**141**	<5.00	**25**	<5.00	<5.00	<5.00	**34**	**8**	NA	NA	**33**

Bold text indicates results
above analytical detection limits.
NA = Not Analyzed.

Table 5-9f
North Industrial Corridor (NIC) Site
Monitoring Well Groundwater Sample Analytical Results, Inorganic Parameters

Station	**WND-36S**	**WND-37DR**	**WND-39D**	**WND-40D**	**WND-40S**	**WND-41D**	**WND-41S**	**WND-41S**	**WND-42D**	**WND-42S**
Groundwater Depth zone	**S**	**D**	**D**	**D**	**S**	**D**	**S**	**S**	**D**	**S**
Sample Date (Phase 2B)	**5/4/01**	**5/7/01**	**5/8/01**	**5/2/01**	**5/2/01**	**5/3/01**	**5/3/01**	**5/3/01**	**5/3/01**	**5/3/01**
QC Sample Flag								**DUP**		
Compound										
Alkalinity, Carbonate (CaCO)	NA	<1.00	**26.2**	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Alkalinity, Hydroxide (CaCO)	NA	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Alkalinity, Total	NA	**492**	**479**	**228**	**232**	**265**	**322**	**331**	**288**	**356**
Alkalinity,Bicarbonate (CaCO3)	NA	**492**	**452**	**228**	**232**	**265**	**331**	**331**	**288**	**356**
Chloride	NA	**54.4**	**136**	**106**	**95.9**	**44.2**	**27.4**	**27.2**	**94.4**	**54.1**
Nitrogen, Ammonia	**1.02**	<0.276	<0.272	<0.240	<0.244	<0.276	<0.240	<0.240	<0.236	<0.248
Nitrogen, Kjeldahl, Total	**1.32**	**0.278**	**0.348**	**0.284**	**0.234**	<0.200	<0.200	<0.200	<0.200	**0.309**
Nitrogen, Nitrate	<0.500	<0.500	**1.82**	**6.91**	**5.15**	**11.7**	**14.9**	**15.2**	<0.500	<0.500
Nitrogen, Nitrite	<0.500	<0.500	<0.500	<0.500	<0.500	<5.00	<5.00	<5.00	<0.500	<0.500
Nitrogen, NO2 plus NO3	<0.500	<0.500	**1.83**	**6.96**	**5.2**	**12**	**15.4**	**15.4**	<0.500	<0.500
Sulfate	NA	**96**	**207**	**123**	**112**	**102**	**72**	**71.2**	**140**	**123**
Total Dissolved Solids	NA	**699**	**1030**	**650**	**590**	**596**	**599**	**613**	**684**	**654**
Total Organic Carbon	NA	**6.6**	**6.7**	**2.6**	**4.4**	**1.5**	**2.6**	**2.6**	**2.7**	**2.6**
Total Suspended Solids	NA	**39**	**9**	<5.00	<5.00	**25**	<5.00	<5.00	**70**	**12**

Bold text indicates results
above analytical detection limits.
NA = Not Analyzed.

Table 5-12a
North Industrial Corridor (NIC) Site
Comparison of Site VOCs in Geoprobe Groundwater Samples, Phase 1 and Phase 2

Station	Groundwater Depth Zone / Depth (feet)	Sample Date	Investigation	Units	PCE	TCE	cis12 DCE	VC	TCA	11DCA	11DCE	CT	CFM	BEN
GP#18-1	S/20	01/08/98	Phase 1	µg/L	<1	**18**	**5.7**	<1	**110**	**7.5**	**26**	<1	**8.1**	<1
GP#18-1	S/20	10/15/99	Phase 2	µg/L	<1	**12**	**9.7**	**1**	**5.5**	**4.4**	<1	<1	<1	<1
GP#18-2	S/20	01/08/98	Phase 1	µg/L	**2.2**	**60**	**16**	<1	**5.9**	<1	**2.3**	<1	<1	<1
GP#18-2	S/20	10/15/99	Phase 2	µg/L	<1	**26**	**9.2**	<1	**38**	**1**	**8.8**	<1	**1**	<1
GP#18-5	S/18	06/04/98	Phase 1	µg/L	<1	**180**	**12**	<1	**110**	**12**	**33**	<1	**1.2**	<1
GP#18-5	S/18	10/15/99	Phase 2	µg/L	<1	**120**	**10**	<1	**99**	**6.6**	**26**	<1	**2**	<1
GP#18-6	S/18	06/04/98	Phase 1	µg/L	<1	**50**	**8.9**	<1	**100**	**1.3**	**38**	<1	**9.9**	<1
GP#18-6	S/18	10/15/99	Phase 2	µg/L	<1	**35**	**6.3**	<1	**180**	**3.4**	**52**	<1	**5.8**	<1
GP#18-7	S/18	06/04/98	Phase 1	µg/L	<1	**2.9**	**1.2**	<1	**2.6**	<1	<1	<1	<1	<1
GP#18-7	S/18	10/15/99	Phase 2	µg/L	<1	**170**	**86**	**4.1**	<1	**1.4**	**2**	<1	<1	<1
GP#19-2	S/19	06/02/98	Phase 1	µg/L	<1	**140**	**61**	**30**	<1	**1.5**	**1.9**	<1	<1	<1
GP#19-2	S/19	10/15/99	Phase 2	µg/L	<1	**55**	**35**	**32**	<1	**1.3**	<1	<1	<1	<1
GP#19-6	S/20	06/01/98	Phase 1	µg/L	**2.2**	**310**	**40**	**2.7**	<1	**1.7**	**2.5**	<1	<1	<1
GP#19-6	S/20	10/15/99	Phase 2	µg/L	**3.4**	**160**	**27**	**1.2**	<1	<1	**1.3**	<1	<1	<1
GP#32-1	S/20	01/22/98	Phase 1	µg/L	<1	**140**	**73**	**17**	**1.7**	**4.2**	**11**	<1	<1	<1
GP#32-1	S/20	10/21/99	Phase 2	µg/L	<1	**5.8**	**5.9**	**1.4**	<1	<1	<1	<1	<1	<1
GP#34-10	S/18	06/08/98	Phase 1	µg/L	<1	**22**	**57**	**3.1**	<1	**2.3**	**5.1**	<1	<1	<1
GP#34-10	S/18	01/10/00	Phase 2	µg/L	<1	**6.4**	**120**	**8.4**	<1	**3.2**	**5.9**	<1	<1	<1
GP#34-7	S/18	06/08/98	Phase 1	µg/L	<1	**120**	**160**	**3.3**	<1	**4.3**	**8.6**	<1	<1	<1
GP#34-7	S/18	10/21/99	Phase 2	µg/L	<1	**37**	**55**	<1	<1	**1.4**	**1.7**	<1	<1	<1
GP#35-2	S/16	06/05/98	Phase 1	µg/L	<1	**61**	**14**	<1	<1	<1	<1	<1	<1	<1
GP#35-2	S/20	10/19/99	Phase 2	µg/L	<1	**3.7**	<1	<1	<1	<1	<1	<1	<1	<1
GP#35-4	S/20	06/08/98	Phase 1	µg/L	**1.7**	**490**	**170**	**25**	**6.4**	**14**	**48**	<1	<1	<1
GP#35-4	S/20	10/19/99	Phase 2	µg/L	<1	**220**	**78**	**12**	**2.7**	**5.3**	**15**	<1	<1	<1
GP#47-1	S/20	01/07/98	Phase 1	µg/L	**3.3**	**70**	**43**	**10**	<1	**3**	**5.3**	<1	<1	<1
GP#47-1	S/20	10/19/99	Phase 2	µg/L	**2.2**	**89**	**51**	**23**	<1	**6.1**	**10**	<1	<1	**1.5**
GP#48-3	S/16	06/05/98	Phase 1	µg/L	<1	**360**	**360**	**1.9**	**7.6**	**14**	**39**	<1	<1	**2.2**
GP#48-3	S/16	12/20/99	Phase 2	µg/L	<1	**220**	**280**	**14**	**2.3**	**11**	**21**	<1	**1.1**	**1.4**
GP#50-3	S/20	01/09/98	Phase 1	µg/L	<1	**1.1 JS**	**1.7**	**1.4**	<1 JS	<1 JS	<1	<1 JS	<1	<1 JS
GP#50-3	S/20	10/19/99	Phase 2	µg/L	<1	<1	**1.3**	<1	<1	<1	<1	<1	<1	<1

CDM

Table 5-12a
North Industrial Corridor (NIC) Site
Comparison of Site VOCs in Geoprobe Groundwater Samples, Phase 1 and Phase 2

Station	Groundwater Depth Zone / Depth (feet)	Sample Date	Investigation	Units	PCE	TCE	cis12 DCE	VC	TCA	11DCA	11DCE	CT	CFM	BEN
GP#55-1	S/20	12/22/97	Phase 1	µg/L	<1	**600**	**81 JDB**	**1.3**	**17**	**5.4**	**39**	**3.5**	**1.8**	<1
GP#55-1	S/20	10/19/99	Phase 2	µg/L	<1	**440**	**37**	<1	**11**	**1.9**	**13**	**9.2**	**4.2**	<1
GP#56-2	S/20	01/13/98	Phase 1	µg/L	<1	**200**	**30**	**2.2**	<1	<1	**1.2**	<1	<1	<1
GP#56-2	S/20	10/20/99	Phase 2	µg/L	<1	**28**	**36**	<1	<1	<1	<1	<1	<1	<1
GP#62-3	S/20	01/14/98	Phase 1	µg/L	**2.4**	**230**	**690**	**80**	**3**	**6.4**	**2.8**	<1	<1	1.2
GP#62-3	S/20	11/05/99	Phase 2	µg/L	<1	**480 H**	**790 H**	**19**	<1	**5.5**	**2.9**	<1	<1	<1
GPA03-1	S/20	12/12/97	Phase 1	µg/L	<1	<1	<1	<1	<1	**1.3**	<1	<1	<1	<1
GPA03-1	S/20	10/15/99	Phase 2	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
GPA05-3	S/20	12/15/97	Phase 1	µg/L	<1	**260**	**3.9 JDB**	<1	<1	<1	<1	<1	<1	<1
GPA05-3	S/20	10/15/99	Phase 2	µg/L	<1	**160**	**6.4**	<1	<1	<1	<1	<1	<1	<1
GPA08-2	S/20	12/17/97	Phase 1	µg/L	**5**	**450**	**560**	**47**	**2.5**	**4.8**	**3**	<1	<1	<1
GPA08-2	S/20	10/19/99	Phase 2	µg/L	<1	**45**	**74**	**7.4**	<1	<1	<1	<1	<1	<1
GPA08-4	S/20	12/17/97	Phase 1	µg/L	**1.5**	**230**	**34 JDB**	<1	<1	<1	<1	<1	<1	<1
GPA08-4	S/20	10/19/99	Phase 2	µg/L	**1.7**	**130**	**24**	<1	<1	<1	<1	<1	<1	<1
GPA15-2	S/20	01/06/98	Phase 1	µg/L	**3.2**	**11**	**5.3**	<1	**1.5**	**5.6**	**3.7**	<1	<1	<1
GPA15-2	S/20	10/19/99	Phase 2	µg/L	<1	**5.1**	**1.9**	<1	<1	**2.5**	<1	<1	<1	<1
GPA18-4	S/20	12/29/97	Phase 1	µg/L	<1	**39 JDB**	**11 JDB**	<1	<1	<1	<1	<1	<1	<1
GPA18-4	S/20	10/15/99	Phase 2	µg/L	<1	**27**	**5.2**	<1	<1	<1	<1	<1	<1	<1
GPA24-2	S/20	12/11/97	Phase 1	µg/L	<1	**180**	**23 JDB**	**1.3**	<1	<1	**1.1**	<1	<1	<1
GPA24-2	S/20	10/15/99	Phase 2	µg/L	<1	**15**	<1	<1	<1	<1	<1	<1	<1	<1
GPA25-1	S/20	12/09/97	Phase 1	µg/L	**1.3**	**510**	**96 JDB**	**13**	<1	**3.8**	**4.9**	<1	<1	<1
GPA25-1	S/20	10/15/99	Phase 2	µg/L	<1	**290**	**59**	**7.4**	<1	**2.2**	**4.1**	<1	<1	<1
GPA28-2	S/20	12/08/97	Phase 1	µg/L	**5.4**	**160**	**38 JDB**	<1	<1	<1	<1	<1	**1.5**	<1
GPA28-2	S/20	10/15/99	Phase 2	µg/L	**6.8**	**60**	**14**	<1	<1	<1	<1	<1	<1	<1
GPA28-3	S/20	12/08/97	Phase 1	µg/L	<1	**240**	**140**	**3.5**	<1	**3.5**	**2.2**	<1	<1	<1
GPA28-3	S/20	10/20/99	Phase 2	µg/L	**9.3**	**130**	**92**	<1	<1	**1.1**	<1	<1	<1	<1
GPA29-4	S/20	05/29/98	Phase 1	µg/L	**1.6**	**180**	**8.8**	<1	<1	<1	<1	<1	<1	<1
GPA29-4	S/20	12/16/99	Phase 2	µg/L	<1	**42**	<1	<1	<1	<1	<1	<1	<1	<1
GPA29-6	S/20	05/29/98	Phase 1	µg/L	<1	**30**	<1	<1	**1.6**	<1	<1	<1	<1	<1
GPA29-6	S/20	10/20/99	Phase 2	µg/L	<1	**43**	<1	<1	**1.8**	<1	<1	<1	<1	<1

Table 5-12a
North Industrial Corridor (NIC) Site
Comparison of Site VOCs in Geoprobe Groundwater Samples, Phase 1 and Phase 2

Station	Groundwater Depth Zone / Depth (feet)	Sample Date	Investigation	Units	PCE	TCE	cis12 DCE	VC	TCA	11DCA	11DCE	CT	CFM	BEN
GPA30-3	S/20	01/05/98	Phase 1	µg/L	<1	**13**	**4.5**	<1	<1	<1	<1	<1	<1	<1
GPA30-3	S/20	10/15/99	Phase 2	µg/L	<1	**2.3**	<1	<1	<1	<1	<1	<1	<1	<1
GPA31-1	S/20.5	12/22/97	Phase 1	µg/L	<1	**43 JDB**	**19 JDB**	<1	<1	<1	<1	<1	<1	<1
GPA31-1	S/20	10/15/99	Phase 2	µg/L	<1	**66**	**40**	<1	<1	<1	<1	<1	<1	<1
GPA31-3	S/20	12/23/97	Phase 1	µg/L	**3.5**	**550**	**81 JDB**	**5**	<1	**3.8**	**2.7**	<1	<1	<1
GPA31-3	S/20	10/20/99	Phase 2	µg/L	**9.2**	**260**	**50**	**2.7**	<1	**1.6**	**1.2**	<1	<1	<1
GPA31-6	S/20	05/29/98	Phase 1	µg/L	**9**	**360**	**72**	**5.1**	<1	**2.5**	**2.6**	<1	<1	<1
GPA31-6	S/20	01/10/00	Phase 2	µg/L	**5.6**	**92**	**23**	<1	**1.3**	**1.1**	<1	<1	<1	<1
GPA34-3	S/20	12/29/97	Phase 1	µg/L	**2.1**	**150**	**41 JDB**	**1.2**	**51**	**12**	**19**	<1	<1	<1
GPA34-3	S/20	10/20/99	Phase 2	µg/L	**1.6**	**180**	**47**	**3.5**	**52**	**12**	**13**	<1	<1	<1
GPA40-1	S/20	05/28/98	Phase 1	µg/L	<1	**22**	**8**	<1	<1	**2**	**1.5**	<1	**1.2**	<1
GPA40-1	S/20	10/19/99	Phase 2	µg/L	<1	**11**	**5.1**	<1	<1	**1**	<1	<1	<1	<1

PCE = Tetrachloroethene
TCE = Trichloroethene
C12DCE = cis-1,2-dichloroethene
VC = Vinyl chloride
TCA = 1,1,1-Trichloroethane
11DCA = 1,1-Dichloroethane
11DCE = 1,1-Dichloroethene
CT = Carbon tetrachloride
CFM = Chloroform
BEN = Benzene

Bold text indicates results above analytical detection limits.

Table 5-12b
North Industrial Corridor (NIC) Site
Comparison of Site VOCs in Monitoring Well Samples, Phase 1 and Phase 2

Station	Depth Zone	Sample Date	Investigation	PCE (µg/L)	TCE (µg/L)	C12DCE (µg/L)	VC (µg/L)	TCA (µg/L)	11DCA (µg/L)	11DCE (µg/L)	CCL4 (µg/L)	CFM (µg/L)	BEN (µg/L)
EXC-MW-04A	S	6/15/98	Phase 1	**1.5**	**330**	**86**	<1	**3.9**	**3.5**	**18**	<1	<1	<1
EXC-MW-04A	S	5/2/01	Phase 2	**1.4**	**290**	**91**	**2.4**	**2.4**	**2.7**	**15**	<1.0	<1.0	<1.0
EXC-MW-04B	D	6/15/98	Phase 1	<1	**19**	**1.6**	<1	<1	<1	**1.1**	<1	<1	<1
EXC-MW-04B	D	5/2/01	Phase 2	<1.0	**39**	**7**	<1.0	<1.0	<1.0	**1.9**	<1.0	<1.0	<1.0
EXC-MW-05B	D	6/15/98	Phase 1	<1	**270**	**38**	<1	**5**	**2**	**17**	<1	<1	<1
EXC-MW-05B	D	5/2/01	Phase 2	<1.0	**62**	**8.7**	<1.0	<1.0	<1.0	**2.4**	<1.0	<1.0	<1.0
EXC-MW-07B	D	6/16/98	Phase 1	<1	**96**	**24**	<1	**2.3**	**1.1**	**7.3**	<1	<1	<1
EXC-MW-07B	D	5/2/01	Phase 2	<1.0	**51**	**18**	<1.0	<1.0	**1.3**	**2.1**	<1.0	<1.0	<1.0
WND-02D	D	12/1/97	Phase 1	<1	**48 JDB**	**23 JDB**	**24**	<1	**1.2**	**2**	<1	<1	<1
WND-02D	D	5/10/01	Phase 2	<1.0	**6.9**	**6.9**	**2.3**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
WND-02S	S	12/1/97	Phase 1	<1	**7.8 JDB**	**1.9 JDB**	<1	<1	**2**	**2.3**	<1	<1	<1
WND-02S	S	5/10/01	Phase 2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
WND-03S	S	6/16/98	Phase 1	<1	**72**	**760**	**3.3**	<1	**6.9**	**25**	<1	<1	**7.4**
WND-03S	S	5/2/01	Phase 2	<1.0	**30**	**240**	**46**	<1.0	**2.5**	**12**	<1.0	<1.0	**5.7**
WND-04S	S	6/15/98	Phase 1	**1.1**	**550**	**77**	**1.2**	**12**	**3.9**	**31**	<1	<1	<1
WND-04S	S	5/2/01	Phase 2	<1.0	**120**	**41**	<1.0	**1.5**	<1.0	**5.1**	<1.0	<1.0	<1.0
WND-07S	S	12/5/97	Phase 1	**5.5**	**55 JDB**	**8.2 JDB**	<1	<1	<1	<1	<1	<1	<1
WND-07S	S	5/9/01	Phase 2	<1.0	**5.4**	**6.4**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
WND-12D	D	12/1/97	Phase 1	<1	**37 JDB**	**3.3 JDB**	<1	**2.1**	**4.9**	**5.7**	**2.2**	**4.2**	<1
WND-12D	D	5/3/01	Phase 2	<1.0	**18**	**1.4**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
WND-12S	S	12/1/97	Phase 1	3.4	**13 JDB**	**3.7 JDB**	**16**	**100**	**670**	**300**	<1	**2.3**	**2.2**
WND-12S	S	5/3/01	Phase 2	<1.0	**1.4**	**3.7**	**7.1**	**1.5**	**43**	**33**	<1.0	<1.0	<1.0
WND-15D	D	12/4/97	Phase 1	<1	**24 JDB**	**2 JDB**	<1	<1	<1	<1	**1.6**	**2.4**	<1
WND-15D	D	5/4/01	Phase 2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
WND-15S	S	12/4/97	Phase 1	<1	**13 JDB**	<1	<1	<1	<1	<1	<1	<1	<1
WND-15S	S	5/4/01	Phase 2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
WND-18D	D	12/5/97	Phase 1	<1	**360**	**90 JDB**	**9.1**	**3.3**	**4.5**	**15**	<1	<1	<1
WND-18D	D	5/9/01	Phase 2	<1.0	**170**	**80**	**15**	<1.0	**4.8**	**14**	<1.0	<1.0	<1.0

Table 5-12b
North Industrial Corridor (NIC) Site
Comparison of Site VOCs in Monitoring Well Samples, Phase 1 and Phase 2

Station	Depth Zone	Sample Date	Investigation	PCE (µg/L)	TCE (µg/L)	C12DCE (µg/L)	VC (µg/L)	TCA (µg/L)	11DCA (µg/L)	11DCE (µg/L)	CCL4 (µg/L)	CFM (µg/L)	BEN (µg/L)
WND-18S	S	12/5/97	Phase 1	<1	**13 JDB**	<1	<1	<1	<1	<1	<1	<1	<1
WND-18S	S	5/9/01	Phase 2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
WND-19D	D	12/3/97	Phase 1	<1	**330**	**51 JDB**	**2.3**	<1	**1.3**	**3.6**	<1	<1	<1
WND-19D	D	5/9/01	Phase 2	<1.0	**150**	**37**	**5.5**	<1.0	**1.7**	**5.2**	<1.0	<1.0	<1.0
WND-19S	S	12/3/97	Phase 1	<1	**110**	**17 JDB**	<1	<1	<1	<1	<1	<1	<1
WND-19S	S	5/9/01	Phase 2	<1.0	**14**	**1.6**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
WND-20S	S	12/3/97	Phase 1	<1	**29 JDB**	**3.9 JDB**	**1.1**	<1	<1	<1	<1	<1	<1
WND-20S	S	5/8/01	Phase 2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
WND-21D	D	12/2/97	Phase 1	<1	**400**	**77 JDB**	**1.2**	**12**	**5.4**	**32**	**2.9**	**1.8**	<1
WND-21D	D	5/4/01	Phase 2	<1.0	**230**	**86**	**22**	**2.9**	**7.5**	**21**	**1.5**	**1.6**	**5.2**
WND-21S	S	12/2/97	Phase 1	<1	**14 JDB**	**92 JDB**	<1	<1	**2.5**	**5.5**	<1	<1	<1
WND-21S	S	5/4/01	Phase 2	<1.0	**2.9**	**55**	**1.4**	<1.0	**1.2**	**3.1**	<1.0	<1.0	<1.0
WND-22D	D	12/2/97	Phase 1	<1	**5.1 JDB**	<1	<1	<1	<1	<1	<1	<1	<1
WND-22D	D	5/1/01	Phase 2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
WND-22S	S	12/2/97	Phase 1	<1	**10 JDB**	<1	<1	<1	<1	<1	<1	<1	<1
WND-22S	S	5/1/01	Phase 2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
WND-24D	D	12/8/97	Phase 1	<1 JS	**220**	**49 JDB**	**6.5**	**2**	<1	**7.6**	<1	<1	<1
WND-24D	D	5/9/01	Phase 2	<1.0	**130**	**44**	**6.8**	<1.0	**1.7**	**3.1**	<1.0	<1.0	<1.0
WND-24S	S	12/8/97	Phase 1	<1	**50 JDB**	**13 JDB**	<1	<1	<1	<1	<1	<1	<1
WND-24S	S	5/9/01	Phase 2	<1.0	**79**	**24**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
WND-27S	S	12/9/97	Phase 1	**6.8**	**21 JDB**	<1	<1	<1	<1	<1	<1	<1	**6.2**
WND-27S	S	5/9/01	Phase 2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
WND-28S	S	12/1/97	Phase 1	<1	**12 JDB**	**1 JDB**	<1	<1	<1	<1	<1	<1	<1
WND-28S	S	5/1/01	Phase 2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
WND-33D	D	12/3/97	Phase 1	<1	**380**	**150**	**110**	**2**	**12**	**25**	<1	<1	**5.4**
WND-33D	D	5/7/01	Phase 2	<1.0	**43**	**72**	<1.0	<1.0	**4.3**	<1.0	<1.0	<1.0	<1.0
WND-33S	S	12/3/97	Phase 1	<1	**370**	**120**	**70**	**1.8**	**14**	**27**	<1	<1	**4**
WND-33S	S	5/7/01	Phase 2	<1.0	**160**	**100**	**9.4**	<1.0	**3.5**	**2.4**	<1.0	<1.0	<1.0

Table 5-12b
North Industrial Corridor (NIC) Site
Comparison of Site VOCs in Monitoring Well Samples, Phase 1 and Phase 2

Station	Depth Zone	Sample Date	Investigation	PCE (µg/L)	TCE (µg/L)	C12DCE (µg/L)	VC (µg/L)	TCA (µg/L)	11DCA (µg/L)	11DCE (µg/L)	CCL4 (µg/L)	CFM (µg/L)	BEN (µg/L)
WND-34D	D	6/16/98	Phase 1	<1	**160**	**74**	**31**	<1	**7.1**	**10**	<1	**5.2**	**230**
WND-34D	D	5/4/01	Phase 2	<1.0 JIH	**32 JIH**	**23 JIH**	<1.0 JIH	<1.0 JIH	**1.7 JIH**	**1.4 JIH**	<1.0 JIH	<1.0 JIH	**64 JIH**
WND-34S	S	6/16/98	Phase 1	<1	**17**	**33**	**79**	<1	**8.5**	**2.9**	<1	<1	**120**
WND-34S	S	5/4/01	Phase 2	<1.0	**11**	**7.3**	**5**	<1.0	**2.3**	<1.0	<1.0	<1.0	**160**
WND-36D	D	12/5/97	Phase 1	<1	**400**	**76 JDB**	**22**	**7.8**	**6.7**	**35**	<1	**2.1**	**2.7**
WND-36D	D	5/4/01	Phase 2	<1.0	**44**	**49**	**15**	<1.0	**2.2**	**2.5**	<1.0	<1.0	**1.2**
WND-36S	S	12/5/97	Phase 1	<1	<1	<1	**65**	<1	**9.1**	<1	<1	<1	**240**
WND-36S	S	5/4/01	Phase 2	<1.0	**3.2**	**1.1**	<1.0	<1.0	**4.6**	<1.0	<1.0	<1.0	**100**
WND-37DR	D	6/16/98	Phase 1	**1.4**	**900**	**220**	**12**	**21**	**12**	**70**	**2.6**	**3.1**	**2.9**
WND-37DR	D	5/7/01	Phase 2	<1.0	**120**	**37**	<1.0	<1.0	**5.3**	**11**	<1.0	<1.0	**3.3**
WND-38D	D	12/4/97	Phase 1	<1	**140**	**26 JDB**	**4.3**	**1.3**	**1.6**	**5.6**	<1	<1	<1
WND-38D	D	5/8/01	Phase 2	<1.0	**22**	**8.1**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
WND-38S	S	12/4/97	Phase 1	<1	**16 JDB**	<1	<1	<1	<1	<1	<1	<1	<1
WND-38S	S	5/8/01	Phase 2	<1.0	**3.3**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
WND-39D	D	12/8/97	Phase 1	<1	**610**	**120 JS**	**54 JS**	**5**	**12 JS**	**34 JS**	<1	<1	**5.4**
WND-39D	D	5/8/01	Phase 2	<1.0	**32**	**13**	**1.8**	<1.0	**2.5**	**1.3**	<1.0	<1.0	<1.0
WND-39S	S	12/8/97	Phase 1	<1	**47 JDB**	**7.4 JDB**	<1	<1	<1	<1	<1	<1	<1
WND-39S	S	5/8/01	Phase 2	<1.0	**29**	**3**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
WND-44D	D	12/4/97	Phase 1	<1	**21 JDB**	**7.7 JDB**	<1	<1	<1	<1	<1	<1	<1
WND-44D	D	5/8/01	Phase 2	<1.0	**18**	**17**	**2.7**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
WND-44S	S	12/4/97	Phase 1	<1	**28 JDB**	**6.7 JDB**	**15**	<1	**2.1**	<1	<1	<1	**1.8**
WND-44S	S	5/8/01	Phase 2	<1.0	<1.0	**1.3**	**23**	<1.0	**1.8**	<1.0	<1.0	<1.0	**2.3**
WND-45D	D	12/4/97	Phase 1	<1	**300**	**110**	**8.8**	<1	**1.9**	**4.1**	<1	<1	<1
WND-45D	D	5/10/01	Phase 2	<1.0	**220**	**54**	**3.4**	<1.0	**2**	**7.2**	<1.0	<1.0	<1.0
WND-45S	S	12/4/97	Phase 1	<1	**20 JDB**	**5.6 JDB**	<1	<1	<1	<1	<1	<1	<1
WND-45S	S	5/10/01	Phase 2	<1.0	**26**	**7.9**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
WND-47D	D	12/3/97	Phase 1	**2.4**	**590**	**88 JDB**	**7.5**	<1	**4.3**	**5.1**	<1	<1	<1
WND-47D	D	5/9/01	Phase 2	**6.1**	**110**	**100**	**4.4**	<1.0	**2.2**	**3.8**	<1.0	<1.0	<1.0

Table 5-12b
North Industrial Corridor (NIC) Site
Comparison of Site VOCs in Monitoring Well Samples, Phase 1 and Phase 2

Station	Depth Zone	Sample Date	Investigation	PCE (µg/L)	TCE (µg/L)	C12DCE (µg/L)	VC (µg/L)	TCA (µg/L)	11DCA (µg/L)	11DCE (µg/L)	CCL4 (µg/L)	CFM (µg/L)	BEN (µg/L)
WND-47S	S	12/3/97	Phase 1	**9.7**	**170**	**26 JDB**	**1.1**	<1	**1**	**1.2**	<1	<1	<1
WND-47S	S	5/9/01	Phase 2	**6.8**	**180**	**27**	**1.1**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

PCE = Tetrachloroethene
TCE = Trichloroethene
C12DCE = cis-1,2-dichloroethene
VC = Vinyl chloride
TCA = 1,1,1-Trichloroethane
11DCA = 1,1-Dichloroethane
11DCE = 1,1-Dichloroethene
CT = Carbon tetrachloride
CFM = Chloroform
BEN = Benzene

Table 8-4
North Industrial Corridor (NIC) Site
Summary of Methane, Ethane, Ethene, and VOCs in Groundwater Samples

Well	Well Location	PCE	TCE	C12DCE	VC	11DCE	11DCA	Ethene	Ethane	Methane	Other Compounds
		(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
WND-06S	up/cross-gradient	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	< .005	< .005	0.58	None
WNC-06D	up/cross-gradient	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	< .005	< .005	0.32	None
WND-22S	up/cross-gradient	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	< .005	< .005	0.85	None
WND-22D	up/cross-gradient	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	< .005	< .005	3.5	None
WND-03S	In-plume	<1.0	30	240	46	12	2.5	1.4	0.6	15,000	Benzene-5.7, Ethylbenzene-13, m&p-Xylene-6.4, Toluene-2.7
EXC-MW-07B	In-plume	<1.0	51	18	<1.0	2.1	1.3	0.31	0.66	150	None
WND-04S	In-plume	<1.0	120	41.	<1.0	5.1	<1.0	0.051	0.35	23	1,1,1-Trichloroethane-1.5, 1,2-Dibromoethane-1.1
EXC-MW-05B	In-plume	<1.0	62.	8.7	<1.0	2.4	<1.0	0.21	0.95	28	None
WND-14D	In-plume	1.4	51.	11.	<1.0	<1.0	<1.0	< .005	0.04	4.2	None
WND-16S	In-plume	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	< .005	2.4	11,000	1,2,4-Trimethylbenzene-2.8, 1,3,5-Trimethylbenzene-31, Acenaphthene-12, Benzene-25, Ethylbenzene-18, Fluorene-10, Isopropylbenzene-17, m&p-Xylenes-28, n-Butylbenzene-6.9, n-Propylbenzene-26, Naphthalene-500, o-Xylene-1.7, Phenanthrene-21,sec-Butylbenzene-3.2, tert-Butylbenzene-1.1, Toluene-2.3, GRO TPH-14,300, DRO TPH-7,700
WNC-16D	In-plume	<1.0	6.4	3.2	<1.0	<1.0	<1.0	0.049	0.38	1,200	None

Table 8-4
North Industrial Corridor (NIC) Site
Summary of Methane, Ethane, Ethene, and VOCs in Groundwater Samples

Well	Well Location	PCE (µg/L)	TCE (µg/L)	C12DCE (µg/L)	VC (µg/L)	11DCE (µg/L)	11DCA (µg/L)	Ethene (µg/L)	Ethane (µg/L)	Methane (µg/L)	Other Compounds (µg/L)
WND-21S	In-plume	<1.0	2.9	55.	1.4	3.1	1.2	< .005	0.13	560	None
WND-21D	In-plume	<1.0	230	86.	22.	21.	7.5	0.32	3.7	3,700	1,1,1-Trichloroethane-2.9, Benzene-5.2, Carbon tetrachloride-1.5, Chloroform-1.6
WND-23S	In-plume	<1.0	9.5	5.2	<1.0	<1.0	<1.0	< .005	0.17	6.6	None
WNC-23D	In-plume	<1.0	33.	3.7	<1.0	1.1	<1.0	0.067	0.11	5.6	None
WND-33S	In-plume	<1.0	160	100	9.4	2.4	3.5	0.022	0.26	66	None
WND-33D	In-plume	<1.0	43.	72.	<1.0	<1.0	4.3	0.053	0.76	330	None
WND-36D	In-plume	<1.0	44.	49.	15.	2.5	2.2	0.18	0.67	1,700	Benzene-1.2
WND-37DA	In-plume	<1.0	120	37.	<1.0	11.	5.3	0.17	4.5	3,000	Benzene-3.3, Chloroethane-1.1
WND-39D	In-plume	<1.0	32.	13.	1.8	1.3	2.5	< .005	1.4	510	None
WND-40S	In-plume	<1.0	36.	9.6	<1.0	6.0	1.8	< .005	< .005	38	1,1,1, Trichloroethane-9.7
WND-40D	In-plume	1.4	54.	21.	<1.0	6.2	1.9	< .005	0.2	0.6	1,1,1, Trichloroethane-9.5
WND-41S	In-plume	2.3	7.2	<1.0	<1.0	<1.0	<1.0	< .005	< .005	0.28	None
WND-41D	In-plume	3.2	45.	4.2	<1.0	<1.0	<1.0	0.021	0.065	1	None
WND-42S	In-plume	<1.0	<1.0	4.9	<1.0	<1.0	<1.0	0.019	0.073	22	None
WND-42D	In-plume	<1.0	3.3	41.	2.0	<1.0	<1.0	0.041	0.072	24	None
NMW-06D	In-plume	<1.0	80.	49.	24.	3.3	3.6	0.11	1.1	980	None
NMW-08S	In-plume	<1.0	130	65.	17.	9.4	4.3	0.11	0.84	1,000	Toluene-120
NMW-08D	In-plume	<1.0	230	110	34.	18.	7.9	0.2	1.6	2,700	Benzene-1.2
NMW-10S	In-plume	<1.0	150	53.	18.	7.5	4.6	0.18	1.1	790	None
NMW-10D	In-plume	<1.0	140	51.	20.	6.5	4.0	0.13	1.6	1,600	Chloroform-1.3
NMW-14D	In-plume	<1.0	8.9	200	2.4	1.9	1.7	0.057	0.32	3	None
NMW-18S	In-plume	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	< .005	< .005	0.58	None
NMW-18D	In-plume	<1.0	1.5	10.	<1.0	<1.0	<1.0	0.12	0.045	2.9	None
NMW-19D	In-plume	<1.0	110	68	3.7	3.6	1.5	0.075	0.38	49	*trans*-1,2-Dichlorethene
NMW-25S	In-plume	1.2	21.	18.	<1.0	<1.0	<1.0	< .005	0.01	0.5	None
NMW-25D	In-plume	<1.0	19.	20.	<1.0	<1.0	<1.0	0.015	0.015	0.91	None
NMW-29D	In-plume	<1.0	18.	9.1	<1.0	1.0	1.4	0.038	0.06	1	None

Table 8-4
North Industrial Corridor (NIC) Site
Summary of Methane, Ethane, Ethene, and VOCs in Groundwater Samples

Well	Well Location	PCE (µg/L)	TCE (µg/L)	C12DCE (µg/L)	VC (µg/L)	11DCE (µg/L)	11DCA (µg/L)	Ethene (µg/L)	Ethane (µg/L)	Methane (µg/L)	Other Compounds (µg/L)
NMW-31S	In-plume	3.0	55.	11.	<1.0	<1.0	<1.0	0.043	0.051	0.11	n-Butylbenzene-0.99
NMW-31D	In-plume	4.0	200	43.	3.3	1.0	1.9	0.28	0.42	2.8	None
EXC-MW-04B	In-plume	<1.0	39	7	<1.0	1.9	<1.0	0.21	0.03	8.2	None
DRB-MW20	In-plume	<1.0	13.	9.6	<1.0	<1.0	<1.0	0.1	3.9	9,300	1,2,4-Trimethylbenzene-40, 1,3,5-Trimethylbenzene-8.4, Benzene-560, Chloroethane-1.1, Ethylbenzene-35, Isopropylbenzene-5.9, m&p-Xylene-98, n-Propylbenzene-10, Naphthalene-30, o-Xylene-38, sec-Butylbenzene-1.2, Toluene-28
NMW-45D	In-plume	<1.0	32.	17.	<1.0	<1.0	<1.0	0.075	2.7	250	1,2,4-Trimethylbenzene-1.2, Benzene-11, MTBE-6.8
DRB-MW250	In-plume	<1.0	<1.0	33.	24.	<1.0	<1.0	0.51	3.8	1,700	Benzene-170, Isopropylbenzene-1.2
NMW-44D	In-plume	<1.0	13.	39.	18.	1.6	<1.0	0.51	2.8	1,700	Benzene-8.5, Isopropylbenzene-3.3, n-propylbenzene-6.9, tert-butylbenzene-1.3

DRO- Diesel range organics
GRO-Gasoline range organics
TPH-Total petroleum hydrocarbons

Table 8-5
North Industrial Corridor (NIC) Site
Summary of Inorganic Parameters in Groundwater Samples

Well	Location	Nitrogen (Ammonia) (mg/L)	Nitrogen (Total Kjeldahl) (mg/L)	TDS (mg/L)	TSS (mg/L)	Bicarbonate (CaCO3) (mg/L)	Carbonate (CaCO) (mg/L)	Chloride (mg/L)	Nitrite (mg/L)	Nitrate (mg/L)	Sulfate (mg/L)	TOC (mg/L)
WND-06S	up/cross-gradient	< 0.272	0.215	675	< 5.0	376	< 1	50.3	< 0.5	6.64	97.1	1.8
WNC-06D	up/cross-gradient	< 0.236	< 0.20	589	< 5.0	333	< 1	33.0	< 0.5	6.24	85.8	1.4
WND-22S	up/cross-gradient	< 0.268	< 0.20	485	< 5.0	307	< 1	48.4	< 0.5	< 0.5	56.4	2.6
WND-22D	up/cross-gradient	< 0.236	< 0.20	532	< 5.0	261	< 1	46.1	< 0.5	0.569	110	1.8
WND-03S	In-plume	< 0.236	< 0.20	591	9	494	< 1	24.4	< 0.5	< 0.5	19	2.6
EXC-MW-07B	In-plume	< 0.244	1.47	627	< 5.0	300	< 1	38.5	< 0.5	2.85	147	3.3
WND-04S	In-plume	< 0.248	< 0.20	841	< 5.0	367	< 1	55.0	< 0.5	2.99	223	3.6
EXC-MW-05B	In-plume	< 0.252	0.49	822	< 5.0	294	< 1	53.5	< 0.5	3.18	260	2.7
WND-14D	In-plume	< 0.268	< 0.20	1090	8	368	< 1	64.2	< 0.5	2.13	349	1.6
WND-16S	In-plume	1.45	2.01	513	141	355	< 1	38.1	< 0.5	< 0.5	5.13	13
WNC-16D	In-plume	< 0.260	< 0.20	645	< 5.0	415	< 1	28.7	< 0.5	< 0.5	76.7	6.1
WND-21S	In-plume	3.18	3.14	793	25	462	< 1	42.6	< 0.5	< 0.5	98.6	4.3
WND-21D	In-plume	< 0.260	0.335	695	< 5.0	486	< 1	42.7	< 0.5	1.07	98.5	3.5
WND-23S	In-plume	6.54	8.54	600	< 5.0	222	< 1	44.0	< 0.5	1.04	208	2.1
WNC-23D	In-plume	4.19	4.42	725	< 5.0	293	< 1	47.5	< 0.5	3.22	234	3
WND-33S	In-plume	< 0.256	< 0.20	874	8	497	< 1	100.0	< 0.5	< 0.5	164	6.6
WND-33D	In-plume	0.374	0.642	1260	34	655	< 1	132.0	< 0.5	< 0.5	226	11
WND-36D	In-plume	2.16	2.3	782	33	488	< 1	71.7	< 0.5	< 0.5	142	5.9
WND-37DA	In-plume	< 0.276	0.278	699	39	492	< 1	54.4	< 0.5	< 0.5	96	6.6
WND-39D	In-plume	< 0.272	0.348	1030	9	452	26.2	136.0	< 0.5	1.82	207	6.7
WND-40S	In-plume	< 0.244	0.234	590	< 5.0	232	< 1	95.9	< 0.5	5.15	112	4.4
WND-40D	In-plume	< 0.240	0.284	650	< 5.0	228	< 1	106.0	< 0.5	6.91	123	2.6
WND-41S	In-plume	< 0.244	0.506	599	< 5.0	322	< 1	27.4	< 5.0	14.9	72	2.4
WND-41D	In-plume	< 0.276	< 0.20	596	25	265	< 1	44.2	<5.0	11.7	102	1.5
WND-42S	In-plume	< 0.248	0.309	654	12	356	< 1	54.1	< 0.5	< 0.5	123	2.6
WND-42D	In-plume	< 0.236	< 0.20	684	70	228	< 1	94.4	< 0.5	< 0.5	140	2.7
NMW-06D	In-plume	< 0.264	0.389	1200	< 5.0	608	< 1	132.0	< 0.5	< 0.5	235	9.2
NMW-08S	In-plume	0.344	< 0.20	726	< 5.0	308	< 1	95.4	< 0.5	< 0.5	112	6.8
NMW-08D	In-plume	< 0.256	0.447	1100	14	370	< 1	256.0	< 0.5	< 0.5	122	4.7
NMW-10S	In-plume	< 0.256	0.326	713	9	307	< 1	96.6	< 0.5	< 0.5	133	4
NMW-10D	In-plume	< 0.260	< 0.20	800	9	338	< 1	92.8	< 0.5	< 0.5	142	4.9
NMW-14D	In-plume	< 0.276	0.584	771	45	289	< 1	90.5	< 0.5	< 0.5	182	2

Table 8-5
North Industrial Corridor (NIC) Site
Summary of Inorganic Parameters in Groundwater Samples

Well	Location	Nitrogen (Ammonia) (mg/L)	Nitrogen (Total Kjeldahl) (mg/L)	TDS (mg/L)	TSS (mg/L)	Bicarbonate (CaCO3) (mg/L)	Carbonate (CaCO) (mg/L)	Chloride (mg/L)	Nitrite (mg/L)	Nitrate (mg/L)	Sulfate (mg/L)	TOC (mg/L)
NMW-18S	In-plume	< 0.276	0.266	735	16	357	< 1	99.8	< 0.5	1.8	150	2.3
NMW-18D	In-plume	< 0.274	0.356	720	5	332	< 1	98.6	< 0.5	< 0.5	159	2
NMW-19D	In-plume	< 0.240	< 0.20	909	< 5.0	461	< 1	154.0	< 0.5	< 0.5	136	4.1
NMW-25S	In-plume	< 0.250	0.309	874	< 5.0	435	< 1	126.0	< 0.5	2.82	159	1.9
NMW-25D	In-plume	< 0.248	0.334	917	< 5.0	388	< 1	129.0	< 0.5	< 0.5	210	2
NMW-29D	In-plume	< 0.276	0.229	783	< 5.0	367	< 1	103.0	< 0.5	0.798	175	1.6
NMW-31S	In-plume	< 0.256	0.448	872	< 5.0	334	< 1	88.9	< 0.5	3.71	200	2.1
NMW-31D	In-plume	< 0.264	< 0.20	951	< 5.0	354	< 1	108.0	< 0.5	< 0.5	249	2.3
EXC-MW-04B	In-plume	< 0.256	0.438	700	23	297	< 1	68.2	< 0.5	4.02	162	2.2
DRB-MW20	In-plume	0.692	2.56	957	9	595	< 1	109.0	< 0.5	3.33	58.1	22
NMW-45D	In-plume	< 0.256	1.08	763	402	372	< 1	67.4	< 5.0	11.6	94.5	4.4
DRB-MW250	In-plume	0.382	0.544	675	2760	412	< 1	69.8	< 0.5	< 0.5	80	4.6
NMW-44D	In-plume	< 0.240	0.787	719	1700	383	<1	81.8	< 0.5	< 0.5	99.5	5.3

Appendix A
NIC RI Addendum Results Tables

Table 3-1
North Industrial Corridor
Water Level Measurement Data
Source Area Investigations
August 2004

Sample ID	Date Measured	Measuring Point Elevation (ft msl)	Depth to Product (ft bmp)	Depth to Water (ft bmp)	Product Thickness (feet)	Product Density	Adjusted Product Thickness (feet)	Adjusted DTW (ft bmp)	Potentiometric Elevation (ft msl)
501B	8/6/2004	1301.26		16.10	0.00		0.00	16.10	1285.16
CNE-NE-06D	8/5/2004	1319.11		12.51	0.00		0.00	12.51	1306.60
CNE-NE-06S	8/5/2004	1318.88		12.05	0.00		0.00	12.05	1306.83
CNE-NE-07D	8/5/2004	1320.75		13.66	0.00		0.00	13.66	1307.09
CNE-NE-07S	8/5/2004	1320.66		13.66	0.00		0.00	13.66	1307.00
CNE-NE-08I	8/5/2004	1320.48		15.22	0.00		0.00	15.22	1305.26
CNE-NE-09D	8/5/2004	1317.43		12.15	0.00		0.00	12.15	1305.28
CNE-NE-09S	8/5/2004	1317.66		12.31	0.00		0.00	12.31	1305.35
CNE-NE-10D	8/5/2004	1319.37		13.21	0.00		0.00	13.21	1306.16
CNE-NE-10S	8/5/2004	1319.21		13.11	0.00		0.00	13.11	1306.10
CNE-NE-11D	8/5/2004	1315.74		10.66	0.00		0.00	10.66	1305.08
CNE-NE-12I	not found	1318.92			0.00		0.00	0.00	
CSI-MW-01	8/6/2004	1304.00		16.17	0.00		0.00	16.17	1287.83
CSI-MW-09	8/6/2004	1302.63		15.15	0.00		0.00	15.15	1287.48
CSI-MW-10	8/6/2004	1302.08		15.08	0.00		0.00	15.08	1287.00
DBC-9	8/5/2004	1313.59		12.74	0.00		0.00	12.74	1300.85
DRB-04	8/5/2004	1313.95	17.16	17.18	0.02	0.80	0.02	17.16	1296.79
DRB-MW-02	8/5/2004	1313.50		12.77	0.00		0.00	12.77	1300.73
DRB-MW-03	8/5/2004	1315.40		15.21	0.00		0.00	15.21	1300.19
DRB-MW-11	Damaged	1307.85			0.00		0.00	0.00	
DRB-MW-110	8/6/2004	1311.70		16.95	0.00		0.00	16.95	1294.75
DRB-MW-140	8/6/2004	1312.61		16.78	0.00		0.00	16.78	1295.83
DRB-MW-150	8/6/2004	1312.12		17.96	0.00		0.00	17.96	1294.16
DRB-MW-20	8/5/2004	1312.39	14.14	15.40	1.26	0.80	1.01	14.39	1298.00
DRB-MW-250	8/5/2004	1314.20		15.63	0.00		0.00	15.63	1298.57
DRB-MW-30	8/5/2004	1312.72		14.04	0.00		0.00	14.04	1298.68
DRB-MW-350	not found	1306.40			0.00		0.00	0.00	
DRB-MW-370	8/5/2004	1311.64		13.96	0.00		0.00	13.96	1297.68
DRB-MW-380	not found	1312.46			0.00		0.00	0.00	
DRB-MW-440	8/5/2004	1312.97		12.03	0.00		0.00	12.03	1300.94
EXC-MW-02A	8/5/2004	1314.74		12.87	0.00		0.00	12.87	1301.87
EXC-MW-02B	8/5/2004	1315.00		10.28	0.00		0.00	10.28	1304.72
EXC-MW-04A	8/5/2004	1317.39		13.25	0.00		0.00	13.25	1304.14
EXC-MW-04B	8/5/2004	1317.75		13.55	0.00		0.00	13.55	1304.20

Table 3-1
North Industrial Corridor
Water Level Measurement Data
Source Area Investigations
August 2004

Sample ID	Date Measured	Measuring Point Elevation (ft msl)	Depth to Product (ft bmp)	Depth to Water (ft bmp)	Product Thickness (feet)	Product Density	Adjusted Product Thickness (feet)	Adjusted DTW (ft bmp)	Potentiometric Elevation (ft msl)
EXC-MW-05B	8/5/2004	1316.36		12.68	0.00		0.00	12.68	1303.68
EXC-MW-06A	not found	1313.17			0.00		0.00	0.00	
EXC-MW-06B	not found	1313.12			0.00		0.00	0.00	
EXC-MW-07B	not found	1313.81			0.00		0.00	0.00	
EXC-MW-08A	8/5/2004	1311.62		10.40	0.00		0.00	10.40	1301.22
EXC-MW-08B	8/5/2004	1311.73		10.42	0.00		0.00	10.42	1301.31
FLE-MW-01D	8/5/2004	1318.19		16.34	0.00		0.00	16.34	1301.85
FLE-MW-01S	8/5/2004	1318.05		16.22	0.00		0.00	16.22	1301.83
FLE-MW-02D	8/6/2004	1318.16		15.42	0.00		0.00	15.42	1302.74
FLE-MW-02S	8/6/2004	1318.13		15.38	0.00		0.00	15.38	1302.75
JSP-MW-05	8/5/2004	1321.95		18.36	0.00		0.00	18.36	1303.59
NBPN-MW-01	8/5/2004	1309.07		11.22	0.00		0.00	11.22	1297.85
NBPN-MW-02	8/5/2004	1310.01		12.39	0.00		0.00	12.39	1297.62
NBPN-MW-03	not found	1311.62			0.00		0.00	0.00	
NBPN-MW-04	8/5/2004	1310.33		12.03	0.00		0.00	12.03	1298.30
NBPN-MW-05	8/5/2004	1310.65		12.29	0.00		0.00	12.29	1298.36
NMW-02D	8/5/2004	1315.77		11.75	0.00		0.00	11.75	1304.02
NMW-02S	8/5/2004	1315.65		11.91	0.00		0.00	11.91	1303.74
NMW-03D	not found	1315.88			0.00		0.00	0.00	
NMW-03S	8/5/2004	1315.98		15.38	0.00		0.00	15.38	1300.60
NMW-04D	8/5/2004	1316.14		15.39	0.00		0.00	15.39	1300.75
NMW-04S	8/5/2004	1316.30		15.57	0.00		0.00	15.57	1300.73
NMW-05D	8/5/2004	1316.21		12.71	0.00		0.00	12.71	1303.50
NMW-05S	8/5/2004	1315.91		12.65	0.00		0.00	12.65	1303.26
NMW-06D	8/5/2004	1314.92		16.69	0.00		0.00	16.69	1298.23
NMW-06S	8/5/2004	1314.82		16.59	0.00		0.00	16.59	1298.23
NMW-08D	8/5/2004	1306.90		10.71	0.00		0.00	10.71	1296.19
NMW-08S	8/5/2004	1306.90		10.76	0.00		0.00	10.76	1296.14
NMW-09D	8/5/2004	1306.87		11.54	0.00		0.00	11.54	1295.33
NMW-09S	8/5/2004	1306.89		11.54	0.00		0.00	11.54	1295.35
NMW-10D	8/5/2004	1309.71		14.83	0.00		0.00	14.83	1294.88
NMW-10S	8/5/2004	1309.63		14.62	0.00		0.00	14.62	1295.01
NMW-11D	8/5/2004	1305.58		16.24	0.00		0.00	16.24	1289.34
NMW-11S	8/5/2004	1306.24		15.99	0.00		0.00	15.99	1290.25

Table 3-1
North Industrial Corridor
Water Level Measurement Data
Source Area Investigations
August 2004

Sample ID	Date Measured	Measuring Point Elevation (ft msl)	Depth to Product (ft bmp)	Depth to Water (ft bmp)	Product Thickness (feet)	Product Density	Adjusted Product Thickness (feet)	Adjusted DTW (ft bmp)	Potentiometric Elevation (ft msl)
NMW-12D	8/6/2004	1305.08		14.94	0.00		0.00	14.94	1290.14
NMW-12S	Dry	1304.83			0.00		0.00	0.00	
NMW-13D	8/6/2004	1304.55		15.29	0.00		0.00	15.29	1289.26
NMW-13S	8/6/2004	1304.34		15.13	0.00		0.00	15.13	1289.21
NMW-14D	8/5/2004	1302.89		13.23	0.00		0.00	13.23	1289.66
NMW-14S	8/5/2004	1302.78		13.16	0.00		0.00	13.16	1289.62
NMW-15D	8/6/2004	1303.53		14.96	0.00		0.00	14.96	1288.57
NMW-15S	8/6/2004	1303.40		14.83	0.00		0.00	14.83	1288.57
NMW-16D	8/6/2004	1306.28		18.71	0.00		0.00	18.71	1287.57
NMW-16S	Soft bottom @ 18.5'	1306.19			0.00		0.00	0.00	
NMW-17D	8/5/2004	1312.55		16.02	0.00		0.00	16.02	1296.53
NMW-17S	8/5/2004	1312.63		16.12	0.00		0.00	16.12	1296.51
NMW-18D	8/5/2004	1307.89		13.08	0.00		0.00	13.08	1294.81
NMW-18S	blocked @ 12.8'	1307.78			0.00		0.00	0.00	
NMW-19D	blocked @ 11.4'	1308.10			0.00		0.00	0.00	
NMW-19S	8/5/2004	1308.13		12.38	0.00		0.00	12.38	1295.75
NMW-20D	8/6/2004	1306.48		14.60	0.00		0.00	14.60	1291.88
NMW-20S	8/6/2004	1306.65		14.60	0.00		0.00	14.60	1292.05
NMW-21D	8/6/2004	1306.10		15.30	0.00		0.00	15.30	1290.80
NMW-21S	8/6/2004	1306.03		15.25	0.00		0.00	15.25	1290.78
NMW-22D	8/6/2004	1304.53		13.82	0.00		0.00	13.82	1290.71
NMW-22S	8/6/2004	1304.40		13.69	0.00		0.00	13.69	1290.71
NMW-23D	8/6/2004	1304.77		12.86	0.00		0.00	12.86	1291.91
NMW-23S	8/6/2004	1304.68		12.82	0.00		0.00	12.82	1291.86
NMW-24D	8/6/2004	1303.79		13.27	0.00		0.00	13.27	1290.52
NMW-24S	8/6/2004	1303.06		13.25	0.00		0.00	13.25	1289.81
NMW-25D	8/6/2004	1300.65		14.93	0.00		0.00	14.93	1285.72
NMW-25S	8/6/2004	1300.66		14.97	0.00		0.00	14.97	1285.69
NMW-26D	8/6/2004	1298.76		14.72	0.00		0.00	14.72	1284.04
NMW-26S	8/6/2004	1298.71		14.69	0.00		0.00	14.69	1284.02
NMW-27D	8/6/2004	1299.85		14.63	0.00		0.00	14.63	1285.22
NMW-27S	8/6/2004	1299.89		14.71	0.00		0.00	14.71	1285.18
NMW-28D	8/6/2004	1299.33		12.42	0.00		0.00	12.42	1286.91
NMW-28S	8/6/2004	1299.25		12.33	0.00		0.00	12.33	1286.92

Table 3-1
North Industrial Corridor
Water Level Measurement Data
Source Area Investigations
August 2004

Sample ID	Date Measured	Measuring Point Elevation (ft msl)	Depth to Product (ft bmp)	Depth to Water (ft bmp)	Product Thickness (feet)	Product Density	Adjusted Product Thickness (feet)	Adjusted DTW (ft bmp)	Potentiometric Elevation (ft msl)
NMW-29D	8/6/2004	1300.00		14.70	0.00		0.00	14.70	1285.30
NMW-29S	8/6/2004	1300.13		14.81	0.00		0.00	14.81	1285.32
NMW-30D	8/6/2004	1299.62		13.11	0.00		0.00	13.11	1286.51
NMW-30S	blocked @ 9.0'	1299.73			0.00		0.00	0.00	
NMW-31D	8/6/2004	1303.55		12.20	0.00		0.00	12.20	1291.35
NMW-31S	8/6/2004	1303.69		12.35	0.00		0.00	12.35	1291.34
NMW-32D	8/6/2004	1303.78		13.89	0.00		0.00	13.89	1289.89
NMW-32S	8/6/2004	1303.61		13.62	0.00		0.00	13.62	1289.99
NMW-34D	8/5/2004	1314.59		10.27	0.00		0.00	10.27	1304.32
NMW-34S	8/5/2004	1314.69		10.32	0.00		0.00	10.32	1304.37
NMW-35D	8/6/2004	1303.73		11.78	0.00		0.00	11.78	1291.95
NMW-35S	8/6/2004	1303.74		11.71	0.00		0.00	11.71	1292.03
NMW-36D	8/5/2004	1318.44		15.32	0.00		0.00	15.32	1303.12
NMW-37D	8/5/2004	1318.15		15.84	0.00		0.00	15.84	1302.31
NMW-38D	8/5/2004	1319.83		17.49	0.00		0.00	17.49	1302.34
NMW-39D	8/5/2004	1308.25		11.70	0.00		0.00	11.70	1296.55
NMW-39S	8/5/2004	1308.19		11.73	0.00		0.00	11.73	1296.46
NMW-40D	8/6/2004	1313.86		16.16	0.00		0.00	16.16	1297.70
NMW-40S	8/6/2004	1313.97		16.29	0.00		0.00	16.29	1297.68
NMW-41D	8/5/2004	1305.27		11.82	0.00		0.00	11.82	1293.45
NMW-41S	8/5/2004	1305.13		11.70	0.00		0.00	11.70	1293.43
NMW-42D	8/5/2004	1315.79		15.20	0.00		0.00	15.20	1300.59
NMW-42S	8/5/2004	1315.68		15.08	0.00		0.00	15.08	1300.60
NMW-43D	8/5/2004	1314.24		15.58	0.00		0.00	15.58	1298.66
NMW-44D	8/5/2004	1315.81		16.41	0.00		0.00	16.41	1299.40
NMW-45D	8/5/2004	1319.07		16.24	0.00		0.00	16.24	1302.83
NMW-46D	not found	1309.30			0.00		0.00	0.00	
NMW-47D	8/5/2004	1310.54		9.30	0.00		0.00	9.30	1301.24
NMW-47S	8/5/2004	1310.59		9.35	0.00		0.00	9.35	1301.24
NMW-48D	8/6/2004	1311.51		11.90	0.00		0.00	11.90	1299.61
NMW-48S	8/6/2004	1311.29		11.39	0.00		0.00	11.39	1299.90
NMW-49D	8/6/2004	1308.32		20.80	0.00		0.00	20.80	1287.52
NMW-49S	8/6/2004	1307.28		20.73	0.00		0.00	20.73	1286.55
NMW-50D	8/6/2004	1300.95		13.34	0.00		0.00	13.34	1287.61

Table 3-1
North Industrial Corridor
Water Level Measurement Data
Source Area Investigations
August 2004

Sample ID	Date Measured	Measuring Point Elevation (ft msl)	Depth to Product (ft bmp)	Depth to Water (ft bmp)	Product Thickness (feet)	Product Density	Adjusted Product Thickness (feet)	Adjusted DTW (ft bmp)	Potentiometric Elevation (ft msl)
NMW-50S	8/6/2004	1300.96		13.62	0.00		0.00	13.62	1287.34
NMW-51D	8/6/2004	1300.17		11.93	0.00		0.00	11.93	1288.24
NMW-51S	8/6/2004	1300.14		11.95	0.00		0.00	11.95	1288.19
NWL-01D	8/6/2004	1313.01		12.99	0.00		0.00	12.99	1300.02
NWL-01S	8/6/2004	1313.10		13.10	0.00		0.00	13.10	1300.00
NWL-02D	--	1309.35			0.00		0.00	0.00	
NWL-02S	--	1309.32			0.00		0.00	0.00	
NWL-03S	--	1311.28			0.00		0.00	0.00	
NWL-04S	8/6/2004	1306.63		9.03	0.00		0.00	9.03	1297.60
NWL-05S	8/5/2004	1311.20		13.67	0.00		0.00	13.67	1297.53
NWL-06S	8/5/2004	1314.82		16.96	0.00		0.00	16.96	1297.86
NWL-07D	8/5/2004	1307.24		14.34	0.00		0.00	14.34	1292.90
NWL-07S	8/5/2004	1307.48		14.95	0.00		0.00	14.95	1292.53
NWL-08D	8/5/2004	1308.48		16.36	0.00		0.00	16.36	1292.12
NWL-08S	8/5/2004	1308.47		16.25	0.00		0.00	16.25	1292.22
NWL-09D	8/6/2004	1310.59		12.10	0.00		0.00	12.10	1298.49
NWL-09S	8/6/2004	1310.60		12.14	0.00		0.00	12.14	1298.46
NWL-10S	8/6/2004	1298.72		13.17	0.00		0.00	13.17	1285.55
NWL-11S	8/6/2004	1300.17		14.39	0.00		0.00	14.39	1285.78
NWL-13S	8/5/2004	1308.30		12.76	0.00		0.00	12.76	1295.54
NWL-14S	8/5/2004	1315.95		10.56	0.00		0.00	10.56	1305.39
NWL-15S	8/5/2004	1316.01		11.26	0.00		0.00	11.26	1304.75
NWL-16S	8/5/2004	1314.76		11.33	0.00		0.00	11.33	1303.43
NWL-17S	8/5/2004	1312.97		10.33	0.00		0.00	10.33	1302.64
NWL-18S	8/5/2004	1312.94		10.62	0.00		0.00	10.62	1302.32
NWL-19S	8/5/2004	1310.85		10.45	0.00		0.00	10.45	1300.40
NWL-20S	8/5/2004	not surveyed		11.62	0.00		0.00	11.62	
NWL-21S	8/5/2004	1312.58		13.05	0.00		0.00	13.05	1299.53
NWL-22S	8/5/2004	1306.79		11.83	0.00		0.00	11.83	1294.96
NWL-23S	8/5/2004	1305.81		11.35	0.00		0.00	11.35	1294.46
NWL-24S	8/5/2004	1305.04		11.91	0.00		0.00	11.91	1293.13
NWL-25S	8/6/2004	1303.17		11.44	0.00		0.00	11.44	1291.73
NWL-26S	8/6/2004	1301.67		11.62	0.00		0.00	11.62	1290.05
NWL-27S	8/6/2004	1300.55		13.68	0.00		0.00	13.68	1286.87

Table 3-1
North Industrial Corridor
Water Level Measurement Data
Source Area Investigations
August 2004

Sample ID	Date Measured	Measuring Point Elevation (ft msl)	Depth to Product (ft bmp)	Depth to Water (ft bmp)	Product Thickness (feet)	Product Density	Adjusted Product Thickness (feet)	Adjusted DTW (ft bmp)	Potentiometric Elevation (ft msl)
NWL-29S	8/5/2004	1303.89		11.54	0.00		0.00	11.54	1292.35
NWL-30S	8/5/2004	1313.58		9.25	0.00		0.00	9.25	1304.33
SK-MW-01S	8/5/2004	1315.43		16.01	0.00		0.00	16.01	1299.42
SK-MW-04S	8/5/2004	1312.80		11.71	0.00		0.00	11.71	1301.09
ULI-MW-01	8/5/2004	1314.72		10.34	0.00		0.00	10.34	1304.38
ULI-MW-02	8/5/2004	1315.59		11.31	0.00		0.00	11.31	1304.26
ULI-MW-03	8/5/2004	1315.57		11.91	0.00		0.00	11.91	1303.68
ULI-MW-04	8/5/2004	1316.27		12.82	0.00		0.00	12.82	1303.45
UPRF-MW03	8/5/2004	1318.07		15.69	0.00		0.00	15.69	1302.38
UPRF-MW-16	8/5/2004	1319.90		18.26	0.00		0.00	18.26	1301.64
UST-02	8/6/2004	1306.56		13.85	0.00		0.00	13.85	1292.71
VCM-MW-01	8/5/2004	1303.09		15.10	0.00		0.00	15.10	1287.99
VCM-MW-02B	8/5/2004	1306.44		15.37	0.00		0.00	15.37	1291.07
VCM-MW-03	8/5/2004	1304.63		13.30	0.00		0.00	13.30	1291.33
VCM-MW-04	8/5/2004	1303.12		15.11	0.00		0.00	15.11	1288.01
VCM-MW-06	8/5/2004	1307.00		15.91	0.00		0.00	15.91	1291.09
VCM-MW-07	8/5/2004	1304.66		13.35	0.00		0.00	13.35	1291.31
VWRS-MW-02D	8/5/2004	1313.42		15.87	0.00		0.00	15.87	1297.55
VWRS-MW-02S	8/5/2004	1313.33		15.79	0.00		0.00	15.79	1297.54
VWRS-MW-07D	8/5/2004	1309.52		12.05	0.00		0.00	12.05	1297.47
VWRS-MW-07S	8/5/2004	1309.54		12.08	0.00		0.00	12.08	1297.46
VWRS-MW-09D	8/5/2004	1309.38		11.89	0.00		0.00	11.89	1297.49
VWRS-MW-09S	8/5/2004	1309.20		11.94	0.00		0.00	11.94	1297.26
WNC-09D	8/5/2004	1315.16		10.25	0.00		0.00	10.25	1304.91
WNC-09SR	8/5/2004	1315.14		10.25	0.00		0.00	10.25	1304.89
WNC-16D	8/5/2004	1313.61		11.35	0.00		0.00	11.35	1302.26
WNC-23D	8/5/2004	1318.61		13.81	0.00		0.00	13.81	1304.80
WNC-31D	8/6/2004	1318.31		15.88	0.00		0.00	15.88	1302.43
WND-02D	8/6/2004	1311.66		12.02	0.00		0.00	12.02	1299.64
WND-02S	not found	1311.53			0.00		0.00	0.00	
WND-03S	8/5/2004	1316.50		14.14	0.00		0.00	14.14	1302.36
WND-04S	8/5/2004	1319.04		15.38	0.00		0.00	15.38	1303.66
WNC-05D	8/5/2004	1318.20		13.76	0.00		0.00	13.76	1304.44
WND-05S	8/5/2004	1317.74		13.28	0.00		0.00	13.28	1304.46

CDM

Table 3-1
North Industrial Corridor
Water Level Measurement Data
Source Area Investigations
August 2004

Sample ID	Date Measured	Measuring Point Elevation (ft msl)	Depth to Product (ft bmp)	Depth to Water (ft bmp)	Product Thickness (feet)	Product Density	Adjusted Product Thickness (feet)	Adjusted DTW (ft bmp)	Potentiometric Elevation (ft msl)
WNC-10D	8/5/2004	1316.81		10.92	0.00		0.00	10.92	1305.89
WND-10S	Dry	1318.58			0.00		0.00	0.00	
WNC-11D	8/5/2004	1314.36		10.15	0.00		0.00	10.15	1304.21
WND-11S	8/5/2004	1316.77		12.52	0.00		0.00	12.52	1304.25
WND-12D	8/5/2004	1315.84		11.13	0.00		0.00	11.13	1304.71
WND-12S	8/5/2004	1315.76		11.06	0.00		0.00	11.06	1304.70
WND-14D	8/5/2004	1317.53		13.81	0.00		0.00	13.81	1303.72
WND-14S	8/5/2004	1317.69		14.01	0.00		0.00	14.01	1303.68
WND-15D	8/6/2004	1306.41		13.86	0.00		0.00	13.86	1292.55
WND-15S	8/6/2004	1306.76		14.22	0.00		0.00	14.22	1292.54
WND-16S	8/5/2004	1313.47	11.93	14.20	2.27	0.80	1.82	12.38	1301.09
WND-18D	8/6/2004	1310.90		14.10	0.00		0.00	14.10	1296.80
WND-18S	8/6/2004	1310.95		14.20	0.00		0.00	14.20	1296.75
WND-19D	8/5/2004	1306.76		10.69	0.00		0.00	10.69	1296.07
WND-19S	8/5/2004	1306.73		10.66	0.00		0.00	10.66	1296.07
WND-20S	8/5/2004	1314.05		15.65	0.00		0.00	15.65	1298.40
WND-21D	bolts stuck	1309.33			0.00		0.00	0.00	
WND-21S	8/5/2004	1309.31		10.80	0.00		0.00	10.80	1298.51
WND-23S	8/5/2004	1317.73		13.99	0.00		0.00	13.99	1303.74
WND-24D	8/6/2004	1306.77		12.09	0.00		0.00	12.09	1294.68
WND-24S	8/6/2004	1306.88		12.25	0.00		0.00	12.25	1294.63
WND-25D	8/5/2004	1318.75		13.72	0.00		0.00	13.72	1305.03
WND-25S	8/5/2004	1318.73		13.71	0.00		0.00	13.71	1305.02
WND-26D	8/5/2004	1315.53		14.01	0.00		0.00	14.01	1301.52
WND-26S	8/5/2004	1315.62		14.09	0.00		0.00	14.09	1301.53
WND-27S	8/5/2004	1315.01		12.42	0.00		0.00	12.42	1302.59
WND-29D	8/5/2004	1320.04		15.11	0.00		0.00	15.11	1304.93
WND-29S	8/5/2004	1319.64		14.65	0.00		0.00	14.65	1304.99
WND-30D	8/6/2004	1315.70		15.39	0.00		0.00	15.39	1300.31
WND-31S	8/6/2004	1317.26		15.43	0.00		0.00	15.43	1301.83
WNC-32D	8/6/2004	1318.82		16.90	0.00		0.00	16.90	1301.92
WND-32S	8/6/2004	1317.68		16.28	0.00		0.00	16.28	1301.40
WND-33D	not found	1310.65			0.00		0.00	0.00	
WND-33S	8/5/2004	1310.58		11.46	0.00		0.00	11.46	1299.12

CDM

Table 3-1
North Industrial Corridor
Water Level Measurement Data
Source Area Investigations
August 2004

Sample ID	Date Measured	Measuring Point Elevation (ft msl)	Depth to Product (ft bmp)	Depth to Water (ft bmp)	Product Thickness (feet)	Product Density	Adjusted Product Thickness (feet)	Adjusted DTW (ft bmp)	Potentiometric Elevation (ft msl)
WND-34D	8/5/2004	1314.40		13.80	0.00		0.00	13.80	1300.60
WND-34S	8/5/2004	1314.34		13.75	0.00		0.00	13.75	1300.59
WND-36D	8/6/2004	1314.69		13.09	0.00		0.00	13.09	1301.60
WND-36S	8/6/2004	1314.75		13.12	0.00		0.00	13.12	1301.63
WND-37DR	8/5/2004	1314.75		14.72	0.00		0.00	14.72	1300.03
WNC-37SR	8/5/2004	1315.18		15.16	0.00		0.00	15.16	1300.02
WND-38D	8/5/2004	1307.62		10.50	0.00		0.00	10.50	1297.12
WND-38S	8/5/2004	1307.48		10.33	0.00		0.00	10.33	1297.15
WND-39D	8/5/2004	1308.29		11.05	0.00		0.00	11.05	1297.24
WND-39S	8/5/2004	1308.31		11.07	0.00		0.00	11.07	1297.24
WND-40D	8/6/2004	1302.38		11.54	0.00		0.00	11.54	1290.84
WND-40S	8/6/2004	1301.94		11.29	0.00		0.00	11.29	1290.65
WND-41D	8/6/2004	1306.94		11.54	0.00		0.00	11.54	1295.40
WND-41S	8/6/2004	1306.97		11.63	0.00		0.00	11.63	1295.34
WND-42D	8/6/2004	1303.79		14.10	0.00		0.00	14.10	1289.69
WND-42S	8/6/2004	1303.64		13.97	0.00		0.00	13.97	1289.67
WND-43D	8/6/2004	1307.40		12.82	0.00		0.00	12.82	1294.58
WND-43S	8/5/2004	1307.54		12.87	0.00		0.00	12.87	1294.67
WND-44D	not found	1303.52			0.00		0.00	0.00	
WND-44S	8/6/2004	1303.27		13.06	0.00		0.00	13.06	1290.21
WND-45D	8/6/2004	1305.54		11.66	0.00		0.00	11.66	1293.88
WND-45S	8/6/2004	1305.66		11.87	0.00		0.00	11.87	1293.79
WND-46D	8/6/2004	1304.87		11.45	0.00		0.00	11.45	1293.42
WND-46S	8/6/2004	1304.98		11.56	0.00		0.00	11.56	1293.42
WND-47D	8/5/2004	1304.63		12.00	0.00		0.00	12.00	1292.63
WND-47S	8/5/2004	1304.81		11.96	0.00		0.00	11.96	1292.85
WND-48D	8/6/2004	1301.21		12.00	0.00		0.00	12.00	1289.21
WND-48S	8/6/2004	1301.01		11.84	0.00		0.00	11.84	1289.17
WND-49D	8/6/2004	1308.14		12.30	0.00		0.00	12.30	1295.84
WNC-49SR	8/6/2004	1308.22		12.38	0.00		0.00	12.38	1295.84
WU-MW-04D	8/5/2004	1307.36		12.07	0.00		0.00	12.07	1295.29
WU-MW-04S	8/5/2004	1307.23		12.03	0.00		0.00	12.03	1295.20
WU-MW-05D	Destroyed	1307.65			0.00		0.00	0.00	
WU-MW-05S	Abandoned	1307.38			0.00		0.00	0.00	

Table 3-1
North Industrial Corridor
Water Level Measurement Data
Source Area Investigations
August 2004

Sample ID	Date Measured	Measuring Point Elevation (ft msl)	Depth to Product (ft bmp)	Depth to Water (ft bmp)	Product Thickness (feet)	Product Density	Adjusted Product Thickness (feet)	Adjusted DTW (ft bmp)	Potentiometric Elevation (ft msl)
SW-101	8/6/2004	1318.26		9.88	0.00		0.00	9.88	1308.38
SW-102	8/6/2004	1303.15		2.22	0.00		0.00	2.22	1300.93
SW-103	8/6/2004	1301.88		2.23	0.00		0.00	2.23	1299.65
SW-104	8/6/2004	1296.63		2.00	0.00		0.00	2.00	1294.63
SW-105	8/6/2004	1298.40		2.41	0.00		0.00	2.41	1295.99
SWL-02	8/6/2004	1316.46		11.41	0.00		0.00	11.41	1305.05
SWL-04	8/6/2004	1315.82		11.83	0.00		0.00	11.83	
SWL-05	8/6/2004	1316.85		18.02	0.00		0.00	18.02	1298.83
SWL-06	8/6/2004	1314.84		18.99	0.00		0.00	18.99	1295.85
SWL-07	8/6/2004	1309.71		18.77	0.00		0.00	18.77	1290.94
SWL-08	8/6/2004	1306.43		23.59	0.00		0.00	23.59	1282.84
SWL-12	Pond filled	1307.93			0.00		0.00	0.00	
SWL-13	8/6/2004	1307.26		20.27	0.00		0.00	20.27	1286.99
SWL-14	8/6/2004	1307.57		23.40	0.00		0.00	23.40	1284.17

Note: ft msl= feet relative to mean sea level ft bmp= feet below measuring point

Table 3-2
North Industrial Corridor (NIC) Site
Summary of Quarterly Downgradient Monitoring Results

Sample ID	Sample Date	11DCA (µg/L)	11DCE (µg/L)	BEN (µg/L)	C12DCE (µg/L)	CCL4 (µg/L)	CFM (µg/L)	PCE (µg/L)	T12DCE (µg/L)	TCA (µg/L)	TCE (µg/L)	VC (µg/L)
NMW-12D	5/8/2001	**1.9**	**5**	<1.0	**180**	<1.0	<1.0	<1.0	**2.6**	<1.0	**3.1**	**4.5**
NMW-12D	4/22/2004	<1.0	<1.0	<1.0	**71**	<1.0	<1.0	<1.0	**1.1**	<1.0	**2.3**	<1.0
NMW-12D	7/28/2004	<1.0	<1.0	<1.0	**73**	<1.0	<1.0	<1.0	**1.1**	<1.0	**3.2**	**1.8**
NMW-12D	10/21/2004	<1.0	**1.3**	<1.0	**79**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**2.3**
NMW-12D	1/24/2005	<1.0	**1.2**	<1.0	**91**	<1.0	<1.0	<1.0	<1.0	<1.0	**1.9**	<1.0
NMW-12S	5/8/2001	**1.7**	**3.1**	<1.0	**88**	<1.0	<1.0	<1.0	**1.6**	<1.0	**70**	**2.5**
NMW-12S	4/22/2004	D	D	D	D	D	D	D	D	D	D	D
NMW-12S	7/28/2004	D	D	D	D	D	D	D	D	D	D	D
NMW-12S	10/21/2004	D	D	D	D	D	D	D	D	D	D	D
NMW-12S	1/24/2005	D	D	D	D	D	D	D	D	D	D	D
NMW-14D	5/9/2001	**1.7**	**1.9**	<1.0	**200**	<1.0	<1.0	<1.0	**3.6**	<1.0	**8.9**	**2.4**
NMW-14D	4/22/2004	<1.0	<1.0	<1.0	**130**	<1.0	<1.0	<1.0	**2.6**	<1.0	**1.6**	<1.0
NMW-14D	7/28/2004	<1.0	<1.0	<1.0	**120**	<1.0	<1.0	<1.0	**2.4**	<1.0	**3**	<1.0
NMW-14D	10/21/2004	<1.0	**1.3**	<1.0	**130**	<1.0	<1.0	<1.0	**1.8**	<1.0	**2.7**	<1.0
NMW-14D	1/24/2005	<1.0	<1.0	<1.0	**140**	<1.0	<1.0	<1.0	<1.0	<1.0	**1.3**	<1.0
NMW-14S	5/9/2001	**1.4**	**1.3**	<1.0	**130**	<1.0	<1.0	<1.0	**2.6**	<1.0	**3.8**	**1.7**
NMW-14S	4/22/2004	<1.0	<1.0	<1.0	**95**	<1.0	<1.0	<1.0	**2.1**	<1.0	**1.8**	<1.0
NMW-14S	7/28/2004	<1.0	<1.0	<1.0	**140**	<1.0	<1.0	<1.0	**2.9**	<1.0	**4**	<1.0
NMW-14S	10/21/2004	<1.0	**1.7**	<1.0	**170**	<1.0	<1.0	<1.0	**2.4**	<1.0	**2.7**	<1.0
NMW-14S	1/24/2005	**1.2**	**1.4**	<1.0	**130**	<1.0	<1.0	<1.0	<1.0	<1.0	**2**	<1.0
NMW-15D	5/8/2001	**1.1**	<1.0	<1.0	**59**	<1.0	<1.0	<1.0	<1.0	<1.0	**20**	<1.0
NMW-15D	4/22/2004	<1.0	<1.0	<1.0	**51**	<1.0	<1.0	**1.2**	**1.7**	<1.0	**88**	<1.0
NMW-15D	7/28/2004	**1**	<1.0	<1.0	**66**	<1.0	<1.0	**1.7**	**2.4**	<1.0	**120**	**1.1**
NMW-15D	10/21/2004	**1.2**	**1.6**	<1.0	**76**	<1.0	<1.0	**1.7**	**2.1**	<1.0	**160**	**1.5**
NMW-15D	1/24/2005	**1.8**	**2.4**	<1.0	**97**	<1.0	<1.0	<1.0	<1.0	<1.0	**170**	<1.0
NMW-15S	5/8/2001	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
NMW-15S	4/22/2004	<1.0	<1.0	<1.0	<1.0	<1.0	**1.2**	<1.0	<1.0	<1.0	<1.0	<1.0
NMW-15S	7/28/2004	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
NMW-15S	10/21/2004	<1.0	<1.0	<1.0	<1.0	<1.0	**3.1**	<1.0	<1.0	<1.0	<1.0	<1.0
NMW-15S	1/24/2005	<1.0	<1.0	<1.0	**13**	<1.0	**2.4**	<1.0	<1.0	<1.0	**38**	<1.0

Table 3-2
North Industrial Corridor (NIC) Site
Summary of Quarterly Downgradient Monitoring Results

Sample ID	Sample Date	11DCA (µg/L)	11DCE (µg/L)	BEN (µg/L)	C12DCE (µg/L)	CCL4 (µg/L)	CFM (µg/L)	PCE (µg/L)	T12DCE (µg/L)	TCA (µg/L)	TCE (µg/L)	VC (µg/L)
NMW-26D	5/8/2001	<1.0	<1.0	<1.0	**34**	<1.0	<1.0	**1.2**	<1.0	<1.0	**11**	<1.0
NMW-26D	7/31/2003	<1.0	<1.0	<1.0	**50**	<1.0	<1.0	**2**	<1.0	<1.0	**3.9**	<1.0
NMW-26D	4/21/2004	<1.0	<1.0	<1.0	**42**	<1.0	<1.0	**1.5**	<1.0	<1.0	**3.6**	<1.0
NMW-26D	7/28/2004	<1.0	<1.0	<1.0	**43**	<1.0	<1.0	**1.6**	<1.0	<1.0	**2.9**	<1.0
NMW-26D	10/21/2004	<1.0	<1.0	<1.0	**47**	<1.0	<1.0	**1**	**1.1**	<1.0	**3.9**	<1.0
NMW-26D	1/24/2005	<1.0	<1.0	<1.0	**50**	<1.0	<1.0	<1.0	**1.6**	<1.0	**7.9**	<1.0
NMW-26S	5/8/2001	<1.0	<1.0	<1.0	**14**	<1.0	<1.0	**2.2**	<1.0	<1.0	**13**	<1.0
NMW-26S	7/31/2003	<1.0	<1.0	<1.0	**23**	<1.0	<1.0	**2.5**	<1.0	<1.0	**5.5**	<1.0
NMW-26S	4/21/2004	<1.0	<1.0	<1.0	**26**	<1.0	<1.0	**2.9**	<1.0	<1.0	**5.1**	<1.0
NMW-26S	7/28/2004	<1.0	<1.0	<1.0	**15**	<1.0	<1.0	**2.4**	<1.0	<1.0	**3.2**	<1.0
NMW-26S	10/21/2004	<1.0	<1.0	<1.0	**16**	<1.0	<1.0	**3.1**	<1.0	<1.0	**5.4**	<1.0
NMW-26S	1/24/2005	<1.0	<1.0	<1.0	**16**	<1.0	<1.0	<1.0	<1.0	<1.0	**4.2**	<1.0
NMW-27D	5/4/2001	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
NMW-27D	4/21/2004	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
NMW-27D	7/28/2004	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
NMW-27D	10/21/2004	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
NMW-27D	1/24/2005	<1.0	<1.0	<1.0	**1.9**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
NMW-27S	5/4/2001	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
NMW-27S	4/21/2004	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
NMW-27S	7/28/2004	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
NMW-27S	10/21/2004	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
NMW-27S	1/24/2005	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
NMW-28D	5/4/2001	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
NMW-28D	4/21/2004	<1.0	<1.0	<1.0	**3.9**	<1.0	<1.0	<1.0	<1.0	<1.0	**6.1**	<1.0
NMW-28D	7/28/2004	<1.0	<1.0	<1.0	**4.9**	<1.0	<1.0	<1.0	<1.0	<1.0	**6.3**	<1.0
NMW-28D	10/21/2004	**1.1**	**1**	<1.0	**4.9**	<1.0	<1.0	<1.0	<1.0	<1.0	**6.9**	<1.0
NMW-28D	1/24/2005	**1.2**	<1.0	<1.0	**5.7**	<1.0	<1.0	<1.0	<1.0	<1.0	**7.8**	<1.0
NMW-28S	5/4/2001	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
NMW-28S	4/21/2004	<1.0	<1.0	<1.0	**3.6**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
NMW-28S	7/28/2004	<1.0	<1.0	<1.0	**2.9**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
NMW-28S	10/21/2004	<1.0	<1.0	<1.0	**4.9**	<1.0	<1.0	**1**	<1.0	<1.0	<1.0	<1.0
NMW-28S	1/24/2005	<1.0	<1.0	<1.0	**7.1**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Table 3-2
North Industrial Corridor (NIC) Site
Summary of Quarterly Downgradient Monitoring Results

Sample ID	Sample Date	11DCA (µg/L)	11DCE (µg/L)	BEN (µg/L)	C12DCE (µg/L)	CCL4 (µg/L)	CFM (µg/L)	PCE (µg/L)	T12DCE (µg/L)	TCA (µg/L)	TCE (µg/L)	VC (µg/L)
NMW-29D	5/8/2001	**1.4**	**1**	<1.0	**9.1**	<1.0	<1.0	<1.0	<1.0	<1.0	**18**	<1.0
NMW-29D	7/31/2003	<1.0	<1.0	<1.0	**12**	<1.0	<1.0	<1.0	<1.0	<1.0	**16**	<1.0
NMW-29D	4/21/2004	<1.0	<1.0	<1.0	**12**	<1.0	<1.0	<1.0	<1.0	<1.0	**11**	<1.0
NMW-29D	7/28/2004	**1**	<1.0	<1.0	**14**	<1.0	<1.0	<1.0	**1.1**	<1.0	**11**	<1.0
NMW-29D	10/21/2004	**1.3**	**1.2**	<1.0	**17**	<1.0	<1.0	**1.1**	<1.0	<1.0	**13**	<1.0
NMW-29D	1/24/2005	<1.0	<1.0	<1.0	**22**	<1.0	<1.0	<1.0	**1.2**	<1.0	**12**	<1.0
NMW-29S	5/8/2001	<1.0	<1.0	<1.0	**2.9**	<1.0	<1.0	<1.0	<1.0	<1.0	**6.2**	<1.0
NMW-29S	7/31/2003	<1.0	<1.0	<1.0	**5.4**	<1.0	<1.0	<1.0	<1.0	**1**	**7.1**	<1.0
NMW-29S	4/21/2004	<1.0	<1.0	<1.0	**4.7**	<1.0	<1.0	<1.0	<1.0	<1.0	**4.9**	<1.0
NMW-29S	7/28/2004	<1.0	<1.0	<1.0	**6.7**	<1.0	<1.0	<1.0	<1.0	<1.0	**6**	<1.0
NMW-29S	10/21/2004	<1.0	<1.0	<1.0	**7**	<1.0	<1.0	**1.2**	<1.0	<1.0	**6.5**	<1.0
NMW-29S	1/24/2005	<1.0	<1.0	<1.0	**3.6**	<1.0	<1.0	<1.0	<1.0	<1.0	**3.7**	<1.0
NMW-49D	4/21/2004	<1.0	<1.0	<1.0	**16**	<1.0	<1.0	<1.0	<1.0	<1.0	**36**	<1.0
NMW-49D	7/28/2004	<1.0	<1.0	<1.0	**13**	<1.0	<1.0	<1.0	<1.0	<1.0	**12**	<1.0
NMW-49D	10/21/2004	<1.0	<1.0	<1.0	**13**	<1.0	<1.0	<1.0	<1.0	<1.0	**15**	<1.0
NMW-49D	1/24/2005	<1.0	<1.0	<1.0	**18**	<1.0	<1.0	<1.0	<1.0	<1.0	**26**	<1.0
NMW-49S	4/21/2004	<1.0	<1.0	<1.0	**3.5**	<1.0	<1.0	<1.0	<1.0	<1.0	**2.6**	<1.0
NMW-49S	7/28/2004	<1.0	<1.0	<1.0	**3.9**	<1.0	<1.0	<1.0	<1.0	<1.0	**3.6**	<1.0
NMW-49S	10/21/2004	<1.0	<1.0	<1.0	**3.2**	<1.0	<1.0	<1.0	<1.0	<1.0	**4**	<1.0
NMW-49S	1/24/2005	<1.0	<1.0	<1.0	**4.2**	<1.0	<1.0	<1.0	<1.0	<1.0	**4.6**	<1.0
NMW-50D	4/21/2004	<1.0	<1.0	<1.0	**2.8**	<1.0	<1.0	<1.0	<1.0	<1.0	**2.2**	<1.0
NMW-50D	7/28/2004	<1.0	<1.0	<1.0	**4.9**	<1.0	<1.0	<1.0	<1.0	<1.0	**3**	<1.0
NMW-50D	10/21/2004	<1.0	<1.0	<1.0	**9.4**	<1.0	<1.0	<1.0	<1.0	<1.0	**15**	<1.0
NMW-50D	1/24/2005	<1.0	<1.0	<1.0	**9.1**	<1.0	<1.0	<1.0	<1.0	<1.0	**19**	<1.0
NMW-50S	4/21/2004	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
NMW-50S	7/28/2004	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
NMW-50S	10/21/2004	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
NMW-50S	1/24/2005	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
NMW-51D	4/21/2004	<1.0	<1.0	<1.0	**2**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
NMW-51D	7/28/2004	<1.0	<1.0	<1.0	**2.4**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
NMW-51D	10/21/2004	**1.3**	**1.2**	<1.0	**3.8**	<1.0	<1.0	<1.0	<1.0	<1.0	**1.5**	<1.0
NMW-51D	1/24/2005	**2**	**1.7**	<1.0	**5.8**	<1.0	<1.0	<1.0	<1.0	<1.0	**3**	<1.0

CDM

Table 3-2
North Industrial Corridor (NIC) Site
Summary of Quarterly Downgradient Monitoring Results

Sample ID	Sample Date	11DCA (µg/L)	11DCE (µg/L)	BEN (µg/L)	C12DCE (µg/L)	CCL4 (µg/L)	CFM (µg/L)	PCE (µg/L)	T12DCE (µg/L)	TCA (µg/L)	TCE (µg/L)	VC (µg/L)
NMW-51S	4/21/2004	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
NMW-51S	7/28/2004	<1.0	<1.0	<1.0	**1.4**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
NMW-51S	10/21/2004	<1.0	<1.0	<1.0	**1.8**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
NMW-51S	1/24/2005	<1.0	<1.0	<1.0	**3.4**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
SW-12	5/16/2001	<1.0	<1.0	<1.0	**3.5**	<1.0	<1.0	<1.0	<1.0	<1.0	**10**	<1.0
SW-12	4/22/2004	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
SW-12	7/28/2004	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**2.3**	<1.0
SW-12	10/21/2004	<1.0	<1.0	<1.0	**1.6**	<1.0	<1.0	<1.0	<1.0	<1.0	**5.9**	<1.0
SW-12	1/24/2005	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**4.2**	<1.0
SW-15	5/16/2001	<1.0	<1.0	<1.0	**7.5**	<1.0	<1.0	<1.0	<1.0	<1.0	**1.1**	<1.0
SW-15	4/22/2004	<1.0	<1.0	<1.0	**6**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
SW-15	7/28/2004	<1.0	<1.0	**1**	**8.2**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**1.8 J-LCS**
SW-15	10/21/2004	<1.0	<1.0	<1.0	**7.8**	<1.0	<1.0	<1.0	<1.0	<1.0	**1.8**	**1**
SW-15	1/24/2005	<1.0	<1.0	**3.1**	**14**	<1.0	<1.0	<1.0	<1.0	<1.0	**2.7**	<1.0

Notes:

µg/L= micrograms per liter

D= Well dry - not sampled

J-LCS = Potential high bias due to high recovery in the laboratory control sample for this compound.

11DCA = 1,1-Dichloroethane
11DCE = 1,1-Dichloroethene
BEN = Benzene
C12DCE = cis-1,2-dichloroethene
CCL4 = Carbon Tetrachloride
CFM = Chloroform
PCE = Tetrachloroethene
T12DCE = trans-1,2-Dichloroethene
TCA = 1,1,1-Trichloroethane
TCE = Trichloroethene
VC = Vinyl chloride

CDM

Table 3-3
North Industrial Corridor
Summary of Site-wide Sampling Results
August 2004

Station ID	Well Depth	Sample Date	cis-1,2-DCE (µg/L)	TCE (µg/L)	PCE (µg/L)	BEN (µg/L)	CT / CCL4 (µg/L)	CFM (µg/L)	VC (µg/L)	11DCE (µg/L)	11DCA (µg/L)	1,1,1-TCA (µg/L)	Other Detected Compounds (µg/L)
DRB-MW-02	S	07/25/01	**14.0**	**60.0**	**2.1**	**6.5**	**9.1**	**4.3**	**1.2**	**1.1**	<1.0	<1.0	MECL 1.2, TCFM 1.5
DRB-MW-02	S	08/25/04	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-30D	D	07/25/01	**17.0**	**53.0**	**1.9**	**3.3**	**7.4**	**3.5**	**1.2**	**1.1**	<1.0	<1.0	IPB 1.0, NAP 4.8, TCFM 1.5
WND-30D	D	08/25/04	**9.0**	**45.0**	**1.3**	<1.0	**9.2**	**1.7**	<1.0	<1.0	<1.0	<1.0	None
DRB-MW-11	S	07/26/01	**13.0**	<1.0	<1.0	**9.9**	<1.0	<1.0	**12.0**	<1.0	<1.0	<1.0	124TMB 44, 135TMB 7.8, EBN 3.1, IPB 1.4, NAP 18, NPB 1.9, SBB 1.2, XYL-MP 25, XYL-O 1.1
NMW-46D	D	07/25/01	**43.0**	**6.9**	<1.0	**1.9**	<1.0	<1.0	**4.4**	<1.0	<1.0	<1.0	MTBE 10, NAP 1.5
DRB-MW-20	S	07/26/01	**9.6**	**13.0**	<1.0	**560.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	124 TMB 40, 135 TMB 8.4, CHEA 1.1, EBN 35, IPB 5.9, NAP 30, NPB 10, PIPT 1.0, SBB 1.2, TOL 28, XYL-MP 98, XYL-O 38
DRB-MW-20	S	08/25/04	<10.0	<10.0	<10.0	**820.0**	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	EBN 100, XYL-MP 460, MTBE 21, XYL-O 150, TOL 36
NMW-45D	D	07/26/01	**17.0**	**32.0**	<1.0	**11.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	124TMB 1.2, MTBE 6.8
NMW-45D	D	08/25/04	**23.0**	**15.0**	**3.9**	**3.6**	<1.0	<1.0	**5.2**	<1.0	**1.0**	<1.0	MTBE 4.2
DRB-MW-250	S	07/26/01	**33.0**	<1.0	<1.0	**170**	<1.0	<1.0	**24.0**	<1.0	<1.0	<1.0	IPB 1.2
DRB-MW-250	S	08/25/04	<1.0	<1.0	<1.0	**13.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	CM 1.8
NMW-44D	D	07/26/01	**39.0**	**13.0**	<1.0	**8.5**	<1.0	<1.0	**18.0**	**1.6**	<1.0	<1.0	IPB 3.3, NPB 6.9, TBB 1.3
NMW-44D	D	08/25/04	**65.0**	**56.0**	**67.0**	**2.0**	<1.0	<1.0	**8.8**	**2.2**	**7.3**	**4.4**	112TCA 1.7, MTBE 3.3
DRB-MW-30	S	07/25/01	<1.0	<1.0	<1.0	**32**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	124 TMB 29, 135 TMB 16, EBN 32, IPB 24, NAP 27, NBB 13, NPB 22, PIPT 11, SBB 9.7, TBB 3.5, TOL 31, XYL-MP 62, XYL-O 21
DRB-MW-30	S	08/25/04	<20.0	<20.0	<20.0	**550**	<20.0	<20.0	<20.0	<20.0	<20.0	<20.0	EBN 160, XYL-MP 240, XYL-O 39, TOL 140
NMW-43D	D	07/25/01	**64.0**	**8.4**	<1.0	**82**	<1.0	<1.0	**15.0**	<1.0	<1.0	<1.0	124TMB 2.8, EBN 4.7, IPB 3.7, NAP 3.5, NPB 3.0, TOL 7.5, XYL-MP 15, XYL-O 1.1
NMW-43D	D	08/25/04	**37.0**	**50.0**	<1.0	<1.0	<1.0	<1.0	**1.6**	<1.0	<1.0	<1.0	None
EXC-MW-02A	S	12/08/97	**2.6 JDB**	**42.0 JDB**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	XYL-MP 1.9
EXC-MW-02A	S	08/10/04	<1.0	**1.7**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
EXC-MW-02B	D	12/08/97	**1.5 JDB**	**23.0 JDB**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	XYL-MP 1.5
EXC-MW-02B	D	08/10/04	**2.4**	**15.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
EXC-MW-04A	S	06/15/98	**86.0**	**330.0**	**1.5**	<1.0	<1.0	<1.0	<1.0	**18.0**	**3.5**	**3.9**	MECL 1, T12DCE 1.1, TOL 1.5
EXC-MW-04A	S	05/02/01	**91.0**	**290.0**	**1.4**	<1.0	<1.0	<1.0	**2.4**	**15.0**	**2.7**	**2.4**	T12DCE 1.3
EXC-MW-04A	S	08/10/04	**49.0**	**88.0**	<1.0	<1.0	<1.0	<1.0	<1.0	**3.3**	<1.0	<1.0	T12DCE 1.2
EXC-MW-04B	D	06/15/98	**1.6**	**19.0**	<1.0	<1.0	<1.0	<1.0	<1.0	**1.1**	<1.0	<1.0	MECL 1
EXC-MW-04B	D	05/02/01	**7.0**	**39.0**	<1.0	<1.0	<1.0	<1.0	<1.0	**1.9**	<1.0	<1.0	None
EXC-MW-04B	D	08/10/04	**7.4**	**82.0**	<1.0	<1.0	<1.0	<1.0	<1.0	**3.4**	<1.0	<1.0	None

Table 3-3
North Industrial Corridor
Summary of Site-wide Sampling Results
August 2004

Station ID	Well Depth	Sample Date	cis-1,2-DCE (µg/L)	TCE (µg/L)	PCE (µg/L)	BEN (µg/L)	CT / CCL4 (µg/L)	CFM (µg/L)	VC (µg/L)	11DCE (µg/L)	11DCA (µg/L)	1,1,1-TCA (µg/L)	Other Detected Compounds (µg/L)
EXC-MW-05B	D	06/15/98	**38.0**	**270.0**	<1.0	<1.0	<1.0	<1.0	<1.0	**17.0**	**2.0**	**5.0**	MECL 1.1
EXC-MW-05B	D	05/02/01	**8.7**	**62.0**	<1.0	<1.0	<1.0	<1.0	<1.0	**2.4**	<1.0	<1.0	None
EXC-MW-05B	D	08/10/04	**33.0**	**120.0**	**1.4**	<1.0	<1.0	<1.0	<1.0	**12.0**	**1.1**	**1.5**	EDB 3.6, 12DCP 1.3
EXC-MW-06A	S	06/16/98	**9.9**	**100.0**	<1.0	<1.0	<1.0	<1.0	<1.0	**5.3**	<1.0	**2.2**	MECL 1.5
EXC-MW-06B	D	06/16/98	**7.1**	**92.0**	<1.0	<1.0	<1.0	<1.0	<1.0	**5.3**	<1.0	**1.7**	MECL 1.3
EXC-MW-07B	D	06/16/98	**25.0**	**99.0**	<1.0	<1.0	<1.0	<1.0	<1.0	**6.4**	<1.0	**2.0**	MECL 1.4
EXC-MW-07B	D	05/02/01	**18.0**	**51.0**	<1.0	<1.0	<1.0	<1.0	<1.0	**2.1**	**1.3**	<1.0	None
EXC-MW-08A	S	12/08/97	**10 JDB**	**78 JDB**	<1.0	<1.0	<1.0	<1.0	<1.0	**1.8**	<1.0	**1.2**	None
EXC-MW-08A	S	08/10/04	**6.5**	**53.0**	<1.0	<1.0	**1.1**	<1.0	<1.0	**1.1**	<1.0	<1.0	None
EXC-MW-08B	D	12/08/97	**17 JDB**	**240.0**	<1.0	<1.0	<1.0	<1.0	<1.0	**10.0**	**1.5**	**5.1**	None
EXC-MW-08B	D	08/10/04	**13.0**	**23.0**	<1.0	<1.0	<1.0	<1.0	<1.0	**4.5**	<1.0	**1.2**	None
NMW-02S	S	05/02/01	<1.0	<1.0	**41.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-02S	S	08/11/04	<1.0	**1.0**	**50.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	MTBE 1.8
NMW-02D	D	05/02/01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-02D	D	08/11/04	<1.0	**1.2**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-03S	S	05/09/01	<1.0	**1.2**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-03S	S	08/23/04	**5.1**	**36.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-03D	D	05/09/01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-04S	S	05/07/01	**67.0**	**60.0**	<1.0	**2**	**1.4**	**1.6**	**36.0**	**5.8**	**5.2**	<1.0	T12DCE 20
NMW-04S	S	08/26/04	**160.0**	**160.0**	<1.0	<1.0	<1.0	<1.0	**14.0**	**8.1**	**5.2**	<1.0	T12DCE 5.4
NMW-04D	D	05/07/01	**42.0**	**140.0**	<1.0	**1.2**	<1.0	<1.0	**14.0**	**8.7**	**5.4**	<1.0	T12DCE 1.9
NMW-04D	D	08/26/04	**91.0**	**230.0**	<1.0	<1.0	**10.0**	**1.7**	**6.4**	**9.4**	**4.5**	**1.3**	T12DCE 1.6
NMW-05S	S	05/09/01	**500.0**	**250.0**	**7.8**	**1.9**	<1.0	<1.0	**86.0**	**3.7**	**10.0**	<1.0	T12DCE 5.4
NMW-05S	S	08/12/04	**95.0**	**42.0**	**4.7**	<1.0	<1.0	<1.0	**34.0**	<1.0	**1.5**	<1.0	T12DCE 1.6
NMW-05D	D	05/09/01	**23.0**	**16.0**	<1.0	<1.0	<1.0	<1.0	**1.6**	<1.0	<1.0	<1.0	None
NMW-05D	D	08/12/04	**9.8**	**8.4**	<1.0	<1.0	<1.0	<1.0	**6.1**	<1.0	<1.0	<1.0	None
NMW-05D dup	D	08/12/04	**9.1**	**8.4**	<1.0	<1.0	<1.0	<1.0	**1.1**	<1.0	<1.0	<1.0	None
NMW-06S	S	05/07/01	**2.1**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-06S	S	08/17/04	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-06D	D	05/07/01	**49.0**	**80.0**	<1.0	<1.0	<1.0	<1.0	**24.0**	**3.3**	**3.6**	<1.0	None
NMW-06D	D	08/17/04	**55.0**	**26.0**	<1.0	<1.0	<1.0	<1.0	**4.8**	**2.4**	**3.1**	<1.0	T12DCE 1.2, CM 2.1
NMW-08S	S	05/10/01	**65.0**	**130.0**	<1.0	<1.0	<1.0	<1.0	**17.0**	**9.4**	**4.3**	<1.0	T12DCE 5.0, TOL 120
NMW-08S	S	08/12/04	**48.0**	**62.0**	<1.0	<1.0	<1.0	<1.0	**5.5**	**3.9**	**2.2**	<1.0	MTBE 1.7, T12DCE 3.2
NMW-08D	D	05/10/01	**110.0**	**230.0**	<1.0	**1.2**	<1.0	<1.0	**34.0**	**18.0**	**7.9**	<1.0	T12DCE 11
NMW-08D	D	08/12/04	**56.0**	**91.0**	<1.0	<1.0	<1.0	<1.0	**5.8**	**4.9**	**3.5**	<1.0	MTBE 3.2, T12DCE 4.5
NMW-09S	S	05/10/01	**180.0**	**190.0**	<1.0	<1.0	<1.0	<1.0	**14.0**	**20.0**	**6.8**	<1.0	T12DCE 12
NMW-09S	S	08/18/04	**170.0**	**18.0**	<5.0	<5.0	<5.0	<5.0	**9.7**	**8.6**	<5.0	<5.0	T12DCE 5.2
NMW-09D	D	05/10/01	**130.0**	**290.0**	<1.0	<1.0	<1.0	<1.0	**25.0**	**27.0**	**8.4**	**2.3**	MTBE 1.5, T12DCE 20
NMW-09D	D	08/18/04	**120.0**	**76.0**	<2.0	<2.0	<2.0	<2.0	**6.7**	**6.8**	**2.2**	<2.0	T12DCE 3.8
NMW-09D dup	D	08/18/04	**99.0**	**99.0**	<1.0	<1.0	<1.0	**1.4**	**9.4**	**9.8**	**2.8**	<1.0	T12DCE 4.8, 12DCA 1.2

Table 3-3
North Industrial Corridor
Summary of Site-wide Sampling Results
August 2004

Station ID	Well Depth	Sample Date	cis-1,2-DCE (µg/L)	TCE (µg/L)	PCE (µg/L)	BEN (µg/L)	CT / CCL4 (µg/L)	CFM (µg/L)	VC (µg/L)	11DCE (µg/L)	11DCA (µg/L)	1,1,1-TCA (µg/L)	Other Detected Compounds (µg/L)
NMW-10S	S	05/09/01	**53.0**	**150.0**	<1.0	<1.0	<1.0	<1.0	**18.0**	**7.5**	**4.6**	<1.0	T12DCE 1.4
NMW-10S	S	08/18/04	**94.0**	**130.0 JH**	<1.0	<1.0	<1.0	**1.4**	<1.0	**10.0**	**5.3**	<1.0	12DCA 1.2, MTBE 1.4, T12DCE 4.7
NMW-10D	D	05/09/01	**51.0**	**140.0**	<1.0	<1.0	<1.0	**1.3**	**20.0**	**6.5**	**4.0**	<1.0	T12DCE 1.6
NMW-10D	D	08/18/04	**68.0**	**88.0**	<1.0	<1.0	<1.0	**1.3**	**12.0**	**5.6**	**3.7**	<1.0	MTBE 1.6, T12DCE 3.4
NMW-11S	S	05/03/01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-11S	S	08/12/04	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-11D	D	05/03/01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-11D	D	08/12/04	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-13S	S	05/10/01	<1.0	<1.0	<1.0	**320.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	EBN 95, TOL 140, XYL-MP 310, XYL-O 84
NMW-13S	S	08/11/04	<1.0	**1.7**	<1.0	**250.0**	<1.0	**3.7**	<1.0	<1.0	**1.2**	<1.0	12DCA 7.3, 12DCP 2.5,CHEA 6.2. CM 35, EBN 130, XYL-MP 380, XYL O 160, TOL 120
NMW-13D	D	05/10/01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-13D	D	08/11/04	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-16S	S	05/04/01	<1.0	**1.7**	**3.5**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-16S	S	08/11/04	<1.0	<1.0	**2.1**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-16D	D	05/04/01	<1.0	**2.4**	**7.3**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-16D	D	08/11/04	<1.0	**1.8**	**3.5**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	MTBE 1.8
NMW-18S	S	05/08/01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-18S	S	08/11/04	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-18D	D	05/08/01	**10.0**	**1.5**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-18D	D	08/11/04	**4.7**	**1.3**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	CHEA 6.6
NMW-19D	D	05/08/01	**68.0**	**110.0**	<1.0	<1.0	<1.0	<1.0	**3.7**	**3.6**	**1.5**	<1.0	T12DCE 1.4
NMW-19D	D	08/11/04	**59.0**	**9.1**	<1.0	<1.0	<1.0	<1.0	**2.0**	**1.2**	<1.0	<1.0	None
NMW-20S	S	05/03/01	<1.0	<1.0	**40.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-20S	S	08/12/04	<1.0	<1.0	**25.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-20D	D	05/03/01	**4.5**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-20D	D	08/12/04	**6.2**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-22S	S	05/07/01	<1.0	**1.7**	**19.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-22S	S	08/12/04	<1.0	<1.0	<1.0	<1.0	<1.0	**3.0**	<1.0	<1.0	<1.0	<1.0	BDCM 1.7
NMW-22D	D	05/07/01	**2.3**	**1.8**	**2.8**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-22D	D	08/12/04	**3.8**	**5.7**	**17.0**	<1.0	<1.0	**2.8**	<1.0	<1.0	<1.0	<1.0	BDCM 1.7
NMW-23S	S	05/03/01	**7.4**	**50.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-23S	S	08/23/04	**21.0**	**17.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	CHEA 1.7
NMW-23D	D	05/03/01	**2.0**	**3.5**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-23D	D	08/23/04	**1.8**	**1.6**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None

Table 3-3
North Industrial Corridor
Summary of Site-wide Sampling Results
August 2004

Station ID	Well Depth	Sample Date	cis-1,2-DCE (µg/L)	TCE (µg/L)	PCE (µg/L)	BEN (µg/L)	CT / CCL4 (µg/L)	CFM (µg/L)	VC (µg/L)	11DCE (µg/L)	11DCA (µg/L)	1,1,1-TCA (µg/L)	Other Detected Compounds (µg/L)
NMW-25S	S	05/08/01	**18.0**	**21.0**	**1.2**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-25S	S	08/12/04	**10.0**	**8.4**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-25D	D	05/08/01	**20.0**	**19.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-25D	D	08/12/04	**20.0**	**14.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-31S	S	05/09/01	**11.0**	**55.0**	**3.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NBB 0.99, PIPT 1.0, T12DCE 1.3
NMW-31S	S	08/11/04	**23.0**	**59.0**	**5.5**	<1.0	<1.0	<1.0	<1.0	<1.0	**1.4**	<1.0	MTBE 4.2
NMW-31D	D	05/09/01	**43.0**	**200.0**	**4.0**	<1.0	<1.0	<1.0	**3.3**	**1.0**	**1.9**	<1.0	T12DCE 5.2
NMW-31D	D	08/11/04	**98.0**	**260.0**	**17.0**	<1.0	<1.0	<1.0	**8.1**	**2.5**	**4.6**	<1.0	12DCP 1.5, MTBE 3.1, T12DCE 3.9
NMW-32S	S	05/08/01	**40.0**	**220.0**	**4.5**	<1.0	<1.0	<1.0	**2.3**	**1.6**	**1.7**	<1.0	T12DCE 2.7
NMW-32S	S	08/11/04	**24.0**	**180.0**	**8.7**	<1.0	<1.0	<1.0	<1.0	**1.1**	<1.0	<1.0	T12DCE 1.6
NMW-32D	D	05/08/01	**55.0**	**270.0**	**5.2**	<1.0	<1.0	<1.0	**3.1**	**2.3**	**2.1**	<1.0	T12DCE 3.0
NMW-32D	D	08/11/04	**43.0**	**210.0**	**6.4**	<1.0	<1.0	<1.0	**1.4**	**2.3**	**1.3**	<1.0	T12DCE 2.8
NMW-32D dup	D	08/11/04	**43.0**	**240.0**	**7.2**	<1.0	<1.0	<1.0	**1.4**	**2.4**	**1.2**	<1.0	T12DCE 2.9
NMW-35S	S	05/08/01	**29.0**	**68.0**	<1.0	<1.0	<1.0	<1.0	<1.0	**1.5**	<1.0	<1.0	None
NMW-35S	S	08/12/04	**13.0**	**35.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-35D	D	05/08/01	**95.0**	**270.0**	<1.0	<1.0	<1.0	<1.0	**4.5**	**5.7**	**2.5**	<1.0	T12DCE 3.0
NMW-35D	D	08/12/04	**74.0**	**170.0**	<1.0	<1.0	<1.0	<1.0	**1.7**	**6.2**	**1.8**	<1.0	T12DCE 2.8
NMW-39S	S	05/09/01	**360.0**	**37.0**	<1.0	<1.0	<1.0	<1.0	**26.0**	**24.0**	**8.4**	<1.0	T12DCE 17
NMW-39S	S	08/17/04	**110.0**	**5.6**	<1.0	<1.0	<1.0	<1.0	**8.0**	**3.7**	**4.2**	<1.0	MTBE 2.4, T12DCE 3.9
NMW-39D	D	05/09/01	**260.0**	**220.0**	<1.0	**1.6**	<1.0	**1.1**	**18.0**	**17.0**	**6.2**	**1.9**	T12DCE 13
NMW-39D	D	08/17/04	**93.0**	**110.0**	<1.0	<1.0	<1.0	<1.0	**2.9**	**9.4**	**2.6**	<1.0	T12DCE 3.6
NMW-40S	S	05/08/01	**77.0**	**190.0**	<1.0	<1.0	<1.0	<1.0	**25.0**	**14.0**	**7.2**	<1.0	T12DCE 10
NMW-40S	S	08/31/04	**42.0**	**73.0**	<1.0	<1.0	<1.0	<1.0	**3.5**	**2.6**	**2.6**	<1.0	MTBE 3.0, T12DCE 3.2
NMW-40D	D	05/08/01	**56.0**	**150.0**	<1.0	**2.6**	<1.0	<1.0	**22.0**	**7.7**	**5.2**	<1.0	T12DCE 4.0
NMW-40D	D	08/31/04	**74.0**	**110.0**	<1.0	<1.0	<1.0	<1.0	**8.8**	**5.6**	**4.0**	<1.0	T12DCE 3.8
NMW-41S	S	05/08/01	**55.0**	**250.0**	<1.0	<1.0	<1.0	<1.0	**3.8**	**3.2**	**1.7**	<1.0	T12DCE 2.2
NMW-41S	S	08/12/04	**38.0**	**92.0**	<1.0	<1.0	<1.0	<1.0	**2.2**	**2.7**	<1.0	<1.0	T12DCE 1.3
NMW-41D	D	05/08/01	**38.0**	**170.0**	<1.0	<1.0	<1.0	<1.0	**5.7**	**4.0**	**2.0**	<1.0	T12DCE 2.6
NMW-41D	D	08/12/04	**38.0**	**130.0**	<1.0	<1.0	<1.0	<1.0	**3.9**	**3.6**	**1.2**	<1.0	T12DCE 1.6
NMW-42S	S	07/25/01	**16.0**	**62.0**	**13.0**	<1.0	**5.5**	**8.6**	**1.4**	**1.3**	<1.0	**1.3**	NAP 1.6, TCFM 1.4
NMW-42S	S	08/25/04	**26.0**	**32.0**	**38.0**	<1.0	<1.0	<1.0	**7.1**	**1.3**	**4.2**	<1.0	MTBE 5.2
NMW-42D	D	07/26/01	**35.0**	**99.0**	**2.2**	<1.0	**1.4**	<1.0	**1.1**	**1.1**	<1.0	<1.0	MECL 1.2, TCFM 1.4
NMW-42D	D	08/25/04	**22.0**	**22.0**	**21.0**	<1.0	<1.0	<1.0	**6.2**	<1.0	**2.1**	**1.2**	MTBE 4.5
NMW-42D dup	D	08/25/04	**22.0**	**20.0**	**15.0**	<1.0	<1.0	<1.0	**5.3**	<1.0	**1.9**	**1.1**	MTBE 4.4, CHEA 1.7
NMW-47S	S	05/09/01	**62.0**	**25.0**	<1.0	<1.0	<1.0	<1.0	**11.0**	<1.0	<1.0	<1.0	None
NMW-47S	S	08/11/04	**96.0**	**76.0**	<1.0	<1.0	<1.0	<1.0	**7.9**	<1.0	**1.1**	<1.0	T12DCE 1.9
NMW-47D	D	05/09/01	**270.0**	**77.0**	<1.0	<1.0	<1.0	<1.0	**33.0**	**1.1**	**2.5**	<1.0	None
NMW-47D	D	08/11/04	**21.0**	**87.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None

Table 3-3
North Industrial Corridor
Summary of Site-wide Sampling Results
August 2004

Station ID	Well Depth	Sample Date	cis-1,2-DCE (µg/L)	TCE (µg/L)	PCE (µg/L)	BEN (µg/L)	CT / CCL4 (µg/L)	CFM (µg/L)	VC (µg/L)	11DCE (µg/L)	11DCA (µg/L)	1,1,1-TCA (µg/L)	Other Detected Compounds (µg/L)
NMW-48S	S	07/27/01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-48S	S	08/12/04	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-48D	D	07/27/01	**5.7**	**5.0**	<1.0	<1.0	<1.0	<1.0	**3.4**	<1.0	<1.0	<1.0	None
NMW-48D	D	08/12/04	**6.3**	**1.4**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NWL-06S	S	08/17/04	<1.0	<1.0	<1.0	<1.0	<1.0	**6.0**	<1.0	<1.0	<1.0	<1.0	None
NWL-09S	S	08/17/04	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NWL-09D	D	08/17/04	**13.0**	**5.1**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
UPRF-MW-03	S	07/27/01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NAP 1.2
UPRF-MW-03	S	08/24/04	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-36D	D	07/27/01	<1.0	**5.8**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NAP 2.4
NMW-36D	D	08/24/04	<1.0	**16.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
UPRF-MW-09	S	07/27/01	**1.0**	**2.8**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NAP 44, NPB 1.2
UPRF-MW-09	S	08/24/04	**2.7**	**4.1**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
UPRF-MW-09	S	08/24/04	**1.9**	**3.6**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-37D	D	07/27/01	**17.0**	**66.0**	**1.3**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NAP 21
NMW-37D	D	08/24/04	**13.0**	**110.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	TCFM 1.6
VCM-MW-01	S	05/02/01	**17.0**	**9.2**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**1.5**	<1.0	T12DCE 1.4
VCM-MW-01	S	07/31/03	**20.0**	**8.5**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
VCM-MW-01	S	08/31/04	**8.4**	**3.5**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
VCM-MW-04	D	05/02/01	**28.0**	**11.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**1.7**	<1.0	T12DCE
VCM-MW-04	D	07/31/03	**50.0**	**5.5**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
VCM-MW-04	D	08/31/04	**34.0**	**3.6**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
VCM-MW-02B	S	05/02/01	**7.5**	**15.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
VCM-MW-02B	S	08/31/04	**55.0**	**41.0**	<1.0	<1.0	<1.0	<1.0	<1.0	**1.2**	<1.0	<1.0	T12DCE 1.4
VCM-MW-06	D	05/02/01	**37.0**	**71.0**	<1.0	<1.0	<1.0	<1.0	**1.7**	**1.0**	**1.4**	<1.0	T12DCE 2.4
VCM-MW-06	D	08/31/04	**89.0**	**36.0**	<1.0	<1.0	<1.0	<1.0	<1.0	**1.6**	**1.2**	<1.0	T12DCE 1.9
VCM-MW-07	D	05/02/01	**6.0**	**6.1**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	TOL 1.6
VCM-MW-07	D	08/31/04	**3.8**	**5.4**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WNC-09SR	S	05/02/01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WNC-09SR	S	08/10/04	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	CHEA 10
WNC-09D	D	05/02/01	<1.0	<1.0	<1.0	**1.1**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WNC-09D	D	08/10/04	**6.8**	**13.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-16S	S	05/10/01	<1.0	<1.0	<1.0	**25**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	124TMB 2.8, 135TMB 31, EBN 18, IPB 17, NAP 790, NBB 6.9, NPB 26, PIPT 3.5, SBB 3.2, TBB 1.1, TOL 2.3, XYL-MP 28, XYL-O 1.7
WND-16S	S	08/11/04	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	**1122PCA 110, 112TCA 470**, EBN 190
WNC-16D	D	05/10/01	**3.2**	**6.4**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WNC-16D	D	08/23/04	**3.7**	**5.8**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	CHEA 1.2

Table 3-3
North Industrial Corridor
Summary of Site-wide Sampling Results
August 2004

Station ID	Well Depth	Sample Date	cis-1,2-DCE (µg/L)	TCE (µg/L)	PCE (µg/L)	BEN (µg/L)	CT / CCL4 (µg/L)	CFM (µg/L)	VC (µg/L)	11DCE (µg/L)	11DCA (µg/L)	1,1,1-TCA (µg/L)	Other Detected Compounds (µg/L)
WND-23S	S	05/08/01	**5.2**	**9.5**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-23S	S	08/10/04	<1.0	**4.7**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WNC-23D	D	05/08/01	**3.7**	**33.0**	<1.0	<1.0	<1.0	<1.0	<1.0	**1.1**	<1.0	<1.0	None
WNC-23D	D	08/10/04	**3.1**	**33.0**	<1.0	<1.0	<1.0	<1.0	<1.0	**1.5**	**1.0**	**2.1**	None
WND-31S	S	07/27/01	<1.0	**3.2**	<1.0	<1.0	<1.0	**6.6**	<1.0	<1.0	<1.0	<1.0	NAP 2.8
WND-31S	S	08/24/04	<1.0	**1.7**	<1.0	<1.0	<1.0	**39.0**	<1.0	<1.0	<1.0	<1.0	None
WNC-31D	D	07/27/01	**7.8**	**48.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NAP 6.9
WNC-31D	D	08/24/04	**22.0**	**110.0**	**3.7**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WNC-37SR	S	05/07/01	**22.0**	**37.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WNC-37SR	S	08/26/04	**19.0**	**28.0**	<1.0	<1.0	<1.0	<1.0	**1.6**	**1.2**	**4.0**	<1.0	MTBE 6.0, T12DCE 1.5
WND-37DR	D	06/16/98	**220.0**	**900.0**	**1.4**	**2.9**	**2.6**	**3.1**	**12.0**	**70.0**	**12.0**	**21.0**	12DCA 1.7, CM 1.3, MECL 1.2, T12DCE 20, TOL 1.2
WND-37DR	D	05/07/01	**37.0**	**120.0**	<1.0	**3.3**	<1.0	<1.0	<1.0	**11.0**	**5.3**	<1.0	CHEA 1.1, T12DCE 2.8
WND-37DR	D	08/26/04	**73.0**	**130.0**	<1.0	**1.2**	<1.0	<1.0	**8.1**	**9.7**	**5.8**	<1.0	T12DCE 3.4
WND-02D	D	12/01/97	**23 JDB**	**48 JDB**	<1.0	<1.0	<1.0	<1.0	**24.0**	**2.0**	**1.2**	<1.0	XYL-MP 1.9
WND-02D	D	05/10/01	**6.9**	**6.9**	<1.0	<1.0	<1.0	<1.0	**2.3**	<1.0	<1.0	<1.0	None
WND-02D	D	08/12/04	**7.4**	**3.4**	<1.0	<1.0	<1.0	<1.0	**1.5**	<1.0	<1.0	<1.0	None
WND-03S	S	06/16/98	**760.0**	**72.0**	<1.0	**7.4**	<1.0	<1.0	**3.3**	**25.0**	**6.9**	<1.0	CM 5.1, EBN 40, T12DCE 92, TOL 6.7, XYL-MP 27, XYL-O 3.2
WND-03S	S	05/02/01	**240.0**	**30.0**	<1.0	**5.7**	<1.0	<1.0	**46.0**	**12.0**	**2.5**	<1.0	EBN 13, TOL 2.7, XYL-MP 6.4
WND-03S	S	08/10/04	**30.0**	**19.0**	<1.0	**4.8**	<1.0	<1.0	**36.0**	<1.0	**2.1**	<1.0	**112TCA 5.1**, 12DCP 2.9, CHEA 3.0, EBN 28, XYL-MP 25, XYL-O 9.5, TOL 15, T12DCE 1.7
WND-04S	S	06/15/98	**77.0**	**550.0**	**1.1**	<1.0	<1.0	<1.0	**1.2**	**31.0**	**3.9**	**12.0**	MECL 1.6
WND-04S	S	05/02/01	**41.0**	**120.0**	<1.0	<1.0	<1.0	<1.0	<1.0	**5.1**	<1.0	**1.5**	EDB 1.1
WND-04S	S	08/10/04	**46.0**	**130.0**	<1.0	<1.0	<1.0	<1.0	**1.0**	**4.2**	<1.0	**1.5**	None
WND-12D	D	12/01/97	**3.3 JDB**	**37 JDB**	<1.0	<1.0	**2.2**	**4.2**	<1.0	**5.7**	**4.9**	**2.1**	XYL-MP 2.4, XYL-O 1.3
WND-12D	D	05/03/01	**1.4**	**18.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-12D	D	08/10/04	<1.0	**10.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**2.1**	None
WND-14S	S	05/07/01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-14S	S	08/12/04	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-14D	D	05/07/01	**11.0**	**51.0**	**1.4**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-14D	D	08/12/04	**96.0**	**330.0**	**21.0**	<1.0	<1.0	<1.0	<1.0	**1.0**	**1.1**	<1.0	None
WND-18S	S	12/05/97	<1.0	**13.0 JDB**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	XYL-MP 2.5, XYL-O 1.1
WND-18S	S	05/09/01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-18S	S	08/12/04	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-18D	D	12/05/97	**90.0 JDB**	**360.0**	<1.0	<1.0	<1.0	<1.0	**9.1**	**15.0**	**4.5**	**3.3**	T12DCE 2.6, XYL-MP 1.5
WND-18D	D	05/09/01	**80.0**	**170.0**	<1.0	<1.0	<1.0	<1.0	**15.0**	**14.0**	**4.8**	<1.0	T12DCE 2.4
WND-18D	D	08/12/04	**52.0**	**75.0**	<1.0	<1.0	<1.0	<1.0	**3.7**	**4.2**	**1.4**	<1.0	CBN 2.1, T12DCE 1.5

Table 3-3
North Industrial Corridor
Summary of Site-wide Sampling Results
August 2004

Station ID	Well Depth	Sample Date	cis-1,2-DCE (µg/L)	TCE (µg/L)	PCE (µg/L)	BEN (µg/L)	CT / CCL4 (µg/L)	CFM (µg/L)	VC (µg/L)	11DCE (µg/L)	11DCA (µg/L)	1,1,1-TCA (µg/L)	Other Detected Compounds (µg/L)
WND-19S	S	12/03/97	**17.0 JDB**	**110.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	BDCM 1.1, XYL-MP 1.8
WND-19S	S	05/09/01	**1.6**	**14.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-19S	S	08/12/04	**2.4**	**14.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-19D	D	12/03/97	**51.0 JDB**	**330.0**	<1.0	<1.0	<1.0	<1.0	**2.3**	**3.6**	**1.3**	<1.0	T12DCE 3.3, XYL-MP 1.4
WND-19D	D	05/09/01	**37.0**	**150.0**	<1.0	<1.0	<1.0	<1.0	**5.5**	**5.2**	**1.7**	<1.0	T12DCE 1.3
WND-19D	D	08/12/04	**20.0**	**78.0**	<1.0	<1.0	<1.0	<1.0	**1.8**	**1.8**	<1.0	<1.0	None
WND-21S	S	12/02/97	**92.0 JDB**	**14.0 JDB**	<1.0	<1.0	<1.0	<1.0	<1.0	**5.5**	**2.5**	<1.0	T12DCE 2.1, XYL-MP 2.2
WND-21S	S	05/04/01	**55.0**	**2.9**	<1.0	<1.0	<1.0	<1.0	**1.4**	**3.1**	**1.2**	<1.0	T12DCE 1.7
WND-21S	S	08/20/04	**66.0**	**6.6**	<1.0	<1.0	<1.0	<1.0	<1.0	**2.1**	**1.0**	<1.0	XYL-MP 2.9, T12DCE 1.3
WND-21D	D	12/02/97	**77.0 JDB**	**400.0**	<1.0	<1.0	**2.9**	**1.8**	**1.2**	**32.0**	**5.4**	**12.0**	12DCA 2.1, T12DCE 4.3, XYL-MP 2
WND-21D	D	05/04/01	**86.0**	**230.0**	<1.0	**5.2**	**1.5**	**1.6**	**22.0**	**21.0**	**7.5**	**2.9**	T12DCE 12
WND-21D	D	08/20/04	**85.0**	**230.0**	<1.0	<1.0	<1.0	**1.0**	**3.3**	**8.2**	**2.5**	**1.3**	MECL 2.2, TOL 1.3, T12DCE 4.2
WND-24S	S	12/08/97	**13.0 JDB**	**50.0 JDB**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	XYL-MP 1.5
WND-24S	S	05/09/01	**24.0**	**79.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-24S	S	08/18/04	**6.5**	**15.0**	<1.0	<1.0	<1.0	**2.3**	<1.0	<1.0	<1.0	<1.0	None
WND-24D	D	12/08/97	**49.0 JDB**	**220.0**	<1.0 **JS**	<1.0	<1.0	<1.0	**6.5**	**7.6**	<1.0	**2.0**	T12DCE 1.8
WND-24D	D	05/09/01	**44.0**	**130.0**	<1.0	<1.0	<1.0	<1.0	**6.8**	**3.1**	**1.7**	<1.0	T12DCE 1.1
WND-24D	D	08/18/04	**46.0**	**82.0**	<1.0	**1.5**	<1.0	<1.0	**3.8**	**2.2**	**1.9**	<1.0	TOL 3.3
WND-26S	S	05/04/01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-26S	S	08/20/04	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-26D	D	05/04/01	<1.0	**6.4**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-26D	D	08/20/04	<1.0	**4.6**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	MECL 1.4
WND-29S	S	05/03/01	<1.0	**1.1**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-29S	S	08/23/04	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-29D	D	05/03/01	<1.0	**4.6**	<1.0	<1.0	**1.3**	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-29D	D	08/23/04	<1.0	**2.6**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-33S	S	12/03/97	**120.0**	**370.0**	<1.0	**4.0**	<1.0	<1.0	**70.0**	**27.0**	**14.0**	**1.8**	CHEA 4.6, T12DCE 5.9, XYL-MP 2.6, XYL-O 1.4
WND-33S	S	05/07/01	**100.0**	**160.0**	<1.0	<1.0	<1.0	<1.0	**9.4**	**2.4**	**3.5**	<1.0	T12DCE 1.9
WND-33S	S	08/17/04	**22.0**	**37.0**	<1.0	<1.0	<1.0	<1.0	**1.4**	<1.0	**1.6**	<1.0	None
WND-33D	D	12/03/97	**150.0**	**380.0**	<1.0	**5.4**	<1.0	<1.0	**110.0**	**25.0**	**12.0**	**2.0**	CHEA 7.9, T12DCE 7.4, TOL 1.2, XYL-MP 2.1, XYL-O 1.1
WND-33D	D	05/07/01	**72.0**	**43.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**4.3**	<1.0	None

Table 3-3
North Industrial Corridor
Summary of Site-wide Sampling Results
August 2004

Station ID	Well Depth	Sample Date	cis-1,2-DCE (µg/L)	TCE (µg/L)	PCE (µg/L)	BEN (µg/L)	CT / CCL4 (µg/L)	CFM (µg/L)	VC (µg/L)	11DCE (µg/L)	11DCA (µg/L)	1,1,1-TCA (µg/L)	Other Detected Compounds (µg/L)
WND-34S	S	06/16/98	**33.0**	**17.0**	<1.0	**120**	<1.0	<1.0	**79.0**	**2.9**	**8.5**	<1.0	12DCA 4.6, CM 5.9, T12DCE 2.7, TOL 1.3
WND-34S	S	05/04/01	**7.3**	**11.0**	<1.0	**160**	<1.0	<1.0	**5.0**	<1.0	**2.3**	<1.0	MECL 4.4, TOL 1.5
WND-34S	S	08/18/04	**1.3**	<1.0	<1.0	**100**	<1.0	<1.0	<1.0	<1.0	**2.9**	<1.0	112TCA 3.0, 12DCA 4.6, XYL-MP 5.0, TOL 2.8
WND-34D	D	06/16/98	**74.0**	**160.0**	<1.0	**230**	<1.0	**5.2**	**31.0**	**10.0**	**7.1**	<1.0	12DCA 7.2, CHEA 1, CM 7.9, EBN 1.3, T12DCE 2.2, TOL 1.4
WND-34D	D	05/04/01	**23.0 JIH**	**32.0 JIH**	<1.0 **JIH**	**64 JIH**	<1.0 **JIH**	<1.0 **JIH**	<1.0 **JIH**	**1.4 JIH**	**1.7 JIH**	<1.0 **JIH**	None
WND-34D	D	08/18/04	**30.0**	**10.0**	<1.0	**110**	<1.0	<1.0	<1.0	<1.0	**2.6**	<1.0	BDCM 1.0
WND-36S	S	12/05/97	**4.7**	<1.0	<1.0	**180**	<1.0	<1.0	**52.0**	<1.0	**9.2**	<1.0	EBN 72, TOL 18, XYL-MP 45, XYL-O 12
WND-36S	S	05/04/01	**1.1**	**3.2**	<1.0	**100**	<1.0	<1.0	<1.0	<1.0	**4.6**	<1.0	EBN 54, TOL 31, XYL-MP 73, XYL-O 10
WND-36S	S	08/18/04	<1.0	<1.0	<1.0	**290 JH**	<1.0	<1.0	<1.0	<1.0	**2.9**	<1.0	12DCA 12, BDCM 2.1, EBN 55, XYL-MP 94, MECL 23, XYL-O 13, TOL 28
WND-36D	D	12/05/97	**76.0 JDB**	**400.0**	<1.0	**2.7**	<1.0	**2.1**	**22.0**	**35.0**	**6.7**	**7.8**	None
WND-36D	D	05/04/01	**49.0**	**44.0**	<1.0	**1.2**	<1.0	<1.0	**15.0**	**2.5**	**2.2**	<1.0	T12DCE 1.1
WND-36D	D	08/18/04	**18.0**	**66.0**	**12.0**	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	None
WND-38S	S	12/04/97	<1.0	**16.0 JDB**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	XYL-MP 1.5
WND-38S	S	05/08/01	<1.0	**3.3**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-38S	S	08/17/04	<1.0	**2.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-38D	D	12/04/97	**26.0 JDB**	**140.0**	<1.0	<1.0	<1.0	<1.0	**4.3**	**5.6**	**1.6**	**1.3**	BDCM 1.5
WND-38D	D	05/08/01	**8.1**	**22.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-38D	D	08/17/04	**26.0**	**36.0**	<1.0	<1.0	<1.0	<1.0	**2.4**	**2.0**	<1.0	<1.0	None
WND-39S	S	12/08/97	**7.4 JDB**	**47.0 JDB**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	XYL-MP 2.3, XYL-O 1.1
WND-39S	S	05/08/01	**3.0**	**29.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-39S	S	08/17/04	**15.0**	**50.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	MTBE 2.1
WND-39D	D	12/08/97	**120.0 JS**	**610.0**	<1.0	**5.4**	<1.0	<1.0	**54.0 JS**	**34.0 JS**	**12.0 JS**	**5.0**	CM 2.5, T12DCE 3.7, XYL-MP 1.7
WND-39D	D	05/08/01	**13.0**	**32.0**	<1.0	<1.0	<1.0	<1.0	**1.8**	**1.3**	**2.5**	<1.0	None
WND-39D	D	08/17/04	**40.0**	**64.0**	<1.0	<1.0	<1.0	<1.0	**2.5**	**1.9**	**1.5**	<1.0	T12DCE 1.3
WND-41S	S	05/03/01	<1.0	**7.2**	**2.3**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-41S	S	08/24/04	<1.0	**2.1**	**1.5**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-41D	D	05/03/01	**4.2**	**45.0**	**3.2**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-41D	D	08/24/04	**8.4**	**39.0**	**1.8**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-43S	S	05/09/01	**1.7**	<1.0	<1.0	<1.0	<1.0	<1.0	**1.2**	<1.0	<1.0	<1.0	None
WND-43S	S	08/18/04	<1.0	<1.0	<1.0	**2.1**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-43D	D	05/09/01	**37.0**	**99.0**	<1.0	**1.1**	<1.0	<1.0	**6.5**	**2.7**	**1.2**	<1.0	T12DCE 1.1
WND-43D	D	08/18/04	**21.0**	**47.0**	<1.0	**8.3**	<1.0	<1.0	**4.5**	<1.0	<1.0	<1.0	None

Table 3-3
North Industrial Corridor
Summary of Site-wide Sampling Results
August 2004

Station ID	Well Depth	Sample Date	cis-1,2-DCE (µg/L)	TCE (µg/L)	PCE (µg/L)	BEN (µg/L)	CT / CCL4 (µg/L)	CFM (µg/L)	VC (µg/L)	11DCE (µg/L)	11DCA (µg/L)	1,1,1-TCA (µg/L)	Other Detected Compounds (µg/L)
WND-44S	S	12/04/97	**6.7 JDB**	**28.0 JDB**	<1.0	**1.8**	<1.0	<1.0	**15.0**	<1.0	**2.1**	<1.0	XYL-MP 2.5, XYL-O 1.3
WND-44S	S	05/08/01	**1.3**	<1.0	<1.0	**2.3**	<1.0	<1.0	**23.0**	<1.0	**1.8**	<1.0	None
WND-44S	S	08/20/04	**14.0**	<1.0	<1.0	**1.3**	<1.0	<1.0	**4.4**	<1.0	<1.0	<1.0	XYL-MP 3.0
WND-44D	D	12/04/97	**7.7 JDB**	**21.0 JDB**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	XYL-MP 1.9
WND-44D	D	05/08/01	**17.0**	**18.0**	<1.0	<1.0	<1.0	<1.0	**2.7**	<1.0	<1.0	<1.0	None
WND-45S	S	12/04/97	**5.6 JDB**	**20.0 JDB**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	XYL-MP 1.8
WND-45S	S	05/10/01	**7.9**	**26.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-45S	S	08/11/04	**5.2**	**19.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-45D	D	12/04/97	**110.0**	**300.0**	<1.0	<1.0	<1.0	<1.0	**8.8**	**4.1**	**1.9**	<1.0	T12DCE 2.7, XYL-MP 1.3
WND-45D	D	05/10/01	**54.0**	**220.0**	<1.0	<1.0	<1.0	<1.0	**3.4**	**7.2**	**2.0**	<1.0	DCDFM 7.3, T12DCE 1.9
WND-45D	D	08/11/04	**58.0**	**100.0**	<1.0	<1.0	<1.0	<1.0	**1.8**	**3.8**	**1.4**	<1.0	T12DCE 1.8
WND-46S	S	05/10/01	**2.8**	**8.8**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-46S	S	08/20/04	**3.3**	**8.2**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	EBN 1.6, XYL-MP 6.5, XYL-O 1.6
WND-46D	D	05/10/01	**65.0**	**130.0**	<1.0	<1.0	<1.0	<1.0	**3.2**	**3.2**	**3.3**	**1.9**	T12DCE 2.7
WND-46D	D	08/20/04	**66.0**	**61.0**	<1.0	<1.0	<1.0	<1.0	**1.4**	**2.5**	**1.9**	<1.0	T12DCE 1.5
WND-47S	S	12/03/97	**26.0 JDB**	**170.0**	**9.7**	<1.0	<1.0	<1.0	**1.1**	**1.2**	**1.0**	<1.0	12DCP 1.3, T12DCE 1.6, XYL-MP 1.8
WND-47S	S	05/09/01	**27.0**	**180.0**	**6.8**	<1.0	<1.0	<1.0	**1.1**	<1.0	<1.0	<1.0	T12DCE 1.4
WND-47S	S	08/11/04	**8.6**	**70.0**	**11.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-47D	D	12/03/97	**88.0 JDB**	**590.0**	**2.4**	<1.0	<1.0	<1.0	**7.5**	**5.1**	**4.3**	<1.0	T12DCE 6.3, XYL-MP 1.5
WND-47D	D	05/09/01	**51.0**	**340.0**	**7.4**	<1.0	<1.0	<1.0	**6.1**	**4.6**	**2.5**	<1.0	T12DCE 4.7
WND-47D	D	08/11/04	**32.0**	**130.0**	**12.0**	<1.0	<1.0	<1.0	<1.0	**2.9**	**1.1**	<1.0	T12DCE 1.7
WND-48S	S	05/08/01	<1.0	**1.2**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-48S	S	07/31/03	**8.1**	**2.5**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**2.8**	<1.0	None
WND-48S	S	08/20/04	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-48D	D	05/08/01	**10.0**	**35.0**	<1.0	<1.0	<1.0	<1.0	<1.0	**7.1**	**2.9**	**12.0**	None
WND-48D	D	07/31/03	**37.0**	**41.0**	<1.0	<1.0	<1.0	<1.0	**2.1**	**4.5**	**5.1**	**3.3**	None
WND-48D	D	08/20/04	**32.0**	**31.0**	<1.0	<1.0	<1.0	<1.0	**1.5**	**1.3**	**2.2**	<1.0	EBN 1.0, XYL-MP 4.4
SW-04	Surface	08/09/04	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
SW-05	Surface	08/09/04	**3.9**	**2.5**	<1.0	<1.0	<1.0	<1.0	**1.1**	<1.0	<1.0	<1.0	None
SW-06	Surface	05/16/01	**30 JH**	<1.0 **JH**	<1.0 **JH**	**3.3 JH**	<1.0 **JH**	<1.0 **JH**	**33 JH**	**1.5 JH**	**1.9 JH**	<1.0 **JH**	TOL 7.6JH, T12DCE 2.6JH
SW-06	Surface	08/09/04	**15.0**	<1.0	<1.0	**3.4**	<1.0	<1.0	**3.5**	<1.0	<1.0	<1.0	None
SW-06 dup	Surface	08/09/04	**15.0**	<1.0	<1.0	**4.1**	<1.0	<1.0	**3.5**	<1.0	<1.0	<1.0	None
SW-08	Surface	05/16/01	<1.0	**1.2**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
SW-08	Surface	08/09/04	**3.0**	**2.6**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
SW-101	Surface	08/09/04	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
SW-102	Surface	08/09/04	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
SW-103	Surface	08/09/04	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
SW-104	Surface	08/09/04	**9.4**	**8.3**	**3.2**	**3.7**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
SW-105	Surface	08/09/04	**2.8**	**6.5**	**2.2**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None

Table 3-3
North Industrial Corridor
Summary of Site-wide Sampling Results
August 2004

Station ID	Well Depth	Sample Date	cis-1,2-DCE (µg/L)	TCE (µg/L)	PCE (µg/L)	BEN (µg/L)	CT / CCL4 (µg/L)	CFM (µg/L)	VC (µg/L)	11DCE (µg/L)	11DCA (µg/L)	1,1,1-TCA (µg/L)	Other Detected Compounds (µg/L)
SW-13	Surface	08/09/04	**3.0**	**2.0**	**1.4**	**2.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
SW-14	Surface	08/09/04	**9.0**	**1.9**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
Source Area Monitoring Wells													
NMW-34S		03/28/05	**37.0**	**14.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-34D		03/28/05	**11.0**	**34.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-11S		03/28/05	**5.1**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	12DCP 2.5, **1122PCA 6.4, 112TCA 24**, XYL-O 3.9
WND-11D		03/28/05	**2.0**	**28.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-12S		03/28/05	**2.2**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**11.0**	<1.0	<1.0	None
WND-40D		03/28/05	**25.0**	**29.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	T12DCE 1.9
FLE-1S		03/28/05	<1.0	<1.0	<1.0	**3400.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	EBN 200, TOL 2.0, XYL-MP 35, XYL-O 1.2
FLE-1D		03/28/05	**26.0**	**110.0**	**3.5**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	T12DCE 1.8

µg/L= micorgrams per liter

VOLATILE ORGANIC COMPOUNDS:

PCE = Tetrachloroethene
TCE = Trichloroethene
C12DCE = cis-1,2-dichloroethene
VC = Vinyl chloride
1,1,1-TCA = 1,1,1-Trichloroethane
11DCA = 1,1-Dichloroethane
11DCE = 1,1-Dichloroethene
CT/CCL4 = Carbon tetrachloride
CFM = Chloroform
BEN = Benzene

Bold text indicates results above analytical detection limits.
DUP = Field duplicate sample.
JS = Estimated due to surrogate recoveries outside of control limits.
JH = Estimated due to holding time violations.
JIH = Estimated due to elevated internal standard concentration (from RI report)
JDB = Estimated due to contamination detected in decontamination blank (from RI report)

Other Detected Compounds:

T12DCE = trans-1,2-Dichloroethene
12DCA = 1,2-Dichloroethane
EBN = Ethylbenzene
XYL-MP = m,p-Xylene
XYL-O = o-Xylene
TOL = Toluene
MECL = Methylene Chloride
NAP = Naphthalene
CHEA = Chloroethane
CM = Chloromethane
NB=n-Butylbenzene
NPB = n-Propylbenzene
SBB = sec-Butylbenzene
PIPT = p-Isopropyltoluene
TCFM = Trichlorofluoromethane
1122PCA = 1,1,2,2-Tetrachloroethane
112TCA = 1,1,2-Trichloroethane
12DCP = 1,2-Dichloropropane
CBN = Chlorobenzene
12DCB = 1,2-Dichlorobenzene
BDCM = Bromodichloromethane
IPB= Isopropylbenzene
124TMB = 1,2,4-Trimethylbenzene
135TMB = 1,3,5-Trimethylbenzene
DCDFM=Dichlorodifluoromethane
MTBE = Methyl-tertbutylether
TBB = tert-Butylbenzene
EDB=Ethylene Dibromide

Table 3-4
Source Area Investigation Groundwater Analytical Results
North Industrial Corridor
Wichita, Kansas

Source Area	Sample Location	Depth (feet)	Dilution Onsite	Date	Comment	cis-1,2-DCE		TCE		PCE		B		T		EBN		XYL		CT / CCL4		CFM		VC	1,1 DCE	1,1-DCA	1,1,1-TCA		Other Detected Compounds
						Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite (m&p / o)	Onsite	Offsite	Onsite	Offsite	Offsite	Offsite	Offsite	Onsite	Offsite	Offsite
Identified Source Areas (Based on 2004 RI Classification)																													
A & A Auto	GP05C-03	16-20	1:1	8/31/04		**0.8 J**	-----	**1.2 J**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP05C-03	11-15	1:1	8/31/04		<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP05C-04	16-20	1:1	8/31/04		**15.9**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP05C-04	11-15	1:1	8/31/04		**0.9 J**	<1	<2	<1	<2	<1	<2	<1	-----	<1	-----	<1	-----	<2 / <1	<2	<1	<2	<1	<1	<1	<1	<2	<1	None
	GP05C-06	16-20	1:1	8/31/04		**5.5**	-----	**9.5**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP05C-06	11-15	1:1	8/31/04		<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP05C-08	16-20	1:1	8/31/04		**41.8**	-----	**31.8**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP05C-08	16-20	1:1	8/31/04	duplicate	**39.8**	-----	**31.5**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP05C-08	11-15	1:1	8/31/04		**19.7**	**25.0**	**14.4**	**23.0**	<2	<1	<2	<1	-----	<1	-----	<1	-----	<2 / <1	<2	<1	<2	<1	<1	<1	**1.1**	<2	<1	trans 1,2-DCA 1.4
Aero Space Controls	GP#18-1	12-16	1:1	9/3/04		**5.9**	**1.7**	<2	<1	<2	<1	**3.5**	<1	-----	<1	-----	**1.9**	-----	<2 / <1	<2	<1	<2	<1	<1	<1	<1	<2	<1	None
	GP03F-01	12-16	1:1	9/3/04		**49.2**	**78.0**	**411 E**	**620.0**	**2.0**	**5.5**	<2	<1	-----	<1	-----	<1	-----	<2 / <1	<2	<1	<2	<1	<1	**2.8**	**8.1**	**29.0**	**29.0**	trans 1,2-DCA 1.1
	GP03F-01	12-16	1:3	9/3/04	duplicate	**62.4**	-----	**562.0**	-----	**2.2 J**	-----	<6	-----	-----	-----	-----	-----	-----	-----	<6	-----	<6	-----	-----	-----	-----	**34.1**	-----	None
	GP03F-02	12-16	1:5	9/3/04		**60.9**	**110.0**	**363.0**	**520.0**	**0.4 J**	**5.5**	<10	<1	-----	<1	-----	<1	-----	<2 / <1	<10	<1	<10	<1	<1	**1.6**	**7.8**	**20.1**	**22.0**	trans 1,2-DCA 2.1
	GP-ASC-01	12-16	1:2	9/3/04		**19.1**	<1	**6.4**	<1	**11.2**	<1	**6.9**	**1.8**	-----	<1	-----	<1	-----	<2 / <1	<4	<1	<4	<1	<1	<1	<1	<4	<1	None
	GP-ASC-01Q	12-16		9/3/04	duplicate		<1		<1		<1	-----	**1.8**	-----	<1	-----	<1	-----	<2 / <1	-----	<1	-----	<1	<1	<1	<1	-----	<1	None
	GP-ASC-02	12-16	1:2	9/3/04		**60.7**	-----	**95.1**	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	<4	-----	<4	-----	-----	-----	-----	**3.1 J**	-----	None
Christopher Steel	GP-CSI-01	15-19	1:1	9/29/04		<2	<1	<2	<1	**28.9**	**9.4**	<2	<1	<2	<1	<2	<1	<2	<2 / <1	-----	<1	-----	<1	<1	<1	<1	-----	<1	None
	GP-CSI-01	15-19	1:1	9/29/04	duplicate	<2	-----	<2	-----	**28.3**		<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-CSI-02	12-16	1:1	10/20/04		<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-CSI-03	12-16	1:1	10/20/04		<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
Former Coastal Boneyard	GPA05-3	31-35	1:2	9/16/04		**2.7 J**	-----	**56.5**	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None
	GPA05-3	31-35	1:2	9/16/04	duplicate	**2.3 J**	-----	**47.2**	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None
	GPA05-3	16-20	1:2	9/16/04		<4	-----	**24.2**	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None
	GPA05-3	12-16	1:1	9/16/04		<2	-----	**3.6**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GPA05-3	12-16	1:1	9/16/04	duplicate	<2	-----	**4.3**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP02A-05	31-35	1:1	9/17/04		<2	-----	**0.7 J**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP02A-05	16-20	1:1	9/17/04		**0.9 J**	<1	**26.3**	**31.0**	<2	<1	<2	<1	-----	<1	-----	<1	-----	<2 / <1	<2	<1	<2	<1	<1	<1	<1	<2	<1	None
	GP02A-05	12-16	1:1	9/17/04		<2	<1	**2.0**	**4.5**	<2	<1	<2	<1	-----	<1	-----	<1	-----	<2 / <1	<2	<1	<2	<1	<1	<1	<1	<2	<1	None
	GP02A-06	31-35	1:1	9/17/04		**0.6 J**	-----	**6.2**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP02A-06	16-20	1:1	9/17/04		<2	-----	**1.5**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP02A-06	12-16	1:1	9/17/04		<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP02A-07	31-35	1:1	9/17/04		**1.4 J**	-----	**17.6**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP02A-07	31-35	1:1	9/17/04	duplicate	**1.1 J**	-----	**13.9**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP02A-07	16-20	1:1	9/17/04		**0.3 J**	-----	**6.1**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP02A-07	12-16	1:1	9/17/04		<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-CBY-01	12-16	1:1	3/28/05		<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-CBY-01	16-20	1:1	3/28/05		<2	-----	**3.2**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-CBY-01	31-35	1:1	3/28/05		<2	-----	**4.3**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
Compressed Gases	WND-12S	S	1:1	9/10/04	odor	**2.7**	-----	<2	-----	<2	-----	**0.7 J**	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
Former Dold Foods	GP04C-01	14-18	1:1	8/31/04		**0.4 J**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP04C-01	12-16	1:1	8/31/04		**9.8**	<1	<2	<1	<2	<1	<2	<1	-----	<1	-----	<1	-----	<2 / <1	<2	<1	<2	<1	<1	<1	<1	<2	<1	None
	GP-DLD-01	14-18	1:1	8/31/04		<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-DLD-01	12-16	1:1	8/31/04		<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-DLD-01	12-16	1:1	8/31/04	duplicate	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-DLD-02	14-18	1:1	9/1/04		**16.7**	-----	**11.7**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-DLD-02	12-16	1:1	9/1/04		**9.2**	-----	**5.4**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-DLD-03	14-18	1:1	9/1/04		**23.0**	-----	**15.4**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-DLD-03	12-16	1:1	9/1/04		**13.1**	**19.0**	**10.8**	**13.0**	<2	<1	<2	<1	-----	<1	-----	<1	-----	<2 / <1	<2	<1	<2	<1	<1	<1	<1	<2	<1	None
	GP#34-7	14-18	1:1	9/1/04		**1.0 J**	-----	**1.7 J**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP#34-7	12-16	1:1	9/1/04		**1.9 J**	-----	**3.6**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP#34-7	12-16	1:1	9/1/04	duplicate	**1.3 J**	-----	**3.0**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-DLD-05	14-18	1:1	9/10/04		**11.0**	-----	**4.9**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-DLD-05	12-16	1:1	9/10/04		**8.8**	-----	**6.6**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-DLD-05	12-16	1:1	9/10/04	duplicate	**9.9**	-----	**6.9**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-DLD-06	14-18	1:1	9/21/04		**16.8**	-----	**0.7 J**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-DLD-06	12-16	1:1	9/21/04		**11.6**	**13.0**	<2	<1	<2	<1	<2	<1	-----	<1	-----	<1	-----	<2 / <1	<2	<1	<2	<1	<1	<1	<1	<2	<1	None
Dow Essex/ Wil-Gro	GP03A-01	13-17	1:1	8/30/04		**1.4 J**	**1.2**	**21.4**	**24.0**	<2	<1	<2	<1	-----	<1	-----	<1	-----	<2 / <1	<2	<1	<2	<1	<1	<1	<1	<2	<1	MeCL 2 (UB)
	GP03A-06	13-17	1:1	8/30/04		**2.8**	-----	**11.5**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP03A-06	9-13	1:1	8/30/04		<2	-----	**1.7 J**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-DOW-01	13-17	1:1	8/30/04		<2	-----	**1.2 J**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-DOW-01	9-13	1:1	8/30/04		<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-DOW-02	13-17	1:1	8/30/04		**2.3**	-----	**15.5**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-DOW-02	9-13	1:1	8/30/04		**0.6 J**	-----	**5.9**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-DOW-03	13-17	1:1	8/30/04		<2	-----	**1.3 J**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-DOW-03	9-13	1:1	8/30/04		<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None

CDM

Results are given in ug/L (ppb) for groundwater
J = Estimated value below calibration range
NA = Not applicable/not available

Table 3-4
Source Area Investigation Groundwater Analytical Results
North Industrial Corridor
Wichita, Kansas

Source Area	Sample Location	Depth (feet)	Dilution Onsite	Date	Comment	cis-1,2-DCE		TCE		PCE		B		T		EBN		XYL		CT / CCL4		CFM		VC	1,1 DCE	1,1-DCA	1,1,1-TCA		Other Detected Compounds
						Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite (m&p / o)	Onsite	Offsite	Onsite	Offsite	Offsite	Offsite	Offsite	Onsite	Offsite	Offsite
Dow Essex/ Wil-Gro (Continued)	GP-DOW-04	13-17	1:1	8/30/04		0.3 J	-----	4.1	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-DOW-04	9-13	1:1	8/30/04		<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-DOW-04	9-13	1:1	8/30/04	duplicate	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-DOW-05	13-17	1:1	8/30/04		<2	<1	3.6	7.8	<2	<1	<2	<1	-----	<1	-----	<1	-----	<2 / <1	<2	<1	<2	<1	<1	<1	<1	<2	<1	MTBE 5.1, MeCL 12 (UB)
	GP-DOW-05	9-13	1:1	8/30/04		<2	<1	1.2 J	1.1	<2	<1	<2	<1	-----	<1	-----	<1	-----	<2 / <1	<2	<1	<2	<1	<1	<1	<1	<2	<1	MeCL 7 (UB)
	GP-DOW-06	11-15	1:1	9/17/04		<2	-----	6.8	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-DOW-07	13-17	1:1	9/17/04		4.1	-----	39.7	-----	0.3 J	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-DOW-07	10-14	1:1	9/17/04		1.3	-----	17.7	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
Huttig	GP-HUT-01	16-20	1:1	9/14/04		<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-HUT-01	12-16	1:1	9/14/04		<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-HUT-02	16-20	1:1	9/14/04		24.9	-----	4.9	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-HUT-02	12-16	1:2	9/14/04		28.2	22.0	1.6 J	1.8	<4	<1	<4	<1	-----	<1	-----	<1	-----	<2 / <1	<4	<1	<4	<1	<1	1.1	<1	<4	<1	None
	GP-HUT-02	12-16	1:1	9/14/04	duplicate	24.8	-----	1.8 J	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP02I-05	16-20	1:1	9/20/04		119.0	-----	45.6	-----	0.9 J	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP02I-05	12-16	1:1	9/20/04		45.9	-----	9.0	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP02I-02	16-20	1:1	9/29/04		<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP02I-02	12-16	1:1	9/29/04		<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GPA31-7	16-20	1:1	9/29/04		6.6	-----	17.1	-----	2.6	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GPA31-7	10-14	1:1	9/29/04		<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-11TH-14	12-16	1:1	10/20/04		<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GPA31-8	12-16	1:1	10/20/04		<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP02I-04	12-16	1:1	10/20/04		<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-11TH-15	12-16	1:1	10/22/04		<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-11TH-15	12-16	1:1	10/22/04	duplicate	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-11TH-16	12-16	1:1	10/22/04		0.5 J	-----	1.5 J	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP02I-07	12-16	1:1	10/22/04		1.3 J	-----	1.7 J	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
Kansas Plating/ Kreonite East	GP#18-6	12-16	1:1	9/14/04		2.6	3.7	8.3	11.0	<2	<1	<2	<1	-----	<1	-----	<1	-----	<2 / <1	<2	<1	<2	<1	<1	2.0	<1	13.0	8.4	None
	GP#18-7	12-16	1:1	9/14/04		1.9 J	-----	6.5	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	2.2	-----	None
	GP08C-04	12-16	1:1	9/14/04		<2	<1	1.3 J	2.5	<2	<1	<2	<1	-----	<1	-----	<1	-----	<2 / <1	<2	<1	<2	<1	<1	<1	<1	9.8	8.6	None
	GP08C-06	12-16	1:1	9/14/04		<2	<1	<2	<1	<2	<1	<2	<1	-----	<1	-----	<1	-----	<2 / <1	<2	<1	<2	<1	<1	<1	<1	<2	<1	BM 3.6
	GP-KPI-1	12-16	1:1	9/14/04		<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-KPI-2	12-16	1:1	9/14/04		<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-KPI-2	12-16	1:1	9/14/04	duplicate	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-KPI-3	12-16	1:1	9/14/04		<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-KPI-4	12-16	1:1	9/14/04		2.3	3.1	3.5	3.1	<2	<1	<2	<1	-----	<1	-----	<1	-----	<2 / <1	<2	<1	<2	<1	<1	3.5	2.0	11.0	7.0	None
National By-Products	GP#35-4	16-20	1:1	9/15/04		6.1	-----	11.8	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP#35-4	12-16	1:1	9/15/04		4.7	-----	10.2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP#35-4	12-16	1:1	9/15/04	duplicate	3.5	-----	7.6	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP02C-06	16-20	1:2	9/15/04		3.4 J	-----	10.2	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None
	GP02C-06	12-16	1:1	9/15/04		<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP02C-08	16-20	1:1	9/15/04		49.4	-----	68.5	-----	9.8	-----	3.7	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP02C-08	12-16	1:1	9/15/04		14.1	19.0	2.4	<1	<2	<1	4.8	<1	-----	<1	-----	<1	-----	<2 / <1	<2	<1	<2	<1	15.0	1.2	1.1	<2	<1	None
	GP02C-09	16-20	1:2	9/16/04	old fuel odor	28.0	-----	22.3	-----	<4	-----	43.7	-----	-----	-----	-----	-----	-----	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None
	GP02C-09	12-16	1:2	9/16/04	slight odor	14.6	13.0	2.4 J	<1	<4	<1	20.1	<1	-----	<1	-----	<1	-----	<2 / <1	<4	<1	<4	<1	17.0	<1	<1	<4	<1	1,1,2,2-PCA 2.9
	GP02C-11	16-20	1:2	9/15/04		9.4	-----	11.0	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None
	GP02C-11	12-16	1:1	9/15/04		9.6	-----	12.3	-----	0.3 J	-----	0.7 J	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GPA12-9	16-20	1:1	9/16/04		47.1	-----	6.6	-----	<2	-----	2.7	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GPA12-9	12-16	1:1	9/16/04		85.7	90.0	19.7	24.0	<2	<1	<2	<1	-----	<1	-----	<1	-----	<2 / <1	<2	<1	<2	<1	11.0	3.2	2.6	<2	<1	None
	GP-NBPN-01	16-20	1:1	9/15/04		12.9	-----	17.4	-----	<2	-----	0.9 J	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-NBPN-01	12-16	1:1	9/15/04		6.8	-----	12.7	-----	<2	-----	0.6 J	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-NBPN-02	16-20	1:2	9/15/04	fuel odor	37.0	-----	12.6	-----	<4	-----	85.9	-----	-----	-----	-----	-----	-----	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None
	GP-NBPN-02	12-16	1:2	9/15/04		27.9	-----	2.7 J	-----	<4	-----	4.1	-----	-----	-----	-----	-----	-----	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None
Wichita Mirror and Glass/ Parker Boss	GP-PKB-01	16-20	1:1	9/3/04		<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-PKB-01	12-16	1:1	9/3/04		<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-PKB-02	16-20	1:1	9/3/04		1.7 J	-----	2.1	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-PKB-02	12-16	1:1	9/3/04		2.2	-----	3.3	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-PKB-03	16-20	1:1	9/3/04		1.1 J	-----	1.6 J	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-PKB-03	12-16	1:1	9/3/04		0.7 J	-----	1.0 J	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-PKB-04	16-20	1:1	9/3/04		0.6 J	-----	1.1 J	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-PKB-04	12-16	1:1	9/3/04		<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-PKB-04	12-16	1:1	9/3/04	duplicate	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP02G-02	16-20	1:1	9/7/04		1.5 J	-----	1.4 J	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP02G-02	12-16	1:1	9/7/04		0.3 J	-----	0.7 J	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GPA24-2	16-20	1:1	9/7/04		0.6 J	-----	1.3 J	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GPA24-2	12-16	1:1	9/7/04		<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GPA24-2	12-16	1:1	9/7/04	duplicate	<2	-----	0.9 J	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None

CDM

Results are given in ug/L (ppb) for groundwater
J = Estimated value below calibration range
NA = Not applicable/not available

Table 3-4
Source Area Investigation Groundwater Analytical Results
North Industrial Corridor
Wichita, Kansas

Source Area	Sample Location	Depth (feet)	Dilution Onsite	Date	Comment	cis-1,2-DCE		TCE		PCE		B		T		EBN		XYL		CT / CCL4		CFM		VC	1,1 DCE	1,1-DCA	1,1,1-TCA		Other Detected Compounds
						Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite (m&p / o)	Onsite	Offsite	Onsite	Offsite	Offsite	Offsite	Offsite	Onsite	Offsite	Offsite
Stockyards Property Area 02B	GP02B-06	12-16	1:1	9/8/04		3.1	-----	30.5	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-S2B-01	12-16	1:1	9/8/04		69.6	94.0	80.7	130.0	<2	<1	<2	<1	-----	<1	-----	<1	-----	<2 / <1	1.0 J	1.8	1.2 J	1.5	<1	1.3	1.9	<2	<1	trans 1,2-DCA 5.0
	GP-S2B-02	14-18	1:2	9/8/04		22.9	-----	59.0	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None
	GP-S2B-03	15-19	1:2	9/8/04		7.7	-----	11.7	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None
	GP-S2B-03	15-19	1:1	9/8/04	duplicate	9.5	-----	15.4	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-S2B-04	12-16	1:1	9/8/04		139.0	-----	78.8	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-S2B-05	12-16	1:2	9/8/04		103.0	110.0	151.0	170.0	<4	<1	<4	<1	-----	<1	-----	<1	-----	<2 / <1	<4	<1	<4	<1	2.2	5.9	2.4	<4	<1	trans 1,2-DCA 5.0
	GP-S2B-06	12-16	1:2	9/8/04		62.9	-----	79.4	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None
	GP-S2B-07	12-16	1:1	9/8/04		<2	-----	6.9	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-S2B-08	10-14	1:2	9/29/04	fuel odor	<4	<1	<4	<1	<4	<1	1.4 J	2.3	<4	<1	<4	<1	<4	<2 / <1	-----	<1	-----	<1	<1	<1	<1	-----	<1	None
	GP-S2B-09	11-15	1:1	9/29/04		22.1	-----	12.3	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-S2B-10	10-14	1:2	9/29/04	fuel odor	5.8	-----	27.9	-----	<4	-----	54.4	-----	11.2	-----	7.8	-----	<4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
Stockyards Property Area 06D	GP06D-02	12-16	1:1	9/8/04		<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP08E-03	12-16	1:1	9/8/04		<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-S6D-01	12-16	1:2	9/8/04		6.5	-----	8.5	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None
	GP-S6D-02	12-16	1:2	9/8/04		<4	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None
	GP-S6D-03	12-16	1:1	9/8/04		2.9	-----	1.3 J	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-S6D-04	12-16	1:1	9/8/04		<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-S6D-04	12-16	1:1	9/8/04	duplicate	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
Western Uniform	GP-WU-01	12-16	1:1	9/7/04		<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-WU-02	12-16	1:1	9/7/04		<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-WU-04	12-16	1:1	9/9/04		<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	WU-GP02R	11-15	1:1	9/7/04		<2	-----	<2	-----	5.3	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	WU-GP11R	11-15	1:1	9/7/04		<2	-----	<2	-----	1.9	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
Wichita Terminal Elevator	GP#55-1	12-16	1:2	3/29/05		28.3	-----	125.0	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None
	GP#55-1	16-20	1:2	3/29/05		33.3	-----	122.0	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None
	GP#55-1	41-45	1:1	3/29/05		35.6	-----	196.0	-----	1.9 J	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP#55-1	41-45	1:8	3/29/05	duplicate	38.4	-----	160.0	-----	<16	-----	<16	-----	-----	-----	-----	-----	-----	-----	<16	-----	<16	-----	-----	-----	-----	<16	-----	None
11th & State	GP04F-01	13-17	1:1	8/27/04		451 E	-----	348.0	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP04F-01	13-17	1:1	8/27/04	duplicate	439.0	-----	294.0	-----	<20	-----	<20	-----	-----	-----	-----	-----	-----	-----	<20	-----	<20	-----	-----	-----	-----	<20	-----	None
	GP-11S-1	13-17	1:1	8/27/04		26.6	-----	49.0	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-11S-2	15-19	1:1	9/9/04		26.0	52.0	165.0	250.0	<2	<1	<2	<1	-----	<1	-----	<1	-----	<2 / <1	<2	<1	<2	<1	<1	<1	<1	<2	<1	trans 1,2-DCA 1.9
	GP-11S-2	15-19	1:1	9/9/04	duplicate	19.4	-----	136.0	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-11S-3	15-19	1:2	9/9/04		0.5 J	-----	1.4 J	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None
	GP-11S-4	12-16	1:2	9/9/04		<4	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None
Waco Handi-Wash	GP-WHW-01	14-18	1:1	3/28/05		<2	-----	<2	-----	4.2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-WHW-02	15-19	1:1	3/28/05		1.3 J	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-WHW-03	14-18	1:1	3/28/05		3.2	3.0	2.2	1.9	11.5	14.0	<2	<1	-----	<1	-----	<1	-----	<1	<2	<1	<2	<1	<1	<1	<1	<2	<1	None
	GP-WHW-05	14-18	1:1	3/28/05		<2	<1	<2	<1	1.0 J	2.7	<2	<1	-----	<1	-----	<1	-----	<1	<2	<1	<2	<1	<1	<1	<1	<2	<1	None
15th Street Area	GP03E-02	31-35	1:2	8/23/04		53.2	-----	124.0	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None
	GP03E-02	24-28	1:2	8/23/04		NA	-----	122.0	-----	0.2 J	-----	<4	-----	-----	-----	-----	-----	-----	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None
	GP03E-02	24-28	1:2	8/23/04	duplicate	35.2	-----	111.0	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None
	GP03E-02	12-16	1:2	8/23/04		2.1 J	-----	5.5	-----	1.6 J	-----	<4	-----	-----	-----	-----	-----	-----	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None
	GP03E-07	21-25	1:2	8/23/04		17.5	-----	94.1	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None
	GP03E-07	11-15	1:1	8/23/04		2.2	2.1	17.9	20.0	<2	<1	<2	<1	-----	<1	-----	<1	-----	<2 / <1	<2	<1	<2	<1	<1	<1	<1	<2	<1	None
	GP-15TH-5	21-25	1:2	8/23/04		5.1	-----	15.0	-----	0.8 J	-----	<4	-----	-----	-----	-----	-----	-----	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None
	GP-15TH-5	11-15	1:1	8/23/04		11.0	11.0	6.1	7.5	26.3	34.0	<2	<1	-----	<1	-----	<1	-----	<2 / <1	<2	<1	<2	<1	<1	<1	<1	<2	<1	None
	GP-15TH-6	31-35	1:2	8/23/04		32.4	-----	143.0	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None
	GP-15TH-6	24-28	1:1	8/23/04		30.4	-----	226.0	-----	5.4	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-15TH-6	12-16	1:2	8/23/04		9.0	-----	27.5	-----	7.7	-----	<4	-----	-----	-----	-----	-----	-----	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None
	GP-15TH-7	31-35	1:1	8/23/04		32.8	-----	244.0	-----	3.3	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-15TH-7	31-35	1:6	8/23/04	duplicate	31.1	-----	215.0	-----	<12	-----	<12	-----	NA	-----	-----	-----	-----	-----	<12	-----	<12	-----	-----	-----	-----	<12	-----	None
	GP-15TH-7	24-28	1:2	8/23/04		12.6	-----	32.5	-----	1.8 J	-----	<4	-----	-----	-----	-----	-----	-----	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None
	GP-15TH-7	12-16	1:1	8/23/04		2.7	-----	9.3	-----	101.0	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP02F-6	16-20	1:1	8/24/04		6.3	-----	15.8	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP02F-6	12-16	1:1	8/24/04		<2	-----	1.3 J	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GPA24-3	16-20	1:1	8/24/04		8.5	13.0	61.6	99.0	0.5 J	1.4	<2	<1	-----	<1	-----	<1	-----	<2 / <1	<2	<1	<2	<1	<1	1.2	3.7	<2	<1	None
	GPA24-3	12-16	1:1	8/24/04		4.9	5.1	39.1	39.0	0.3 J	<1	<2	<1	-----	<1	-----	<1	-----	<2 / <1	<2	<1	<2	<1	<1	<1	3.5	<2	<1	None
	GPA24-3	12-16	1:1	8/24/04	duplicate	4.6	-----	36.8	-----	0.2 J	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GPA24-4	16-20	1:1	8/24/04		14.0	-----	65.8	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GPA24-4	12-16	1:1	8/24/04		0.6 J	-----	7.7	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GPA25-1	16-20	1:1	8/24/04		43.9	-----	116.0	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GPA25-1	12-16	1:1	8/24/04		7.5	-----	21.2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP#19-2	16-20	1:1	8/25/04		2.4	-----	8.3	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP#19-2	12-16	1:1	8/25/04		0.7 J	1.2	2.3	3.2	<2	<1	<2	<1	-----	<1	-----	<1	-----	<2 / <1	<2	<1	<2	<1	<1	<1	<1	<2	<1	None

CDM

Results are given in ug/L (ppb) for groundwater
J = Estimated value below calibration range
NA = Not applicable/not available

Table 3-4
Source Area Investigation Groundwater Analytical Results
North Industrial Corridor
Wichita, Kansas

Source Area	Sample Location	Depth (feet)	Dilution Onsite	Date	Comment	cis-1,2-DCE		TCE		PCE		B		T		EBN		XYL		CT / CCL4		CFM		VC	1,1 DCE	1,1-DCA	1,1,1-TCA		Other Detected Compounds
						Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite (m&p / o)	Onsite	Offsite	Onsite	Offsite	Offsite	Offsite	Offsite	Onsite	Offsite	Offsite
15th Street Area (Continued)	GP#19-2	12-16	1:1	8/25/04	duplicate	0.6 J	<1	2.1	2.4	<2	<1	<2	<1	-----	<1	-----	<1	-----	<2 / <1	<2	<1	<2	<1	<1	<1	<1	<2	<1	None
	GP#19-5	16-20	1:1	8/25/04		1.3 J	-----	0.7 J	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP#19-5	12-16	1:1	8/25/04		<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP#19-6	16-20	1:1	8/25/04		2.5	-----	15.2	-----	0.4 J	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP#19-6	12-16	1:1	8/25/04		0.2 J	-----	2.4	-----	0.1 J	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP03D-03	16-20	1:1	8/25/04	degraded fuel	15.9	9.7	16.0	15.0	19.2	<1	10.0	<1	-----	<1	-----	12.0	-----	22 JS / <1	<2	<1	<2	1.7	3.2	<1	<1	<2	<1	None
	GP03D-03	12-16	1:1	8/25/04		6.2	1.2	2.4	2.2	4.0	<1	2.0	<1	-----	<1	-----	<1	-----	<2 / <1	<2	<1	<2	<1	<1	<1	<1	<2	<1	None
	GP03D-03	12-16	1:1	8/25/04	duplicate	6.0	-----	2.3	-----	2.3	-----	1.9 J	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-15TH-1	16-20	1:1	8/25/04		<2	-----	4.2	-----	0.7 J	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-15TH-1	12-16	1:1	8/25/04		<2	-----	<2	-----	0.1 J	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-15TH-2	16-20	1:1	8/25/04		<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-15TH-2	12-16	1:1	8/25/04		<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-15TH-3	16-20	1:1	8/24/04		3.3	5.9	13.8	29.0	0.1 J	<1	<2	<1	-----	<1	-----	<1	-----	<2 / <1	<2	<1	<2	<1	<1	<1	<1	<2	<1	None
	GP-15TH-3	12-16	1:1	8/24/04		<2	<1	2.0	2.8	<2	<1	<2	<1	-----	<1	-----	<1	-----	<2 / <1	<2	<1	<2	<1	<1	<1	<1	<2	<1	None
	GP-15TH-4	16-20	1:1	8/25/04		13.2	-----	30.5	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-15TH-4	12-16	1:1	8/25/04		2.2	-----	7.6	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GPA20-1	16-20	1:1	8/25/04		8.2	-----	23.1	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GPA20-1	12-16	1:1	8/25/04		2.6	-----	7.5	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP03D-01	16-20	1:1	9/2/04		<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP03D-01	12-16	1:1	9/2/04		<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-15TH-8	31-35	1:1	9/1/04		39.5	-----	254.0	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-15TH-8	31-35	1:5	9/1/04	duplicate	44.3	-----	324.0	-----	<10	-----	<10	-----	-----	-----	-----	-----	-----	-----	<10	-----	<10	-----	-----	-----	-----	<10	-----	None
	GP-15TH-8	24-28	1:2	9/1/04		28.9	-----	190.0	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None
	GP-15TH-8	12-16	1:1	9/1/04		17.6	-----	7.3	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-15TH-10	31-35	1:2	9/2/04		33.7	-----	162.0	-----	1.0 J	-----	<4	-----	-----	-----	-----	-----	-----	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None
	GP-15TH-10	24-28	1:2	9/2/04		29.3	-----	180.0	-----	4.5	-----	<4	-----	-----	-----	-----	-----	-----	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None
	GP-15TH-10	12-16	1:1	9/2/04		11.5	13.0	32.7	39.0	14.2	18.0	<2	<1	-----	1.2	-----	<1	-----	<2 / <1	<2	<1	<2	<1	<1	<1	<1	<2	<1	None
	GP-15TH-11	31-35	1:1	9/2/04		40.6	-----	94.1	-----	8.9	-----	0.5 J	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-15TH-11	24-28	1:1	9/2/04		24.2	-----	133.0	-----	24.1	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-15TH-11	24-28	1:2	9/2/04	duplicate	31.8	-----	177.0	-----	28.7	-----	<4	-----	-----	-----	-----	-----	-----	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None
	GP-15TH-11	12-16	1:1	9/2/04		7.2	11.0	28.8	37.0	21.2	28.0	<2	<1	-----	<1	-----	<1	-----	<2 / <1	<2	<1	<2	<1	<1	<1	<1	0.6 J	<1	None
	GP-15TH-12	16-20	1:2	9/2/04		4.7	-----	27.6	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None
	GP-15TH-12	12-16	1:1	9/2/04		3.5	-----	24.4	-----	0.3 J	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-15TH-13	16-20	1:1	9/2/04		10.4	12.0	52.3	68.0	0.3 J	<1	<2	<1	-----	1.2	-----	<1	-----	<2 / <1	<2	<1	<2	<1	<1	1.2	<1	<2	<1	None
	GP-15TH-13	12-16	1:2	9/2/04		4.2	6.4	20.7	36.0	<4	<1	<4	<1	-----	<1	-----	<1	-----	<2 / <1	<4	<1	<4	<1	<1	<1	<1	<4	<1	None
	GP-15TH-14	16-20	1:1	9/2/04		0.9 J	-----	12.0	-----	0.3 J	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-15TH-14	12-16	1:1	9/2/04		1.3 J	1.5	14.5	18.0	0.2 J	<1	<2	<1	-----	<1	-----	<1	-----	<2 / <1	<2	<1	<2	<1	<1	<1	<1	<2	<1	None
	GP-15TH-15	16-20	1:1	9/2/04		3.9	-----	13.2	-----	0.4 J	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-15TH-15	12-16	1:1	9/2/04		<2	-----	2.4	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-15TH-17	31-35	1:1	9/10/04		17.8	-----	52.1	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-15TH-17	16-20	1:1	9/10/04		13.0	-----	41.6	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-15TH-17	12-16	1:1	9/10/04		6.4	-----	26.2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-15TH-18	31-35	1:1	9/10/04		7.2	-----	16.5	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-15TH-18	16-20	1:1	9/10/04		4.4	-----	4.3	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-15TH-18	12-16	1:1	9/10/04		<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-15TH-16	31-35	1:1	9/21/04		34.3	-----	79.2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-15TH-16	16-20	1:1	9/21/04		2.7	-----	6.8	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-15TH-16	12-16	1:1	9/21/04		0.8 J	-----	2.2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-15TH-19	31-35	1:1	9/21/04		48.2	-----	117.0	-----	0.3 J	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-15TH-19	16-20	1:1	9/21/04		10.7	8.9	36.6	32.0	<2	<1	<2	<1	-----	<1	-----	<1	-----	<2 / <1	<2	<1	<2	<1	1.0	<1	<1	<2	<1	None
	GP-15TH-19	12-16	1:1	9/21/04		5.3	5.5	18.3	12.0	<2	<1	<2	<1	-----	<1	-----	<1	-----	<2 / <1	<2	<1	<2	<1	<1	<1	<1	<2	<1	None
	GP-15TH-20	16-20	1:1	9/22/04		4.0	-----	14.0	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-15TH-20	12-16	1:1	9/22/04		2.7	-----	8.5	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-15TH-21	16-20	1:1	9/22/04		27.7	-----	86.9	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-15TH-21	12-16	1:1	9/22/04		16.9	20.0	57.7	69.0	<2	<1	<2	<1	-----	<1	-----	<1	-----	<2 / <1	<2	<1	<2	<1	<1	<1	<1	<2	<1	None
	GP-15TH-22	16-20	1:1	9/22/04		10.6	-----	16.1	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-15TH-22	16-20	1:1	9/22/04	duplicate	10.3	-----	17.5	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-15TH-22	12-16	1:1	9/22/04		7.6	-----	15.3	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-15TH-23	16-20	1:1	9/22/04		35.7	34.0	102.0	150.0	<2	<1	<2	<1	-----	<1	-----	<1	-----	<2 / <1	<2	<1	<2	<1	2.5	2.5	<1	<2	<1	trans 1,2-DCA 1.2
	GP-15TH-23	12-16	1:1	9/22/04		4.4	-----	13.9	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-15TH-24	16-20	1:1	9/21/04		5.2	-----	14.1	-----	13.9	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-15TH-24	12-16	1:1	9/21/04		<2	-----	1.8 J	-----	5.3	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-15TH-25	16-20	1:1	9/22/04		10.5	-----	16.7	-----	6.1	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-15TH-25	12-16	1:1	9/22/04		2.7	-----	4.4	-----	0.7 J	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-15TH-26	16-20	1:1	9/21/04		4.9	-----	14.4	-----	7.5	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-15TH-26	12-16	1:1	9/21/04		1.3 J	-----	2.2	-----	0.9 J	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-15TH-26	12-16	1:1	9/21/04	duplicate	1.0 J	-----	1.7 J	-----	0.5 J	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None

CDM

Results are given in ug/L (ppb) for groundwater
J = Estimated value below calibration range
NA = Not applicable/not available

Table 3-4
Source Area Investigation Groundwater Analytical Results
North Industrial Corridor
Wichita, Kansas

Source Area	Sample Location	Depth (feet)	Dilution Onsite	Date	Comment	cis-1,2-DCE		TCE		PCE		B		T		EBN		XYL		CT / CCL4		CFM		VC	1,1 DCE	1,1-DCA	1,1,1-TCA		Other Detected Compounds
						Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite (m&p / o)	Onsite	Offsite	Onsite	Offsite	Offsite	Offsite	Offsite	Onsite	Offsite	Offsite
15th Street Area (Continued)	GP-15TH-27	31-35	1:1	9/21/04		34.4	-----	82.7	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-15TH-27	31-35	1:1	9/21/04	duplicate	40.2	-----	103.0	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-15TH-27	16-20	1:1	9/21/04		13.0	12.0	55.1	53.0	<2	<1	<2	<1	-----	<1	-----	<1	-----	<2 / <1	<2	<1	<2	<1	1.0	1.4	<1	<2	<1	None
	GP-15TH-27	12-16	1:1	9/21/04		7.1	8.8	28.2	29.0	0.4 J	<1	<2	<1	-----	<1	-----	<1	-----	<2 / <1	<2	<1	<2	<1	<1	<1	<1	<2	<1	None
	GP03E-06	24-28	1:2	9/29/04		21.1	-----	125.0	-----	35.9	-----	<4	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP03E-06	12-16	1:2	9/29/04		4.9	-----	47.7	-----	37.1	-----	<4	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-ALT-01	16-20	1:1	10/7/04		1.7 J	-----	18.7	-----	0.7 J	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-ALT-01	12-16	1:1	10/7/04		0.8 J	-----	14.4	-----	1.0 J	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-ALT-01	12-16	1:1	10/7/04	duplicate	0.8 J	-----	16.7	-----	1.4 J	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-ALT-02	16-20	1:1	10/7/04		0.2 J	-----	5.0	-----	1.0 J	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-ALT-02	12-16	1:1	10/7/04		0.2 J	-----	4.2	-----	0.8 J	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-ALT-03	16-20	1:1	10/7/04		0.5 J	-----	6.4	-----	0.7 J	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-ALT-03	12-16	1:1	10/7/04		<2	<1	7.0	6.8	<2	<1	<2	<1	<2	<1	<2	<1	<2	<2 / <1	-----	<1	-----	<1	<1	<1	<1	-----	<1	None
	GP-15TH-9	31-35	1:1	10/8/04		30.3	-----	232.0	-----	2.1	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-15TH-9	24-28	1:2	10/8/04		7.2	-----	51.4	-----	3.6 J	-----	<4	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-15TH-9	16-20	1:1	10/8/04		15.9	-----	31.6	-----	1.0 J	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-15TH-9	12-16	1:2	10/8/04	old fuel odor	<4	-----	<4	-----	<4	-----	<4	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-15TH-28	31-35	1:1	10/13/04		19.2	-----	49.7	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-15TH-28	16-20	1:1	10/13/04		12.5	-----	51.9	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-15TH-28	12-16	1:1	10/13/04		3.4	-----	13.2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-15TH-29	31-35	1:2	10/13/04		19.8	-----	54.3	-----	<4	-----	<4	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-15TH-29	16-20	1:1	10/13/04		2.4	-----	18.0	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-15TH-29	12-16	1:1	10/13/04		0.7 J	-----	4.5	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-15TH-30	16-20	1:1	10/13/04		0.9 J	-----	3.4	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-15TH-30	12-16	1:1	10/13/04		0.9 J	-----	4.2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-15TH-31	16-20	1:1	10/13/04		2.3	-----	8.0	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-15TH-31	12-16	1:1	10/13/04		1.4 J	-----	6.2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP#19-1	31-35	1:1	10/13/04		29.9	-----	92.7	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP#19-1	31-35	1:2	10/13/04	duplicate	24.4	-----	75.9	-----	<4	-----	<4	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP#19-1	16-20	1:1	10/13/04		13.0	-----	49.3	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP#19-1	12-16	1:1	10/13/04		14.7	-----	89.7	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP#19-7	16-20	1:1	10/22/04		2.0	-----	22.9	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP#19-7	12-16	1:1	10/22/04		0.8 J	-----	14.1	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-15TH-32	12-16	1:1	10/22/04		0.9 J	-----	10.9	-----	56.1	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-15TH-33	31-35	1:1	10/22/04		20.2	-----	60.4	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-15TH-33	16-20	1:1	10/22/04		3.7	-----	14.2	-----	<2	-----	<2	-----	<2	-----	<2	-----	0.7 J	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-15TH-33	12-16	1:1	10/22/04		0.6 J	-----	6.7	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-15TH-34	12-16	1:1	10/22/04		<2	-----	0.8 J	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-15TH-35	12-16	1:1	10/22/04		<2	-----	4.3	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GPA28-2	13-17	1:1	11/4/04		2.0	3.7	11.3	19.0	63.0	95.0	<2	<1	<2	<1	<2	<1	<2	<2 / <1	-----	<1	-----	<1	<1	<1	<1	-----	<1	None
	GPA-28-3	12-16	1:1	11/4/04		2.7	-----	3.3	-----	26.2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-15TH-36	13-17	1:1	11/4/04		<2	-----	<2	-----	3.4	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP15TH-37	12-16	1:1	11/23/04		8.5	11.0	9.5	15.0	12.1	26.0	<2	<1	<2	<1	<2	<1	<2	<2 / <1	-----	<1	-----	<1	<1	<1	<1	-----	<1	None
	GP-15TH-38	12-16	1:1	11/23/04		3.5	-----	12.3	-----	4.0	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-15TH-39	31-35	1:2	11/23/04		17.6	-----	29.1	-----	<4	-----	<4	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-15TH-39	12-16	1:1	11/23/04		7.0	-----	16.8	-----	1.5 J	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-15TH-40	12-16	1:1	11/23/04		2.5	-----	10.8	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-15TH-41	13-17	1:1	11/4/04		1.0 J	-----	3.2	-----	1.4 J	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-15TH-42	13-17	1:1	11/4/04		5.3	-----	32.9	-----	9.6	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-15TH-43	13-17	1:1	11/4/04		0.6 J	-----	14.7	-----	41.1	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-15TH-44	13-17	1:1	11/4/04		<2	<1	<2	<1	6.3	8.3	<2	<1	<2	<1	<2	<1	<2	<2 / <1	-----	<1	-----	<1	<1	<1	<1	-----	<1	None
	GP-15TH-45	13-17	1:1	11/4/04		0.6 J	-----	12.2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-15TH-46	13-17	1:1	11/4/04		2.7	-----	13.4	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-15TH-47	13-17	1:1	11/4/04		1.2 J	-----	11.3	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-15TH-48	12-16	1:1	3/28/05		2.5	-----	7.8	-----	4.6	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-15TH-49	12-16	1:1	3/28/05		39.7	51.0	35.6	52.0	194.0	240.0	<2	<1	-----	<1	-----	<1	-----	<1	<2	<1	<2	<1	<1	<1	<1	<2	1.5	None
	GP-15TH-50	12-16	1:1	3/28/05		<2	-----	2.6	-----	2.4	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-15TH-50	12-16	1:1	3/28/05	duplicate	<2	-----	2.3	-----	2.2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-15TH-51	12-16	1:1	3/28/05		<2	<1	3.4	5.7	2.1	2.5	<2	<1	-----	<1	-----	<1	-----	<1	<2	<1	<2	<1	<1	<1	<1	<2	<1	None
	GP-15TH-51Q	12-16	1:1	3/28/05	duplicate	-----	<1	-----	5.4	-----	4.4	-----	<1	-----	<1	-----	<1	-----	<1	-----	<1	-----	<1	<1	<1	<1	-----	<1	None
	GP03B-06	31-35	1:2	11/19/04		27.4	-----	34.9	-----	<4	-----	<4	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP03B-06	19-23	1:2	11/19/04		12.4	-----	32.1	-----	<4	-----	<4	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP03B-06	12-16	1:1	11/19/04		9.6	11.0	34.5	39.0	<2	<1	<2	<1	<2	<1	<2	<1	<2	<2 / <1	-----	<1	-----	<1	<1	<1	<1	-----	<1	None

CDM

Results are given in ug/L (ppb) for groundwater
J = Estimated value below calibration range
NA = Not applicable/not available

Table 3-4
Source Area Investigation Groundwater Analytical Results
North Industrial Corridor
Wichita, Kansas

Source Area	Sample Location	Depth (feet)	Dilution Onsite	Date	Comment	cis-1,2-DCE		TCE		PCE		B		T		EBN		XYL		CT / CCL4		CFM		VC	1,1 DCE	1,1-DCA	1,1,1-TCA		Other Detected Compounds
						Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite (m&p / o)	Onsite	Offsite	Onsite	Offsite	Offsite	Offsite	Offsite	Onsite	Offsite	Offsite
26th Street Area	GP#62-2	16-20	1:1	9/27/04		8.3	13.0	9.9	14.0	<2	<1	<2	<1	<2	<1	<2	<1	<2	<2 / <1	-----	<1	-----	<1	<1	<1	<1	-----	<1	None
	GP-26TH-1	16-20	1:1	9/27/04		0.2 J	-----	8.5	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-26TH-1	11-15	1:1	9/27/04		<2	<1	7.0	8.7	<2	<1	<2	<1	<2	<1	<2	<1	<2	<2 / <1	-----	<1	-----	<1	<1	<1	<1	-----	<1	None
	GP-26TH-2	16-20	1:1	9/27/04		<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-26TH-2	12-16	1:1	9/27/04		<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GPA08-2	16-20	1:1	9/27/04		182.0	180.0	57.9	78.0	<2	2.0	<2	52.0	<2	<1	<2	<1	<2	<2 / <1	-----	<1	-----	<1	24.0	<1	1.7	-----	<1	trans 1,2-DCA 1.8
	GPA08-2	16-20	1:5	9/27/04	duplicate	161.0	-----	61.2	-----	<10	-----	2.9 J	-----	<10	-----	<10	-----	<10	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GPA08-2	12-16	1:1	9/27/04		46.8	-----	19.9	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GPA08-3	16-20	1:1	9/27/04		22.0	26.0	31.9	48.0	<2	<1	281.0	280.0	<2	<1	<2	1.3	<2	<2 / <1	-----	<1	-----	<1	<1	<1	<1	-----	<1	None
	GPA08-3	9-13	1:2	9/27/04	fuel odor	61.6	23.0	<4	3.5	<4	<1	1751 E	11000.0	11.0	20.0	81.5	98.0	94.7	140 / 85	-----	<1	-----	<1	<1	<1	<1	-----	<1	None
	GPA08-3	9-13	1:10	9/27/04	duplicate	90.1	-----	<20	-----	<20	-----	3750 E	-----	<20	-----	22.6	-----	<20	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GPA08-4	16-20	1:2	9/27/04		0.5 J	-----	28.4	-----	<4	-----	3.2 J	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GPA08-4	12-16	1:1	9/27/04		<2	-----	1.7 J	-----	<2	-----	2.2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-WRG-1	16-20	1:2	9/28/04		<4	-----	12.9	-----	<4	-----	<4	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-WRG-1	12-16	1:1	9/28/04		0.1 J	1.3	11.5	15.0	<2	<1	<2	<1	<2	<1	<2	<1	<2	<2 / <1	-----	<1	-----	<1	<1	<1	<1	-----	<1	MTBE 13.0
	GP-WRG-2	16-20	1:2	9/28/04		<4	-----	19.7	-----	<4	-----	<4	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-WRG-2	12-16	1:1	9/28/04		2.7	3.2	30.1	20.0	1.3 J	<1	<2	<1	<2	<1	<2	<1	<2	<2 / <1	-----	<1	-----	<1	<1	<1	<1	-----	<1	None
	GP-WRG-5A	16-20	1:2	9/28/04		7.4	-----	23.8	-----	<4	-----	13.7	-----	6.1	-----	3.6 J	-----	5.9	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-WRG-5A	12-16	1:5	9/28/04	fuel odor	<10	2.3	<10	18.0	<10	<1	SAT.	6.0	3632.0	4.4	693 E	3.0	1310 E	<2 / <1	-----	<1	-----	<1	<1	<1	<1	-----	<1	MTBE 10.0, 1,1,2-TCA 2.4
	GP-WRG-5A	12-16	1:25	9/28/04	duplicate	<50	-----	<50	-----	<50	-----	10630.0	-----	3649.0	-----	336.0	-----	589.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP#62-1	16-20	1:2	10/8/04		SAT.	4200.0	148.0	300.0	<4	1.6	12.8	15.0	<4	<1	<4	<1	<4	<2 / <1	-----	<1	-----	<1	760.0	7.4	23.0	-----	3.6	trans 1,2-DCA 6.4
	GP#62-1	16-20	1:10	10/8/04	duplicate	606.0	-----	46.7	-----	<20	-----	<20	-----	<20	-----	<20	-----	<20	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP#62-1	12-16	1:2	10/8/04		67.1	140.0	22.7	53.0	<4	<1	<4	<1	<4	<1	<4	<1	<4	<2 / <1	-----	<1	-----	<1	66.0	1.1	1.7	-----	<1	None
	GP-26TH-3	16-20	1:2	10/8/04		19.2	-----	24.1	-----	<4	-----	<4	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-26TH-3	12-16	1:1	10/8/04		16.7	-----	17.3	-----	1.9 J	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-26TH-4	16-20	1:2	10/8/04		5.1	-----	21.6	-----	<4	-----	<4	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-26TH-4	12-16	1:1	10/8/04		2.5	-----	9.4	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-26TH-5	16-20	1:1	10/8/04		<4	-----	5.9	-----	1.4 J	-----	<4	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-26TH-5	12-16	1:1	10/8/04		<2	-----	1.2 J	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-26TH-6	16-20	1:2	10/8/04		194.0	300.0	89.5	120.0	<4	<1	<4	<1	<4	<1	<4	<1	<4	<2 / <1	-----	<1	-----	<1	40.0	<1	2.5	-----	<1	trans 1,2-DCA 1.7
	GP-26TH-6	12-16	1:2	10/8/04		481.0	540.0	336.0	220.0	<4	<1	<4	<1	<4	<1	<4	<1	<4	<2 / <1	-----	<1	-----	<1	29.0	1.5	4.1	-----	<1	trans 1,2-DCA 2.4
	GP-26TH-7	16-20	1:1	10/14/04		5.6	-----	43.9	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-26TH-7	12-16	1:1	10/14/04		5.9	-----	39.1	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-WRG-3	16-20	1:1	10/14/04		0.4 J	-----	5.9	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-WRG-3	12-16	1:1	10/14/04		0.4 J	2.1	5.4	13.0	<2	1.6	<2	<1	<2	<1	<2	<1	<2	<2 / <1	-----	<1	-----	<1	<1	<1	<1	-----	<1	MTBE 12.0
	GP-WRG-4	20-24	1:1	10/14/04		4.0	-----	22.5	-----	1.6 J	-----	0.9J	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-WRG-4	16-20	1:2	10/14/04	fuel odor	NA	6.4	<4	39.0	<4	<1	SAT.	19.0	SAT.	5.9	NA	7.7	NA	480 / 69	-----	<1	-----	<1	<1	<1	<1	-----	<1	MTBE 2.1, CM 88.0
	GP-WRG-4	16-20	1:20	10/14/04	duplicate	<40	-----	<40	-----	<40	-----	7255 E	-----	1752 E	-----	<40	-----	500.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-WRG-6	16-20	1:1	10/14/04		1.2 J	-----	21.5	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-WRG-6	12-16	1:1	10/14/04		0.6 J	-----	21.3	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-WRG-7	16-20	1:1	10/14/04		2.6	-----	13.0	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-WRG-7	12-16	1:2	10/14/04	fuel interferenc	46.1*	-----	<4	-----	<4	-----	101.0	-----	22.6	-----	24.9	-----	22.5	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-WRG-8	16-20	1:1	10/14/04		2.0	-----	22.2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-WRG-8	12-16	1:1	10/14/04		1.8 J	-----	25.8	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-WRG-9	16-20	1:1	10/14/04		0.9 J	-----	8.4	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-WRG-9	12-16	1:1	10/14/04		<2	-----	3.6	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-WRG-10	16-20	1:1	10/14/04		0.3 J	-----	6.7	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-WRG-10	12-16	1:2	10/14/04		0.6 J	-----	15.6	-----	<4	-----	<4	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-WRG-10	12-16	1:1	10/14/04	duplicate	1.0 J	-----	13.8	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-26TH-8	38-42	1:1	11/19/04		9.9	-----	34.0	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-26TH-8	12-16	1:1	11/19/04		67.3	68.0	6.3	7.0	<2	<1	<2	<1	<2	<1	<2	<1	<2	<2 / <1	-----	<1	-----	<1	12.0	<1	<1	-----	<1	None
	GP-26TH-9	38-42	1:1	11/19/04		12.5	-----	49.6	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-26TH-9	12-16	1:1	11/19/04		11.0	-----	17.3	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-26TH-9	12-16	1:1	11/19/04	duplicate	10.0	-----	14.9	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-26TH-10	38-42	1:1	11/19/04		13.2	-----	44.7	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-26TH-10	12-16	1:1	11/19/04		131.0	-----	18.3	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-26TH-11	38-42	1:2	11/19/04		14.3	-----	57.7	-----	<4	-----	<4	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-26TH-11	12-16	1:1	11/19/04		6.5	-----	21.0	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-26TH-12	38-42	1:1	11/19/04		16.3	-----	58.0	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-26TH-12	12-16	1:1	11/19/04		32.5	-----	23.6	-----	<2	-----	112.0	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None

CDM

Results are given in ug/L (ppb) for groundwater
J = Estimated value below calibration range
NA = Not applicable/not available

Table 3-4
Source Area Investigation Groundwater Analytical Results
North Industrial Corridor
Wichita, Kansas

Source Area	Sample Location	Depth (feet)	Dilution Onsite	Date	Comment	cis-1,2-DCE		TCE		PCE		B		T		EBN		XYL		CT / CCL4		CFM		VC	1,1 DCE	1,1-DCA	1,1,1-TCA		Other Detected Compounds
						Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite (m&p / o)	Onsite	Offsite	Onsite	Offsite	Offsite	Offsite	Offsite	Onsite	Offsite	Offsite
11th Street Area	GP02I-06	16-20	1:1	8/26/04		34.7	-----	58.5	-----	2.7	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP02I-06	12-16	1:1	8/26/04		26.3	-----	26.0	-----	1.8 J	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP08C-01	16-20	1:1	8/26/04		17.2	-----	18.0	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP08C-01	12-16	1:1	8/26/04		1.5 J	-----	3.4	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-11TH-1	16-20	1:1	8/26/04		1.9 J	-----	1.4 J	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-11TH-1	12-16	1:1	8/26/04		<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-11TH-2	16-20	1:1	8/26/04		<2	-----	4.5	-----	1.7 J	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-11TH-2	12-16	1:1	8/26/04		8.2	-----	20.5	-----	5.4	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
11th Street Area(Continued)	GP-11TH-3	16-20	1:1	8/26/04	GPA31-4	0.9 J	-----	1.2 J	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-11TH-3	12-16	1:1	8/26/04		<2	-----	0.8 J	-----	0.1 J	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	13.8	-----	None
	GP-11TH-3	12-16	1:1	8/26/04	duplicate	0.5 J	-----	1.0 J	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	17.4	-----	None
	GPA31-3	16-20	1:1	8/26/04		45.5	52.0	133.0	140.0	12.2	9.4	<2	<1	-----	<1	-----	<1	-----	<2 / <1	<2	<1	<2	<1	2.5	<1	2.7	<2	<1	MTBE 3.2, trans 1,2-DCA 1.2
	GPA31-3	16-20	1:1	8/26/04	duplicate	44.3	-----	114.0	-----	9.9	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GPA31-3	12-16	1:1	8/26/04		11.6	9.2	34.0	27.0	2.2	1.7	<2	<1	-----	<1	-----	<1	-----	<2 / <1	<2	<1	<2	<1	<1	<1	<1	<2	<1	None
	GPA32-1	16-20	1:1	8/26/04		20.9	28.0	110.0	200.0	2.9	6.1	<2	<1	-----	<1	-----	<1	-----	<2 / <1	<2	<1	<2	<1	<1	1.1	<1	<2	<1	None
	GPA32-1	12-16	1:1	8/26/04		23.4	18.0	154.0	140.0	4.2	4.3	<2	<1	-----	<1	-----	<1	-----	<2 / <1	<2	<1	<2	<1	<1	<1	<1	<2	<1	None
	GP-11TH-4	16-20	1:1	9/20/04		30.1	-----	26.8	-----	0.8 J	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-11TH-4	12-16	1:1	9/20/04		0.6 J	-----	2.0	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-11TH-5	16-20	1:2	9/20/04		16.2	-----	83.1	-----	38.0	-----	<4	-----	-----	-----	-----	-----	-----	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None
	GP-11TH-5	12-16	1:1	9/20/04		1.9 J	-----	8.7	-----	1.2 J	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-11TH-6	16-20	1:1	9/20/04		107.0	58.0	364.0	200.0	81.8	44.0	<2	<2	-----	<2	-----	<2	-----	<4 / <2	<2	<2	<2	<2	<2	<2	<2	<2	<2	None
	GP-11TH-6	16-20	1:8	9/20/04	duplicate	117.0	-----	371.0	-----	84.4	-----	<16	-----	-----	-----	-----	-----	-----	-----	<16	-----	<16	-----	-----	-----	-----	<16	-----	None
	GP-11TH-6	12-16	1:2	9/20/04		29.7	28.0	104.0	120.0	6.0 J	8.4	<4	<1	-----	<1	-----	<1	-----	<2 / <1	<4	<1	<4	<1	<1	<1	<1	<4	<1	None
	GP-11TH-7	16-20	1:2	9/20/04		4.9	6.0	44.5	44.0	2.1 J	2.6	<4	<1	-----	<1	-----	<1	-----	<2 / <1	<4	<1	<4	<1	<1	<1	<1	<4	<1	None
	GP-11TH-7	12-16	1:1	9/20/04		0.8 J	<1	18.9	14.0	<2	<1	<2	<1	-----	<1	-----	<1	-----	<2 / <1	<2	<1	<2	<1	<1	<1	<1	<2	<1	None
	GP-11TH-7	12-16	1:2	9/20/04	-duplicate	1.2 J	5.3	22.1	54.0	<4	3.1	<4	<1	-----	<1	-----	<1	-----	<2 / <1	<4	<1	<4	<1	<1	<1	<1	<4	<1	None
	GP-11TH-8	16-20	1:1	9/20/04		56.1	-----	127.0	-----	33.6	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-11TH-8	12-16	1:1	9/20/04		7.9	-----	22.2	-----	2.4	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GPA31-6	16-20	1:1	9/20/04		38.9	37.0	89.5	87.0	7.1	8.4	<2	<1	-----	<1	-----	<1	-----	<2 / <1	<2	<1	<2	<1	<1	<1	3.0	<2	<1	MTBE 9.4, trans 1,2-DCA 1.0
	GPA31-6	12-16	1:1	9/20/04		25.8	25.0	4.1	3.3	<2	<1	<2	<1	-----	<1	-----	<1	-----	<2 / <1	<2	<1	<2	<1	<1	<1	<1	<2	<1	MTBE 3.3, trans 1,2-DCA 1.4
	GP-11TH-9	12-16	1:1	10/20/04		13.6	-----	139.0	-----	13.7	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-11TH-10	12-16	1:1	10/20/04		5.1	-----	46.5	-----	2.6	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-11TH-10	12-16	1:1	10/20/04	duplicate	4.3	-----	38.4	-----	2.3	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-11TH-11	16-20	1:1	10/20/04		14.7	-----	130.0	-----	4.8	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-11TH-11	12-16	1:1	10/20/04		12.2	-----	120.0	-----	4.6	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-11TH-12	13-17	1:1	10/20/04		5.0	-----	10.9	-----	2.5	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-11TH-13	13-17	1:1	10/20/04		5.3	-----	34.3	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-11TH-14	12-16	1:1	10/20/04		<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-11TH-15	12-16	1:1	10/22/04		<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-11TH-15	12-16	1:1	10/22/04	duplicate	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-11TH-16	12-16	1:1	10/22/04		0.5 J	-----	1.5 J	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-11TH-17	13-17	1:1	11/4/04		0.3 J	-----	17.0	-----	2.8	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-11TH-18	13-17	1:1	11/4/04		4.6	-----	17.2	-----	27.7	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-11TH-18	13-17	1:1	11/4/04	duplicate	4.2	-----	15.2	-----	21.0	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-11TH-19	12-16	1:1	11/23/04		9.1	-----	9.6	-----	2.4	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-11TH-20	12-16	1:1	11/23/04		3.5	-----	4.5	-----	2.5	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-11TH-21	26-30	1:1	11/23/04		52.0	-----	66.9	-----	8.2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-11TH-21	12-16	1:1	11/23/04		30.6	21.0	52.6	55.0	8.7	11.0	<2	<1	<2	<1	<2	<1	<2	<2 / <1	-----	<1	-----	<1	1.9	<1	1.5	-----	<1	None
	GP-11TH-21	12-16	1:1	11/23/04	duplicate	24.8	-----	40.0	-----	7.0	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-11TH-22	12-16	1:1	11/23/04		1.7 J	-----	6.2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-11TH-23	12-16	1:1	11/23/04		7.3	-----	41.6	-----	2.6	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
10th and Ohio	GP-10-OH-1	16-20	1:1	8/26/04		79.5	-----	69.4	-----	3.0	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-10-OH-1	12-16	1:1	8/26/04		39.8	-----	56.2	-----	1.9 J	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	DG-21	16-20	1:1	8/27/04		17.1	-----	65.9	-----	0.3 J	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	DG-21	12-16	1:1	8/27/04		5.8	-----	49.6	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	DG-31	16-20	1:1	8/27/04		48.5	56.0	114.0	140.0	4.0	6.6 J-LCS	<2	<5	-----	<5	-----	<5	-----	<10 / <5	<2	<5	<2	<5	<5	<5	<5	<2	<5	None
	DG-31	12-16	1:1	8/27/04		9.8	8.1	35.9	28.0	1.3 J	1.4 J-LCS	<2	<1	-----	<1	-----	<1	-----	<2 / <1	<2	<1	<2	<1	<1	<1	<1	<2	<1	None
13th and Emporia	GP-13E-1	13-17	1:1	8/27/04		1.3 J	-----	5.6	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-13E-2	14-18	1:1	8/27/04		11.1	13.0	14.9	26.0	<2	<1	<2	<1	-----	<1	-----	<1	-----	<2 / <1	<2	<1	<2	<1	<1	<1	2.2	<2	<1	None
	GP04E-03	12-16	1:1	9/1/04		<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-13E-3	12-16	1:1	9/1/04		19.2	23.0	48.1	65.0	<2	<1	<2	<1	-----	<1	-----	<1	-----	<2 / <1	<2	<1	<2	<1	<1	1 J-LCS	<1	<2	<1	trans 1,2-DCA 1.5(J-LCS)
	GP-13E-4	12-16	1:1	9/9/04		<2	-----	1.0 J	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-13E-5	12-16	1:1	9/9/04		<2	-----	1.4 J	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-13E-7	12-16	1:1	9/9/04		7.0	-----	13.9	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-13E-6	12-16	1:2	9/29/04		7.4	-----	12.1	-----	<4	-----	<4	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-13E-8	12-16	1:2	9/29/04		16.5	-----	41.2	-----	<4	-----	<4	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-13E-9	12-16	1:2	9/29/04		13.7	19.0	45.1	56.0	24.9	<1	<4	<1	<4	<1	<4	<1	<4	<2 / <1	-----	<1	-----	<1	<1	<1	<1	-----	<1	None
	GP-13E-10	12-16	1:1	10/20/04		<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-13E-11	12-16	1:1	10/20/04		<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None

CDM

Results are given in ug/L (ppb) for groundwater
J = Estimated value below calibration range
NA = Not applicable/not available

Table 3-4
Source Area Investigation Groundwater Analytical Results
North Industrial Corridor
Wichita, Kansas

Source Area	Sample Location	Depth (feet)	Dilution Onsite	Date	Comment	cis-1,2-DCE		TCE		PCE		B		T		EBN		XYL		CT / CCL4		CFM		VC	1,1 DCE	1,1-DCA	1,1,1-TCA		Other Detected Compounds
						Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite (m&p / o)	Onsite	Offsite	Onsite	Offsite	Offsite	Offsite	Offsite	Onsite	Offsite	Offsite
20th and Washington	GP06F-02	16-20	1:2	9/24/04		**166.0**	-----	**20.8**	-----	<4	-----	<4	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP06F-02	16-20	1:1	9/24/04	duplicate	**140.0**	-----	**25.1**	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP06F-02	12-16	1:1	9/24/04		**116.0**	-----	**20.0**	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP06F-03	16-20	1:2	9/24/04		**13.9**	-----	**21.3**	-----	<4	-----	<4	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP06F-03	12-16	1:1	9/24/04		**0.9 J**	-----	**1.7 J**	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-20W-1	16-20	1:1	9/24/04		**44.7**	-----	**47.9**	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-20W-1	12-16	1:1	9/24/04		**29.8**	-----	**12.5**	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-20W-2	16-20	1:2	9/24/04		**194.0**	**83.0**	**32.2**	**3.6**	<4	<1	**24.8**	<1	**6.0**	<1	<4	<1	<4	<2 / <1	-----	<1	-----	<1	**14.0**	**3.1**	**2.7**	-----	<1	trans 1,2-DCA 3.1
	GP-20W-2	12-16	1:1	9/24/04		**41.2**	**46.0**	**5.8**	**2.5**	<2	<1	**3.4**	<1	<2	<1	<2	<1	<2	<2 / <1	-----	<1	-----	<1	**6.8**	**1.6**	**1.6**	-----	<1	None
	GP-20W-3	16-20	1:2	9/24/04		**35.8**	-----	**7.9**	-----	<4	-----	<4	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-20W-3	12-16	1:1	9/24/04		**71.9**	-----	**1.1 J**	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GPA14-2	16-20	1:1	9/24/04		**65.9**	**59.0**	**97.9**	**73.0**	<2	<1	<2	<1	<2	<1	<2	<1	<2	<2 / <1	-----	<1	-----	<1	**6.4**	**4.0**	**3.0**	-----	<1	MTBE 2.5, trans 1,2-DCA 4.1
	GPA14-2Q	16-20		9/24/04	-duplicate		**60.0**		**77.0**		<1	-----	<1	-----	<1	-----	<1	-----	<2 / <1	-----	<1	-----	<1	**6.7**	**4.1**	**3.0**	-----	<1	MTBE 2.6, trans 1,2-DCA 4.6
	GPA14-2	12-16	1:1	9/24/04		**8.7**	-----	**11.6**	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GPA14-3	16-20	1:1	9/24/04		**99.9**	**99.0**	**95.2**	**92.0**	<2	<1	<2	<1	<2	<1	<2	<1	<2	<2 / <1	-----	<1	-----	<1	**8.8**	**7.1**	**4.1**	-----	<1	MTBE 1.1, trans 1,2-DCA 6.5
	GPA14-3	16-20	1:2	9/24/04	duplicate	**116.0**	-----	**113.0**	-----	<4	-----	<4	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GPA14-3	12-16	1:1	9/24/04		**76.5**	**110.0**	**41.4**	**57.0**	<2	<1	<2	<1	<2	<1	<2	<1	<2	<2 / <1	-----	<1	-----	<1	**7.0**	**5.6**	**3.6**	-----	<1	trans 1,2-DCA 5.2
	GP#47-2	16-20	1:1	10/7/04		**10.9**	-----	**0.6 J**	-----	<2	-----	**0.5 J**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP#47-2	12-16	1:1	10/7/04		**0.3 J**	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-20W-4	16-20	1:1	10/7/04		**36.4**	-----	**45.9**	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-20W-4	12-16	1:1	10/7/04		**19.5**	-----	**15.5**	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-20W-5	16-20	1:1	10/7/04		**42.1**	-----	**52.8**	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-20W-5	12-16	1:1	10/7/04		**21.8**	-----	**26.4**	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-20W-6	16-20	1:1	10/7/04		**24.0**	-----	**1.7 J**	-----	<2	-----	**3.9**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-20W-6	16-20	1:1	10/7/04	duplicate	**21.9**	-----	**1.3 J**	-----	<2	-----	**4.2**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-20W-6	12-16	1:1	10/7/04		**19.7**	-----	<2	-----	<2	-----	**2.8**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-20W-7	12-16	1:1	10/22/04		**86.6**	-----	**28.0**	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-20W-8	12-16	1:1	10/22/04		**118.0**	-----	**21.1**	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-20W-8	12-16	1:1	10/22/04	duplicate	**106.0**	-----	**19.0**	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
3rd & St. Francis	GP-3SF-1	14-18	1:1	8/27/04		**2.9**	-----	**2.5**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GPA40-1	14-18	1:1	8/27/04		**1.2 J**	-----	**1.9 J**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	NMW-29D	MW	1:1	8/27/04		**16.3**	-----	**11.5**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	NMW-29S	MW	1:1	8/27/04		**7.6**	-----	**7.8**	-----	**0.2 J**	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	**0.3 J**	-----	-----	-----	-----	<2	-----	None
	GP-3SF-2	14-18	1:1	9/9/04		<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-3SF-3	14-18	1:1	9/9/04		<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
John's Refinery	GP-JRF-01	12-16	1:1	9/28/04	-fuel odor	<2	<1	**22.4**	<1	<2	<1	**55.8**	**47.0**	**5.6**	<1	<2	<1	<2	<2 / <1	-----	<1	-----	<1	**10.0**	<1	<1	-----	<1	None
	GP-JRF-02	14-18	1:5	9/28/04	fuel odor	**0.2J**	-----	<10	-----	<10	-----	**8.9 J**	-----	<10	-----	<10	-----	<10	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-JRF-03	16-20	1:2	10/13/04	old fuel odor	<4	-----	<4	-----	<4	-----	<4	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
	GP-JRF-03	12-16	1:1	10/13/04	old fuel odor	**3.0**	-----	**1.8 J**	-----	<2	-----	**6.5**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None
Kreonite West	GP-KRW-1	12-16	1:1	8/24/04		<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	GP-KRW-2	12-16	1:2	8/24/04		**0.8 J**	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None
	GP-KRW-3	12-16	1:5	8/24/04	fuel odor	**6.0 J**	-----	<10	-----	<10	-----	**18.2**	-----	-----	-----	-----	-----	-----	-----	<10	-----	<10	-----	-----	-----	-----	<10	-----	None
	GP-KRW-3	12-16	1:4	8/24/04	duplicate	**4.8 J**	-----	<8	-----	<8	-----	**16.3**	-----	-----	-----	-----	-----	-----	-----	<8	-----	<8	-----	-----	-----	-----	<8	-----	None
	GP-KRW-4	12-16	1:2	8/24/04	fuel odor	**1.1 J**	-----	<4	-----	<4	-----	**1.2 J**	-----	-----	-----	-----	-----	-----	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None
	GP-KRW-5A	15-19	1:1	8/24/04		**2.5**	-----	**4.2**	-----	**7.6**	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	**0.1 J**	-----	None
Northern Pipeline	GP-NP-2	16-20	1:10	9/9/04	-diesel odor	**122.0**	**17.0**	<20	<10	<20	<10	**365.0**	<10	-----	<10	-----	<10	<20	<20 / <10	<20	<10	<20	<10	<10	<10	<10	<20	<10	**1,1,2-TCA 71.0**
	NMW-34D	D	1:2	9/10/04		**4.3**	-----	**20.5**	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None
	NMW-34S	S	1:1	9/10/04		**30.5**	-----	**7.0**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	WND-11D	D	1:1	9/10/04		**1.1 J**	-----	**13.9**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None
	WND-11S	S	1:5	9/10/04	-old fuel odor	**4.1 J**	**9.8**	<10	<1	<10	<1	**5.5 J**	<1	-----	<1	-----	<1	-----	<2 / <1	<10	<1	<10	<1	<1	<1	<1	<10	<1	None

Results in µg/L= micrograms per liter

VOLATILE ORGANIC COMPOUNDS:
PCE = Tetrachloroethene
TCE = Trichloroethene
cis-1,2-DCE = cis-1,2-dichloroethene
B = Benzene
T = Toluene
EBN = Ethylbenzene
XYL = Xylene
CT / CCL4 = Carbon tetrachloride
CFM = Chloroform
VC = Vinyl chloride
MTBE = Methyl-tert-butyl ether

1,1-DCE = 1,1-dichloroethene
trans-1,2-DCE = trans-1,2-dichloroethene
1,1-DCA = 1,1-dichloroethane
1,1,1-TCA = 1,1,1-trichloroethane
1,1,2-TCA = 1,1,2-trichloroethane
1,1,2,2-PCA = 1,1,2,2-tetrachloroethane
MeCl = Methylene chloride
BM = Bromomethane
CM = Chloromethane

QUALIFIERS:
Highlighted sample indicates both on-site and off-site samples were submitted
E = Value quantified above the linear range of the instrumentation
J = Result estimated, value measured between the reporting limit and the detection limit
UB= Found in associated QC blank, considered to be laboratory contamination
J-LCS = Result is estimated due to lab control sample recoveries outside of the control limits
JS = Result is estimated due to surrogate recoveries outside of the control limits
SAT= On-site laboratory detector saturated

CDM

Results are given in ug/L (ppb) for groundwater
J = Estimated value below calibration range
NA = Not applicable/not available

Table 3-5
Source Area Investigation Soil Analytical Results
North Industrial Corridor
Wichita, Kansas

Source Area	Sample Location	Depth (feet)	Date	Comment	cis-1,2-DCE		TCE		PCE		B		T		EBN		XYL		CT / CCL4		CFM		1,1,1-TCA	
					Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite (m&p / o)	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite
Aero Space Controls	GP03F-01	2	9/22/04	Soil	<8.4	-----	**3.8 J**	-----	<8.4	-----	<8.4	-----	NA	-----	NA	-----	NA	-----	<8.4	-----	<8.4	-----	<8.4	-----
	GP03F-01	2	9/22/04	Soil-duplicate	<8.4	-----	**3.2 J**	-----	<8.4	-----	<8.4	-----	NA	-----	NA	-----	NA	-----	<8.4	-----	<8.4	-----	<8.4	-----
	GPS-ASC-03	3.5	9/22/04	Soil	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	NA	-----	NA	-----	NA	-----	<8.4	-----	<8.4	-----	<8.4	-----
	GPS-ASC-03	7.5	9/22/04	Soil	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	NA	-----	NA	-----	NA	-----	<8.4	-----	<8.4	-----	<8.4	-----
	GPS-ASC-03	11.5	9/22/04	Soil	**1.5 J**	-----	**6.7 J**	-----	<8.4	-----	<8.4	-----	NA	-----	NA	-----	NA	-----	<8.4	-----	<8.4	-----	<8.4	-----
	GPS-ASC-04	1	9/22/04	Soil	**27.7**	<260	**312.0**	**3100.0**	<8.4	<260	<8.4	<260	NA	<260	NA	<260	NA	<260 / <260	<8.4	<260	<8.4	<260	<8.4	<260
	GPS-ASC-05	1	9/22/04	Soil	<8.4	-----	**258.0**	-----	<8.4	-----	<8.4	-----	NA	-----	NA	-----	NA	-----	<8.4	-----	<8.4	-----	**68.2**	-----
National By-Products	GP-02C-08	1.5	11/22/04	Soil	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	NA	-----	NA	-----	NA	-----
	GP-02C-08	9	11/22/04	Soil	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	NA	-----	NA	-----	NA	-----
	GP-NBPN-03	1.5	11/22/04	Soil	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	NA	-----	NA	-----	NA	-----
	GP-NBPN-03	6	11/22/04	Soil	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	NA	-----	NA	-----	NA	-----
	GP-NBPN-04	1.5	11/22/04	Soil	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	NA	-----	NA	-----	NA	-----
	GP-NBPN-04	7	11/22/04	Soil	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	NA	-----	NA	-----	NA	-----
	GP-NBPN-05	1.5	11/22/04	Soil	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	NA	-----	NA	-----	NA	-----
	GP-NBPN-05	11.5	11/22/04	Soil	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	NA	-----	NA	-----	NA	-----
	GP-NBPN-05	11.5	11/22/04	Soil-duplicate	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	NA	-----	NA	-----	NA	-----
	GP-NBPN-06	1.5	11/22/04	Soil	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	NA	-----	NA	-----	NA	-----
	GP-NBPN-06	1.5	11/22/04	Soil-duplicate	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	NA	-----	NA	-----	NA	-----
Stockyards Property Area 02B (Identified Plan, Figure 13)	GP-S2B-11	1	11/22/04	Soil	<8.4	-----	<8.4	-----	**3.9 J**	-----	**1.4 J**	-----	<8.4	-----	<8.4	-----	**1.4 J**	-----	NA	-----	NA	-----	NA	-----
	GP-S2B-11	5.5	11/22/04	Soil	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	NA	-----	NA	-----	NA	-----
	GP-S2B-12	1.5	11/22/04	Soil	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	NA	-----	NA	-----	NA	-----
	GP-S2B-12	7	11/22/04	Soil	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	NA	-----	NA	-----	NA	-----
	GP-S2B-13	1.5	11/22/04	Soil	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	NA	-----	NA	-----	NA	-----
	GP-S2B-13	6	11/22/04	Soil	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	NA	-----	NA	-----	NA	-----

Results in µg/kg= micorgrams per kilogram

VOLATILE ORGANIC COMPOUNDS:

PCE = Tetrachloroethene
TCE = Trichloroethene
cis-1,2-DCE = cis-1,2-dichloroethene
B = Benzene
T = Toluene
EBN = Ethylbenzene
XYL = Xylene
CT / CCL4 = Carbon tetrachloride
CFM = Chloroform
1,1,1-TCA = 1,1,1-trichloroethane

QUALIFIERS:

Highlighted sample indicates both on-site and off-site sample were submitted
J = Result estimated, value measured between the reporting limit and the detection limit
NA= Not Analyzed

Table 4-1
Source Area Investigation Data
North Industrial Corridor
Wichita, Kansas

Sample Location	Depth (feet)	Date	cis-1,2-DCE		TCE		PCE		B		CT / CCL4		CFM		VC	1,1 DCE	1,1-DCA	1,1,1-TCA		Other Detected Compounds (µg/L) OFFSITE	Other Detected Compounds (µg/L) ONSITE
			Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Offsite	Offsite	Offsite	Onsite	Offsite		
Groundwater																					
3rd & St. Francis (Suspect Plan, Fig 5)																					
GP-3SF-1	14-18	8/27/04	**2.9**	-----	**2.5**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GPA40-1	14-18	8/27/04	**1.2 J**	-----	**1.9 J**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
NMW-29D	MW	8/27/04	**16.3**	-----	**11.5**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
NMW-29S	MW	8/27/04	**7.6**	-----	**7.8**	-----	**0.2 J**	-----	<2	-----	<2	-----	**0.3 J**	-----	-----	-----	-----	<2	-----	None	None
GP-3SF-2	14-18	9/9/04	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-3SF-3	14-18	9/9/04	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
10th and Ohio (Suspect Plan, Figure 10)																					
GP-10-OH-1	16-20	8/26/04	**79.5**	-----	**69.4**	-----	**3.0**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-10-OH-1	12-16	8/26/04	**39.8**	-----	**56.2**	-----	**1.9 J**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
DG-21	16-20	8/27/04	**17.1**	-----	**65.9**	-----	**0.3 J**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
DG-21	12-16	8/27/04	**5.8**	-----	**49.6**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
DG-31	16-20	8/27/04	**48.5**	**56.0**	**114.0**	**140.0**	**4.0**	**6.6 J-LCS**	<2	<5	<2	<5	<2	<5	<5	<5	<5	<2	<5	None	None
DG-31	12-16	8/27/04	**9.8**	**8.1**	**35.9**	**28.0**	**1.3 J**	**1.4 J-LCS**	<2	<1	<2	<1	<2	<1	<1	<1	<1	<2	<1	None	None
11th Street Area (Suspect Plan, Figure 2)																					
GP02I-06	16-20	8/26/04	**34.7**	-----	**58.5**	-----	**2.7**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP02I-06	12-16	8/26/04	**26.3**	-----	**26.0**	-----	**1.8 J**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP08C-01	16-20	8/26/04	**17.2**	-----	**18.0**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP08C-01	12-16	8/26/04	**1.5 J**	-----	**3.4**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-11TH-1	16-20	8/26/04	**1.9 J**	-----	**1.4 J**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-11TH-1	12-16	8/26/04	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-11TH-2	16-20	8/26/04	<2	-----	**4.5**	-----	**1.7 J**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-11TH-2	12-16	8/26/04	**8.2**	-----	**20.5**	-----	**5.4**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-11TH-3	16-20	8/26/04	**0.9 J**	-----	**1.2 J**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-11TH-3	12-16	8/26/04	<2	-----	**0.8 J**	-----	**0.1 J**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	**13.8**	-----	None	None
GP-11TH-3 dup	12-16	8/26/04	**0.5 J**	-----	**1.0 J**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	**17.4**	-----	None	None
GPA31-3	16-20	8/26/04	**45.5**	**52.0**	**133.0**	**140.0**	**12.2**	**9.4**	<2	<1	<2	<1	<2	<1	**2.5**	<1	**2.7**	<2	<1	MTBE 3.2, T12DCE 1.2	None
GPA31-3 dup	16-20	8/26/04	**44.3**	-----	**114.0**	-----	**9.9**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GPA31-3	12-16	8/26/04	**11.6**	**9.2**	**34.0**	**27.0**	**2.2**	**1.7**	<2	<1	<2	<1	<2	<1	<1	<1	<1	<2	<1	None	None
GPA32-1	16-20	8/26/04	**20.9**	**28.0**	**110.0**	**200.0**	**2.9**	**6.1**	<2	<1	<2	<1	<2	<1	<1	**1.1**	<1	<2	<1	T12DCE 1.1	None
GPA32-1	12-16	8/26/04	**23.4**	**18.0**	**154.0**	**140.0**	**4.2**	**4.3**	<2	<1	<2	<1	<2	<1	<1	<1	<1	<2	<1	None	None
GP-11TH-4	16-20	9/20/04	**30.1**	-----	**26.8**	-----	**0.8 J**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-11TH-4	12-16	9/20/04	**0.6 J**	-----	**2.0**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-11TH-5	16-20	9/20/04	**16.2**	-----	**83.1**	-----	**38.0**	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None	None
GP-11TH-5	12-16	9/20/04	**1.9 J**	-----	**8.7**	-----	**1.2 J**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-11TH-6	16-20	9/20/04	**107.0**	**58.0**	**364.0**	**200.0**	**81.8**	**44.0**	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	None	None
GP-11TH-6 dup	16-20	9/20/04	**117.0**	-----	**371.0**	-----	**84.4**	-----	<16	-----	<16	-----	<16	-----	-----	-----	-----	<16	-----	None	None
GP-11TH-6	12-16	9/20/04	**29.7**	**28.0**	**104.0**	**120.0**	**6.0 J**	**8.4**	<4	<1	<4	<1	<4	<1	<1	<1	<1	<4	<1	None	None
GP-11TH-7	16-20	9/20/04	**4.9**	**6.0**	**44.5**	**44.0**	**2.1 J**	**2.6**	<4	<1	<4	<1	<4	<1	<1	<1	<1	<4	<1	None	None
GP-11TH-7	12-16	9/20/04	**0.8 J**	<1	**18.9**	**14 J-RPD**	<2	<1	<2	<1	<2	<1	<2	<1	<1	<1	<1	<2	<1	None	None
GP-11TH-7 dup	12-16	9/20/04	**1.2 J**	**5.3**	**22.1**	**54 J-RPD**	<4	**3.1**	<4	<1	<4	<1	<4	<1	<1	<1	<1	<4	<1	None	None
GP-11TH-8	16-20	9/20/04	**56.1**	-----	**127.0**	-----	**33.6**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-11TH-8	12-16	9/20/04	**7.9**	-----	**22.2**	-----	**2.4**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GPA31-6	16-20	9/20/04	**38.9**	**37.0**	**89.5**	**87.0**	**7.1**	**8.4**	<2	<1	<2	<1	<2	<1	<1	<1	**3.0**	<2	<1	MTBE 9.4, T12DCE 1.0	None
GPA31-6	12-16	9/20/04	**25.8**	**25.0**	**4.1**	**3.3**	<2	<1	<2	<1	<2	<1	<2	<1	<1	<1	<1	<2	<1	MTBE 3.3, T12DCE 1.4	None

CDM

Table 4-1
Source Area Investigation Data
North Industrial Corridor
Wichita, Kansas

Sample Location	Depth (feet)	Date	cis-1,2-DCE		TCE		PCE		B		CT / CCL4		CFM		VC	1,1 DCE	1,1-DCA	1,1,1-TCA		Other Detected Compounds (µg/L) OFFSITE	Other Detected Compounds (µg/L) ONSITE
			Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Offsite	Offsite	Offsite	Onsite	Offsite		
GP-11TH-9	12-16	10/20/04	**13.6**	-----	**139.0**	-----	**13.7**	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-11TH-10	12-16	10/20/04	**5.1**	-----	**46.5**	-----	**2.6**	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-11TH-10 dup	12-16	10/20/04	**4.3**	-----	**38.4**	-----	**2.3**	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-11TH-11	16-20	10/20/04	**14.7**	-----	**130.0**	-----	**4.8**	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-11TH-11	12-16	10/20/04	**12.2**	-----	**120.0**	-----	**4.6**	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-11TH-12	13-17	10/20/04	**5.0**	-----	**10.9**	-----	**2.5**	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-11TH-13	13-17	10/20/04	**5.3**	-----	**34.3**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-11TH-17	13-17	11/4/04	**0.3 J**	-----	**17.0**	-----	**2.8**	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-11TH-18	13-17	11/4/04	**4.6**	-----	**17.2**	-----	**27.7**	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-11TH-18 dup	13-17	11/4/04	**4.2**	-----	**15.2**	-----	**21.0**	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-11TH-19	12-16	11/23/04	**9.1**	-----	**9.6**	-----	**2.4**	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-11TH-20	12-16	11/23/04	**3.5**	-----	**4.5**	-----	**2.5**	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-11TH-21	26-30	11/23/04	**52.0**	-----	**66.9**	-----	**8.2**	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-11TH-21	12-16	11/23/04	**30.6**	**21.0**	**52.6**	**55.0**	**8.7**	**11.0**	<2	<1	-----	<1	-----	<1	**1.9**	<1	**1.5**	-----	<1	None	None
GP-11TH-21 dup	12-16	11/23/04	**24.8**	-----	**40.0**	-----	**7.0**	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-11TH-22	12-16	11/23/04	**1.7 J**	-----	**6.2**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-11TH-23	12-16	11/23/04	**7.3**	-----	**41.6**	-----	**2.6**	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
11th & State (Identified Plan, Fig 17)																					
GP04F-01	13-17	8/27/04	**451 E**	-----	**348.0**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP04F-01 dup	13-17	8/27/04	**439.0**	-----	**294.0**	-----	<20	-----	<20	-----	<20	-----	<20	-----	-----	-----	-----	<20	-----	None	None
GP-11S-1	13-17	8/27/04	**26.6**	-----	**49.0**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-11S-2	15-19	9/9/04	**26.0**	**52.0**	**165.0**	**250.0**	<2	<1	<2	<1	<2	<1	<2	<1	<1	<1	<1	<2	<1	T12DCE 1.9	None
GP-11S-2 dup	15-19	9/9/04	**19.4**	-----	**136.0**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-11S-3	15-19	9/9/04	**0.5 J**	-----	**1.4 J**	-----	<4	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None	None
GP-11S-4	12-16	9/9/04	<4	-----	<4	-----	<4	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None	None
GP-WHW-03	14-18	3/28/05	**3.2**	**3.0**	**2.2**	**1.9**	**11.5**	**14.0**	<2	<1	<2	<1	<2	<1	<1	<1	<1	<2	<1	None	None
GP-WHW-05	14-18	3/28/05	<2	<1	<2	<1	**1.0J**	**2.7**	<2	<1	<2	<1	<2	<1	<1	<1	<1	<2	<1	None	None
13th and Emporia (Suspect Plan, Fig 3)																					
GP-13E-1	13-17	8/27/04	**1.3 J**	-----	**5.6**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-13E-2	14-18	8/27/04	**11.1**	**13.0**	**14.9**	**26.0**	<2	<1	<2	<1	<2	<1	<2	<1	<1	<1	**2.2**	<2	<1	None	None
GP04E-03	12-16	9/1/04	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-13E-3	12-16	9/1/04	**19.2**	**23.0**	**48.1**	**65.0**	<2	<1	<2	<1	<2	<1	<2	<1	<1	**1 J-LCS**	<1	<2	<1	T12DCE 1.5 J-LCS	None
GP-13E-4	12-16	9/9/04	<2	-----	**1.0 J**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-13E-5	12-16	9/9/04	<2	-----	**1.4 J**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-13E-7	12-16	9/9/04	**7.0**	-----	**13.9**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-13E-6	12-16	9/29/04	**7.4**	-----	**12.1**	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-13E-8	12-16	9/29/04	**16.5**	-----	**41.2**	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-13E-9	12-16	9/29/04	**13.7**	**19.0**	**45.1**	**56.0**	**24.9**	<1	<4	<1	-----	<1	-----	<1	<1	<1	<1	-----	<1	None	None
GP-13E-10	12-16	10/20/04	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-13E-11	12-16	10/20/04	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
15th Street Area (Suspect Plan, Plate 3)																					
GP03E-02	31-35	8/23/04	**53.2**	-----	**124.0**	-----	<4	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None	None
GP03E-02	24-28	8/23/04	NA	-----	**122.0**	-----	**0.2 J**	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None	None
GP03E-02 dup	24-28	8/23/04	**35.2**	-----	**111.0**	-----	<4	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None	None
GP03E-02	12-16	8/23/04	**2.1 J**	-----	**5.5**	-----	**1.6 J**	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None	None
GP03E-07	21-25	8/23/04	**17.5**	-----	**94.1**	-----	<4	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None	None
GP03E-07	11-15	8/23/04	**2.2**	**2.1**	**17.9**	**20.0**	<2	<1	<2	<1	<2	<1	<2	<1	<1	<1	<1	<2	<1	None	None
GP-15TH-5	21-25	8/23/04	**5.1**	-----	**15.0**	-----	**0.8 J**	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None	None
GP-15TH-5	11-15	8/23/04	**11.0**	**11.0**	**6.1**	**7.5**	**26.3**	**34.0**	<2	<1	<2	<1	<2	<1	<1	<1	<1	<2	<1	None	None

Table 4-1
Source Area Investigation Data
North Industrial Corridor
Wichita, Kansas

Sample Location	Depth (feet)	Date	cis-1,2-DCE		TCE		PCE		B		CT / CCL4		CFM		VC	1,1 DCE	1,1-DCA	1,1,1-TCA		Other Detected Compounds (µg/L) OFFSITE	Other Detected Compounds (µg/L) ONSITE
			Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Offsite	Offsite	Offsite	Onsite	Offsite		
GP-15TH-6	31-35	8/23/04	**32.4**	-----	**143.0**	-----	<4	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None	None
GP-15TH-6	24-28	8/23/04	**30.4**	-----	**226.0**	-----	**5.4**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-15TH-6	12-16	8/23/04	**9.0**	-----	**27.5**	-----	**7.7**	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None	None
GP-15TH-7	31-35	8/23/04	**32.8**	-----	**244.0**	-----	**3.3**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-15TH-7 dup	31-35	8/23/04	**31.1**	-----	**215.0**	-----	<12	-----	<12	-----	<12	-----	<12	-----	-----	-----	-----	<12	-----	None	None
GP-15TH-7	24-28	8/23/04	**12.6**	-----	**32.5**	-----	**1.8 J**	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None	None
GP-15TH-7	12-16	8/23/04	**2.7**	-----	**9.3**	-----	**101.0**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP02F-6	16-20	8/24/04	**6.3**	-----	**15.8**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP02F-6	12-16	8/24/04	<2	-----	**1.3 J**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GPA24-3	16-20	8/24/04	**8.5**	**13.0**	**61.6**	**99.0**	**0.5 J**	**1.4**	<2	<1	<2	<1	<2	<1	<1	**1.2**	**3.7**	<2	<1	None	None
GPA24-3	12-16	8/24/04	**4.9**	**5.1**	**39.1**	**39.0**	**0.3 J**	<1	<2	<1	<2	<1	<2	<1	<1	<1	**3.5**	<2	<1	None	None
GPA24-3 dup	12-16	8/24/04	**4.6**	-----	**36.8**	-----	**0.2 J**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GPA24-4	16-20	8/24/04	**14.0**	-----	**65.8**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GPA24-4	12-16	8/24/04	**0.6 J**	-----	**7.7**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GPA25-1	16-20	8/24/04	**43.9**	-----	**116.0**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GPA25-1	12-16	8/24/04	**7.5**	-----	**21.2**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP#19-2	16-20	8/25/04	**2.4**	-----	**8.3**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP#19-2	12-16	8/25/04	**0.7 J**	**1.2**	**2.3**	**3.2**	<2	<1	<2	<1	<2	<1	<2	<1	<1	<1	<1	<2	<1	None	None
GP#19-2 dup	12-16	8/25/04	**0.6 J**	<1	**2.1**	**2.4**	<2	<1	<2	<1	<2	<1	<2	<1	<1	<1	<1	<2	<1	None	None
GP#19-5	16-20	8/25/04	**1.3 J**	-----	**0.7 J**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP#19-5	12-16	8/25/04	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP#19-6	16-20	8/25/04	**2.5**	-----	**15.2**	-----	**0.4 J**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP#19-6	12-16	8/25/04	**0.2 J**	-----	**2.4**	-----	**0.1 J**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP03D-03	16-20	8/25/04	**15.9**	**9.7**	**16.0**	**15.0**	**19.2**	<1	**10.0**	<1	<2	<1	<2	**1.7**	**3.2**	<1	<1	<2	<1	EBN 12.0, XYL-MP 22 JS	None
GP03D-03	12-16	8/25/04	**6.2**	**1.2**	**2.4**	**2.2**	**4.0**	<1	**2.0**	<1	<2	<1	<2	<1	<1	<1	<1	<2	<1	None	None
GP03D-03 dup	12-16	8/25/04	**6.0**	-----	**2.3**	-----	**2.3**	-----	**1.9 J**	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-15TH-1	16-20	8/25/04	<2	-----	**4.2**	-----	**0.7 J**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-15TH-1	12-16	8/25/04	<2	-----	<2	-----	**0.1 J**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-15TH-2	16-20	8/25/04	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-15TH-2	12-16	8/25/04	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-15TH-3	16-20	8/24/04	**3.3**	**5.9**	**13.8**	**29.0**	**0.1 J**	<1	<2	<1	<2	<1	<2	<1	<1	<1	<1	<2	<1	None	None
GP-15TH-3	12-16	8/24/04	<2	<1	**2.0**	**2.8**	<2	<1	<2	<1	<2	<1	<2	<1	<1	<1	<1	<2	<1	None	None
GP-15TH-4	16-20	8/25/04	**13.2**	-----	**30.5**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-15TH-4	12-16	8/25/04	**2.2**	-----	**7.6**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GPA20-1	16-20	8/25/04	**8.2**	-----	**23.1**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GPA20-1	12-16	8/25/04	**2.6**	-----	**7.5**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP03D-01	16-20	9/2/04	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP03D-01	12-16	9/2/04	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-15TH-8	31-35	9/1/04	**39.5**	-----	**254.0**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-15TH-8 dup	31-35	9/1/04	**44.3**	-----	**324.0**	-----	<10	-----	<10	-----	<10	-----	<10	-----	-----	-----	-----	<10	-----	None	None
GP-15TH-8	24-28	9/1/04	**28.9**	-----	**190.0**	-----	<4	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None	None
GP-15TH-8	12-16	9/1/04	**17.6**	-----	**7.3**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-15TH-10	31-35	9/2/04	**33.7**	-----	**162.0**	-----	**1.0 J**	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None	None
GP-15TH-10	24-28	9/2/04	**29.3**	-----	**180.0**	-----	**4.5**	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None	None
GP-15TH-10	12-16	9/2/04	**11.5**	**13.0**	**32.7**	**39.0**	**14.2**	**18.0**	<2	<1	<2	<1	<2	<1	<1	<1	<1	<2	<1	TOL 1.2	None
GP-15TH-11	31-35	9/2/04	**40.6**	-----	**94.1**	-----	**8.9**	-----	**0.5 J**	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-15TH-11	24-28	9/2/04	**24.2**	-----	**133.0**	-----	**24.1**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-15TH-11 dup	24-28	9/2/04	**31.8**	-----	**177.0**	-----	**28.7**	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None	None
GP-15TH-11	12-16	9/2/04	**7.2**	**11.0**	**28.8**	**37.0**	**21.2**	**28.0**	<2	<1	<2	<1	<2	<1	<1	<1	<1	**0.6 J**	<1	None	None
GP-15TH-12	16-20	9/2/04	**4.7**	-----	**27.6**	-----	<4	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None	None
GP-15TH-12	12-16	9/2/04	**3.5**	-----	**24.4**	-----	**0.3 J**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None

Table 4-1
Source Area Investigation Data
North Industrial Corridor
Wichita, Kansas

Sample Location	Depth (feet)	Date	cis-1,2-DCE		TCE		PCE		B		CT / CCL4		CFM		VC	1,1 DCE	1,1-DCA	1,1,1-TCA		Other Detected Compounds (µg/L) OFFSITE	Other Detected Compounds (µg/L) ONSITE
			Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Offsite	Offsite	Offsite	Onsite	Offsite		
GP-15TH-13	16-20	9/2/04	**10.4**	**12.0**	**52.3**	**68.0**	**0.3 J**	<1	<2	<1	<2	<1	<2	<1	<1	**1.2**	<1	<2	<1	TOL 1.2	None
GP-15TH-13	12-16	9/2/04	**4.2**	**6.4**	**20.7**	**36.0**	<4	<1	<4	<1	<4	<1	<4	<1	<1	<1	<1	<4	<1	None	None
GP-15TH-14	16-20	9/2/04	**0.9 J**	-----	**12.0**	-----	**0.3 J**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-15TH-14	12-16	9/2/04	**1.3 J**	**1.5**	**14.5**	**18.0**	**0.2 J**	<1	<2	<1	<2	<1	<2	<1	<1	<1	<1	<2	<1	None	None
GP-15TH-15	16-20	9/2/04	**3.9**	-----	**13.2**	-----	**0.4 J**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-15TH-15	12-16	9/2/04	<2	-----	**2.4**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-15TH-17	31-35	9/10/04	**17.8**	-----	**52.1**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-15TH-17	16-20	9/10/04	**13.0**	-----	**41.6**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-15TH-17	12-16	9/10/04	**6.4**	-----	**26.2**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-15TH-18	31-35	9/10/04	**7.2**	-----	**16.5**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-15TH-18	16-20	9/10/04	**4.4**	-----	**4.3**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-15TH-18	12-16	9/10/04	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-15TH-16	31-35	9/21/04	**34.3**	-----	**79.2**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-15TH-16	16-20	9/21/04	**2.7**	-----	**6.8**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-15TH-16	12-16	9/21/04	**0.8 J**	-----	**2.2**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-15TH-19	31-35	9/21/04	**48.2**	-----	**117.0**	-----	**0.3 J**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-15TH-19	16-20	9/21/04	**10.7**	**8.9**	**36.6**	**32.0**	<2	<1	<2	<1	<2	<1	<2	<1	**1.0**	<1	<1	<2	<1	None	None
GP-15TH-19	12-16	9/21/04	**5.3**	**5.5**	**18.3**	**12.0**	<2	<1	<2	<1	<2	<1	<2	<1	<1	<1	<1	<2	<1	None	None
GP-15TH-20	16-20	9/22/04	**4.0**	-----	**14.0**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-15TH-20	12-16	9/22/04	**2.7**	-----	**8.5**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-15TH-21	16-20	9/22/04	**27.7**	-----	**86.9**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-15TH-21	12-16	9/22/04	**16.9**	**20.0**	**57.7**	**69.0**	<2	<1	<2	<1	<2	<1	<2	<1	<1	<1	<1	<2	<1	None	None
GP-15TH-22	16-20	9/22/04	**10.6**	-----	**16.1**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-15TH-22 dup	16-20	9/22/04	**10.3**	-----	**17.5**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-15TH-22	12-16	9/22/04	**7.6**	-----	**15.3**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-15TH-23	16-20	9/22/04	**35.7**	**34.0**	**102.0**	**150.0**	<2	<1	<2	<1	<2	<1	<2	<1	**2.5**	**2.5**	<1	<2	<1	T12DCE 1.2	None
GP-15TH-23	12-16	9/22/04	**4.4**	-----	**13.9**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-15TH-24	16-20	9/21/04	**5.2**	-----	**14.1**	-----	**13.9**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-15TH-24	12-16	9/21/04	<2	-----	**1.8 J**	-----	**5.3**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-15TH-25	16-20	9/22/04	**10.5**	-----	**16.7**	-----	**6.1**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-15TH-25	12-16	9/22/04	**2.7**	-----	**4.4**	-----	**0.7 J**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-15TH-26	16-20	9/21/04	**4.9**	-----	**14.4**	-----	**7.5**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-15TH-26	12-16	9/21/04	**1.3 J**	-----	**2.2**	-----	**0.9 J**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-15TH-26 dup	12-16	9/21/04	**1.0 J**	-----	**1.7 J**	-----	**0.5 J**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-15TH-27	31-35	9/21/04	**34.4**	-----	**82.7**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-15TH-27 dup	31-35	9/21/04	**40.2**	-----	**103.0**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-15TH-27	16-20	9/21/04	**13.0**	**12.0**	**55.1**	**53.0**	<2	<1	<2	<1	<2	<1	<2	<1	**1.0**	**1.4**	<1	<2	<1	None	None
GP-15TH-27	12-16	9/21/04	**7.1**	**8.8**	**28.2**	**29.0**	**0.4 J**	<1	<2	<1	<2	<1	<2	<1	<1	<1	<1	<2	<1	None	None
GP03E-06	24-28	9/29/04	**21.1**	-----	**125.0**	-----	**35.9**	-----	<4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP03E-06	12-16	9/29/04	**4.9**	-----	**47.7**	-----	**37.1**	-----	<4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-ALT-01	16-20	10/7/04	**1.7 J**	-----	**18.7**	-----	**0.7 J**	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-ALT-01	12-16	10/7/04	**0.8 J**	-----	**14.4**	-----	**1.0 J**	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-ALT-01 dup	12-16	10/7/04	**0.8 J**	-----	**16.7**	-----	**1.4 J**	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-ALT-02	16-20	10/7/04	**0.2 J**	-----	**5.0**	-----	**1.0 J**	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-ALT-02	12-16	10/7/04	**0.2 J**	-----	**4.2**	-----	**0.8 J**	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-ALT-03	16-20	10/7/04	**0.5 J**	-----	**6.4**	-----	**0.7 J**	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-ALT-03	12-16	10/7/04	<2	<1	**7.0**	**6.8**	<2	<1	<2	<1	-----	<1	-----	<1	<1	<1	<1	-----	<1	None	None

Table 4-1
Source Area Investigation Data
North Industrial Corridor
Wichita, Kansas

Sample	Depth		cis-1,2-DCE		TCE		PCE		B		CT / CCL4		CFM		VC	1,1 DCE	1,1-DCA	1,1,1-TCA		Other Detected Compounds (µg/L) OFFSITE	Other Detected Compounds (µg/L) ONSITE
Location	(feet)	Date	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Offsite	Offsite	Offsite	Onsite	Offsite		
GP-15TH-9	31-35	10/8/04	**30.3**	-----	**232.0**	-----	**2.1**	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-15TH-9	24-28	10/8/04	**7.2**	-----	**51.4**	-----	**3.6 J**	-----	<4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-15TH-9	16-20	10/8/04	**15.9**	-----	**31.6**	-----	**1.0 J**	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-15TH-9	12-16	10/8/04	<4	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-15TH-28	31-35	10/13/04	**19.2**	-----	**49.7**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-15TH-28	16-20	10/13/04	**12.5**	-----	**51.9**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-15TH-28	12-16	10/13/04	**3.4**	-----	**13.2**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-15TH-29	31-35	10/13/04	**19.8**	-----	**54.3**	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-15TH-29	16-20	10/13/04	**2.4**	-----	**18.0**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-15TH-29	12-16	10/13/04	**0.7 J**	-----	**4.5**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-15TH-30	16-20	10/13/04	**0.9 J**	-----	**3.4**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-15TH-30	12-16	10/13/04	**0.9 J**	-----	**4.2**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-15TH-31	16-20	10/13/04	**2.3**	-----	**8.0**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-15TH-31	12-16	10/13/04	**1.4 J**	-----	**6.2**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP#19-1	31-35	10/13/04	**29.9**	-----	**92.7**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP#19-1 dup	31-35	10/13/04	**24.4**	-----	**75.9**	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP#19-1	16-20	10/13/04	**13.0**	-----	**49.3**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP#19-1	12-16	10/13/04	**14.7**	-----	**89.7**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP#19-7	16-20	10/22/04	**2.0**	-----	**22.9**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP#19-7	12-16	10/22/04	**0.8 J**	-----	**14.1**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-15TH-32	12-16	10/22/04	**0.9 J**	-----	**10.9**	-----	**56.1**	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-15TH-33	31-35	10/22/04	**20.2**	-----	**60.4**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-15TH-33	16-20	10/22/04	**3.7**	-----	**14.2**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	XYL 0.7 J
GP-15TH-33	12-16	10/22/04	**0.6 J**	-----	**6.7**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-15TH-34	12-16	10/22/04	<2	-----	**0.8 J**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-15TH-35	12-16	10/22/04	<2	-----	**4.3**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GPA28-2	13-17	11/4/04	**2.0**	**3.7**	**11.3**	**19.0**	**63.0**	**95.0**	<2	<1	-----	<1	-----	<1	<1	<1	<1	-----	<1	None	None
GPA-28-3	12-16	11/4/04	**2.7**	-----	**3.3**	-----	**26.2**	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-15TH-36	13-17	11/4/04	<2	-----	<2	-----	**3.4**	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP15TH-37	12-16	11/23/04	**8.5**	**11.0**	**9.5**	**15.0**	**12.1**	**26.0**	<2	<1	-----	<1	-----	<1	<1	<1	<1	-----	<1	None	None
GP-15TH-38	12-16	11/23/04	**3.5**	-----	**12.3**	-----	**4.0**	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-15TH-39	31-35	11/23/04	**17.6**	-----	**29.1**	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-15TH-39	12-16	11/23/04	**7.0**	-----	**16.8**	-----	**1.5 J**	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-15TH-40	12-16	11/23/04	**2.5**	-----	**10.8**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-15TH-41	13-17	11/4/04	**1.0 J**	-----	**3.2**	-----	**1.4 J**	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-15TH-42	13-17	11/4/04	**5.3**	-----	**32.9**	-----	**9.6**	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-15TH-43	13-17	11/4/04	**0.6 J**	-----	**14.7**	-----	**41.1**	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-15TH-44	13-17	11/4/04	<2	<1	<2	<1	**6.3**	**8.3**	<2	<1	-----	<1	-----	<1	<1	<1	<1	-----	<1	None	None
GP-15TH-45	13-17	11/4/04	**0.6 J**	-----	**12.2**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-15TH-46	13-17	11/4/04	**2.7**	-----	**13.4**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-15TH-47	13-17	11/4/04	**1.2 J**	-----	**11.3**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-15TH-48	12-16	3/28/05	**2.5**	-----	**7.8**	-----	**4.6**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-15TH-49	12-16	3/28/05	**39.7**	**51.0**	**35.6**	**52.0**	**194.0**	**240.0**	<2	<1	<2	<1	<2	<1	<1	<1	<1	<2	**1.5**	None	None
GP-15TH-50	12-16	3/28/05	<2	-----	**2.6**	-----	**2.4**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-15TH-50 dup	12-16	3/28/05	<2	-----	**2.3**	-----	**2.2**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-15TH-51	12-16	3/28/05	<2	<1	**3.4**	**5.7**	**2.1**	**2.5**	<2	<1	<2	<1	<2	<1	<1	<1	<1	<2	<1	None	None
GP-15TH-51Q	12-16	3/28/05	-----	<1	-----	**5.4**	-----	**4.4**	-----	<1	-----	<1	-----	<1	<1	<1	<1	-----	<1	None	None
18th & Mead Area																					
GP03B-06	31-35	11/19/04	**27.4**	-----	**34.9**	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP03B-06	19-23	11/19/04	**12.4**	-----	**32.1**	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP03B-06	12-16	11/19/04	**9.6**	**11.0**	**34.5**	**39.0**	<2	<1	<2	<1	-----	<1	-----	<1	<1	<1	<1	-----	<1	None	None

Table 4-1
Source Area Investigation Data
North Industrial Corridor
Wichita, Kansas

Sample Location	Depth (feet)	Date	cis-1,2-DCE		TCE		PCE		B		CT / CCL4		CFM		VC	1,1 DCE	1,1-DCA	1,1,1-TCA		Other Detected Compounds (µg/L) OFFSITE	Other Detected Compounds (µg/L) ONSITE
			Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Offsite	Offsite	Offsite	Onsite	Offsite		
20th and Washington (Suspect Plan, Figure 4)																					
GP06F-02	16-20	9/24/04	**166.0**	-----	**20.8**	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP06F-02 dup	16-20	9/24/04	**140.0**	-----	**25.1**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP06F-02	12-16	9/24/04	**116.0**	-----	**20.0**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP06F-03	16-20	9/24/04	**13.9**	-----	**21.3**	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP06F-03	12-16	9/24/04	**0.9 J**	-----	**1.7 J**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-20W-1	16-20	9/24/04	**44.7**	-----	**47.9**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-20W-1	12-16	9/24/04	**29.8**	-----	**12.5**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-20W-2	16-20	9/24/04	**194.0**	**83.0**	**32.2**	**3.6**	<4	<1	**24.8**	<1	-----	<1	-----	<1	**14.0**	**3.1**	**2.7**	-----	<1	T12DCE 3.1	TOL 6.0
GP-20W-2	12-16	9/24/04	**41.2**	**46.0**	**5.8**	**2.5**	<2	<1	**3.4**	<1	-----	<1	-----	<1	**6.8**	**1.6**	**1.6**	-----	<1	MTBE 1.1, T12DCE 1.8	None
GP-20W-3	16-20	9/24/04	**35.8**	-----	**7.9**	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-20W-3	12-16	9/24/04	**71.9**	-----	**1.1 J**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GPA14-2	16-20	9/24/04	**65.9**	**59.0**	**97.9**	**73.0**	<2	<1	<2	<1	-----	<1	-----	<1	**6.4**	**4.0**	**3.0**	-----	<1	MTBE 2.5, T12DCE 4.1	None
GPA14-2 dup	16-20	9/24/04	-----	**60.0**	-----	**77.0**	-----	<1	-----	<1	-----	<1	-----	<1	**6.7**	**4.1**	**3.0**	-----	<1	MTBE 2.6, T12DCE 4.6	None
GPA14-2	12-16	9/24/04	**8.7**	-----	**11.6**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GPA14-3	16-20	9/24/04	**99.9**	**99.0**	**95.2**	**92.0**	<2	<1	<2	<1	-----	<1	-----	<1	**8.8**	**7.1**	**4.1**	-----	<1	None	None
GPA14-3 dup	16-20	9/24/04	**116.0**	-----	**113.0**	-----	<4	-----	<4		-----		-----					-----		None	None
GPA14-3	12-16	9/24/04	**76.5**	**110.0**	**41.4**	**57.0**	<2	<1	<2	<1	-----	<1	-----	<1	**7.0**	**5.6**	**3.6**	-----	<1	None	None
GP#47-2	16-20	10/7/04	**10.9**	-----	**0.6 J**	-----	<2	-----	**0.5 J**	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP#47-2	12-16	10/7/04	**0.3 J**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-20W-4	16-20	10/7/04	**36.4**	-----	**45.9**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-20W-4	12-16	10/7/04	**19.5**	-----	**15.5**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-20W-5	16-20	10/7/04	**42.1**	-----	**52.8**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-20W-5	12-16	10/7/04	**21.8**	-----	**26.4**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-20W-6	16-20	10/7/04	**24.0**	-----	**1.7 J**	-----	<2	-----	**3.9**	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-20W-6 dup	16-20	10/7/04	**21.9**	-----	**1.3 J**	-----	<2	-----	**4.2**	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-20W-6	12-16	10/7/04	**19.7**	-----	<2	-----	<2	-----	**2.8**	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-20W-7	12-16	10/22/04	**86.6**	-----	**28.0**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-20W-8	12-16	10/22/04	**118.0**	-----	**21.1**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-20W-8 dup	12-16	10/22/04	**106.0**	-----	**19.0**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
26th Street Area (Suspect Plan, Plate 4)																					
GP#62-2	16-20	9/27/04	**8.3**	**13.0**	**9.9**	**14.0**	<2	<1	<2	<1	-----	<1	-----	<1	<1	<1	<1	-----	<1	None	None
GP-26TH-1	16-20	9/27/04	**0.2 J**	-----	**8.5**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-26TH-1	11-15	9/27/04	<2	<1	**7.0**	**8.7**	<2	<1	<2	<1	-----	<1	-----	<1	<1	<1	<1	-----	<1	None	None
GP-26TH-2	16-20	9/27/04	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-26TH-2	12-16	9/27/04	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GPA08-2	16-20	9/27/04	**182.0**	**180.0**	**57.9**	**78.0**	<2	**2.0**	<2	**52.0**	-----	<1	-----	<1	**24.0**	<1	**1.7**	-----	<1	T12DCE 1.8	None
GPA08-2 dup	16-20	9/27/04	**161.0**	-----	**61.2**	-----	<10	-----	**2.9 J**	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GPA08-2	12-16	9/27/04	**46.8**	-----	**19.9**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GPA08-3	16-20	9/27/04	**22.0**	**26.0**	**31.9**	**48.0**	<2	<1	**281.0**	**280.0**	-----	<1	-----	<1	<1	<1	<1	-----	<1	EBN 1.3	None
GPA08-3	9-13	9/27/04	**61.6 J-RPD**	**23.0**	<4	**3.5**	<4	<1	**1751 E**	**11000.0**	-----	<1	-----	<1	<1	<1	<1	-----	<1	TOL 20.0, EBN 98.0, XYL-MP 140, XYL-O 85, T13DCP 5.2	TOL 11.0, EBN 81.5 J-RPD, XYL 94.7 J-RPD
GPA08-3 dup	9-13	9/27/04	**90.1 J-RPD**	-----	<20	-----	<20	-----	**3750 E**	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	EBN 22.6 J-RPD
GPA08-4	16-20	9/27/04	**0.5 J**	-----	**28.4**	-----	<4	-----	**3.2 J**	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GPA08-4	12-16	9/27/04	<2	-----	**1.7 J**	-----	<2	-----	**2.2**	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-WRG-1	16-20	9/28/04	<4	-----	**12.9**	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None

Table 4-1
Source Area Investigation Data
North Industrial Corridor
Wichita, Kansas

Sample	Depth		cis-1,2-DCE		TCE		PCE		B		CT / CCL4		CFM		VC	1,1 DCE	1,1-DCA	1,1,1-TCA		Other Detected Compounds (µg/L) OFFSITE	Other Detected Compounds (µg/L) ONSITE
Location	(feet)	Date	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Offsite	Offsite	Offsite	Onsite	Offsite		
GP-WRG-1	12-16	9/28/04	**0.1 J**	**1.3**	**11.5**	**15.0**	<2	<1	<2	<1	-----	<1	-----	<1	<1	<1	<1	-----	<1	MTBE 13.0	None
GP-WRG-2	16-20	9/28/04	<4	-----	**19.7**	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-WRG-2	12-16	9/28/04	**2.7**	**3.2**	**30.1**	**20.0**	**1.3 J**	<1	<2	<1	-----	<1	-----	<1	<1	<1	<1	-----	<1	None	None
GP-WRG-5A	16-20	9/28/04	**7.4**	-----	**23.8**	-----	<4	-----	**13.7**	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	TOL 6.1, EBN 3.6 J, XYL 5.9
GP-WRG-5A	12-16	9/28/04	<10	**2.3**	<10	**18.0**	<10	<1	**SAT.**	**6.0**	-----	<1	-----	<1	<1	<1	<1	-----	<1	TOL 4.4, EBN 3.0, MTBE 10.0, 112TCA 2.4	TOL 3632.0, EBN 693 E, XYL 1310 E
GP-WRG-5A dup	12-16	9/28/04	<50	-----	<50	-----	<50	-----	**10630.0**	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	TOL 3649.0, EBN 336.0, XYL 589.0
GP#62-1	16-20	10/8/04	**SAT.**	**4200.0**	**148 J-RPD**	**300.0**	<4	**1.6**	**12.8**	**15.0**	-----	<1	-----	<1	**760.0**	**7.4**	**23.0**	-----	**3.6**	T12DCE 6.4	None
GP#62-1 dup	16-20	10/8/04	**606.0**	-----	**46.7 J-RPD**	-----	<20	-----	<20	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP#62-1	12-16	10/8/04	**67.1**	**140.0**	**22.7**	**53.0**	<4	<1	<4	<1	-----	<1	-----	<1	**66.0**	**1.1**	**1.7**	-----	<1	None	None
GP-26TH-3	16-20	10/8/04	**19.2**	-----	**24.1**	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-26TH-3	12-16	10/8/04	**16.7**	-----	**17.3**	-----	**1.9 J**	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-26TH-4	16-20	10/8/04	**5.1**	-----	**21.6**	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-26TH-4	12-16	10/8/04	**2.5**	-----	**9.4**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-26TH-5	16-20	10/8/04	<4	-----	**5.9**	-----	**1.4 J**	-----	<4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-26TH-5	12-16	10/8/04	<2	-----	**1.2 J**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-26TH-6	16-20	10/8/04	**194.0**	**300.0**	**89.5**	**120.0**	<4	<1	<4	<1	-----	<1	-----	<1	**40.0**	<1	**2.5**	-----	<1	T12DCE 1.7	None
GP-26TH-6	12-16	10/8/04	**481.0**	**540.0**	**336.0**	**220.0**	<4	<1	<4	<1	-----	<1	-----	<1	**29.0**	**1.5**	**4.1**	-----	<1	T12DCE 2.4	None
GP-26TH-7	16-20	10/14/04	**5.6**	-----	**43.9**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-26TH-7	12-16	10/14/04	**5.9**	-----	**39.1**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-WRG-3	16-20	10/14/04	**0.4 J**	-----	**5.9**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-WRG-3	12-16	10/14/04	**0.4 J**	**2.1**	**5.4**	**13.0**	<2	**1.6**	<2	<1	-----	<1	-----	<1	<1	<1	<1	-----	<1	MTBE 12.0	None
GP-WRG-4	20-24	10/14/04	**4.0**	-----	**22.5**	-----	**1.6 J**	-----	**0.9J**	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-WRG-4	16-20	10/14/04	NA	**6.4**	<4	**39.0**	<4	<1	**SAT.**	**19.0**	-----	<1	-----	<1	<1	<1	<1	-----	<1	TOL 5.9, EBN 7.7, XYL-MP 480, XYL-O 69, MTBE 2.1, CM 88.0	TOL sat
GP-WRG-4 dup	16-20	10/14/04	<40	-----	<40	-----	<40	-----	**7255 E**	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	TOL 1752 E, XYL 500.0
GP-WRG-6	16-20	10/14/04	**1.2 J**	-----	**21.5**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-WRG-6	12-16	10/14/04	**0.6 J**	-----	**21.3**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-WRG-7	16-20	10/14/04	**2.6**	-----	**13.0**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-WRG-7	12-16	10/14/04	**46.1***	-----	<4	-----	<4	-----	**101.0**	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	TOL 22.6, EBN 24.9, XYL 22.5
GP-WRG-8	16-20	10/14/04	**2.0**	-----	**22.2**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-WRG-8	12-16	10/14/04	**1.8 J**	-----	**25.8**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-WRG-9	16-20	10/14/04	**0.9 J**	-----	**8.4**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-WRG-9	12-16	10/14/04	<2	-----	**3.6**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-WRG-10	16-20	10/14/04	**0.3 J**	-----	**6.7**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-WRG-10	12-16	10/14/04	**0.6 J**	-----	**15.6**	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-WRG-10 dup	12-16	10/14/04	**1.0 J**	-----	**13.8**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-26TH-8	38-42	11/19/04	**9.9**	-----	**34.0**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-26TH-8	12-16	11/19/04	**67.3**	**68.0**	**6.3**	**7.0**	<2	<1	<2	<1	-----	<1	-----	<1	**12.0**	<1	<1	-----	<1	None	None
GP-26TH-9	38-42	11/19/04	**12.5**	-----	**49.6**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-26TH-9	12-16	11/19/04	**11.0**	-----	**17.3**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-26TH-9 dup	12-16	11/19/04	**10.0**	-----	**14.9**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-26TH-10	38-42	11/19/04	**13.2**	-----	**44.7**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-26TH-10	12-16	11/19/04	**131.0**	-----	**18.3**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None

Table 4-1
Source Area Investigation Data
North Industrial Corridor
Wichita, Kansas

Sample Location	Depth (feet)	Date	cis-1,2-DCE		TCE		PCE		B		CT / CCL4		CFM		VC	1,1 DCE	1,1-DCA	1,1,1-TCA		Other Detected Compounds (µg/L) OFFSITE	Other Detected Compounds (µg/L) ONSITE
			Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Offsite	Offsite	Offsite	Onsite	Offsite		
GP-26TH-11	38-42	11/19/04	**14.3**	-----	**57.7**	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-26TH-11	12-16	11/19/04	**6.5**	-----	**21.0**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-26TH-12	38-42	11/19/04	**16.3**	-----	**58.0**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-26TH-12	12-16	11/19/04	**32.5**	-----	**23.6**	-----	<2	-----	**112.0**	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
A & A Auto (Identified Plan, Figure 2)																					
GP05C-03	16-20	8/31/04	**0.8 J**	-----	**1.2 J**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP05C-03	11-15	8/31/04	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP05C-04	16-20	8/31/04	**15.9**	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP05C-04	11-15	8/31/04	**0.9 J**	<1	<2	<1	<2	<1	<2	<1	<2	<1	<2	<1	<1	<1	<1	<2	<1	None	None
GP05C-06	16-20	8/31/04	**5.5**	-----	**9.5**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP05C-06	11-15	8/31/04	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP05C-08	16-20	8/31/04	**41.8**	-----	**31.8**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP05C-08 dup	16-20	8/31/04	**39.8**	-----	**31.5**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP05C-08	11-15	8/31/04	**19.7**	**25.0**	**14.4**	**23.0**	<2	<1	<2	<1	<2	<1	<2	<1	<1	<1	**1.1**	<2	<1	T12DCE 1.4	None
Aero Space Controls (Identified Plan, Figure 3)																					
GP#18-1	12-16	9/3/04	**5.9**	**1.7**	<2	<1	<2	<1	**3.5**	<1	<2	<1	<2	<1	<1	<1	<1	<2	<1	EBN 1.9	None
GP03F-01	12-16	9/3/04	**49.2**	**78.0**	**411 E**	**620.0**	**2.0**	**5.5**	<2	<1	<2	<1	<2	<1	<1	**2.8**	**8.1**	**29.0**	**29.0**	T12DCE 1.1	None
GP03F-01 dup	12-16	9/3/04	**62.4**	-----	**562.0**	-----	**2.2 J**	-----	<6	-----	<6	-----	<6	-----	-----	-----	-----	**34.1**	-----	None	None
GP03F-02	12-16	9/3/04	**60.9**	**110.0**	**363.0**	**520.0**	**0.4 J**	**5.5**	<10	<1	<10	<1	<10	<1	<1	**1.6**	**7.8**	**20.1**	**22.0**	T12DCE 2.1	None
GP-ASC-01	12-16	9/3/04	**19.1**	<1	**6.4**	<1	**11.2**	<1	**6.9**	**1.8**	<4	<1	<4	<1	<1	<1	<1	<4	<1	None	None
GP-ASC-01 dup	12-16	9/3/04	-----	<1	-----	<1	-----	<1	-----	**1.8**	-----	<1	-----	<1	<1	<1	<1	-----	<1	None	None
GP-ASC-02	12-16	9/3/04	**60.7**	-----	**95.1**	-----	<4	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	**3.1 J**		None	None
Christopher Steel																					
GP-CSI-01	15-19	9/29/04	<2	<1	<2	<1	**28.9**	**9.4**	<2	<1	-----	<1	-----	<1	<1	<1	<1	-----	<1	None	None
GP-CSI-01 dup	15-19	9/29/04	<2	-----	<2	-----	**28.3**	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-CSI-02	12-16	10/20/04	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-CSI-03	12-16	10/20/04	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
Former Coastal Boneyard (Identified Plan, Figure 5)																					
GPA05-3	31-35	9/16/04	**2.7 J**	-----	**56.5**	-----	<4	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None	None
GPA05-3 dup	31-35	9/16/04	**2.3 J**	-----	**47.2**	-----	<4	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None	None
GPA05-3	16-20	9/16/04	<4	-----	**24.2**	-----	<4	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None	None
GPA05-3	12-16	9/16/04	<2	-----	**3.6**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GPA05-3 dup	12-16	9/16/04	<2	-----	**4.3**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP02A-05	31-35	9/17/04	<2	-----	**0.7 J**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP02A-05	16-20	9/17/04	**0.9 J**	<1	**26.3**	**31.0**	<2	<1	<2	<1	<2	<1	<2	<1	<1	<1	<1	<2	<1	None	None
GP02A-05	12-16	9/17/04	<2	<1	**2.0**	**4.5**	<2	<1	<2	<1	<2	<1	<2	<1	<1	<1	<1	<2	<1	None	None
GP02A-06	31-35	9/17/04	**0.6 J**	-----	**6.2**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP02A-06	16-20	9/17/04	<2	-----	**1.5**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP02A-06	12-16	9/17/04	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP02A-07	31-35	9/17/04	**1.4 J**	-----	**17.6**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP02A-07	31-35	9/17/04	**1.1 J**	-----	**13.9**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP02A-07	16-20	9/17/04	**0.3 J**	-----	**6.1**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP02A-07	12-16	9/17/04	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-CBY-01	12-16	3/28/05	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-CBY-01	16-20	3/28/05	<2	-----	**3.2**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-CBY-01	31-35	3/28/05	<2	-----	**4.3**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None

Table 4-1
Source Area Investigation Data
North Industrial Corridor
Wichita, Kansas

Sample	Depth		cis-1,2-DCE		TCE		PCE		B		CT / CCL4		CFM		VC	1,1 DCE	1,1-DCA	1,1,1-TCA		Other Detected Compounds (µg/L) OFFSITE	Other Detected Compounds (µg/L) ONSITE
Location	(feet)	Date	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Offsite	Offsite	Offsite	Onsite	Offsite		
Comp. Gases (Identified, Fig 6)																					
WND-12S	S	9/10/04	**2.7**	-----	<2	-----	<2	-----	**0.7 J**	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
Former Dold Foods (Identified Plan, Figure 7)																					
GP04C-01	14-18	8/31/04	**0.4 J**	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP04C-01	12-16	8/31/04	**9.8**	<1	<2	<1	<2	<1	<2	<1	<2	<1	<2	<1	<1	<1	<1	<2	<1	None	None
GP-DLD-01	14-18	8/31/04	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-DLD-01	12-16	8/31/04	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-DLD-01 dup	12-16	8/31/04	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-DLD-02	14-18	9/1/04	**16.7**	-----	**11.7**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-DLD-02	12-16	9/1/04	**9.2**	-----	**5.4**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-DLD-03	14-18	9/1/04	**23.0**	-----	**15.4**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-DLD-03	12-16	9/1/04	**13.1**	**19.0**	**10.8**	**13.0**	<2	<1	<2	<1	<2	<1	<2	<1	<1	<1	<1	<2	<1	None	None
GP#34-7	14-18	9/1/04	**1.0 J**	-----	**1.7 J**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP#34-7	12-16	9/1/04	**1.9 J**	-----	**3.6**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP#34-7 dup	12-16	9/1/04	**1.3 J**	-----	**3.0**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-DLD-05	14-18	9/10/04	**11.0**	-----	**4.9**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-DLD-05	12-16	9/10/04	**8.8**	-----	**6.6**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-DLD-05 dup	12-16	9/10/04	**9.9**	-----	**6.9**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-DLD-06	14-18	9/21/04	**16.8**	-----	**0.7 J**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-DLD-06	12-16	9/21/04	**11.6**	**13.0**	<2	<1	<2	<1	<2	<1	<2	<1	<2	<1	<1	<1	<1	<2	<1	None	None
Dow Essex/ Wil-Gro (Identified Plan, Figure 8)																					
GP03A-01	13-17	8/30/04	**1.4 J**	**1.2**	**21.4**	**24.0**	<2	<1	<2	<1	<2	<1	<2	<1	<1	<1	<1	<2	<1	MECL 2 UB	None
GP03A-06	13-17	8/30/04	**2.8**	-----	**11.5**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP03A-06	9-13	8/30/04	<2	-----	**1.7 J**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-DOW-01	13-17	8/30/04	<2	-----	**1.2 J**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-DOW-01	9-13	8/30/04	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-DOW-02	13-17	8/30/04	**2.3**	-----	**15.5**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-DOW-02	9-13	8/30/04	**0.6 J**	-----	**5.9**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-DOW-03	13-17	8/30/04	<2	-----	**1.3 J**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-DOW-03	9-13	8/30/04	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-DOW-04	13-17	8/30/04	**0.3 J**	-----	**4.1**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-DOW-04	9-13	8/30/04	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-DOW-04 dup	9-13	8/30/04	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-DOW-05	13-17	8/30/04	<2	<1	**3.6**	**7.8**	<2	<1	<2	<1	<2	<1	<2	<1	<1	<1	<1	<2	<1	MTBE 5.1, MECL 12 UB	None
GP-DOW-05	9-13	8/30/04	<2	<1	**1.2 J**	**1.1**	<2	<1	<2	<1	<2	<1	<2	<1	<1	<1	<1	<2	<1	MECL 7 UB	None
GP-DOW-06	11-15	9/17/04	<2	-----	**6.8**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-DOW-07	13-17	9/17/04	**4.1**	-----	**39.7**	-----	**0.3 J**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-DOW-07	10-14	9/17/04	**1.3**	-----	**17.7**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
Huttig (Identified Plan, Figure 9)																					
GP-HUT-01	16-20	9/14/04	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-HUT-01	12-16	9/14/04	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-HUT-02	16-20	9/14/04	**24.9**	-----	**4.9**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-HUT-02	12-16	9/14/04	**28.2**	**22.0**	**1.6 J**	**1.8**	<4	<1	<4	<1	<4	<1	<4	<1	<1	**1.1**	<1	<4	<1	None	None
GP-HUT-02 dup	12-16	9/14/04	**24.8**	-----	**1.8 J**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP02I-05	16-20	9/20/04	**119.0**	-----	**45.6**	-----	**0.9 J**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP02I-05	12-16	9/20/04	**45.9**	-----	**9.0**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP02I-02	16-20	9/29/04	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP02I-02	12-16	9/29/04	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None

Table 4-1
Source Area Investigation Data
North Industrial Corridor
Wichita, Kansas

Sample Location	Depth (feet)	Date	cis-1,2-DCE		TCE		PCE		B		CT / CCL4		CFM		VC	1,1 DCE	1,1-DCA	1,1,1-TCA		Other Detected Compounds (µg/L) OFFSITE	Other Detected Compounds (µg/L) ONSITE
			Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Offsite	Offsite	Offsite	Onsite	Offsite		
GPA31-7	16-20	9/29/04	**6.6**	-----	**17.1**	-----	**2.6**	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GPA31-7	10-14	9/29/04	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-11TH-14	12-16	10/20/04	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GPA31-8	12-16	10/20/04	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP02I-04	12-16	10/20/04	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-11TH-15	12-16	10/22/04	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-11TH-15 dup	12-16	10/22/04	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-11TH-16	12-16	10/22/04	**0.5 J**	-----	**1.5 J**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP02I-07	12-16	10/22/04	**1.3 J**	-----	**1.7 J**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
John's Refinery (Susp. Plan, Fig 7)																					
GP-JRF-01	12-16	9/28/04	<2	<1	**22.4**	<1	<2	<1	**55.8**	**47.0**	-----	<1	-----	<1	**10.0**	<1	<1	-----	<1	None	TOL 5.6
GP-JRF-02	14-18	9/28/04	**0.2J**	-----	<10	-----	<10	-----	**8.9 J**	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-JRF-03	16-20	10/13/04	<4	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-JRF-03	12-16	10/13/04	**3.0**	-----	**1.8 J**	-----	<2	-----	**6.5**	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
Kansas Plating (Identified Plan, Figure 10)																					
GP#18-6	12-16	9/14/04	**2.6**	**3.7**	**8.3**	**11.0**	<2	<1	<2	<1	<2	<1	<2	<1	<1	**2.0**	<1	**13.0**	**8.4**	None	None
GP#18-7	12-16	9/14/04	**1.9 J**	-----	**6.5**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	**2.2**	-----	None	None
GP08C-04	12-16	9/14/04	<2	<1	**1.3 J**	**2.5**	<2	<1	<2	<1	<2	<1	<2	<1	<1	<1	<1	**9.8**	**8.6**	None	None
GP08C-06	12-16	9/14/04	<2	<1	<2	<1	<2	<1	<2	<1	<2	<1	<2	<1	<1	<1	<1	<2	<1	BM 3.6	None
GP-KPI-1	12-16	9/14/04	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-KPI-2	12-16	9/14/04	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-KPI-2 dup	12-16	9/14/04	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-KPI-3	12-16	9/14/04	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-KPI-4	12-16	9/14/04	**2.3**	**3.1**	**3.5**	**3.1**	<2	<1	<2	<1	<2	<1	<2	<1	<1	**3.5**	**2.0**	**11.0**	**7.0**	None	None
Kreonite West (Suspect Plan, Figure 8)																					
GP-KRW-1	12-16	8/24/04	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-KRW-2	12-16	8/24/04	**0.8 J**	-----	<4	-----	<4	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None	None
GP-KRW-3	12-16	8/24/04	**6.0 J**	-----	<10	-----	<10	-----	**18.2**	-----	<10	-----	<10	-----	-----	-----	-----	<10	-----	None	None
GP-KRW-3 dup	12-16	8/24/04	**4.8 J**	-----	<8	-----	<8	-----	**16.3**	-----	<8	-----	<8	-----	-----	-----	-----	<8	-----	None	None
GP-KRW-4	12-16	8/24/04	**1.1 J**	-----	<4	-----	<4	-----	**1.2 J**	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None	None
GP-KRW-5A	15-19	8/24/04	**2.5**	-----	**4.2**	-----	**7.6**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	**0.1 J**	-----	None	None
National By-Products (Identified Plan, Figure 11)																					
GP#35-4	16-20	9/15/04	**6.1**	-----	**11.8**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP#35-4	12-16	9/15/04	**4.7**	-----	**10.2**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP#35-4 dup	12-16	9/15/04	**3.5**	-----	**7.6**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP02C-06	16-20	9/15/04	**3.4 J**	-----	**10.2**	-----	<4	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None	None
GP02C-06	12-16	9/15/04	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP02C-08	16-20	9/15/04	**49.4**	-----	**68.5**	-----	**9.8**	-----	**3.7**	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP02C-08	12-16	9/15/04	**14.1**	**19.0**	**2.4**	<1	<2	<1	**4.8**	<1	<2	<1	<2	<1	**15.0**	**1.2**	**1.1**	<2	<1	MTBE 3.1	None
GP02C-09	16-20	9/16/04	**28.0**	-----	**22.3**	-----	<4	-----	**43.7**	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None	None
GP02C-09	12-16	9/16/04	**14.6**	**13.0**	**2.4 J**	<1	<4	<1	**20.1**	<1	<4	<1	<4	<1	**17.0**	<1	<1	<4	<1	1122PCA 2.9	None
GP02C-11	16-20	9/15/04	**9.4**	-----	**11.0**	-----	<4	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None	None
GP02C-11	12-16	9/15/04	**9.6**	-----	**12.3**	-----	**0.3 J**	-----	**0.7 J**	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GPA12-9	16-20	9/16/04	**47.1**	-----	**6.6**	-----	<2	-----	**2.7**	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GPA12-9	12-16	9/16/04	**85.7**	**90.0**	**19.7**	**24.0**	<2	<1	<2	<1	<2	<1	<2	<1	**11.0**	**3.2**	**2.6**	<2	<1	MTBE 2.2, T12DCE 4.6	None
GP-NBPN-01	16-20	9/15/04	**12.9**	-----	**17.4**	-----	<2	-----	**0.9 J**	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-NBPN-01	12-16	9/15/04	**6.8**	-----	**12.7**	-----	<2	-----	**0.6 J**	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-NBPN-02	16-20	9/15/04	**37.0**	-----	**12.6**	-----	<4	-----	**85.9**	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None	None
GP-NBPN-02	12-16	9/15/04	**27.9**	-----	**2.7 J**	-----	<4	-----	**4.1**	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None	None

Table 4-1
Source Area Investigation Data
North Industrial Corridor
Wichita, Kansas

Sample	Depth		cis-1,2-DCE		TCE		PCE		B		CT / CCL4		CFM		VC	1,1 DCE	1,1-DCA	1,1,1-TCA		Other Detected Compounds (µg/L) OFFSITE	Other Detected Compounds (µg/L) ONSITE
Location	(feet)	Date	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Offsite	Offsite	Offsite	Onsite	Offsite		
Northern Pipeline (Suspect Plan, Fig 9)																					
GP-NP-2	16-20	9/9/04	**122.0**	**17.0**	<20	<10	<20	<10	**365.0**	<10	<20	<10	<20	<10	<10	<10	<10	<20	<10	112TCA 71.0	None
NMW-34D	D	9/10/04	**4.3**	-----	**20.5**	-----	<4	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None	None
NMW-34S	S	9/10/04	**30.5**	-----	**7.0**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
WND-11D	D	9/10/04	**1.1 J**	-----	**13.9**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
WND-11S	S	9/10/04	**4.1 J**	**9.8**	<10	<1	<10	<1	**5.5 J**	<1	<10	<1	<10	<1	<1	<1	<1	<10	<1	None	None
Parker Boss (Identified Plan, Figure 12)																					
GP-PKB-01	16-20	9/3/04	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-PKB-01	12-16	9/3/04	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-PKB-02	16-20	9/3/04	**1.7 J**	-----	**2.1**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-PKB-02	12-16	9/3/04	**2.2**	-----	**3.3**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-PKB-03	16-20	9/3/04	**1.1 J**	-----	**1.6 J**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-PKB-03	12-16	9/3/04	**0.7 J**	-----	**1.0 J**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-PKB-04	16-20	9/3/04	**0.6 J**	-----	**1.1 J**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-PKB-04	12-16	9/3/04	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-PKB-04 dup	12-16	9/3/04	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP02G-02	16-20	9/7/04	**1.5 J**	-----	**1.4 J**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP02G-02	12-16	9/7/04	**0.3 J**	-----	**0.7 J**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GPA24-2	16-20	9/7/04	**0.6 J**	-----	**1.3 J**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GPA24-2	12-16	9/7/04	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GPA24-2 dup	12-16	9/7/04	<2	-----	**0.9 J**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
Stockyards Property Area 02B (Identified Plan, Figure 13)																					
GP02B-06	12-16	9/8/04	**3.1**	-----	**30.5**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-S2B-01	12-16	9/8/04	**69.6**	**94.0**	**80.7**	**130.0**	<2	<1	<2	<1	**1.0 J**	**1.8**	**1.2 J**	**1.5**	<1	**1.3**	**1.9**	<2	<1	T12DCE 5.0	None
GP-S2B-02	14-18	9/8/04	**22.9**	-----	**59.0**	-----	<4	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None	None
GP-S2B-03	15-19	9/8/04	**7.7**	-----	**11.7**	-----	<4	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None	None
GP-S2B-03 dup	15-19	9/8/04	**9.5**	-----	**15.4**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-S2B-04	12-16	9/8/04	**139.0**	-----	**78.8**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-S2B-05	12-16	9/8/04	**103.0**	**110.0**	**151.0**	**170.0**	<4	<1	<4	<1	<4	<1	<4	<1	**2.2**	**5.9**	**2.4**	<4	<1	T12DCE 5.0	None
GP-S2B-06	12-16	9/8/04	**62.9**	-----	**79.4**	-----	<4	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None	None
GP-S2B-07	12-16	9/8/04	<2	-----	**6.9**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-S2B-08	10-14	9/29/04	<4	<1	<4	<1	<4	<1	**1.4 J**	**2.3**	-----	<1	-----	<1	<1	<1	<1	-----	<1	None	None
GP-S2B-09	11-15	9/29/04	**22.1**	-----	**12.3**	-----	<2	-----	<2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-S2B-10	10-14	9/29/04	**5.8**	-----	**27.9**	-----	<4	-----	**54.4**	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	TOL 11.2, EBN 7.8
Stockyards Property Area 06D (Identified Plan, Figure 13)																					
GP06D-02	12-16	9/8/04	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP08E-03	12-16	9/8/04	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-S6D-01	12-16	9/8/04	**6.5**	-----	**8.5**	-----	<4	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None	None
GP-S6D-02	12-16	9/8/04	<4	-----	<4	-----	<4	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None	None
GP-S6D-03	12-16	9/8/04	**2.9**	-----	**1.3 J**	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-S6D-04	12-16	9/8/04	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-S6D-04 dup	12-16	9/8/04	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
Waco Handi-Wash																					
GP-WHW-01	14-18	3/28/05	<2	-----	<2	-----	**4.2**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-WHW-02	15-19	3/28/05	**1.3 J**	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-WHW-03	14-18	3/28/05	**3.2**	-----	**2.2**	-----	**11.5**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-WHW-05	14-18	3/28/05	<2	-----	<2	-----	**1.0 J**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None

Table 4-1
Source Area Investigation Data
North Industrial Corridor
Wichita, Kansas

Sample Location	Depth (feet)	Date	cis-1,2-DCE Onsite	cis-1,2-DCE Offsite	TCE Onsite	TCE Offsite	PCE Onsite	PCE Offsite	B Onsite	B Offsite	CT / CCL4 Onsite	CT / CCL4 Offsite	CFM Onsite	CFM Offsite	VC Offsite	1,1 DCE Offsite	1,1-DCA Offsite	1,1,1-TCA Onsite	1,1,1-TCA Offsite	Other Detected Compounds (µg/L) OFFSITE	Other Detected Compounds (µg/L) ONSITE
Western Uniform (Identified Plan, Fig. 14)																					
GP-WU-01	12-16	9/7/04	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-WU-02	12-16	9/7/04	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP-WU-04	12-16	9/9/04	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
WU-GP02R	11-15	9/7/04	<2	-----	<2	-----	**5.3**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
WU-GP11R	11-15	9/7/04	<2	-----	<2	-----	**1.9**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
Wichita Terminal Elevator																					
GP#55-1	12-16	3/29/05	**28.3**	-----	**125.0**	-----	<4	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None	None
GP#55-1	16-20	3/29/05	**33.3**	-----	**122.0**	-----	<4	-----	<4	-----	<4	-----	<4	-----	-----	-----	-----	<4	-----	None	None
GP#55-1	41-45	3/29/05	**35.6**	-----	**196.0**	-----	**1.9 J**	-----	<2	-----	<2	-----	<2	-----	-----	-----	-----	<2	-----	None	None
GP#55-1 dup	41-45	3/29/05	**38.4**	-----	**160.0**	-----	<16	-----	<16	-----	<16	-----	<16	-----	-----	-----	-----	<16	-----	None	None
Soil																					
Aero Space Controls (Identified Plan, Figure 3)																					
GP03F-01	2	9/22/04	<8.4	-----	**3.8 J**	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	-----	-----	-----	<8.4	-----	None	None
GP03F-01 dup	2	9/22/04	<8.4	-----	**3.2 J**	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	-----	-----	-----	<8.4	-----	None	None
GPS-ASC-03	3.5	9/22/04	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	-----	-----	-----	<8.4	-----	None	None
GPS-ASC-03	7.5	9/22/04	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	-----	-----	-----	<8.4	-----	None	None
GPS-ASC-03	11.5	9/22/04	**1.5 J**	-----	**6.7 J**	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	-----	-----	-----	<8.4	-----	None	None
GPS-ASC-04	1	9/22/04	**27.7**	<260	**312.0**	**3100.0**	<8.4	<260	<8.4	<260	<8.4	<260	<8.4	<260	<260	<260	<260	<8.4	<260	None	None
GPS-ASC-05	1	9/22/04	<8.4	-----	**258.0**	-----	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	-----	-----	-----	**68.2**	-----	None	None
National By-Products (Identified Plan, Figure 11)																					
GP-02C-08	1.5	11/22/04	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-02C-08	9	11/22/04	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-NBPM-03	1.5	11/22/04	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-NBPM-03	6	11/22/04	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-NBPM-04	1.5	11/22/04	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-NBPM-04	7	11/22/04	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-NBPM-05	1.5	11/22/04	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-NBPM-05	11.5	11/22/04	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-NBPM-05 dup	11.5	11/22/04	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-NBPM-06	1.5	11/22/04	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-NBPM-06 dup	1.5	11/22/04	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
Stockyards Property Area 02B (Identified Plan, Figure 13)																					
GP-S2B-11	1	11/22/04	<8.4	-----	<8.4	-----	**3.9 J**	-----	**1.4 J**	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	XYL 1.4 J
GP-S2B-11	5.5	11/22/04	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-S2B-12	1.5	11/22/04	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-S2B-12	7	11/22/04	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-S2B-13	1.5	11/22/04	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None
GP-S2B-13	6	11/22/04	<8.4	-----	<8.4	-----	<8.4	-----	<8.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	None	None

Results in µg/L= micrograms per liter

VOLATILE ORGANIC COMPOUNDS:

PCE = Tetrachloroethene
TCE = Trichloroethene
cis-1,2-DCE = cis-1,2-dichloroeth
B = Benzene
TOL = Toluene
EBN = Ethylbenzene
XYL = Xylene
CT / CCL4 = Carbon tetrachlorid
CFM = Chloroform
VC = Vinyl chloride
MTBE = Methyl-tert-butyl ether

1,1-DCE = 1,1-dichloroethene
T1,2-DCE = trans-1,2-dichloroethene
1,1-DCA = 1,1-dichloroethane
1,1,1-TCA = 1,1,1-trichloroethane
112-TCA = 1,1,2-trichloroethane
1122-PCA = 1,1,2,2-tetrachloroethane
T13DCP=Trans-1,3-Dichloropropane
MeCl = Methylene chloride
BM = Bromomethane
CM = Chloromethane

QUALIFIERS:

Highlighted sample indicates both on-site and off-site samples were submitted
E = Value quantified above the linear range of the instrumentation
J = Result estimated, value measured between the reporting limit and the detection limit
UB= Found in associated QC blank, considered to be laboratory contamination
J-LCS = Result is estimated due to lab control sample recoveries outside of the control limits
JS = Result is estimated due to surrogate recoveries outside of the control limits
SAT= On-site laboratory detector saturated
J-RPD=Original vs. duplicate sample relative percent difference exceeds 25% control limit

CDM

Table 4-2
North Industrial Corridor (NIC) Site
Summary of Site-wide Sample Results (Phase 3)

Station ID	Well Depth	Sample Date	cis-1,2-DCE (µg/L)	TCE (µg/L)	PCE (µg/L)	BEN (µg/L)	CT / CCL4 (µg/L)	CFM (µg/L)	VC (µg/L)	11DCE (µg/L)	11DCA (µg/L)	1,1,1-TCA (µg/L)	Other Detected Compounds (µg/L)
DRB-MW-02	S	07/25/01	**14.0**	**60.0**	**2.1**	**6.5**	**9.1**	**4.3**	**1.2**	**1.1**	<1.0	<1.0	MECL 1.2, TCFM 1.5
DRB-MW-02	S	08/25/04	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-30D	D	07/25/01	**17.0**	**53.0**	**1.9**	**3.3**	**7.4**	**3.5**	**1.2**	**1.1**	<1.0	<1.0	IPB 1.0, NAP 4.8, TCFM 1.5
WND-30D	D	08/25/04	**9.0**	**45.0**	**1.3**	<1.0	**9.2**	**1.7**	<1.0	<1.0	<1.0	<1.0	None
DRB-MW-11	S	07/26/01	**13.0**	<1.0	<1.0	**9.9**	<1.0	<1.0	**12.0**	<1.0	<1.0	<1.0	124TMB 44, 135TMB 7.8, EBN 3.1, IPB 1.4, NAP 18, NPB 1.9, SBB 1.2, XYL-MP 25, XYL-O 1.1
NMW-46D	D	07/25/01	**43.0**	**6.9**	<1.0	**1.9**	<1.0	<1.0	**4.4**	<1.0	<1.0	<1.0	MTBE 10, NAP 1.5
DRB-MW-20	S	07/26/01	**9.6**	**13.0**	<1.0	**560.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	124 TMB 40, 135 TMB 8.4, CHEA 1.1, EBN 35, IPB 5.9, NAP 30, NPB 10, PIPT 1.0, SBB 1.2, TOL 28, XYL-MP 98, XYL-O 38
DRB-MW-20	S	08/25/04	<10.0	<10.0	<10.0	**820.0**	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	EBN 100, XYL-MP 460, MTBE 21, XYL-O 150, TOL 36
NMW-45D	D	07/26/01	**17.0**	**32.0**	<1.0	**11.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	124TMB 1.2, MTBE 6.8
NMW-45D	D	08/25/04	**23.0**	**15.0**	**3.9**	**3.6**	<1.0	<1.0	**5.2**	<1.0	**1.0**	<1.0	MTBE 4.2
DRB-MW-250	S	07/26/01	**33.0**	<1.0	<1.0	**170**	<1.0	<1.0	**24.0**	<1.0	<1.0	<1.0	IPB 1.2
DRB-MW-250	S	08/25/04	<1.0	<1.0	<1.0	**13.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	CM 1.8
NMW-44D	D	07/26/01	**39.0**	**13.0**	<1.0	**8.5**	<1.0	<1.0	**18.0**	**1.6**	<1.0	<1.0	IPB 3.3, NPB 6.9, TBB 1.3
NMW-44D	D	08/25/04	**65.0**	**56.0**	**67.0**	**2.0**	<1.0	<1.0	**8.8**	**2.2**	**7.3**	**4.4**	112TCA 1.7, MTBE 3.3
DRB-MW-30	S	07/25/01	<1.0	<1.0	<1.0	**32**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	124 TMB 29, 135 TMB 16, EBN 32, IPB 24, NAP 27, NBB 13, NPB 22, PIPT 11, SBB 9.7, TBB 3.5, TOL 31, XYL-MP 62, XYL-O 21
DRB-MW-30	S	08/25/04	<20.0	<20.0	<20.0	**550**	<20.0	<20.0	<20.0	<20.0	<20.0	<20.0	EBN 160, XYL-MP 240, XYL-O 39, TOL 140
NMW-43D	D	07/25/01	**64.0**	**8.4**	<1.0	**82**	<1.0	<1.0	**15.0**	<1.0	<1.0	<1.0	124TMB 2.8, EBN 4.7, IPB 3.7, NAP 3.5, NPB 3.0, TOL 7.5, XYL-MP 15, XYL-O 1.1
NMW-43D	D	08/25/04	**37.0**	**50.0**	<1.0	<1.0	<1.0	<1.0	**1.6**	<1.0	<1.0	<1.0	None
EXC-MW-02A	S	12/08/97	**2.6 JDB**	**42.0 JDB**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	XYL-MP 1.9
EXC-MW-02A	S	08/10/04	<1.0	**1.7**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
EXC-MW-02B	D	12/08/97	**1.5 JDB**	**23.0 JDB**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	XYL-MP 1.5
EXC-MW-02B	D	08/10/04	**2.4**	**15.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
EXC-MW-04A	S	06/15/98	**86.0**	**330.0**	**1.5**	<1.0	<1.0	<1.0	<1.0	**18.0**	**3.5**	**3.9**	MECL 1, T12DCE 1.1, TOL 1.5
EXC-MW-04A	S	05/02/01	**91.0**	**290.0**	**1.4**	<1.0	<1.0	<1.0	**2.4**	**15.0**	**2.7**	**2.4**	T12DCE 1.3
EXC-MW-04A	S	08/10/04	**49.0**	**88.0**	<1.0	<1.0	<1.0	<1.0	<1.0	**3.3**	<1.0	<1.0	T12DCE 1.2
EXC-MW-04B	D	06/15/98	**1.6**	**19.0**	<1.0	<1.0	<1.0	<1.0	<1.0	**1.1**	<1.0	<1.0	MECL 1
EXC-MW-04B	D	05/02/01	**7.0**	**39.0**	<1.0	<1.0	<1.0	<1.0	<1.0	**1.9**	<1.0	<1.0	None
EXC-MW-04B	D	08/10/04	**7.4**	**82.0**	<1.0	<1.0	<1.0	<1.0	<1.0	**3.4**	<1.0	<1.0	None

Table 4-2
North Industrial Corridor (NIC) Site
Summary of Site-wide Sample Results (Phase 3)

Station ID	Well Depth	Sample Date	cis-1,2-DCE (µg/L)	TCE (µg/L)	PCE (µg/L)	BEN (µg/L)	CT / CCL4 (µg/L)	CFM (µg/L)	VC (µg/L)	11DCE (µg/L)	11DCA (µg/L)	1,1,1-TCA (µg/L)	Other Detected Compounds (µg/L)
EXC-MW-05B	D	06/15/98	**38.0**	**270.0**	<1.0	<1.0	<1.0	<1.0	<1.0	**17.0**	**2.0**	**5.0**	MECL 1.1
EXC-MW-05B	D	05/02/01	**8.7**	**62.0**	<1.0	<1.0	<1.0	<1.0	<1.0	**2.4**	<1.0	<1.0	None
EXC-MW-05B	D	08/10/04	**33.0**	**120.0**	**1.4**	<1.0	<1.0	<1.0	<1.0	**12.0**	**1.1**	**1.5**	EDB 3.6, 12DCP 1.3
EXC-MW-06A	S	06/16/98	**9.9**	**100.0**	<1.0	<1.0	<1.0	<1.0	<1.0	**5.3**	<1.0	**2.2**	MECL 1.5
EXC-MW-06B	D	06/16/98	**7.1**	**92.0**	<1.0	<1.0	<1.0	<1.0	<1.0	**5.3**	<1.0	**1.7**	MECL 1.3
EXC-MW-07B	D	06/16/98	**25.0**	**99.0**	<1.0	<1.0	<1.0	<1.0	<1.0	**6.4**	<1.0	**2.0**	MECL 1.4
EXC-MW-07B	D	05/02/01	**18.0**	**51.0**	<1.0	<1.0	<1.0	<1.0	<1.0	**2.1**	**1.3**	<1.0	None
EXC-MW-08A	S	12/08/97	**10 JDB**	**78 JDB**	<1.0	<1.0	<1.0	<1.0	<1.0	**1.8**	<1.0	**1.2**	None
EXC-MW-08A	S	08/10/04	**6.5**	**53.0**	<1.0	<1.0	**1.1**	<1.0	<1.0	**1.1**	<1.0	<1.0	None
EXC-MW-08B	D	12/08/97	**17 JDB**	**240.0**	<1.0	<1.0	<1.0	<1.0	<1.0	**10.0**	**1.5**	**5.1**	None
EXC-MW-08B	D	08/10/04	**13.0**	**23.0**	<1.0	<1.0	<1.0	<1.0	<1.0	**4.5**	<1.0	**1.2**	None
NMW-02S	S	05/02/01	<1.0	<1.0	**41.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-02S	S	08/11/04	<1.0	**1.0**	**50.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	MTBE 1.8
NMW-02D	D	05/02/01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-02D	D	08/11/04	<1.0	**1.2**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-03S	S	05/09/01	<1.0	**1.2**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-03S	S	08/23/04	**5.1**	**36.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-03D	D	05/09/01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-04S	S	05/07/01	**67.0**	**60.0**	<1.0	**2**	**1.4**	**1.6**	**36.0**	**5.8**	**5.2**	<1.0	T12DCE 20
NMW-04S	S	08/26/04	**160.0**	**160.0**	<1.0	<1.0	<1.0	<1.0	**14.0**	**8.1**	**5.2**	<1.0	T12DCE 5.4
NMW-04D	D	05/07/01	**42.0**	**140.0**	<1.0	**1.2**	<1.0	<1.0	**14.0**	**8.7**	**5.4**	<1.0	T12DCE 1.9
NMW-04D	D	08/26/04	**91.0**	**230.0**	<1.0	<1.0	**10.0**	**1.7**	**6.4**	**9.4**	**4.5**	**1.3**	T12DCE 1.6
NMW-05S	S	05/09/01	**500.0**	**250.0**	**7.8**	**1.9**	<1.0	<1.0	**86.0**	**3.7**	**10.0**	<1.0	T12DCE 5.4
NMW-05S	S	08/12/04	**95.0**	**42.0**	**4.7**	<1.0	<1.0	<1.0	**34.0**	<1.0	**1.5**	<1.0	T12DCE 1.6
NMW-05D	D	05/09/01	**23.0**	**16.0**	<1.0	<1.0	<1.0	<1.0	**1.6**	<1.0	<1.0	<1.0	None
NMW-05D	D	08/12/04	**9.8**	**8.4**	<1.0	<1.0	<1.0	<1.0	**6.1**	<1.0	<1.0	<1.0	None
NMW-05D dup	D	08/12/04	**9.1**	**8.4**	<1.0	<1.0	<1.0	<1.0	**1.1**	<1.0	<1.0	<1.0	None
NMW-06S	S	05/07/01	**2.1**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-06S	S	08/17/04	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-06D	D	05/07/01	**49.0**	**80.0**	<1.0	<1.0	<1.0	<1.0	**24.0**	**3.3**	**3.6**	<1.0	None
NMW-06D	D	08/17/04	**55.0**	**26.0**	<1.0	<1.0	<1.0	<1.0	**4.8**	**2.4**	**3.1**	<1.0	T12DCE 1.2, CM 2.1
NMW-08S	S	05/10/01	**65.0**	**130.0**	<1.0	<1.0	<1.0	<1.0	**17.0**	**9.4**	**4.3**	<1.0	T12DCE 5.0, TOL 120
NMW-08S	S	08/12/04	**48.0**	**62.0**	<1.0	<1.0	<1.0	<1.0	**5.5**	**3.9**	**2.2**	<1.0	MTBE 1.7, T12DCE 3.2
NMW-08D	D	05/10/01	**110.0**	**230.0**	<1.0	**1.2**	<1.0	<1.0	**34.0**	**18.0**	**7.9**	<1.0	T12DCE 11
NMW-08D	D	08/12/04	**56.0**	**91.0**	<1.0	<1.0	<1.0	<1.0	**5.8**	**4.9**	**3.5**	<1.0	MTBE 3.2, T12DCE 4.5
NMW-09S	S	05/10/01	**180.0**	**190.0**	<1.0	<1.0	<1.0	<1.0	**14.0**	**20.0**	**6.8**	<1.0	T12DCE 12
NMW-09S	S	08/18/04	**170.0**	**18.0**	<5.0	<5.0	<5.0	<5.0	**9.7**	**8.6**	<5.0	<5.0	T12DCE 5.2
NMW-09D	D	05/10/01	**130.0**	**290.0**	<1.0	<1.0	<1.0	<1.0	**25.0**	**27.0**	**8.4**	**2.3**	MTBE 1.5, T12DCE 20
NMW-09D	D	08/18/04	**120.0**	**76.0**	<2.0	<2.0	<2.0	<2.0	**6.7**	**6.8**	**2.2**	<2.0	T12DCE 3.8
NMW-09D dup	D	08/18/04	**99.0**	**99.0**	<1.0	<1.0	<1.0	**1.4**	**9.4**	**9.8**	**2.8**	<1.0	T12DCE 4.8, 12DCA 1.2

Table 4-2
North Industrial Corridor (NIC) Site
Summary of Site-wide Sample Results (Phase 3)

Station ID	Well Depth	Sample Date	cis-1,2-DCE (µg/L)	TCE (µg/L)	PCE (µg/L)	BEN (µg/L)	CT / CCL4 (µg/L)	CFM (µg/L)	VC (µg/L)	11DCE (µg/L)	11DCA (µg/L)	1,1,1-TCA (µg/L)	Other Detected Compounds (µg/L)
NMW-10S	S	05/09/01	**53.0**	**150.0**	<1.0	<1.0	<1.0	<1.0	**18.0**	**7.5**	**4.6**	<1.0	T12DCE 1.4
NMW-10S	S	08/18/04	**94 JH**	**130.0 JH**	<1.0 JH	<1.0 JH	<1.0 JH	**1.4 JH**	<1.0 JH	**10.0 JH**	**5.3 JH**	<1.0 JH	12DCA 1.2, MTBE 1.4, T12DCE 4.7 (all JH)
NMW-10D	D	05/09/01	**51.0**	**140.0**	<1.0	<1.0	<1.0	**1.3**	**20.0**	**6.5**	**4.0**	<1.0	T12DCE 1.6
NMW-10D	D	08/18/04	**68.0**	**88.0**	<1.0	<1.0	<1.0	**1.3**	**12.0**	**5.6**	**3.7**	<1.0	MTBE 1.6, T12DCE 3.4
NMW-11S	S	05/03/01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-11S	S	08/12/04	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-11D	D	05/03/01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-11D	D	08/12/04	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-13S	S	05/10/01	<1.0	<1.0	<1.0	**320.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	EBN 95, TOL 140, XYL-MP 310, XYL-O 84
NMW-13S	S	08/11/04	<1.0	**1.7**	<1.0	**250.0**	<1.0	**3.7**	<1.0	<1.0	**1.2**	<1.0	12DCA 7.3, 12DCP 2.5,CHEA 6.2. CM 35, EBN 130, XYL-MP 380, XYL O 160, TOL 120
NMW-13D	D	05/10/01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-13D	D	08/11/04	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-16S	S	05/04/01	<1.0	**1.7**	**3.5**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-16S	S	08/11/04	<1.0	<1.0	**2.1**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-16D	D	05/04/01	<1.0	**2.4**	**7.3**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-16D	D	08/11/04	<1.0	**1.8**	**3.5**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	MTBE 1.8
NMW-18S	S	05/08/01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-18S	S	08/11/04	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-18D	D	05/08/01	**10.0**	**1.5**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-18D	D	08/11/04	**4.7**	**1.3**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	CHEA 6.6
NMW-19D	D	05/08/01	**68.0**	**110.0**	<1.0	<1.0	<1.0	<1.0	**3.7**	**3.6**	**1.5**	<1.0	T12DCE 1.4
NMW-19D	D	08/11/04	**59.0**	**9.1**	<1.0	<1.0	<1.0	<1.0	**2.0**	**1.2**	<1.0	<1.0	None
NMW-20S	S	05/03/01	<1.0	<1.0	**40.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-20S	S	08/12/04	<1.0	<1.0	**25.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-20D	D	05/03/01	**4.5**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-20D	D	08/12/04	**6.2**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-22S	S	05/07/01	<1.0	**1.7**	**19.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-22S	S	08/12/04	<1.0	<1.0	<1.0	<1.0	<1.0	**3.0**	<1.0	<1.0	<1.0	<1.0	BDCM 1.7
NMW-22D	D	05/07/01	**2.3**	**1.8**	**2.8**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-22D	D	08/12/04	**3.8**	**5.7**	**17.0**	<1.0	<1.0	**2.8**	<1.0	<1.0	<1.0	<1.0	BDCM 1.7
NMW-23S	S	05/03/01	**7.4**	**50.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-23S	S	08/23/04	**21.0**	**17.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	CHEA 1.7
NMW-23D	D	05/03/01	**2.0**	**3.5**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-23D	D	08/23/04	**1.8**	**1.6**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None

Table 4-2
North Industrial Corridor (NIC) Site
Summary of Site-wide Sample Results (Phase 3)

Station ID	Well Depth	Sample Date	cis-1,2-DCE (µg/L)	TCE (µg/L)	PCE (µg/L)	BEN (µg/L)	CT / CCL4 (µg/L)	CFM (µg/L)	VC (µg/L)	11DCE (µg/L)	11DCA (µg/L)	1,1,1-TCA (µg/L)	Other Detected Compounds (µg/L)
NMW-25S	S	05/08/01	**18.0**	**21.0**	**1.2**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-25S	S	08/12/04	**10.0**	**8.4**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-25D	D	05/08/01	**20.0**	**19.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-25D	D	08/12/04	**20.0**	**14.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-31S	S	05/09/01	**11.0**	**55.0**	**3.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NBB 0.99, PIPT 1.0, T12DCE 1.3
NMW-31S	S	08/11/04	**23.0**	**59.0**	**5.5**	<1.0	<1.0	<1.0	<1.0	<1.0	**1.4**	<1.0	MTBE 4.2
NMW-31D	D	05/09/01	**43.0**	**200.0**	**4.0**	<1.0	<1.0	<1.0	**3.3**	**1.0**	**1.9**	<1.0	T12DCE 5.2
NMW-31D	D	08/11/04	**98.0**	**260.0**	**17.0**	<1.0	<1.0	<1.0	**8.1**	**2.5**	**4.6**	<1.0	12DCP 1.5, MTBE 3.1, T12DCE 3.9
NMW-32S	S	05/08/01	**40.0**	**220.0**	**4.5**	<1.0	<1.0	<1.0	**2.3**	**1.6**	**1.7**	<1.0	T12DCE 2.7
NMW-32S	S	08/11/04	**24.0**	**180.0**	**8.7**	<1.0	<1.0	<1.0	<1.0	**1.1**	<1.0	<1.0	T12DCE 1.6
NMW-32D	D	05/08/01	**55.0**	**270.0**	**5.2**	<1.0	<1.0	<1.0	**3.1**	**2.3**	**2.1**	<1.0	T12DCE 3.0
NMW-32D	D	08/11/04	**43.0**	**210.0**	**6.4**	<1.0	<1.0	<1.0	**1.4**	**2.3**	**1.3**	<1.0	T12DCE 2.8
NMW-32D dup	D	08/11/04	**43.0**	**240.0**	**7.2**	<1.0	<1.0	<1.0	**1.4**	**2.4**	**1.2**	<1.0	T12DCE 2.9
NMW-35S	S	05/08/01	**29.0**	**68.0**	<1.0	<1.0	<1.0	<1.0	<1.0	**1.5**	<1.0	<1.0	None
NMW-35S	S	08/12/04	**13.0**	**35.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-35D	D	05/08/01	**95.0**	**270.0**	<1.0	<1.0	<1.0	<1.0	**4.5**	**5.7**	**2.5**	<1.0	T12DCE 3.0
NMW-35D	D	08/12/04	**74.0**	**170.0**	<1.0	<1.0	<1.0	<1.0	**1.7**	**6.2**	**1.8**	<1.0	T12DCE 2.8
NMW-39S	S	05/09/01	**360.0**	**37.0**	<1.0	<1.0	<1.0	<1.0	**26.0**	**24.0**	**8.4**	<1.0	T12DCE 17
NMW-39S	S	08/17/04	**110.0**	**5.6**	<1.0	<1.0	<1.0	<1.0	**8.0**	**3.7**	**4.2**	<1.0	MTBE 2.4, T12DCE 3.9
NMW-39D	D	05/09/01	**260.0**	**220.0**	<1.0	**1.6**	<1.0	**1.1**	**18.0**	**17.0**	**6.2**	**1.9**	T12DCE 13
NMW-39D	D	08/17/04	**93.0**	**110.0**	<1.0	<1.0	<1.0	<1.0	**2.9**	**9.4**	**2.6**	<1.0	T12DCE 3.6
NMW-40S	S	05/08/01	**77.0**	**190.0**	<1.0	<1.0	<1.0	<1.0	**25.0**	**14.0**	**7.2**	<1.0	T12DCE 10
NMW-40S	S	08/31/04	**42.0**	**73.0**	<1.0	<1.0	<1.0	<1.0	**3.5**	**2.6**	**2.6**	<1.0	MTBE 3.0, T12DCE 3.2
NMW-40D	D	05/08/01	**56.0**	**150.0**	<1.0	**2.6**	<1.0	<1.0	**22.0**	**7.7**	**5.2**	<1.0	T12DCE 4.0
NMW-40D	D	08/31/04	**74.0**	**110.0**	<1.0	<1.0	<1.0	<1.0	**8.8**	**5.6**	**4.0**	<1.0	T12DCE 3.8
NMW-41S	S	05/08/01	**55.0**	**250.0**	<1.0	<1.0	<1.0	<1.0	**3.8**	**3.2**	**1.7**	<1.0	T12DCE 2.2
NMW-41S	S	08/12/04	**38.0**	**92.0**	<1.0	<1.0	<1.0	<1.0	**2.2**	**2.7**	<1.0	<1.0	T12DCE 1.3
NMW-41D	D	05/08/01	**38.0**	**170.0**	<1.0	<1.0	<1.0	<1.0	**5.7**	**4.0**	**2.0**	<1.0	T12DCE 2.6
NMW-41D	D	08/12/04	**38.0**	**130.0**	<1.0	<1.0	<1.0	<1.0	**3.9**	**3.6**	**1.2**	<1.0	T12DCE 1.6
NMW-42S	S	07/25/01	**16.0**	**62.0**	**13.0**	<1.0	**5.5**	**8.6**	**1.4**	**1.3**	<1.0	**1.3**	NAP 1.6, TCFM 1.4
NMW-42S	S	08/25/04	**26.0**	**32.0**	**38.0**	<1.0	<1.0	<1.0	**7.1**	**1.3**	**4.2**	<1.0	MTBE 5.2
NMW-42D	D	07/26/01	**35.0**	**99.0**	**2.2**	<1.0	**1.4**	<1.0	**1.1**	**1.1**	<1.0	<1.0	MECL 1.2, TCFM 1.4
NMW-42D	D	08/25/04	**22.0**	**22.0**	**21.0**	<1.0	<1.0	<1.0	**6.2**	<1.0	**2.1**	**1.2**	MTBE 4.5
NMW-42D dup	D	08/25/04	**22.0**	**20.0**	**15.0**	<1.0	<1.0	<1.0	**5.3**	<1.0	**1.9**	**1.1**	MTBE 4.4, CHEA 1.7
NMW-47S	S	05/09/01	**62.0**	**25.0**	<1.0	<1.0	<1.0	<1.0	**11.0**	<1.0	<1.0	<1.0	None
NMW-47S	S	08/11/04	**96.0**	**76.0**	<1.0	<1.0	<1.0	<1.0	**7.9**	<1.0	**1.1**	<1.0	T12DCE 1.9
NMW-47D	D	05/09/01	**270.0**	**77.0**	<1.0	<1.0	<1.0	<1.0	**33.0**	**1.1**	**2.5**	<1.0	None
NMW-47D	D	08/11/04	**21.0**	**87.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None

Table 4-2
North Industrial Corridor (NIC) Site
Summary of Site-wide Sample Results (Phase 3)

Station ID	Well Depth	Sample Date	cis-1,2-DCE (µg/L)	TCE (µg/L)	PCE (µg/L)	BEN (µg/L)	CT / CCL4 (µg/L)	CFM (µg/L)	VC (µg/L)	11DCE (µg/L)	11DCA (µg/L)	1,1,1-TCA (µg/L)	Other Detected Compounds (µg/L)
NMW-48S	S	07/27/01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-48S	S	08/12/04	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-48D	D	07/27/01	**5.7**	**5.0**	<1.0	<1.0	<1.0	<1.0	**3.4**	<1.0	<1.0	<1.0	None
NMW-48D	D	08/12/04	**6.3**	**1.4**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NWL-06S	S	08/17/04	<1.0	<1.0	<1.0	<1.0	<1.0	**6.0**	<1.0	<1.0	<1.0	<1.0	None
NWL-09S	S	08/17/04	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NWL-09D	D	08/17/04	**13.0**	**5.1**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
UPRF-MW-03	S	07/27/01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NAP 1.2
UPRF-MW-03	S	08/24/04	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-36D	D	07/27/01	<1.0	**5.8**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NAP 2.4
NMW-36D	D	08/24/04	<1.0	**16.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
UPRF-MW-09	S	07/27/01	**1.0**	**2.8**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NAP 44, NPB 1.2
UPRF-MW-09	S	08/24/04	**2.7**	**4.1**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
UPRF-MW-09	S	08/24/04	**1.9**	**3.6**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-37D	D	07/27/01	**17.0**	**66.0**	**1.3**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NAP 21
NMW-37D	D	08/24/04	**13.0**	**110.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	TCFM 1.6
VCM-MW-01	S	05/02/01	**17.0**	**9.2**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**1.5**	<1.0	T12DCE 1.4
VCM-MW-01	S	07/31/03	**20.0**	**8.5**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
VCM-MW-01	S	08/31/04	**8.4**	**3.5**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
VCM-MW-04	D	05/02/01	**28.0**	**11.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**1.7**	<1.0	T12DCE
VCM-MW-04	D	07/31/03	**50.0**	**5.5**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
VCM-MW-04	D	08/31/04	**34.0**	**3.6**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
VCM-MW-02B	S	05/02/01	**7.5**	**15.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
VCM-MW-02B	S	08/31/04	**55.0**	**41.0**	<1.0	<1.0	<1.0	<1.0	<1.0	**1.2**	<1.0	<1.0	T12DCE 1.4
VCM-MW-06	D	05/02/01	**37.0**	**71.0**	<1.0	<1.0	<1.0	<1.0	**1.7**	**1.0**	**1.4**	<1.0	T12DCE 2.4
VCM-MW-06	D	08/31/04	**89.0**	**36.0**	<1.0	<1.0	<1.0	<1.0	<1.0	**1.6**	**1.2**	<1.0	T12DCE 1.9
VCM-MW-07	D	05/02/01	**6.0**	**6.1**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	TOL 1.6
VCM-MW-07	D	08/31/04	**3.8**	**5.4**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WNC-09SR	S	05/02/01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WNC-09SR	S	08/10/04	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	CHEA 10
WNC-09D	D	05/02/01	<1.0	<1.0	<1.0	**1.1**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WNC-09D	D	08/10/04	**6.8**	**13.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-16S	S	05/10/01	<1.0	<1.0	<1.0	**25**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	124TMB 2.8, 135TMB 31, EBN 18, IPB 17, NAP 790, NBB 6.9, NPB 26, PIPT 3.5, SBB 3.2, TBB 1.1, TOL 2.3, XYL-MP 28, XYL-O 1.7
WND-16S	S	08/11/04	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	1122PCA 110, 112TCA 470, EBN 190
WNC-16D	D	05/10/01	**3.2**	**6.4**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WNC-16D	D	08/23/04	**3.7**	**5.8**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	CHEA 1.2

Table 4-2
North Industrial Corridor (NIC) Site
Summary of Site-wide Sample Results (Phase 3)

Station ID	Well Depth	Sample Date	cis-1,2-DCE (µg/L)	TCE (µg/L)	PCE (µg/L)	BEN (µg/L)	CT / CCL4 (µg/L)	CFM (µg/L)	VC (µg/L)	11DCE (µg/L)	11DCA (µg/L)	1,1,1-TCA (µg/L)	Other Detected Compounds (µg/L)
WND-23S	S	05/08/01	**5.2**	**9.5**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-23S	S	08/10/04	<1.0	**4.7**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WNC-23D	D	05/08/01	**3.7**	**33.0**	<1.0	<1.0	<1.0	<1.0	<1.0	**1.1**	<1.0	<1.0	None
WNC-23D	D	08/10/04	**3.1**	**33.0**	<1.0	<1.0	<1.0	<1.0	<1.0	**1.5**	**1.0**	**2.1**	None
WND-31S	S	07/27/01	<1.0	**3.2**	<1.0	<1.0	<1.0	**6.6**	<1.0	<1.0	<1.0	<1.0	NAP 2.8
WND-31S	S	08/24/04	<1.0	**1.7**	<1.0	<1.0	<1.0	**39.0**	<1.0	<1.0	<1.0	<1.0	None
WNC-31D	D	07/27/01	**7.8**	**48.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NAP 6.9
WNC-31D	D	08/24/04	**22.0**	**110.0**	**3.7**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WNC-37SR	S	05/07/01	**22.0**	**37.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WNC-37SR	S	08/26/04	**19.0**	**28.0**	<1.0	<1.0	<1.0	<1.0	**1.6**	**1.2**	**4.0**	<1.0	MTBE 6.0, T12DCE 1.5
WND-37DR	D	06/16/98	**220.0**	**900.0**	**1.4**	**2.9**	**2.6**	**3.1**	**12.0**	**70.0**	**12.0**	**21.0**	12DCA 1.7, CM 1.3, MECL 1.2, T12DCE 20, TOL 1.2
WND-37DR	D	05/07/01	**37.0**	**120.0**	<1.0	**3.3**	<1.0	<1.0	<1.0	**11.0**	**5.3**	<1.0	CHEA 1.1, T12DCE 2.8
WND-37DR	D	08/26/04	**73.0**	**130.0**	<1.0	**1.2**	<1.0	<1.0	**8.1**	**9.7**	**5.8**	<1.0	T12DCE 3.4
WND-02D	D	12/01/97	**23 JDB**	**48 JDB**	<1.0	<1.0	<1.0	<1.0	**24.0**	**2.0**	**1.2**	<1.0	XYL-MP 1.9
WND-02D	D	05/10/01	**6.9**	**6.9**	<1.0	<1.0	<1.0	<1.0	**2.3**	<1.0	<1.0	<1.0	None
WND-02D	D	08/12/04	**7.4**	**3.4**	<1.0	<1.0	<1.0	<1.0	**1.5**	<1.0	<1.0	<1.0	None
WND-03S	S	06/16/98	**760.0**	**72.0**	<1.0	**7.4**	<1.0	<1.0	**3.3**	**25.0**	**6.9**	<1.0	CM 5.1, EBN 40, T12DCE 92, TOL 6.7, XYL-MP 27, XYL-O 3.2
WND-03S	S	05/02/01	**240.0**	**30.0**	<1.0	**5.7**	<1.0	<1.0	**46.0**	**12.0**	**2.5**	<1.0	EBN 13, TOL 2.7, XYL-MP 6.4
WND-03S	S	08/10/04	**30.0**	**19.0**	<1.0	**4.8**	<1.0	<1.0	**36.0**	<1.0	**2.1**	<1.0	112TCA 5.1, 12DCP 2.9, CHEA 3.0, EBN 28, XYL-MP 25, XYL-O 9.5, TOL 15, T12DCE 1.7
WND-04S	S	06/15/98	**77.0**	**550.0**	**1.1**	<1.0	<1.0	<1.0	**1.2**	**31.0**	**3.9**	**12.0**	MECL 1.6
WND-04S	S	05/02/01	**41.0**	**120.0**	<1.0	<1.0	<1.0	<1.0	<1.0	**5.1**	<1.0	**1.5**	EDB 1.1
WND-04S	S	08/10/04	**46.0**	**130.0**	<1.0	<1.0	<1.0	<1.0	**1.0**	**4.2**	<1.0	**1.5**	None
WND-12D	D	12/01/97	**3.3 JDB**	**37 JDB**	<1.0	<1.0	**2.2**	**4.2**	<1.0	**5.7**	**4.9**	**2.1**	XYL-MP 2.4, XYL-O 1.3
WND-12D	D	05/03/01	**1.4**	**18.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-12D	D	08/10/04	<1.0	**10.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**2.1**	None
WND-14S	S	05/07/01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-14S	S	08/12/04	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-14D	D	05/07/01	**11.0**	**51.0**	**1.4**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-14D	D	08/12/04	**96.0**	**330.0**	**21.0**	<1.0	<1.0	<1.0	<1.0	**1.0**	**1.1**	<1.0	None
WND-18S	S	12/05/97	<1.0	**13.0 JDB**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	XYL-MP 2.5, XYL-O 1.1
WND-18S	S	05/09/01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-18S	S	08/12/04	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-18D	D	12/05/97	**90.0 JDB**	**360.0**	<1.0	<1.0	<1.0	<1.0	**9.1**	**15.0**	**4.5**	**3.3**	T12DCE 2.6, XYL-MP 1.5
WND-18D	D	05/09/01	**80.0**	**170.0**	<1.0	<1.0	<1.0	<1.0	**15.0**	**14.0**	**4.8**	<1.0	T12DCE 2.4
WND-18D	D	08/12/04	**52.0**	**75.0**	<1.0	<1.0	<1.0	<1.0	**3.7**	**4.2**	**1.4**	<1.0	CBN 2.1, T12DCE 1.5

Table 4-2
North Industrial Corridor (NIC) Site
Summary of Site-wide Sample Results (Phase 3)

Station ID	Well Depth	Sample Date	cis-1,2-DCE (µg/L)	TCE (µg/L)	PCE (µg/L)	BEN (µg/L)	CT / CCL4 (µg/L)	CFM (µg/L)	VC (µg/L)	11DCE (µg/L)	11DCA (µg/L)	1,1,1-TCA (µg/L)	Other Detected Compounds (µg/L)
WND-19S	S	12/03/97	**17.0 JDB**	**110.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	BDCM 1.1, XYL-MP 1.8
WND-19S	S	05/09/01	**1.6**	**14.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-19S	S	08/12/04	**2.4**	**14.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-19D	D	12/03/97	**51.0 JDB**	**330.0**	<1.0	<1.0	<1.0	<1.0	**2.3**	**3.6**	**1.3**	<1.0	T12DCE 3.3, XYL-MP 1.4
WND-19D	D	05/09/01	**37.0**	**150.0**	<1.0	<1.0	<1.0	<1.0	**5.5**	**5.2**	**1.7**	<1.0	T12DCE 1.3
WND-19D	D	08/12/04	**20.0**	**78.0**	<1.0	<1.0	<1.0	<1.0	**1.8**	**1.8**	<1.0	<1.0	None
WND-21S	S	12/02/97	**92.0 JDB**	**14.0 JDB**	<1.0	<1.0	<1.0	<1.0	<1.0	**5.5**	**2.5**	<1.0	T12DCE 2.1, XYL-MP 2.2
WND-21S	S	05/04/01	**55.0**	**2.9**	<1.0	<1.0	<1.0	<1.0	**1.4**	**3.1**	**1.2**	<1.0	T12DCE 1.7
WND-21S	S	08/20/04	**66.0**	**6.6**	<1.0	<1.0	<1.0	<1.0	<1.0	**2.1**	**1.0**	<1.0	XYL-MP 2.9, T12DCE 1.3
WND-21D	D	12/02/97	**77.0 JDB**	**400.0**	<1.0	<1.0	**2.9**	**1.8**	**1.2**	**32.0**	**5.4**	**12.0**	12DCA 2.1, T12DCE 4.3, XYL-MP 2
WND-21D	D	05/04/01	**86.0**	**230.0**	<1.0	**5.2**	**1.5**	**1.6**	**22.0**	**21.0**	**7.5**	**2.9**	T12DCE 12
WND-21D	D	08/20/04	**85.0**	**230.0**	<1.0	<1.0	<1.0	**1.0**	**3.3**	**8.2**	**2.5**	**1.3**	MECL 2.2, TOL 1.3, T12DCE 4.2
WND-24S	S	12/08/97	**13.0 JDB**	**50.0 JDB**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	XYL-MP 1.5
WND-24S	S	05/09/01	**24.0**	**79.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-24S	S	08/18/04	**6.5**	**15.0**	<1.0	<1.0	<1.0	**2.3**	<1.0	<1.0	<1.0	<1.0	None
WND-24D	D	12/08/97	**49.0 JDB**	**220.0**	<1.0 **JS**	<1.0	<1.0	<1.0	**6.5**	**7.6**	<1.0	**2.0**	T12DCE 1.8
WND-24D	D	05/09/01	**44.0**	**130.0**	<1.0	<1.0	<1.0	<1.0	**6.8**	**3.1**	**1.7**	<1.0	T12DCE 1.1
WND-24D	D	08/18/04	**46.0**	**82.0**	<1.0	**1.5**	<1.0	<1.0	**3.8**	**2.2**	**1.9**	<1.0	TOL 3.3
WND-26S	S	05/04/01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-26S	S	08/20/04	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-26D	D	05/04/01	<1.0	**6.4**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-26D	D	08/20/04	<1.0	**4.6**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	MECL 1.4
WND-29S	S	05/03/01	<1.0	**1.1**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-29S	S	08/23/04	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-29D	D	05/03/01	<1.0	**4.6**	<1.0	<1.0	**1.3**	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-29D	D	08/23/04	<1.0	**2.6**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-33S	S	12/03/97	**120.0**	**370.0**	<1.0	**4.0**	<1.0	<1.0	**70.0**	**27.0**	**14.0**	**1.8**	CHEA 4.6, T12DCE 5.9, XYL-MP 2.6, XYL-O 1.4
WND-33S	S	05/07/01	**100.0**	**160.0**	<1.0	<1.0	<1.0	<1.0	**9.4**	**2.4**	**3.5**	<1.0	T12DCE 1.9
WND-33S	S	08/17/04	**22.0**	**37.0**	<1.0	<1.0	<1.0	<1.0	**1.4**	<1.0	**1.6**	<1.0	None
WND-33D	D	12/03/97	**150.0**	**380.0**	<1.0	**5.4**	<1.0	<1.0	**110.0**	**25.0**	**12.0**	**2.0**	CHEA 7.9, T12DCE 7.4, TOL 1.2, XYL-MP 2.1, XYL-O 1.1
WND-33D	D	05/07/01	**72.0**	**43.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**4.3**	<1.0	None

Table 4-2
North Industrial Corridor (NIC) Site
Summary of Site-wide Sample Results (Phase 3)

Station ID	Well Depth	Sample Date	cis-1,2-DCE (µg/L)	TCE (µg/L)	PCE (µg/L)	BEN (µg/L)	CT / CCL4 (µg/L)	CFM (µg/L)	VC (µg/L)	11DCE (µg/L)	11DCA (µg/L)	1,1,1-TCA (µg/L)	Other Detected Compounds (µg/L)
WND-34S	S	06/16/98	**33.0**	**17.0**	<1.0	**120**	<1.0	<1.0	**79.0**	**2.9**	**8.5**	<1.0	12DCA 4.6, CM 5.9, T12DCE 2.7, TOL 1.3
WND-34S	S	05/04/01	**7.3**	**11.0**	<1.0	**160**	<1.0	<1.0	**5.0**	<1.0	**2.3**	<1.0	MECL 4.4, TOL 1.5
WND-34S	S	08/18/04	**1.3**	<1.0	<1.0	**100**	<1.0	<1.0	<1.0	<1.0	**2.9**	<1.0	112TCA 3.0, 12DCA 4.6, XYL-MP 5.0, TOL 2.8
WND-34D	D	06/16/98	**74.0**	**160.0**	<1.0	**230**	<1.0	**5.2**	**31.0**	**10.0**	**7.1**	<1.0	12DCA 7.2, CHEA 1, CM 7.9, EBN 1.3, T12DCE 2.2, TOL 1.4
WND-34D	D	05/04/01	**23.0 JIH**	**32.0 JIH**	<1.0 **JIH**	**64 JIH**	<1.0 **JIH**	<1.0 **JIH**	<1.0 **JIH**	**1.4 JIH**	**1.7 JIH**	<1.0 **JIH**	None
WND-34D	D	08/18/04	**30.0**	**10.0**	<1.0	**110**	<1.0	<1.0	<1.0	<1.0	**2.6**	<1.0	BDCM 1.0
WND-36S	S	12/05/97	**4.7**	<1.0	<1.0	**180**	<1.0	<1.0	**52.0**	<1.0	**9.2**	<1.0	EBN 72, TOL 18, XYL-MP 45, XYL-O 12
WND-36S	S	05/04/01	**1.1**	**3.2**	<1.0	**100**	<1.0	<1.0	<1.0	<1.0	**4.6**	<1.0	EBN 54, TOL 31, XYL-MP 73, XYL-O 10
WND-36S	S	08/18/04	<1.0 JH	<1.0 JH	<1.0 JH	**290 JH**	<1.0 JH	<1.0 JH	<1.0 JH	<1.0 JH	**2.9 JH**	<1.0 JH	12DCA 12, BDCM 2.1, EBN 55, XYL-MP 94, MECL 23, XYL-O 13, TOL 28
WND-36D	D	12/05/97	**76.0 JDB**	**400.0**	<1.0	**2.7**	<1.0	**2.1**	**22.0**	**35.0**	**6.7**	**7.8**	None
WND-36D	D	05/04/01	**49.0**	**44.0**	<1.0	**1.2**	<1.0	<1.0	**15.0**	**2.5**	**2.2**	<1.0	T12DCE 1.1
WND-36D	D	08/18/04	**18.0**	**66.0**	**12.0**	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	None
WND-38S	S	12/04/97	<1.0	**16.0 JDB**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	XYL-MP 1.5
WND-38S	S	05/08/01	<1.0	**3.3**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-38S	S	08/17/04	<1.0	**2.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-38D	D	12/04/97	**26.0 JDB**	**140.0**	<1.0	<1.0	<1.0	<1.0	**4.3**	**5.6**	**1.6**	**1.3**	BDCM 1.5
WND-38D	D	05/08/01	**8.1**	**22.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-38D	D	08/17/04	**26.0**	**36.0**	<1.0	<1.0	<1.0	<1.0	**2.4**	**2.0**	<1.0	<1.0	None
WND-39S	S	12/08/97	**7.4 JDB**	**47.0 JDB**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	XYL-MP 2.3, XYL-O 1.1
WND-39S	S	05/08/01	**3.0**	**29.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-39S	S	08/17/04	**15.0**	**50.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	MTBE 2.1
WND-39D	D	12/08/97	**120.0 JS**	**610.0**	<1.0	**5.4**	<1.0	<1.0	**54.0 JS**	**34.0 JS**	**12.0 JS**	**5.0**	CM 2.5, T12DCE 3.7, XYL-MP 1.7
WND-39D	D	05/08/01	**13.0**	**32.0**	<1.0	<1.0	<1.0	<1.0	**1.8**	**1.3**	**2.5**	<1.0	None
WND-39D	D	08/17/04	**40.0**	**64.0**	<1.0	<1.0	<1.0	<1.0	**2.5**	**1.9**	**1.5**	<1.0	T12DCE 1.3
WND-41S	S	05/03/01	<1.0	**7.2**	**2.3**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-41S	S	08/24/04	<1.0	**2.1**	**1.5**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-41D	D	05/03/01	**4.2**	**45.0**	**3.2**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-41D	D	08/24/04	**8.4**	**39.0**	**1.8**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-43S	S	05/09/01	**1.7**	<1.0	<1.0	<1.0	<1.0	<1.0	**1.2**	<1.0	<1.0	<1.0	None
WND-43S	S	08/18/04	<1.0	<1.0	<1.0	**2.1**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-43D	D	05/09/01	**37.0**	**99.0**	<1.0	**1.1**	<1.0	<1.0	**6.5**	**2.7**	**1.2**	<1.0	T12DCE 1.1
WND-43D	D	08/18/04	**21.0**	**47.0**	<1.0	**8.3**	<1.0	<1.0	**4.5**	<1.0	<1.0	<1.0	None

Table 4-2
North Industrial Corridor (NIC) Site
Summary of Site-wide Sample Results (Phase 3)

Station ID	Well Depth	Sample Date	cis-1,2-DCE (µg/L)	TCE (µg/L)	PCE (µg/L)	BEN (µg/L)	CT / CCL4 (µg/L)	CFM (µg/L)	VC (µg/L)	11DCE (µg/L)	11DCA (µg/L)	1,1,1-TCA (µg/L)	Other Detected Compounds (µg/L)
WND-44S	S	12/04/97	**6.7 JDB**	**28.0 JDB**	<1.0	**1.8**	<1.0	<1.0	**15.0**	<1.0	**2.1**	<1.0	XYL-MP 2.5, XYL-O 1.3
WND-44S	S	05/08/01	**1.3**	<1.0	<1.0	**2.3**	<1.0	<1.0	**23.0**	<1.0	**1.8**	<1.0	None
WND-44S	S	08/20/04	**14.0**	<1.0	<1.0	**1.3**	<1.0	<1.0	**4.4**	<1.0	<1.0	<1.0	XYL-MP 3.0
WND-44D	D	12/04/97	**7.7 JDB**	**21.0 JDB**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	XYL-MP 1.9
WND-44D	D	05/08/01	**17.0**	**18.0**	<1.0	<1.0	<1.0	<1.0	**2.7**	<1.0	<1.0	<1.0	None
WND-45S	S	12/04/97	**5.6 JDB**	**20.0 JDB**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	XYL-MP 1.8
WND-45S	S	05/10/01	**7.9**	**26.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-45S	S	08/11/04	**5.2**	**19.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-45D	D	12/04/97	**110.0**	**300.0**	<1.0	<1.0	<1.0	<1.0	**8.8**	**4.1**	**1.9**	<1.0	T12DCE 2.7, XYL-MP 1.3
WND-45D	D	05/10/01	**54.0**	**220.0**	<1.0	<1.0	<1.0	<1.0	**3.4**	**7.2**	**2.0**	<1.0	DCDFM 7.3, T12DCE 1.9
WND-45D	D	08/11/04	**58.0**	**100.0**	<1.0	<1.0	<1.0	<1.0	**1.8**	**3.8**	**1.4**	<1.0	T12DCE 1.8
WND-46S	S	05/10/01	**2.8**	**8.8**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-46S	S	08/20/04	**3.3**	**8.2**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	EBN 1.6, XYL-MP 6.5, XYL-O 1.6
WND-46D	D	05/10/01	**65.0**	**130.0**	<1.0	<1.0	<1.0	<1.0	**3.2**	**3.2**	**3.3**	**1.9**	T12DCE 2.7
WND-46D	D	08/20/04	**66.0**	**61.0**	<1.0	<1.0	<1.0	<1.0	**1.4**	**2.5**	**1.9**	<1.0	T12DCE 1.5
WND-47S	S	12/03/97	**26.0 JDB**	**170.0**	**9.7**	<1.0	<1.0	<1.0	**1.1**	**1.2**	**1.0**	<1.0	12DCP 1.3, T12DCE 1.6, XYL-MP 1.8
WND-47S	S	05/09/01	**27.0**	**180.0**	**6.8**	<1.0	<1.0	<1.0	**1.1**	<1.0	<1.0	<1.0	T12DCE 1.4
WND-47S	S	08/11/04	**8.6**	**70.0**	**11.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-47D	D	12/03/97	**88.0 JDB**	**590.0**	**2.4**	<1.0	<1.0	<1.0	**7.5**	**5.1**	**4.3**	<1.0	T12DCE 6.3, XYL-MP 1.5
WND-47D	D	05/09/01	**51.0**	**340.0**	**7.4**	<1.0	<1.0	<1.0	**6.1**	**4.6**	**2.5**	<1.0	T12DCE 4.7
WND-47D	D	08/11/04	**32.0**	**130.0**	**12.0**	<1.0	<1.0	<1.0	<1.0	**2.9**	**1.1**	<1.0	T12DCE 1.7
WND-48S	S	05/08/01	<1.0	**1.2**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-48S	S	07/31/03	**8.1**	**2.5**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**2.8**	<1.0	None
WND-48S	S	08/20/04	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-48D	D	05/08/01	**10.0**	**35.0**	<1.0	<1.0	<1.0	<1.0	<1.0	**7.1**	**2.9**	**12.0**	None
WND-48D	D	07/31/03	**37.0**	**41.0**	<1.0	<1.0	<1.0	<1.0	**2.1**	**4.5**	**5.1**	**3.3**	None
WND-48D	D	08/20/04	**32.0**	**31.0**	<1.0	<1.0	<1.0	<1.0	**1.5**	**1.3**	**2.2**	<1.0	EBN 1.0, XYL-MP 4.4
SW-04	Surface	08/09/04	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
SW-05	Surface	08/09/04	**3.9**	**2.5**	<1.0	<1.0	<1.0	<1.0	**1.1**	<1.0	<1.0	<1.0	None
SW-06	Surface	05/16/01	**30 JH**	<1.0 **JH**	<1.0 **JH**	**3.3 JH**	<1.0 **JH**	<1.0 **JH**	**33 JH**	**1.5 JH**	**1.9 JH**	<1.0 **JH**	TOL 7.6JH, T12DCE 2.6JH
SW-06	Surface	08/09/04	**15.0**	<1.0	<1.0	**3.4**	<1.0	<1.0	**3.5**	<1.0	<1.0	<1.0	None
SW-06 dup	Surface	08/09/04	**15.0**	<1.0	<1.0	**4.1**	<1.0	<1.0	**3.5**	<1.0	<1.0	<1.0	None
SW-08	Surface	05/16/01	<1.0	**1.2**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
SW-08	Surface	08/09/04	**3.0**	**2.6**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
SW-101	Surface	08/09/04	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
SW-102	Surface	08/09/04	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
SW-103	Surface	08/09/04	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
SW-104	Surface	08/09/04	**9.4**	**8.3**	**3.2**	**3.7**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
SW-105	Surface	08/09/04	**2.8**	**6.5**	**2.2**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None

Table 4-2
North Industrial Corridor (NIC) Site
Summary of Site-wide Sample Results (Phase 3)

Station ID	Well Depth	Sample Date	cis-1,2-DCE (µg/L)	TCE (µg/L)	PCE (µg/L)	BEN (µg/L)	CT / CCL4 (µg/L)	CFM (µg/L)	VC (µg/L)	11DCE (µg/L)	11DCA (µg/L)	1,1,1-TCA (µg/L)	Other Detected Compounds (µg/L)
SW-13	Surface	08/09/04	**3.0**	**2.0**	**1.4**	**2.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
SW-14	Surface	08/09/04	**9.0**	**1.9**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
Source Area Monitoring Wells													
NMW-34S		03/28/05	**37.0**	**14.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
NMW-34D		03/28/05	**11.0**	**34.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-11S		03/28/05	**5.1**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	12DCP 2.5, 1122PCA 6.4, 112TCA 24, XYL-O 3.9
WND-11D		03/28/05	**2.0**	**28.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	None
WND-12S		03/28/05	**2.2**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**11.0**	<1.0	<1.0	None
WND-40D		03/28/05	**25.0**	**29.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	T12DCE 1.9
FLE-1S		03/28/05	<1.0	<1.0	<1.0	**3400.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	EBN 200, TOL 2.0, XYL-MP 35, XYL-O 1.2
FLE-1D		03/28/05	**26.0**	**110.0**	**3.5**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	T12DCE 1.8

µg/L= micorgrams per liter

VOLATILE ORGANIC COMPOUNDS:

PCE = Tetrachloroethene
TCE = Trichloroethene
C12DCE = cis-1,2-dichloroethene
VC = Vinyl chloride
1,1,1-TCA = 1,1,1-Trichloroethane
11DCA = 1,1-Dichloroethane
11DCE = 1,1-Dichloroethene
CT/CCL4 = Carbon tetrachloride
CFM = Chloroform
BEN = Benzene

Bold text indicates results above analytical detection limits.
DUP = Field duplicate sample.
JS = Estimated due to surrogate recoveries outside of control limits.
JH = Estimated due to holding time violations.
JIH = Estimated due to elevated internal standard concentration (from RI report)
JDB = Estimated due to contamination detected in decontamination blank (from RI report)

Other Detected Compounds:

T12DCE = trans-1,2-Dichloroethene
12DCA = 1,2-Dichloroethane
EBN = Ethylbenzene
XYL-MP = m,p-Xylene
XYL-O = o-Xylene
TOL = Toluene
MECL = Methylene Chloride
NAP = Naphthalene
CHEA = Chloroethane
CM = Chloromethane
NB=n-Butylbenzene
NPB = n-Propylbenzene
SBB = sec-Butylbenzene
PIPT = p-Isopropyltoluene
TCFM = Trichlorofluoromethane
1122PCA = 1,1,2,2-Tetrachloroethane
112TCA = 1,1,2-Trichloroethane
12DCP = 1,2-Dichloropropane
CBN = Chlorobenzene
12DCB = 1,2-Dichlorobenzene
BDCM = Bromodichloromethane
IPB= Isopropylbenzene
124TMB = 1,2,4-Trimethylbenzene
135TMB = 1,3,5-Trimethylbenzene
DCDFM=Dichlorodifluoromethane
MTBE = Methyl-tertbutylether
TBB = tert-Butylbenzene
EDB=Ethylene Dibromide

Appendix B
Source Control Summaries

Appendix B
Site Background and Source Control Summaries

A general site background and summary of source control measures for each source area are included in the following subsections. A more detailed background of each source area is available in the final RI and/or RI Addendum reports (CDM 2007a and CDM 2007b). More recent information has been used to update this appendix as information was available.

B.1 GWU1 Source Areas

B.1.1 Coleman Northeast (CNE) Facility

Background information for the Coleman Northeast (CNE) facility is based on information provided by ARCADIS G & M, Inc.

B.1.1.1 Facility Background

The CNE facility is located at 3600 N. Hydraulic Avenue and is used as a manufacturing facility. Environmental investigation and interim remedial activities are being conducted under Consent Order 91-E-205 signed November 17, 1992 by Coleman and the KDHE BER. The primary chlorinated VOCs detected at the Site are TCE and C12DCE, according to the Remedial System Performance Report of November 6, 1998. TCE concentrations of up to 9,600 µg/L have been reported for the Site; however, the most recent groundwater sampling completed in May 2008, indicated TCE concentrations ranged from 1.2 to 690 µg/L at the Site.

In Geraghty & Miller's February 1997 report titled *Phase III Offsite Remedial Investigation - Coleman Northeast Plant - Wichita, Kansas*, PCE detected on the CNE facility was attributed to Unocal. Conversely, in Woodward-Clyde Consultants' June 1996 report titled *Comprehensive Remedial Investigation Report - Former Unocal Chemicals Division Distribution Facility - Wichita, Kansas*, the PCE contamination on the CNE facility was attributed to the CNE facility. However, the *Final Revision 0 Remedial Investigation Report, Former Unocal Chemical Distribution Facility, Wichita, Kansas* dated November 2007 by URS Corporation indicates that the PCE concentrations in groundwater at the CNE Site originated from source(s) at the former Unocal facility.

The February 1997 Geraghty & Miller report also identified three chlorinated solvent areas (TCE) on the CNE facility. Two source areas (Site 1B) are separated by a shipping road and are located in the central southeastern portion of the facility. A third primary source area (Site 3) is located in the southwest portion of the plant building. Vapor degreasing operations were halted in December 1995.

B.1.1.2 Source Control

The CNE remedial system, started in 1995, consists of three groundwater recovery wells in the southwest part of the facility producing approximately 85 to 100 gpm

total. Wells PW-1, PW-2, and PW-3 have average extraction rates of 35 gpm, 15 gpm, and 45 gpm, respectively. Groundwater is treated by an air stripper and discharged to a drainage ditch under NPDES Permit No. KS-0091421. Between October 1995 through June 2008, a total of 562,525,000 gallons of groundwater were recovered with an estimated removal of 2,186 pounds of VOCs. The remediation system is operated by The Coleman Co. This Interim Remedial Measure (IRM) system is still in operation. Water levels are measured monthly and semiannual sampling is conducted at 15 selected monitoring wells to evaluate remedial system performance (ARCADIS 2008a).

Since the start-up of the groundwater recovery system in 1995, additional corrective measures have been implemented at the CNE Site to further reduce the VOC concentrations in soil and groundwater, including installation of an impermeable geomembrane barrier at Site 3 in 1995, soil excavation and onsite treatment at Site 1B in 2003 (ARCADIS 2004), SVE pilot testing at Site 3 in 2005 (ARCADIS 2005), and enhanced reductive dechlorination (ERD) pilot testing at Site 1B in 2007 and 2008 (discussed below) (ARCADIS 2008b). The operation of the groundwater recovery system, as well as the other corrective actions, have been effective at reducing the VOC concentrations in both the soil and groundwater at the Site.

The groundwater recovery system, in continuous operation since 1995, has been effective at hydraulic control of the dissolved-phase contaminant plume, as well as effective in reducing the concentrations of VOC concentrations in groundwater. For example, Wells NE-2D and NE-3D, which are located offsite west of Hydraulic and downgradient of Recovery Well PW-1, have shown significant reductions in VOC concentrations. The VOC concentrations in groundwater samples from Well NE-3D have decreased two orders of magnitude, from 2,411 µg/L total VOCs in May 1995 to 1.2 µg/L total VOCs in May 2008.

In 1995, as part of the construction of the new office building at Site 3, a 6-mil polyethylene barrier was installed to cap the source area at Site 3. The cap has been effective in reducing groundwater concentrations at Site 3. For example, Wells MW-11D and MW-15S, which are located immediately downgradient of Site 3, have both had significant decreases in VOC concentrations since the installation of the impermeable barrier. The TCE concentrations in groundwater from Well MW-15S have decreased from 56,000 µg/L in May 1995 to 63 µg/L in May 2008. Correspondingly, the C12DCE concentrations at Well MW-15S have decreased from 27,000 µg/L in May 1995 to 65 µg/L in May 2008.

In 2003, a soil shredding remediation effort was voluntarily conducted by Coleman to reduce the VOC concentrations in the upper 15 feet of the unsaturated zone soils to levels below the KDHE Tier 2 Soil-to-Groundwater Protection Pathway action limits for TCE, 12DCE, and 11DCE. The soils excavated from Site 1B were aggressively aerated through a mechanical shredding/grinding process. The effectiveness of soil shredding at Site 1B was then verified by collection of representative composite samples from post-treatment soils, with the results indicating a probable treatment efficiency of 100% for the majority of soils excavated and treated at Site 1B. Following

confirmation that the shredded soils were remediated to levels below the KDHE Tier 2 Soil-to-Groundwater Protection Pathway action limits, the treated soil was returned to the excavation in dump trucks and used as "clean" backfill.

Coleman voluntarily conducted a SVE pilot test at Site 3 in 2005 to evaluate the potential of SVE technology to address VOC impacts to unsaturated soils. SVE technology appeared to be a relatively effective method for VOC removal in the upper unsaturated sediments (i.e., to a depth of approximately 6 ft below the liner in the Well SVE-1 area); however, SVE was less likely to prove effective in the deeper clay soils below 10 ft bgs due to limitations caused by low permeability and moisture content. Based on the results of the SVE pilot test, Coleman does not plan to install a SVE system at Site 3 at the present time.

An ERD pilot test was also conducted voluntarily by Coleman in 2007 and 2008 at Site 1B to evaluate the potential to develop an *in situ* reactive zone (IRZ) that would promote ERD to address the residual VOCs remaining in the fine grained soils at Site 1B. Limited pilot testing was also completed at Site 3. The test was conducted by introducing a carbon solution with a bromide tracer into the sand layer left in the former excavations during the soil shredding project and measuring the hydrologic response in both the sand layer and underlying aquifer, the biogeochemical response in the groundwater, and the migration rate of the solution from the sand infiltration layer into the underlying aquifer. The results of the pilot test indicated that injection of the carbon solution into the infiltration sand bed at Site 1B was feasible under both saturated and unsaturated conditions and that ERD of Site VOCs was a viable remedial alternative. Coleman is currently evaluating the possible expansion of the ERD technology to full scale operation at Site 1B.

B.1.2 Farmland Elevator (FLE) Facility

B.1.2.1 Facility Background

The Farmland Elevator (FLE) facility is located at for the facility located at 1050 E. 25th Street North. During the 29th & Mead investigation, CT was identified in groundwater downgradient of the Farmland Elevator W Site Site at 630 µg/L (HRI-3 on May 21, 1987). In February 1996, FLE conducted an investigation and confirmed the presence of CT in the soil and groundwater. Farmland Industries, Inc. signed KDHE Consent Order 99-E0210 in December 1999 which required source control investigation and remediation activities at the FLE facility. Investigations were conducted in November 1999 and February 2000 but the KDHE requested further delineation of the contamination. Work conducted under the Consent Order at the FLE facility includes limited soil and groundwater sampling and the installation of six monitoring wells at four locations. Review of the vadose zone soil sampling data include detections of CT (244 µg/kg) and CFM (282 µg/kg) with detections of TCE (68.8 µg/kg) and PCE (9.9 µg/kg). The maximum detection of CT in the groundwater during a February 2000 sampling event was 78.7 µg/L. BEN was detected at a concentration of 9,200 µg/L in well located immediately south of the elevator building during a May 2001 sampling event. The source of the BEN contamination has not been determined at this time (refer to Section 5.1.11 of the RI Report (CDM 2007a and CDM 2007b)). According to the KDHE, CT was detected in soils at the FLE

facility at concentrations up to 290 mg/kg during June 2001. PCE and TCE have been detected in groundwater at locations upgradient of the FLE Elevator and several sources of petroleum hydrocarbon contamination are present in the area.

B.1.2.2 Source Control

In June 2001, FLE implemented an IRM which consisted of excavating the septic system and associated piping, installing City water and sewer lines to the FLE facility, and limited excavation for the installation of a new sewer lift station adjacent to the office. The electrical supply to the onsite water well was removed, rendering the non-potable domestic supply well inoperable.

FLE declared bankruptcy on May 31, 2002. A trust fund was established by the bankruptcy court to address outstanding environmental issues. Additional direct-push investigation activities were conducted in December 2002 in order to assess the extent of soil and groundwater contamination. CT remained in the soil at concentrations up to 8.37 mg/kg and in groundwater at concentrations up to 0.261 mg/L. The KDHE Tier 2 action limits are 7.0 mg/kg for soil and 0.005 mg/L for groundwater in non-residential areas. A final Source Control Investigation (SCI) Report was submitted to the KDHE on July 16, 2004. Four shallow monitoring wells (total depth of 25 feet) and two deep monitoring wells (total depth of 42 feet) were installed at the Site.

In September 2004, the Farmland Trust submitted a Source Control Measures (SCM) CAS Work Plan and a FS evaluating various remedial options. After approving the SCM CAS, the KDHE requested additional evaluation be performed of a limited excavation/site monitoring alternative. In August 2005, the KDHE approved implementation of a limited excavation/site monitoring IRM. During September 2005, contaminated soils were excavated at the source to a depth of four feet and disposed offsite, and two additional monitoring well clusters were installed and surveyed. The KDHE approved the SCM IRM Report in 2006. The Site monitoring well network is now comprised of ten onsite wells (seven shallow, three deep) and one offsite well.

In July 2008, the KDHE requested that the groundwater monitoring program continue on a semiannual basis for a total of three years before determining the next step. The shallow groundwater monitoring wells are sampled on a semiannual basis and the deep groundwater monitoring wells are sampled on an annual basis. Recent groundwater monitoring has shown a decreasing trend in CT concentrations in the shallow wells, but three wells continue to contain concentrations of CT above the KDHE Tier 2 action limit.

On July 23, 2009, the Farmland Trust submitted a Revised CAS and submitted responses to KDHE comments on November 20, 2009. A CAD is currently in progress.

B.1.3 Safety-Kleen (SK) Facility

Background information for the Safety-Kleen facility is based on information provided by Cameron-Cole, LLC and the KDHE's ISL.

B.1.3.1 Facility Background

The Safety-Kleen (now Clean Harbors Kansas, LLC) Site was previously owned and operated by other companies for a variety of uses over the last 60 years. Between the 1940's and 1979, Enmar Paint used the Site to manufacture paints. Reid Supply Company (RSC) then acquired the Site and began handling and managing hazardous waste subject to RCRA regulation on June 1, 1979. The wastes RSC handled included spent solvents, spent electroplating baths, and sludges generated offsite. The southwestern portion of the Site was referred to as the South Plant and the northeastern portion, east of 25th Street, was referred to as the North Plant. Bulk storage and solvents reclamation through settling and distillation occurred at the North Plant. Blending into fuel supplement for offsite energy recovery occurred at the South Plant. Otherwise, the waste was shipped to another RCRA facility for treatment or disposal. Hazardous waste operations reportedly ceased at the North Plant in 1985.

RSC subsequently sold facilities at the North Plant to Service Chemical Supply Company (SCSC). RSC retained the title to the property and leased it to SCSC during SCSC's operation. SCSC conducted operations that involved acid repackaging and the distribution of industrial chemicals. In January 1990, SCSC moved its operations from the Site.

After 1985, ownership changed several times, but the facilities continued to be used for chemical processing and waste management activities including the recycling or processing of solvents and other wastes, and the blending of wastes for kiln fuel. Conservation Services, Inc. purchased certain assets, including the RCRA permit, from RSC in 1986. Hydrocarbon Recyclers, Inc. (HRI), a subsidiary of U.S. Pollution Control, Inc. (USPCI), acquired Conservation Services, Inc. in 1988. USPCI was owned by Union Pacific Corporation from 1988 through 1994. Laidlaw Environmental Services (LES) purchased USPCI in 1995; LES changed the name to Safety-Kleen (SK) Inc. after acquiring SK in 1998. Effective September 7, 2002, Clean Harbors, Inc. and certain of its subsidiaries, purchased from Safety-Kleen Services, Inc. and certain of its domestic subsidiaries, certain of the assets of the Chemical Services Division of Safety-Kleen Corporation. The sale included the assets of 56 of the seller's subsidiaries in the United States. As a result of the sale, Clean Harbors Kansas, LLC is, as of September 7, 2002, the new owner of the regulatory permits and operator of the equipment and assets located at 2549 New York Street in Wichita, Kansas, which were formerly owned and operated by Safety-Kleen, Inc. of Wichita.

The Clean Harbors Kansas, LLC facility is a hazardous waste management facility operating under a RCRA permit dated March 29, 1995. The Clean Harbors Kansas, LLC facility EPA Identification Number is KSD007246846. The RCRA Part I hazardous waste operating permit for this facility was issued by the KDHE and became effective on April 7, 1995. Accompanying this operating permit was a

Corrective Action Permit (Part II) issued under the authority of the Hazardous and Solid Waste Amendments (HSWA) to RCRA. The RCRA Permit Renewal Application Parts A & B were submitted to the KDHE on October 8, 2004. As requested, a copy was provided to the EPA on November 19, 2004. The facility is permitted to conduct regulated waste management activities including the storage, treatment, and recovery for recycling of hazardous and non-hazardous wastes. Wastes handled at the facility include paints (and related wastes), batteries, fluorescent lights, incinerable hazardous solids, lab packs, mercury, household hazardous wastes, off-specification and production wastes from industries, both chlorinated and non-chlorinated petroleum-based waste solvents, plating wastes, and corrosives. Wastes that are received at the facility are reclaimed or directed to an appropriate facility for handling.

In 1986, chlorinated solvents were detected in monitoring wells located immediately downgradient of the facility. The facility was investigated as one of the many potential responsible parties in and or around the 29th and Mead Superfund Site. RCRA files from the 1970s and 1980s contain numerous reports of poor handling practices for chemicals onsite.

Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) at the Site were initially identified through a RCRA Facility Assessment (RFA), which was performed by PRC Environmental Management, Inc. in 1992 on behalf of the EPA. This RFA confirmed the presence of chlorinated solvents in groundwater and soil. The results of the RFA are described in a report dated September 24, 1990 and titled, "*Draft Preliminary Assessment Report - RCRA Facility Assessment - Hydrocarbon Recyclers, Inc. - Wichita, Kansas*". No final version of this document has been located by the facility or the agencies. A subset of the SWMUs and AOCs identified from the RFA, together with several additional SWMUs identified subsequent to the RFA, were listed in the RCRA Part II (HSWA) Permit for the facility.

In 1998, the EPA required a RCRA Facility Investigation (RFI) and the RFI was performed between 1999 and 2002. Based on permit requirements and further discussions associated with the formulation and approval of a Phase I RFI Work Plan, the following list of SWMUs and AOCs were agreed upon with the agencies for investigation during the RFI at the Site.

SWMUs:

1. Process Area Storage Tanks
4. Process Area Truck Bay
5. Sparging Area
6. Hot Rooms
7. Elevated Tank Storage Area
8. Regulated Waste Storage Area
9. Solids Dryer
- Warm Room
15. Building J
16. Corrosive Waste Storage Area
17. Dry Solids Gondola

18. Open Area Along the SW corner
19. Open Area North of Bldg. I
20. Paint Can Burial Pit
21. Cyclone
22. Old Still Area West of Bldg. I
23. Area East of Bldg. I
24. Area South of Bldg. C

AOCs:

1. Laboratory Sample Storage Area
2. Former Aboveground Fuel Tanks
3. Building I
4. Concrete Vault

Although SWMUs # 1, 4, 5, 6, 7, 8, 9, 12, 15, 16, and 21 were not designated in the permit for inclusion in the RFI, during the preparation of the Phase I RFI Work Plan the agencies requested that the soils outside of the buildings encompassing these units be evaluated. These investigations were conducted accordingly as defined by the RFI Phase I Work Plan; however, it should be noted that several SWMUs noted in the RFA have since been taken out of service. These consist of SWMUs #5, #7, #9, #17, and #21. Three steam-heated spargers (SWMU #5), located in the southwest corner of Building D, were formerly used for stripping PCE from dry cleaning canisters and filters. The sparging area had a central sump. This process was initiated sometime between 1984 and 1986, but is no longer in operation at the facility. The tanks in the elevated tank storage area (SWMU#7) are located in the northwest corner of Building D and are installed approximately 15 feet above the floor level. The tanks vary in capacity from 2,000 to 9,000 gallons and are made of carbon steel. They were used to store recycled PCE, chlorinated solvents waste water, oils, diesel fuel, and non-hazardous waste oil. The tanks are currently out of service and have been emptied and cleaned. The area is equipped with containment controls and a collection sump. A solids dryer (SWMU#9) used to recover solvents from shredded dry cleaning filters was formerly located in the southeastern corner of Building D, but is no longer in use. A gondola (SWMU#17) (a closed-top roll-off box) was formerly located south of Building C and was used for temporary storage of dry solids. The gondola is no longer used or present at the Site. A cyclone (SWMU #21) was located within the south-central part of Building D, along the west wall of the shredder/granulator room. It was previously used to recover solid material from the shredder/granulator and was located within well-maintained secondary containment. This unit has been closed and the equipment removed. No releases were reported or known from any of these units during their operation.

Other SWMUs and AOCs previously identified in the RFA but not addressed within this RFI report were omitted in accordance with the Part II RCRA (HSWA) Permit for the facility, dated December 23, 1994. These units are the Waste Blending and Drum Processing Area (SWMU #2), Former Drum Processing Area (SWMU #3), Drum Crusher (SWMU #10), Crushed Drum Roll-Off Boxes (SWMU #11), Dock Area (SWMU #13), and Drum Storage Warehouse – Building C (SWMU #14). The permit

allows the delay of investigation and corrective actions, if any, to the subsoils at these units until such time that the structure in question is removed or until final closure of the facility. Despite the exclusion of these units from the RFI, many soil borings were drilled and sampled during the RFI that are adjacent to or in close proximity to these units. SWMUs #2, 3, 10, and 11 are located in the process area and Building D area where many borings were drilled. SWMUs # 13 and 14 are located at Building C. Many borings were drilled to the south of Building C in connection with work at SWMUs # 17 and 24. Building K lies east of SWMU #23 and northeast of SWMU #15 and was not specifically identified as a SWMU or AOC requiring investigation as part of this RFI.

In addition to the SWMUs and AOCs, several other areas were targeted for investigation during the RFI based on the results of a review of historical data for the Site (see Section 2.5) that was performed in connection with the preparation of the Phase I Work Plan. These "Other Areas" are listed below, shown on Figure 1-2, and described in more detail in Section 2.5 of the RI Report (CDM 2007a). Only those areas that did not overlap with other SWMUs or AOCs were identified with an OA number and investigated separately.

Other Areas (OAs):

1. Lagoon Area
2. Former ASTs
3. Possible Former AST Area
4. Possible Former Drum Storage Area
5. Trench Leading to Ditch
6. Northeastern Corner

Collectively, these SWMUs, AOCs, and OAs comprise the complete list of sites investigated during the RFI at the facility.

A final RFI Report on these SWMUs, AOCs, and OAs was submitted to the EPA and the KDHE on January 20, 2005. The EPA provided Notice of Approval of the RFI in a letter date April 28, 2006 following receipt of and review of an RFI Addendum Report dated August 29, 2005 and a Response Letter to EPA Comments dated January 20, 2006.

The RFI indicated that impacts to soil quality occur at concentrations exceeding KDHE or EPA Region 9 PRGs or Soil Screening Levels (SSLs) for the soil-to-groundwater pathway in at least some portion of the following areas: the Process Area and Building D area that include the Process Area Storage Tanks (SWMU #1), Process Area Truck Bay (SWMU #4), Sparging Area (SWMU #5), Hot Rooms (SWMU #6), Elevated Tank Storage Area (SWMU #7), and the Cyclone (SWMU #21); the former Paint Can Burial Pit (SWMU #20); the Open Area Along Southwestern Corner of Site (SWMU #18); the Area South of Building C (SWMU #17) including the Dry Solids Gondola (SWMU #24); and the Northeastern Corner of the Site (OA #6).

Impacts to the groundwater at the Site as a result of historical operations on the Clean Harbors facility appear to be limited for the most part to the upper zone of the alluvial

aquifer. The vertical migration of constituents in the upper zone to the lower zone is impeded by a clay layer that occurs over much of the Site, and by a slight upward vertical gradient. A chlorinated hydrocarbon signature is present in groundwater from each of the wells installed in the upper zone across the Site. All shallow wells show at least low levels (in the range of 5 to 100 µg/L) of PCE, TCE, and C12DCE. Based on characterization of upgradient groundwater quality, it appears that the widespread occurrence of TCE and C12DCE is at least in part explained by the occurrence of these constituents in upgradient groundwater quality. The occurrence of PCE appears primarily attributable to Site impacts. Although of lesser prevalence than TCE, C12DCE, and PCE, twelve additional VOCs were identified in the Site groundwater exceeding the Region 9 PRGs or MCLs. The area of greatest impact to groundwater onsite is the area downgradient of the Process Area Storage Tanks and the Elevated Tank Storage Area (SWMUs # 1 and 7). Groundwater impacts in this area consist predominantly of C12DCE and PCE ranging in concentrations up to 1,500 and 1,100 µg/L, respectively, in monitoring wells and up to 11,000 and 1,800 µg/L, respectively, in direct-push water samples. This area of impacts is defined by monitoring well data at SK-2S, SK-5S, SK-B68. Concentrations of C12DCE, PCE, and TCE at these wells each occur at values greater than the MCLs of 5, 5, and 70 µg/L, respectively. Groundwater quality impacts are observed to the west and east of the process area and Building D, but at lower concentrations. Groundwater quality impacts also occur in the vicinity of the former Paint Can Burial Pit (SWMU #20). The constituents include a variety of substituted aromatic compounds consistent with a paint-related source. This area is likely associated with the historic manufacturing of paint at the facility. The groundwater plume may also be impacting the adjacent Chisholm Creek although the creek is also being impacted from other upgradient sites.

Following completion of the RFI, a Health Risk Assessment was performed to provide quantitative analysis of the likelihood that adverse health effects may be associated with constituents detected in environmental media associated at the Site, and if so, establish the Remedial Action Objectives for a Corrective Measures Study. The Health Risk Assessment noted that the migration of contaminants from soil to groundwater in areas defined by the RFI has resulted in groundwater exceedances of groundwater MCLs. The groundwater pathway is not complete under current conditions because of a lack of groundwater use and an existing ordinance against groundwater use. The groundwater pathway may be complete under hypothetical future use scenarios in which groundwater is used if wells were installed because groundwater exceeds MCLs. No unacceptable health risks were identified due to soil impacts at the Site via direct contact soil exposure scenarios (ingestion, absorption, inhalation of soil contaminants) with two exceptions. One is related to volatile organic compounds in soils in the vicinity of borings B-86 and B-46 for an indoor worker scenario exposed via inhalation. The second is related to lead in soils in the vicinity of B-40 on the eastern side of the Site. The *Health Risk Assessment Report* (August 30, 2006, revised June 30, 2007) was submitted to the EPA and KDHE and is currently under review by these agencies.

Safety-Kleen has submitted several iterations of the Risk Assessment Report which the EPA, as lead agency, has reviewed with KDHE input. The EPA then submitted a letter to Safety-Kleen and their contractor noting significant deficiencies in the risk assessment, requiring Safety-Kleen to address these concerns. Safety-Kleen has submitted several semiannual reports detailing analytical data results. In mid to late 2009 it came to the attention of the KDHE and the EPA that there may be radiological concerns with this Site; predecessor operators may have received waste from former radium dial manufacturers/recyclers and thus there may have been releases to the environment of radiologic materials. KDHE Assessment and Restoration, EPA, and Safety-Kleen personnel conducted a brief Site reconnaissance October 1, 2009 finding a former drain line onsite with radiologic (gamma) detections at three times background. The EPA currently is focusing on development of the RCRA Permit renewal while the KDHE (BWM) is focusing on closure of portions of the Site. The KDHE and EPA continue to confer on this Site.

B.1.3.2 Source Control

Remediation activity consisting of the excavation and disposal of the paint can burial pit (SWMU #20) was conducted prior to the Clean Harbors acquisition of the Site. This area was limited in extent and historical in nature. The pit originated from activities related to the paint manufacturer that previously operated onsite. Information on historical disposal in this area is not known; however, the property was used for paint manufacturing from the mid 1940s until 1979 and the burial likely predated RSC's purchase of the property in 1979. Buried paint cans and paint related wastes were discovered in 1992 west of Building B by HRI, the owner at the time, during excavation for Site improvements. The wastes were located in an area of approximately 20 ft^2, approximately 20 ft west of the southwestern corner of Building B. The waste area was excavated and residual soil samples were reportedly collected and were clean.

The performance of a *Corrective Measures Study* (CMS) is pending EPA approval of the *Health Risk Assessment* for the Site submitted in June 2007. Remedial options will be evaluated in the CMS to address the sources identified based on the RFI and the *Health Risk Assessment* as having the potential for adverse health impacts.

B.1.4 Former Unocal Chemicals Division Distribution Facility

B.1.4.1 Facility Background

The former Unocal facility (now Chevron Environmental Management Company) is located at 2100 E. 37th Street North as shown on Figure 2-2 of the RI Report (CDM 2007a). Unocal operated the 2.4-acre facility from 1953 until 1992 as a chemical storage and distribution facility. Prior to 1953, the Site was undeveloped agricultural land. During its operations, Unocal received bulk shipments of containerized liquid chemicals, stored bulk chemicals in ASTs, blended bulk chemicals for customers, and packaged and transported bulk and containerized liquid chemicals to customers. Chemicals were received by the facility by railcar and truck. Chemicals were stored in 55-gallon drums in the warehouse and drum storage area, in 500-gallon Department of Transportation certified containers, and temporarily in rail cars. The

types of chemicals handled at the facility included aromatic and aliphatic hydrocarbons, chlorinated hydrocarbons, and petrochemicals, among others.

Contamination was identified at the Site when an accidental release of PCE (approximately 150 gallons) occurred in 1989. Unocal contractors attempted to excavate the area; however, it was later determined that excavation activities would not completely remediate the contaminated soil. Unocal then contracted Woodward Clyde Consultants to install a vapor extraction system in the area.

While Unocal points to 1989 as the time releases occurred at the facility, KDHE files contain documentation of a spill and fire in July 1984 at the Union Chemicals facility in Wichita, Kansas. Based upon the information provided in the documentation, the impacted facility appears to be the Unocal facility. Given that numerous compounds other than PCE are present in the groundwater at the facility (see below), the 1989 PCE spill release does not account for all of the observed groundwater contamination. Several VOCs and SVOCs have been detected in the groundwater beneath the facility. The primary chlorinated VOCs are PCE, TCE, and 111TCA.

Unocal completed the first phase of a RI in 1993 with the KDHE approving the Phase 1 RI Report on November 30, 1993. Environmental investigations have indicated that VOCs in the groundwater are migrating to the CNE property to the south and onto the Pinsker Steel and USD properties to the west. The primary contaminants of concern are PCE, TCE, C12DCE, and 111TCA; however, extraction well R-1 located in the primary source area on the Unocal property had the following VOCs and SVOCs detected in March 1996.

Additional Site characterization activities were conducted in 1990 and 1991 to evaluate the nature and extent of subsurface contamination attributable to the Unocal facility. On the basis of information gained from these investigations, on March 23, 1992, the KDHE and Unocal entered into a *Consent Order for Remedial Investigation and Feasibility Study* (Case No. 91-E-206). The Consent Order outlined the requirements for investigating and evaluating remedial alternatives for the Site.

The remedial investigation process was conducted in several phases beginning in 1992 and ending in 2007 with the KDHE's approval of the final RI Report. The investigations identified several release areas, each distinguishable by a unique set of chemical constituents. The RI Report refers to these chemically distinct releases and associated plumes as "plumelets." Contaminants of concern for the Unocal Site include, but are not limited to: PCE and its degradation products (TCE, C12DCE, and VC); BEN; naphthalene; 111TCA; 11DCE; 124TMB; 135TMB; TOL; EBN; and XYL.

March, 1996 Detections in Recovery Well R-1 at the Unocal Facility			
VOCs	**Detection (µg/L)**	**SVOCs**	**Detection (µg/L)**
Tetrachloroethene	24,000	Naphthalene	480
Trichloroethene	20,000	2-Methylphenol	29
Toluene	18,000	4-Methylphenol	29
Xylenes, total	14,000	2-Methylnaphthalene	25
1,1,1-Trichloroethane	5,700	Bis(2-ethylhexyl)phthalate	14 B
2-butanone	4,500	Phenol	1.7 J
cis-1,2-Dichloroethene	3,700		
Ethylbenzene	3,400	Notes: J = estimated value, below the detection limit B = constituent detected in laboratory blanks	
Acetone	1,100 J		
1,1-Dichloroethene	990		
Vinyl Chloride	710		
Methylene Chloride	180 JB		
1,1-Dichloroethane	120		
Benzene	31 J		
1,1,2-Trichloroethane	24 J		

The detections in R-1 as well as the adjacent monitoring well MW-06 indicate that compounds other than PCE have been released to the groundwater on the facility. The June 28, 1996 report prepared by Woodward-Clyde Consultants for Unocal Environmental Remediation Services titled "*Comprehensive Remedial Investigation Report - Former Unocal Chemicals Distribution Facility - Wichita, Kansas*" presented the above data. The report states "the elevated levels of chlorinated compounds in R-1 are considered to be the result of DNAPL removal activities conducted for the blank sump of R-1 prior to groundwater sampling" and "are not considered to be representative of groundwater concentrations". Unocal reports that DNAPL has not been detected in well R-1 subsequent to the 1997 second semiannual groundwater monitoring event.

B.1.4.2 Source Control

Soil and groundwater remediation activities have been conducted at the facility including: soil excavation and offsite disposal, SVE, and groundwater extraction and treatment, and source area and downgradient enhanced reductive dechlorination. Groundwater extraction is also occurring downgradient of the facility on the CNE property as a containment and groundwater remedial measure. Unocal implemented an Interim Response Action vapor extraction system on their property with a start-up date of November 22, 1989. The vapor extraction system is reportedly operational during summer months.

In June 1994, the KDHE approved Unocal's plan to implement an additional IRM in order to hydraulically control migration of the plume and to remediate contaminated groundwater. In addition, Unocal excavated and disposed of 5,038 tons of contaminated soils as part of a KDHE approved IRM in December 2001.

Based on the KDHE ISL information sheet for UCL, bioremediation pilot testing was completed during the RI phase of the project. A FS has been completed for the Unocal facility and was approved by the KDHE in July 2009.

Most recently, in December 2009, HRC-X was injected in four injection transects near the P-5 source area to reduce contaminant concentrations and limit future offsite migration of contamination from this area. In addition, a phytoremediation IRM was implemented in April 2010 to address contamination in the western part of the Site. Monitoring is ongoing in some areas of the Site to evaluate the potential viability of MNA.

B.1.5 Union Pacific Railroad Fueling Terminal (UPRF) Facility

B.1.5.1 Facility Background

The Union Pacific Railroad Fueling Terminal (UPRF) facility, located at 2645 N. New York Avenue, is a fueling and maintenance facility being investigated under the Storage Tank Section of the KDHE BER for hydrocarbon releases resulting in free phase petroleum hydrocarbon contamination. Only three of the onsite shallow monitoring wells were sampled and analyzed for chlorinated VOCs. No chlorinated VOCs were detected in the shallow monitoring wells.

At the direction of the KDHE, the City installed three deep monitoring wells adjacent to three existing shallow monitoring wells. The well pairs were sampled for chlorinated VOCs during the RI. Chlorinated VOCs were detected in these wells, and have since been detected in some of the UPRF shallow wells; however, no chlorinated solvent contamination has been attributed to the UPRF facility at this time.

B.1.5.2 Source Control

In a remedial design report dated April 12, 2002, UPRF's consultant proposed removal of free product using active skimmers in the impacted monitoring wells. Vapor recovery was also proposed to enhance the free product recovery process. CDM is not aware whether the remediation system was installed or is in operation. The Site is currently monitored by the KDHE.

B.1.6 Former VIM Trailer Facility

B.1.6.1 Facility Background

The former VIM Trailer facility is located at 2811 N. Ohio Street. This facility was involved in manufacturing and refurbishing tanker trailers. Solvents were used to clean tankers prior to assembly or painting. A 12,000 gallon UST located on the western end of the property was used to contain spent solvent and rinsate generated during the tanker cleaning and painting operations. The tank was removed in 1993 and a hole was observed in the tank during its removal. VIM Trailer is no longer in business.

Groundwater and soil investigations conducted in 1995 and 1997 identified a variety of chlorinated solvents in the soils and groundwater. CDM acquired summary tables of the 1995 sampling effort but was not able to acquire the original report providing

the groundwater results. The results of a 1997 investigation were presented in a report prepared by Allied Environmental Consultants (AEC) for Chance Coach, Inc. The January 16, 1998 report is titled *Chance Coach Inc. Site Environmental Evaluation - Report of Findings*. No groundwater samples were collected during this investigation. Soil samples collected during the 1997 investigation included the following chlorinated VOC detections: PCE (54,000 µg/kg), TCE (290,000 µg/kg), C12DCE (85,000 µg/kg), VC (1,400 µg/kg). Additionally, significant concentrations of BTEX were observed in the same soil samples (total BTEX 96,700 µg/kg).

In September 2009 and March 2010, CDM conducted a Comprehensive Investigation (CI) at the Site (CDM 2010b). Upon review of the results, VOCs were found to have impacted soils in the VIM Site. The following VIM Site target compounds were identified based on frequency of detection, exceedances of MCLs, extent of contamination, usability in source identification, and importance as a biodegradation daughter product:

- Trichloroethene (TCE);
- *cis*-1,2-dichloroethene (C12DCE);
- Tetrachloroethene (PCE);
- Vinyl chloride (VC); and
- BTEX and associated petroleum hydrocarbons.

Of the above detected compounds in soils, TCE was the most widespread, with C12DCE the second-most widespread. PCE and VC were fairly localized in extent, but are important in contamination source identification. The BTEX compounds are somewhat localized in extent but may be important to promoting degradation of the chlorinated solvents near the source areas.

VOCs were also found to have impacted groundwater in the VIM Site. TCE, PCE, C12DCE, and VC were again identified as groundwater target compounds with BTEX compounds included as a possible degradation promoter. Of the detected compounds, TCE was also the most widespread in groundwater, with C12DCE the second-most widespread. PCE, VC, and BTEX were again fairly localized in extent. At depth, the shallow groundwater contamination from the VIM Site may also be comingling with contamination from offsite upgradient sources.

B.1.6.2 Source Control

No soil or groundwater remediation activities have occurred at the Site, aside from the 1993 removal of the 12,000 gallon UST. Remedial action alternatives to address soil and groundwater contamination at the source area appear to be warranted. A Corrective Action Study (CAS) has been prepared for the Site and is currently under review by the KDHE.

B.1.7 DOW/Essex Facility

B.1.7.1 Facility Background

The Dow/Essex Chemical Company (DEC) facility at 2808 N. Ohio Avenue and the Wil-Gro Fertilizer Inc. (WG) facility at 2728 N. Ohio are located northeast of the intersection of 26th Street and Ohio Avenue.

During the RI, access refusals by both DEC and WG prevented a more detailed assessment of the nature of the source area at these properties. TCE was detected in the shallow and deep groundwater samples collected downgradient of the DEC/WG facilities at concentrations of up to 230 μg/L and 450 μg/L, respectively. TCE concentrations in the shallow and deep groundwater samples collected immediately upgradient from the DEC facility did not exceed 64 μg/L and 240 μg/L, respectively. No documented evidence of the use or storage of TCE at these properties has been identified at this time; however, Polk Directory information indicated that the DEC facility has been operated as a chemical supply distribution facility in the past.

According to the KDHE's ISL website, the DOW facility was used to produce and distribute specialty adhesives under a series of corporate entities prior to Dow's acquisition of the Essex Company in the late 1980s. An AST containment basin, a below-grade trench, and two structures remain on the Site. Phase I and Phase II Site investigations were conducted in 1988 and 1990, and identified soil and groundwater contamination exceeding regulatory limits. The AST basin, mixing tanks, drum storage areas, sumps, and drainage swales have been identified as potential source areas. The horizontal and vertical extent of soil contamination, and the extent, degree, and source(s) of groundwater contamination, has not been determined (KDHE ISL).

Based on the KDHE ISL information sheet for DEC, an Administrative Order for the facility was issued in November 2005. A previously unknown UST, apparently used for heating oil, was discovered during the RI. The UST was removed in the fall of 2006. The KDHE approved a revised Site Investigation Report for the facility in March 2007. On April 13, 2007, the Secretary of the KDHE issued an Administrative Order indicating that the requirements of the previously issued order have been satisfied.

B.1.7.2 Source Control

Based on the groundwater quality data from the source area investigations, TCE levels have diminished in the previously sampled locations since earlier phases of the RI. No significant increases across the DEC/WG Site are noted, and comparable contaminant levels are noted upgradient of the Site. The existence of a historical source of TCE contamination on the DEC/WG Site remains inconclusive. In addition, the DEC facility has received a no further action (NFA) letter from the KDHE. Therefore, no source control measures are proposed for these facilities.

B.1.8 Wilko Paints and BFI Facilities

B.1.8.1 Facility Background

The Wilko Paints (WP) facility and Browning-Ferris Industries (BFI) facility are respectively located at 2727 N. Ohio Avenue and 2745 N. Ohio Avenue, northwest of the intersection of E. 26th Street and N. Ohio Avenue. RI data indicate that this area may be a potential source of chlorinated VOC contamination. RI groundwater sampling data have shown relatively high, but variable concentrations of TCE in the groundwater at these facilities.

The data from the southern portion of the BFI facility and northern portion of the WP facility show contaminant distributions that are south and southeast of the VIM Trailer source area. The available data at the time the final RI was completed were not considered sufficient to demonstrate that the observed shallow groundwater contamination on the BFI and WP facilities was derived from upgradient sources. At the time of the RI, no documentation of the use or storage of TCE at either of these facilities had been identified. WP has provided the City with chemical storage and use information that does not show the use or storage of TCE on the property.

Chlorinated solvent contamination at the WP/BFI Sites is typically characterized by a high C12DCE to TCE ratio and the presence of VC in many samples. Based on the presence of these compounds and a general decreasing trend in TCE concentrations over time, degradation of TCE appears to be occurring in this area.

BEN was detected downgradient of WP during both the initial RI and the source area investigations. Based on the list of chemicals used at the facility provided by WP, chemical use at WP includes the use of TOL and XYL, but not BEN. The BEN detection is assumed to be related to petroleum contamination. TOL and XYL were detected at low levels but are likely associated with petroleum contamination. A release from the previously discussed petroleum pipeline combined with preferential contaminant migration through utility backfill corridors warrants consideration as a possible source of petroleum contamination in the area of WP.

There are no records or other evidence of USTs or ASTs at the WP Site. No petroleum or chemical spills at the Site or in the immediate area of the Site have been reported.

Because of the physical proximity of the facilities directly upgradient of sample locations with high BEN concentrations in groundwater and the presence of an active LUST Site on the BFI property, the WP/BFI Sites were retained as suspect source areas for petroleum hydrocarbons.

B.1.8.2 Source Control

Based on the current data, neither the WP nor BFI Sites appear to be sources of TCE contamination. TCE contamination in this area appears to be attributable to the upgradient VIM Trailer facility. The VIM Trailer facility was listed as a confirmed source area in the final RI Report (CDM 2007a).

With respect to petroleum contamination, three USTs (one gasoline, one diesel, one waste oil) were previously removed from the BFI Site. The Site is enrolled in the KDHE LUST program. Based on the KDHE UST database records, the facility has been put on "hold" at this time.

No source area remediation is proposed at this time for the WP or BFI facilities; however, remediation of the BTEX contamination may be warranted on or in the vicinity of these facilities.

B.1.9 Former WR Grace Facility

B.1.9.1 Facility Background

The former WR Grace (WRG) facility is located at the northeast corner of 26th and Ohio at 2728 N. Ohio.

No significant upgradient-to-downgradient increases in TCE are noted at the WRG facility. RI data indicated that this area may be a potential source of petroleum hydrocarbon contamination. Petroleum hydrocarbon contamination was reportedly present in an upgradient UST investigation well on the Oneok Kansas Gas Service (OKGS) facility located at 1021 E. 26th Street North, just southwest of the WG property.

The former WRG facility is the only suspect source area that is being investigated for issues unrelated to chlorinated solvents (petroleum hydrocarbons are the COCs at this facility). Data from the UST investigation at the former Wichita Gas Service Center (now OKGS) property indicates a probable source of significant petroleum hydrocarbon contamination from a facility located upgradient of an OKGS monitoring well located in the south central portion of the property. The affected OKGS well is located approximately 100 feet north of the former UST tank pit and is reportedly contaminated by petroleum hydrocarbons. Geocore Services, Inc., responsible for conducting the UST investigation under the KDHE Storage Tank Section, has attributed the petroleum hydrocarbon contamination at this well to an offsite upgradient source. Sampling on the WG property was determined to be necessary to assess the nature and extent of the probable petroleum hydrocarbon contamination in the area.

The KDHE provided UST file information to the City of Wichita in a memorandum dated June 16, 2004. The memorandum provided information regarding the OKGS investigation. In addition to the OKGS contaminant plume on the western portion of the OKGS property, the OKGS investigation showed elevated levels of BEN in the eastern portion of the OKGS parking lot (south/southwest of the former WRG Site) and at the Farmland Elevator facility to the east of the OKGS Site (southeast of the former WRG Site). The memorandum also included information regarding UST releases at 2932 N. Ohio (F & E Wholesale) and 2950 N. Ohio (Universal Quick Mart). The two LUST Sites on the 2900 block of N. Ohio appear to be limited in extent and not related to the elevated levels of petroleum contamination near the WRG Site.

Additional groundwater samples were taken from direct-push borings taken during the source area investigations. BEN concentrations ranging from 101 μg/L to 10,625 μg/L were noted in shallow samples taken from these borings, although significantly lower concentrations were noted in offsite confirmatory samples. It is possible that the onsite samples may have retained a higher concentration of product artifacts, causing the discrepancy in offsite and onsite readings. High concentrations of BEN in the area of these borings are consistent with the data included in the OKGS LUST review file. Based on this data file, high concentrations were also present on the south end of the Farmland Elevator. The March 28, 2005 sampling of well FLE-1S demonstrates that high concentrations of BEN (3,400 μg/L in FLE-1S) remain at the south end of Farmland Elevator, indicating high BEN levels at various points downgradient and cross-gradient of the WRG facility. Investigation of the UPRR property between WRG and Farmland was not completed because access could not be obtained.

No known sources of petroleum are noted on the WRG property. There is no documentation or evidence of current or former USTs on the property. Two large ASTs are present on the WRG property. These ASTs are visible on Plate 3-9 of the RI Addendum (CDM 2007b). Based on a review of City of Wichita Planning Department air photos, these ASTs were installed between 1983 and 1992. The ASTs are currently used for fertilizer storage. No record of use of these ASTs for petroleum storage was found.

No BEN or physical evidence of petroleum contamination was noted at sample location GP-WRG-03, which is located southeast of the ASTs. Based on this result, there does not appear to be a correlation between the contamination at FLE-1S and the ASTs. In addition, a petroleum release of a magnitude that would cause the high BEN concentrations noted in the OKGS parking lot would likely result in cross-gradient impacts directly downgradient of the source. The lack of observed petroleum contamination in GP-WRG-03 seems to be an indicator that the ASTs are not a source of petroleum contamination.

The sample locations with high BEN detections are adjacent to a petroleum pipeline. The City understands that the KDHE intends to submit an information request to the owner of this pipeline.

B.1.9.2 Source Control

Based on the available data, no source control measures at the WRG facility appear to be warranted at this time; however, remediation of the BTEX contamination may be warranted on or in the vicinity of the WRG property.

B.2 GWU2 Source Areas

B.2.1 Former Barnsdall Refinery (BRND) Facility

B.2.1.1 Facility Background

The former Barnsdall Refinery (BRND) was generally located between 25th Street North and 29th Street North and between Broadway and Emporia. The facility

operated as an oil refinery between 1930 and 1950. The facility included numerous ASTs of different sizes, process buildings, and acid sludge pits. A 1960 air photo showed most of the structures had been dismantled with some remnants and debris remaining in the south portion of the Site. A 1988 air photo showed the property was being used as a metals scrap yard. The property is currently occupied by the Kansas Metals and Glickman, Inc. both of which are scrap metal recycling operations.

The former BRND is a confirmed source area for petroleum hydrocarbon, metals, and PCB contamination. Chlorinated hydrocarbons detected in deep groundwater may have been used at the Site but could also be coming from offsite sources (KDHE ISL). Numerous sludge pits were left behind when the facility shut down. An October 12, 1981 KDHE Memorandum by Dale T. Stuckey to the Superfund Sites File provides a discussion on the history of some of the sludge pits located on the BRND property. The memorandum notes that a large sludge pit, approximately one acre in size and located in the far northwest corner of the property was cleaned out around 1965. A contractor hired by Kansas Paint and Color, the interim property owner, reportedly pumped out the water and dumped the water at an unspecified location. The oil sludge was dredged out. The majority of the oil sludge was placed on an adjacent southeast tract of land, spread on the ground, and buried. According to Mike Carter of Wichita Brass and Aluminum, the excavated sludge was reportedly placed into a series of east-west trenches, mixed with dirt, and covered. Some of the oil sludge was also used to stabilize unspecified dirt county roads.

The 1981 KDHE Memorandum indicated that a second major pit located approximately 200 yards south, approximately one acre in size, was excavated in 1974. The pit and several associated smaller pits were apparently excavated prior to the construction of a car crusher to be operated by Kansas Metals, Inc. The memorandum indicates that a boomerang-shaped pit located southeast of the southern major pit appeared to have been excavated based upon an air photo review. The memorandum indicated that a second east-west pit, located just south of the northern major pit, was observed to apparently still exist during a September 23, 1981 Site visit by Kent Rowe and Mr. Stuckey. A sludge pit was observed located in close proximity to an east-west fence line just southeast from the northern major pit. The pit contained several dead animal skeletons entrained in the surface. Mr. Stuckey reported that the surface could be walked over while sinking in slowly. A sample was collected and analyzed for metals. The specific gravity was measured at 1.658 g/ml. Detected metals and cyanide included: free cyanide (51 mg/kg), total cadmium (22 mg/kg), total barium (113 mg/kg), total chromium (600 mg/kg), and total lead (2,400 mg/kg).

Several investigations have been conducted on the properties occupied by the former BRND beginning with the USGS investigations in 1984 and 1985. Three monitoring wells were installed on the former BRND facility during the USGS investigation (BRND-MW12, BRND-MW13, and BRND-MW14). Samples collected in 1985 demonstrated concentrations of chlorinated solvents including MECL (27 μg/L), 11DCA (3.2 μg/L), VC (410 μg/L), and TCE (91 μg/L).

Three of the most prominent former sludge pits were investigated during the RI. The investigation revealed that one of the pits had significant free product. Another pit appears to have been over-excavated with little residual evidence of petroleum hydrocarbon contamination from the former sludge pit. The third pit also appears to have been over-excavated but the material still had strong hydrocarbon odor and possible minor staining. Groundwater impacts from the investigated sludge pits appear to be minimal, despite evident soil impacts. The soil and product in the sludge pits has been impacted by PCBs and metals (antimony, copper, lead, selenium, and zinc).

Significant petroleum hydrocarbon contamination also appears to be present in the groundwater at the southeast portion of the former refinery property where the bulk of the refining operations were conducted. Free product was observed in monitoring well WND-16S and was evident during direct-push sampling during the RI. High concentrations of BEN (1,800 µg/L) were also observed in the shallow groundwater sample collected from a direct-push location. The extent of petroleum hydrocarbon contamination not associated with the sludge pit locations has not been completely delineated, but does not appear to extend significantly downgradient (south) of the former refinery.

B.2.1.2 Source Control

No known source control measures have been performed to date. Based on the KDHE ISL for the facility, in 2007, Sunoco, Inc. entered into a letter agreement with the KDHE to conduct sampling at the Site. Groundwater samples were collected from monitoring wells in June 2007 and additional sampling was conducted in June 2009. The KDHE reviewed the investigation results and requested additional sampling and a revised investigation report. Additional sampling was conducted in December 2010. Given that free product is present and significant dissolved phase BEN is present at some locations within this former refinery, the implementation of remedial action alternatives at this facility is likely.

B.2.2 Former Coastal Refining and Marketing Inc. Boneyard (CBY) Facility

B.2.2.1 Site Background

The former Coastal Refining and Marketing, Inc. Boneyard (CBY) facility is located northwest of the intersection of 29th and Emporia Circle. The property is currently vacant. During Phase 2 of the RI (1999-2000), TCE was detected in groundwater downgradient of the facility at up to 440 µg/L (GP02A-07, 28 feet), while the maximum upgradient TCE concentration was observed to be 47 µg/L (GP02A-01, 32 feet) (CDM 2007a and CDM 2007b). During investigations conducted by the USGS in 1984 and 1985, concentrations of TCE and 111TCA were reported in the groundwater downgradient of the CBY Site at up to 1,935 and 216 µg/L, respectively (well GRR-MW-6, screened from 20 to 25 feet). Sampling data indicated that groundwater in this area was also impacted by petroleum hydrocarbon contamination, apparently from the former Golden Rule Refinery operations. The presence of the petroleum hydrocarbon contamination appears to have resulted in significant degradation of the

chlorinated solvents as indicated by the apparent decrease in concentrations between 1984 and 2000. No evidence documenting storage or use of chlorinated solvents on the property has been identified at this time. The available data indicated that this property was a historically significant and active TCE source area.

Based on August 2004 water level data, groundwater flow direction at CBY is toward the southeast and east. The easterly groundwater flow component appears to be the result of pumping of the Coleman North extraction wells. An industrial well also exists east of the Site on the Compressed Gases (CGI) Site. The frequency of use and flow rate of the CGI well is unknown.

An overall decrease in groundwater contamination was noted during source area investigation activities. The overall decrease in contamination appears to be attributable to continued degradation of chlorinated solvents, the influence of the Coleman North groundwater remediation system, or a combination of these factors.

In 2007, El Paso Merchant Energy-Petroleum Company (El Paso) entered into a letter agreement with the KDHE to perform a RI at the site consisting of collection of additional soil and groundwater samples. The RI was conducted during the summer of 2008. The KDHE reviewed the RI Report and determined that additional sampling was needed to fully assess Site impacts. A Phase III Investigation Report, approved by the KDHE in January 2010, identified elevated concentrations of petroleum hydrocarbon-related chemicals and chlorinated solvents in the Site vicinity. In the report, the non-petroleum hydrocarbon chlorinated solvents were attributed to offsite source areas. CDM has identified the property as a historical source of TCE based upon the historical sampling results at monitoring well GRR-6.

B.2.2.2 Source Control

Groundwater data indicate that the CBY Site is a historical source of chlorinated solvent contamination; however, source control measures are not recommended based on the continued decrease in TCE-related contamination at this Site. In October 2010, the KDHE issued the Final Agency Decision Statement (ADS) for the Coastal Boneyard Site. The ADS requires El Paso to develop and implement a long-term groundwater monitoring program, develop and implement a soil waste management plan, and establish Environmental Use Controls (EUC) for the property. The KDHE received application to the EUC Program on January 6, 2011.

B.2.3 Coleman North/Evcon (CN) Facility

B.2.3.1 Facility Background

Background information for the Coleman North (CN) facility is based on information provided by Shaw Environmental and Infrastructure Group on April 5, 2011.

The Coleman North/Evcon (CN) Facility or the Coleman Operable Unit (COU) is a confirmed Site that has had source control measures in place since 1997. The CN facility is located in GWU2 of the NIC Site. The COU consists of 1,440 acres located in an industrial area south of E. 37th Street N. The former Coleman facility is currently owned by Johnson Controls, Inc. (Johnson Controls) and RV Products. The Johnson

Controls facilities includes a manufacturing plant (North Plant) at 801 E. 37th Street N., which occupies approximately 60 percent of the COU, and an Administration and Engineering (A&E) Building at 3110 N. Mead, which occupies approximately 30 percent of the COU. The remainder of the COU, 3050 N. St. Francis, is owned by RV Products. The southern boundary is approximately 300 feet south of E. 30th Street N.

The COU is located in an area which has been used for industrial purposes since 1888. These included manufacturing of railroad cars, automobiles, drilling equipment, farm equipment, aircraft, and metal fabrication. The Coleman Company, Inc. (Coleman) initiated the manufacture of household furnace and air-conditioning units at the Site in 1949/1950. Evcon purchased the majority of the Site in 1990. The Unitary Products Group of York International (York) purchased Evcon and was subsequently purchased by Johnson Controls; the current owner/operator of these facilities. The remainder of the Site was purchased by RV Products in 1987 which currently operates a manufacturing facility of air conditioners for recreational vehicles.

The EPA and KDHE began investigating groundwater contamination in the 29th and Mead area in 1983, which area included the CN facility. These investigations revealed the presence of several VOCs in the groundwater. Initial environmental investigations at the COU began in May 1987. In 1988, Coleman and the KDHE agreed that a ground water recovery and treatment program and a SVE program should be designed and implemented. This system became operational in 1988 and included a 62-point SVE system to treat contaminated soils in a 65,000 square foot area and a groundwater recovery and treatment system that currently utilizes two 40-foot by 4-foot diameter air strippers. Water from the system, subsequent to treatment, is discharged to the Wichita Drainage Canal in conformance with a National Pollutant Discharge Elimination System (NPDES) permit that was issued by the KDHE.

Coleman and Evcon initially entered into a consent agreement with the KDHE in 1991. The consent agreement required the completion of a RI and FS at the COU. Conclusions of the RI Report indicated the soil and groundwater at the COU contained elevated concentrations of VOCs. The primary VOCs of concern identified in the RI Report were TCE, 111TCA, and daughter compounds that are produced as the result of degradation.

The FS evaluated remedial alternatives based on the results of the RI. The technologies that were evaluated were technologies developed for the removal of VOCs from either soil or groundwater. The FS Report was submitted in July 1992 and subsequently approved by the EPA in July of 1992. On September 29, 1992, the EPA issued a Record of Decision (ROD) for the COU.

The major components of the selected remedy for groundwater and soil included the following:

- Enhancement of the existing groundwater extraction and treatment system with the addition of a withdrawal well on the south boundary of the COU. This well was connected to the existing groundwater treatment system.

- Monitoring of the groundwater collection/treatment system and the groundwater contaminant plume during groundwater remediation activities.
- Installation of SVE systems to remediate soil at other source areas within the COU.
- Monitoring of the SVE system to determine performance and establish its maximum attainable goals.
- Monitoring of the emissions from the groundwater treatment system and the SVE system to ensure the health and safety of onsite personnel and determine if additional treatment of the emissions is necessary.

A Consent Decree for RD/RA was entered into by Coleman, Evcon, and RV Products in February 1994. A Statement of Work (SOW) was incorporated into the Consent Decree. The SOW provided the framework for the implementation of the RA set forth in the ROD.

Chronology of the EPA Lead Remedial Action at the COU:

Groundwater Remediation System

- January 22, 1996: Remedial Design Work Plan approved
- May 3, 1996: Pre-Final Remedial Design submitted
- August 3, 1996: Pre-final Remedial Design and Remedial Action Work Plan approved
- August 21, 1996: Final Remedial Design submitted
- October 14, 1996: Installation of RW-2 completed
- October 17, 1996: Well development of RW-2 complete
- October 18, 1996: Installation of transfer line piping
- October 28, 1996: Air stripper modifications completed
- October 30, 1996: Installation of well pump and plumbing
- March 21, 1997: Final system inspection
- April 1997: System startup

Soil Remedy

- October 7, 1997: Remedial Design Work Plan submitted
- October 21, 1997: Remedial Design for Work Plan approved
- March 12, 1999: Pre-final Remedial Design and Remedial Action Work Plan submitted
- July 6, 1999: Pre-Final Remedial Design and Remedial Action Work Plan approved
- August 18, 1999: EPA approval of Final Remedial Design/Remedial Action Work Plan and
- EPA notice to proceed

- March 9, 2000: Initiate construction of Soil Vapor Extraction system
- April 3, 2000: Complete construction for Soil Vapor Extraction system
- May 4, 2000: Final system inspection
- May 15, 2000: Soil Vapor Extraction system startup
- September 2005: Vapor Extraction system closed with the exception of the south field

The EPA conducted an initial five-year review of the Site in September 2005, which indicated that the Site remedies were working successfully to achieve Site remedial action objectives. In September 2010 the EPA issued the second five year review of this Site. The conclusion of that review likewise indicted that the remedy was operating as expected and was protective of human health and the environment.

B.2.3.2 Source Control

The CN remedial system consists of a recovery well in the south end of the Site pumping approximately 90 gpm. Recovered groundwater is pumped to a treatment system onsite. A SVE system and a second groundwater recovery system are operated in the north half of the facility.

B.2.4 Continental Tank Car Corporation (CTC) Facility

B.2.4.1 Facility Background

The Continental Tank Car Corporation (CTC) facility is located at 1106 E. 37th St. North. Industrial activities at the two buildings on the CTC Site have included storage, ripening of bananas by E.L. Banana House, Inc., and wood finishing and other light manufacturing by Great American Design Fabricators and Impala Industries. The facility comprises approximately 3.1 acres.

On September 4, 1992, CTC entered in to a Consent Order agreement with the KDHE to conduct a RI. The RI findings identified a soil source area and found soil and groundwater impacts of VOCs, including 111TCA, TCE, C12DCE, and 11DCE. In 1997, CTC signed a second Consent Order with the KDHE to conduct groundwater monitoring of the plume (between 1998 and 2002), further define the source area, and to develop IRMs for source control. The Order also requires source control efforts be conducted by CTC.

Groundwater investigations conducted from 1988 to 1991 at the CTC Site and adjacent properties showed a high probability of release of solvents from the CTC property. VOCs detected at the Site include PCE, TCE, C12DCE, 11DCE, 11DCA, and 111TCA according to CTC's *Semiannual Monitoring Report* of July 1998 (Strata 1998). PCE, TCE, and 111TCA, among other VOCs have been detected in the onsite surface and subsurface soils. In February 1994, a downgradient monitoring well had detections of TCE and 111TCA at 962 μg/L and 815 μg/L, respectively. An onsite monitoring well CTC-MW09S had a TCE concentration of 329 μg/L and 111TCA was non-detect during the same sampling period.

Onsite and offsite investigations have been conducted in a phased approach from 1993 to 2001. A RI completed in 1994 showed a major source area on the property related to spillage and/or improper disposal of solvents (mainly TCE). A groundwater plume extends off of the Site onto City of Wichita property to the south-southwest and subsequently further southwest to the Coleman North Site. The plume appears to be controlled/contained by Coleman's groundwater pump and treat system.

CTC conducted a source-IRM pilot test in December of 2002. The IRM pilot test consisted of injection of Hydrogen Release Compounds (HRC) into vadose soils, the capillary fringe, and the upper two feet of the water table to test for *in situ* source control and groundwater remediation by enhanced natural reductive dechlorination of VOCs within Site soils and groundwater. The results of this test have not been provided to the KDHE.

B.2.4.2 Source Control

Remediation is proceeding under a KDHE Consent Order. Based on the KDHE ISL information sheet for this property, a source area pilot test consisting of injection of Hydrogen Release Compound (HRC) into the vadose zone soils was completed in December 2002 although the results of this test have not been provided to the KDHE. Semiannual groundwater monitoring is required under the 1997 consent order; however, many of the required sampling events have not been conducted.

B.2.5 Former Golden Rule Refinery Facility

B.2.5.1 Facility Background

The former Golden Rule Refinery (GRR) was generally located north of 29th Street North and south of the projected right-of-way of 30th Street North, and between Broadway and Santa Fe. The facility operated as a refinery prior to 1950, with refinery operations believed to have ceased during the late 1930s. At the close of the refinery, at least four sludge ponds were located on the western portion of the property. The former refinery property is now primarily occupied by Wichita Brass and Aluminum (south half of the former refinery property) and the Dolese Brothers (undeveloped – north half of property). During the RI Report, the former Golden Rule property was identified by CDM as also comprised of the Compressed Gases and former Costal Boneyard properties. Recent evidence uncovered by the City of Wichita has determined that these two properties were never part of the Golden Rule facility. These two properties were included in the 1985 and 1986 USGS report figures and the mischaracterization was carried forward in subsequent reports. The former Coastal Boneyard property was originally operated by Derby Oil. The Compressed Gases property does not appear to have been associated with refinery operations.

The *Narrative Report for the Site Investigation of Wichita Brass and Aluminum* prepared by the USGS in 1985 states that between 1950 and 1973, the portion of the Site currently occupied by Wichita Brass and Aluminum was used as a solvent reclamation facility. The solvent reclamation facility reportedly reclaimed paints, lacquers, and thinners using spent solvents from nearby industries. The USGS report stated that an estimated 1,300 drums of unprocessed paint and solvents were stored on the west

edge of the property. Many of the drums were reported to be in poor condition and all drums were reportedly removed under the direction of the State of Kansas in 1981. In addition to the drums, the USGS report indicates that eight storage tanks of various sizes were located along the northern portion of the facility. A 1981 KDHE memorandum contains a sketch showing approximately 100 drums in this same location.

Several investigations have been conducted on the properties occupied by the former GRR beginning with the USGS investigations in 1984 and 1985. The investigations confirmed the presence of significant petroleum hydrocarbon contamination with the former refinery property. Eight monitoring wells were installed at seven locations on the GRR and former Coastal Boneyard property. Minor chlorinated solvents were detected in the south half of the GRR property.

Five apparent sludge pits have been identified from historical aerial photographs. Three of the most prominent former sludge pits were investigated during the RI. The investigation revealed that all three pits had significant free product (Pits A, C, and E). Groundwater impacts from the investigated sludge pits appear to be minimal, despite evident soil impacts. Groundwater sample results showed lead and arsenic impacts (up to 19.13 µg/L lead and 9.94 µg/L arsenic). The soil and product in the sludge pits has been impacted by PCBs and metals (antimony, lead, and selenium) as noted in Section 5.4.1 of the RI Report (CDM 2007a).

The extent of petroleum hydrocarbon contamination not associated with the sludge pit locations has not been completely delineated, but does not appear to extend significantly downgradient (south) of the former refinery.

B.2.5.2 Source Control

Given the presence of free product in the investigated sludge pits and petroleum contamination observed in areas outside of the sludge pits, remedial action activities are anticipated for this former refinery.

B.2.6 Love Box, Inc. (LBC) Facility

B.2.6.1 Facility Background

The Love Box, Inc. (LBC) facility is located at 700 E. 37th Street North and manufactures paper and cardboard boxes. The facility conducted its own direct-push groundwater investigation in May 1999 and discovered low levels (below MCLs) of 111TCA contamination and a minor PCE source area. PCE and TCE were detected in soil and groundwater samples collected at the Site in a series of investigations beginning in the late 1990s. Results indicated a possible source area near Plant 1 on the northwest corner of 37th Street and the railroad right-of-way. Additional investigation to determine the degree and extent of contamination in this area is necessary. It was reported that PCE and its degradation products (TCE and C12DCE) were detected in the shallow groundwater downgradient of the facility at up to 190, 36, and 140 µg/L, respectively. Adequate upgradient groundwater samples are lacking. 111TCA and its degradation products (11DCA and 11DCE) were also detected in the shallow groundwater downgradient of the facility at up to 6, 4.5, and

2.1 μg/L, respectively. LBC has reported to the City that PCE and 111TCA were part of a 1996 chemical inventory at the facility.

The LBC Site is located directly northwest of the Coleman North plant (C2-087-00444) on 37th; the southeast corner of the LBC Site may be within the capture zone of the Coleman groundwater recovery system.

LBC is conducting work under the KDHE Petroleum Storage Tank program; the tanks involved are located near the intersection of 35th and Santa Fe Avenue, approximately two blocks south (downgradient) of Plant 1.

Based on the KDHE ISL information sheet for the Site, on June 12, 2008, the Secretary of the KDHE issued an Administrative Order under which LBC must perform CI/CAS and Corrective Action Plan/Corrective Action activities. The CI/CAS Work Plan was approved by the KDHE in December 2008. Implementation of the work plan started in February 2009; additional sampling was conducted in May 2009. The CI Report was approved with comment by the KDHE in January 2010. Additional groundwater sampling is ongoing.

B.2.6.2 Source Control

The available data indicate the PCE source area on the property is a moderate source of groundwater contamination. CDM assumes that the need for source control measures will be determined under the administrative order for the facility.

B.2.7 Novick Iron and Metal Facility

B.2.7.1 Facility Background

The Novick Iron and Metal Salvage Company (NIM) facility is located at 1007 E. 21st Street and is generally bounded by the projection of Washington Avenue to the west, 21st Street to the north, the Middle Fork of Chisholm Creek to the east, and the West Fork of Chisholm Creek to the South. The facility salvages scrap metal and batteries. VOCs, semivolatile organic compounds (SVOCs), heavy metals, PCBs, and total petroleum hydrocarbons (TPH) were detected in soil and groundwater samples collected at the Site in a series of investigations beginning in the late 1980s. The EPA conducted a Site investigation in 1988 designed to determine whether PCB contamination was present in the onsite soils as a result of alleged disposal of PCB-contaminated transformer oil around the property. The investigation also targeted lead and other metals. Six soil samples were collected from a depth of 0 to 6 inches. The investigation detected chromium (1,400 mg/kg), copper (430,000 mg/kg), lead (18,000 mg/kg), mercury (3.65 mg/kg), and zinc (5,700 mg/kg). PCB-1254 was detected at levels as great as 31 mg/kg. PCB-1260 was detected at levels as great as 13,000 mg/kg. For reference purposes, the KDHE Tier 2 soil pathway action limit for PCBs is 9.5 mg/kg. The June 1988 sampling results were presented in a November 3, 1988 report for EPA Region VII by Ecology and Environment, Inc.

A November 4, 1988 letter from Ecology and Environment, Inc. to EPA provided the results of a draft hazard ranking score for the NIM facility. The letter included a

recommendation that the facility be placed under RCRA jurisdiction and that the contaminants be removed.

The EPA files contain an August 4, 1989 letter from Terracon to NIM's attorneys Coburn, Croft, and Putzell. The letter indicates that 119 soil samples were collected in June 1989 and that select soil samples were analyzed for either heavy metals (chromium, cadmium, and lead) or PCBs. The EPA files contain no sampling results.

Region VII EPA files also contained records of a monitoring well installed after two diesel fuel USTs were removed in 1989. The well was installed in October 1990 adjacent to the tank excavation. The well was sampled for total petroleum hydrocarbons only, and had a 1 mg/L detected result.

During the City's RI, TCE was detected at up to 270 µg/L in shallow groundwater samples collected downgradient from NIM; it was not detected in shallow groundwater samples collected upgradient of the facility. Groundwater flow in the area is southeast and the "downgradient" samples on the south side of the West Fork of Chisholm Creek may not have been truly downgradient of the NIM facility. Significant debris and traffic patterns on the NIM facility have inhibited an accurate characterization of the facility groundwater. Lead and PCB soil concentrations are significant and have the potential to impact the groundwater. In addition, lead was detected in a surface water sample collected at location SW-06 in the West Fork of Chisholm Creek (see Section 5.1.1.4 of the RI Report (CDM 2007a)).

In 2007, the KDHE and NIM entered into a letter agreement to conduct an additional investigation of the property. The agreement was to conduct additional sampling of soil, sediment, groundwater, and surface water at the facility. The sampling was conducted in January 2008. Based on the investigation findings and the previous investigative history, the KDHE issued an Administrative Order to NIM on April 29, 2009.

B.2.7.2 Source Control

The available data indicate that the facility is a source of PCB, metals, and TPH contamination. IRMs required by the KDHE. NIM has submitted an *Interim Measure Work Plan* to address elevated concentrations of PCBs detected on the southern part of the property. The KDHE and EPA reviewed the plan and determined that additional groundwater sampling is needed to confirm previous detections of PCBs in groundwater before proceeding with Interim Measure implementation. NIM installed and sampled several monitoring wells at the Site in April 2010. Additional soil characterization efforts were conducted during the first quarter of 2011 to support design and implementation of an interim measure to address the southern PCB hotspot.

B.2.8 A&A Auto and Truck Salvage Facility

B.2.8.1 Facility Background

A&A Auto and Truck Salvage (ATS) facility is located at 700 E. 21st St. North, northwest of the intersection of 21st Street and Mead. The principal contaminant of

concern for this facility is TCE. TCE was detected during RI investigations at concentrations up to 150 µg/L in the shallow groundwater downgradient of the facility. TCE was also detected in the shallow alluvial groundwater upgradient of the facility, but at concentrations no greater than 50 µg/L. The sampling data suggested that two separate sources of contamination may be present on the property. No documented use or storage of TCE at the facility or in the vicinity of the property has been identified to date. The RI data indicated that this area was a moderate source of TCE groundwater contamination.

Minor increases of TCE in the shallow zone between upgradient and downgradient sample locations were noted during the source area investigations. This increase in contamination is consistent with results at this location taken during the RI.

B.2.8.2 Source Control

The upgradient-to-downgradient increases in TCE support a conclusion that the Site may be a historical source of TCE; however, TCE levels have also declined at least one to two orders of magnitude in this area. Based on the decline in TCE levels at this Site, source control measures are not recommended.

B.2.9 Compressed Gases Facility

B.2.9.1 Facility Background

The Compressed Gases, Inc. (CGI) facility is located at 602 E. 29th St. North (northeast of 29th and Emporia Circle). 111TCA and its degradation by-products 11DCA, 11DCE, and CHEA are the compounds of concern at this location and were detected at concentrations in the shallow groundwater up to 100, 670, 300, and 35 µg/L, respectively, during the City's RI. Maximum upgradient 111TCA; 11DCA; 11DCE; and CHEA concentrations were observed to be <1 µg/L, 1.2 µg/L, <1 µg/L, and <1 µg/L, respectively. No documentation of 111TCA use at this property has been identified at this time.

Based on data collected at the time of the source area investigations, 111TCA, CHEA, and 11DCA concentrations have decreased significantly at the Site. It should also be noted that the direction of groundwater flow was found to be significantly more easterly during the source area investigation than during previous sampling rounds. This represents either a change in flow apparently caused by the pumping of the Coleman North wells, or improved definition of this pumping effect.

B.2.9.2 Source Control

The data indicate that this Site was a historical source of 111TCA contamination; however, source control measures are not recommended due to the reduction in COC concentrations.

B.2.10 National By-Products North Facility

B.2.10.1 Facility Background

The National By-Products, North Facility (NBPN) is located at 721 East 21st Street North and 2050 North Mosley (21st and Mosley). The property is currently

operated/occupied by Darling International Inc. TCE has been detected at up to 490 µg/L in shallow groundwater samples collected downgradient of the facility during the City's RI. The sampling results indicate that the most significant area of release exists in the southwest portion of the site, on the western side of Mosley in the vicinity of the NBPN maintenance facility. There may be multiple release areas on the west side of Mosley. No TCE use or storage on the facility has been documented; however, RCRA files indicate a separate facility operated by the same company less than a mile away used and stored TCE. Available data indicate that the TCE source area(s) on the facility are moderate sources of groundwater contamination. Data are insufficient to assess whether remedial action alternatives are necessary.

The City of Wichita has also received a report indicating that drums of solvent were buried on an unspecified portion of the NBPN property. No data to confirm this report have been located.

The site was further investigated in 2005 during the NI RI Addendum field work. The RI Addendum Source Area field investigation was focused on the property on the west side of Mosley. Both groundwater and soil samples were collected. Eleven soil samples were collected from five locations and 17 groundwater samples were collected from eight locations. TCE was not detected in the soil samples and the degree of TCE contamination in the groundwater samples was significantly reduced from the levels observed during the RI investigation.

B.2.10.2 Source Control

No source control measures have been employed as of the end of 2010. The degree of groundwater contamination during the NIC RI Addendum field work indicates that source control measures may not be necessary for this property.

B.2.11 Stockyard Properties (Area 02B) Facility

B.2.11.1 Facility Background

The Stockyard Properties (Area 02B) (S2B) Facility is currently a vacant lot of land located south of 25th and west of the projection of Mead. TCE was detected in shallow downgradient groundwater samples collected during the City's RI at concentrations as high as 360 µg/L. Shallow groundwater samples collected immediately upgradient of the suspect source area had TCE concentrations no greater than 80 µg/L. Historical air photos show the presence of an unidentified building in the area that is absent by the 1980s. No TCE storage or use documentation has been identified at this time. The TCE source area appears to have been historically significant with TCE concentrations in shallow downgradient monitoring well WND-37S exceeding 1,000 µg/L during the 29th and Mead investigation.

Upgradient-to-downgradient increases in TCE contamination were also noted during the source area investigations. COCs in soil samples taken during source area investigations were below detection limits or laboratory quantification limits.

WWC5 water well records show that a water well was recently abandoned in the area of the Stockyard 2B facility.

B.2.11.2 Source Control

Currently available data indicate that the TCE source area is a moderate source of groundwater contamination. Based on the increase in TCE concentrations in groundwater across the Site and the increase in TCE levels in the NMW-04 well nest, the S2B site appears to be a source area and may require active source control measures.

B.2.12 Van Waters & Rogers South Facility

B.2.12.1 Facility Background

The Van Waters & Rogers Company (VWR) became the Vopac USA, Inc. company the is now currently operating as Univar USA. VWR operated at two facilities within the NIC Site. The facilities are identified by CDM as VWRS (southern facility) and VWRN (northern facility). Vopac still conducts operations at the southern facility.

VWRS Facility

The southern facility is located at 2041 to 2049 N. Mosley (Figure 2-2 (CDM 2007a)) and is being investigated under KDHE Consent Agreement 98-E-0096. The facility was used for repackaging of chemicals including TCE and 111TCA since 1959 and was acquired by VWR from the McKesson Corporation in 1986. TCE was reportedly spilled at the site in 1984 and 1986 (prior to VWR's acquisition of the facility). VWR conducted a soil investigation in 1990 in response to the documented spill reportedly captured by the secondary containment system. Concentrations of TCE were detected in the soil at concentrations below regulatory levels. In May 1998, VWR entered into a consent order with the KDHE to conduct a RI of the facility. Field work was conducted in June and October of 1998. Groundwater data suggests that the VWRS facility is a possible source of groundwater contamination.

TCE has been detected during onsite investigations by VWRS at up to 270 µg/L in shallow groundwater samples collected at the downgradient portion of the facility. Three rounds of samples collected by VWRS indicate TCE concentrations are consistently higher at the downgradient end of the site relative to the upgradient portion of the Site. The maximum TCE concentration observed in upgradient shallow onsite groundwater was 150 µg/L. In addition, TCE has also been reported in soil samples at up to 12.0 µg/kg, and there are reports of TCE spillage at the Site in 1984 and 1986. PCE has also been reported in some of the 1998 samples from the facility at up to 11.0 µg/L, but was not detected in the 2001 samples.

The VWRS Draft RI concludes that there are no onsite contaminant sources at the facility; however, KDHE's October 2001 comments stated that "KDHE did not concur with this conclusion and requested additional data collection". As part of the Consent Agreement, groundwater monitoring was to be conducted on a quarterly basis.

Based on the KDHE ISL information sheet for this facility, additional monitoring and investigation is necessary to evaluate whether source control will be necessary. On October 29, 2001, the KDHE directed VWRS to submit a semiannual groundwater monitoring work plan for the Site. The KDHE received a revised RI report on April 1, 2005 and provided comments on this report. Based on the KDHE comments, VWR

submitted a work plan for additional Site characterization. VWR has also conducted added groundwater sampling and analysis showing continued presence of VOCs. VWR stated intent to evaluate groundwater data from other NIC facilities before proceeding with the additional characterization. The KDHE and EPA have since approved the CI, but have found the FS to be inadequate. UNIVAR responded to KDHE/EPA comments though this response was inadequate. The KDHE/EPA continue to confer and desire a meeting to resolve technical verbiage in the FS.

VWRN Facility

A former facility, VWRN, was operated under the Van Waters & Rogers name at 3105 N. Mead, located south-southwest of the Coleman North facility. TCE was detected at a concentration of approximately 0.3 mg/L in a well located south of VWRN and south of Coleman-Evcon. In March 1997, VWRN applied for a Certificate of Release from the City of Wichita for this property. The City required an investigation prior to issuing a Certificate. On August 29, 2000, VWR entered into Consent Order 00-E-0155 with KDHE to conduct a preliminary investigation. The field investigation began August 23, 2000. Select figures and data tables from a report submitted to the KDHE on February 5, 2001 are provided in Appendix B-19 of the RI Report (CDM 2007a). The report was prepared by SECOR and is titled "*Preliminary Investigation Report - Former VW&R Mead Street Facility - Wichita, Kansas*". While some VOC contamination was detected in the groundwater during the investigation, the report states that "…TCE and associated VOCs in the groundwater is most likely a result of contaminant migration onto the former facility from sources located hydraulically upgradient, toward the adjacent Evcon facility/COU [Coleman North]." VWRN has stated they only handled TCE for three months beginning in May 1990, and historical data shows TCE in the vicinity prior to that date. The KDHE requested a revised Preliminary Investigation Report from VWRN in 2002, but has not received the report. Based on the KDHE ISL information sheet for this Site, the KDHE does not anticipate further investigation of the VWRN facility.

B.2.12.2 Source Control

Available data indicate that the VWRN is most likely not a source of chlorinated solvent groundwater contamination. The VWRS facility is at least a moderate TCE source of groundwater contamination. The data also appear to indicate that the VWRS facility may have been a past source of low-level PCE contamination to groundwater at the NIC Site. Historical downgradient groundwater data indicate that the degree of TCE contamination from VWRS may have been much more significant in the past.

B.2.13 Wichita Brass and Aluminum (WBA) Facility

B.2.13.1 Facility Background

The Wichita Brass and Aluminum (WBA) facility is located at 412 E. 29th St. North, north of 29th Street at approximately Topeka Avenue. 1122PCA was detected in shallow groundwater samples collected on the WBA facility during the City's RI at concentrations of up to 49 µg/L. 1122PCA was not detected (<1 µg/L) in groundwater samples collected immediately upgradient of the sample locations with

the detects, nor from those sample locations upgradient from the facility. Petroleum hydrocarbon impacts to groundwater have been observed at the facility. Other chlorinated VOCs have also been detected in groundwater at the WBA facility; however, their relationship to WBA facility is unclear. No documentation of the use or storage of 1122PCA has been identified at this time.

B.2.13.2 Source Control

Available data indicate that the WBA facility is a minor source of 1122PCA contamination in groundwater. The City/CDM has requested that the KDHE direct WBA to perform an investigation to determine whether source control is warranted.

B.2.14 Wichita Terminal Elevator (WTE) Facility

B.2.14.1 Facility Background

The Wichita Terminal Elevator (WTE) facility is located at 508 E. 25th St. North, northwest of the intersection of 25th St. North and Mead Avenue. CT was detected in shallow groundwater samples collected on and downgradient from the WTE facility during the City's RI at concentrations of up to 17 µg/L. CT was not detected (<1 µg/L) in shallow groundwater samples collected from upgradient of the facility. Low-level concentrations of CT were detected on the Stockyard Properties located south of 25th St. North. CT was a commonly used grain fumigant prior to 1985. Based on data available at the time the final RI was submitted, the CT source area appears to be a minor source of groundwater contamination and is not likely to require the implementation of remedial action alternatives.

The KDHE has indicated in past correspondence that the TCE contamination at the Site may need additional evaluation. TCE concentrations in the vicinity decreased between the RI and the source area investigation. The Site does not appear to be the source of TCE-related contamination in groundwater. The elevator appears to have utilized pumping wells in the basement of the elevator to lower the groundwater table and control groundwater infiltration into the basement, as is typical of grain elevators at Sites with relatively shallow groundwater. This historical pumping may have affected vertical distribution of TCE within the aquifer.

B.2.14.2 Source Control

Based on a review of historical data and data from the source area investigation, the Site does not appear to be a source of TCE contamination. Historical data indicate that the Site is a minor source of CT contamination, and the presence of CT in groundwater is likely associated with historical operations at the elevator. There does not, however, appear to be an ongoing source of fumigant-related (CT) contamination. Source control measures are not proposed for this facility.

B.2.15 Excel Facility

B.2.15.1 Facility Background

The Excel (EXC) facility is located southeast of 29th and Mead at 2901 N. Mead (Figure 2-3 of the RI Report (CDM 2007a)). The facility is a meat processing plant operated by Excel, a subsidiary of Cargill, Inc. The facility conducted its own investigation in 1991

on properties occupied by the Excel meat processing plant and the Cargill Elevator to the south.

The 1991 EXC sampling demonstrated the presence of numerous VOCs in the groundwater including: acetone (120 µg/L), CFM (9 J µg/L), TCE (5,400 µg/L), 12DCE (380 µg/L), 111TCA (390 µg/L), 11DCA (5 µg/L), and 11DCE (350 µg/L). The groundwater contamination was attributed to upgradient contaminant sources. Subsequent sampling was conducted during the NIC RI.

In 1991, the EXC facility was the subject of subsurface investigations to determine if a chemical release could have occurred on the property (B&M 1997). The investigation included the installation of 14 groundwater and monitoring wells on and downgradient of the EXC property, the collection and analysis of groundwater samples from the monitoring wells and the collection and analysis of soil samples. TCE was reported at up to 540 µg/L in a shallow monitoring well.

An October 22, 1987 Excel Corporation internal memo documents a practice of dumping waste oil as well as, "solvents and numerous other chemicals" in "the area around the transformers west of the maintenance shop" (B&M 1997). It is unclear as to precisely where on the EXC property the dumping occurred. The memo indicated that the dumping area had been cleaned and re-graveled, but provided no information regarding the scope of the cleanup or analytical data. The memo also stated the practice of unauthorized disposal of waste was to be discontinued and any subsequent occurrences would result in disciplinary action. The Excel Corporation has denied the use of TCE at this facility.

B.2.15.2 Source Control

No conclusive data showing TCE storage or use at the property in question have been identified. Available data indicate the potential presence of a moderate TCE source of groundwater contamination.

B.2.16 Former Johns' Refinery Facility

B.2.16.1 Facility Background

The former Johns' Refinery (JRF) facility is located at 915 E. 21st North, southeast of the intersection of 21st Street and Mosley. The facility operated from 1950 until the 1970s as the Super Refined Oil Company, re-refining used motor oil. In 1983, the EPA' s Emergency Response Branch investigated the abandoned JRF facility, by inventorying and sampling tank contents and sampling soils. The facility had been abandoned at the time of the EPA inspection. There were 32 ASTs on the property and standing pools of liquid (apparently waste oil). The investigation indicated that elevated levels of PCBs, lead, copper, and petroleum compounds existed at the Site. A response action (RA) was subsequently performed, as described in Section B.2.16.2.

Metals, PCB, and Petroleum Contamination

Sampling data collected by the EPA prior to the RA detected product materials at JRF containing up to 742 mg/kg PCBs and 3,180 mg/kg lead. After the RA, sampling indicated that the average residual PCB concentration in soil had been reduced to

below 5 mg/kg, but concentrations of lead and copper in the surface of the remaining soil averaged 300 mg/kg and 58 mg/kg, respectively. Kiln dust was used to stabilize remaining "oil-soaked soil" in preparation for capping.

TCE Contamination

During the RA, the EPA discovered an existing well on the JRF property. TCE concentrations in two water samples collected from the well were reported at 550 µg/L and 1,000 µg/L. The EPA stated that the TCE could not be linked with certainty to the JRF Site, and concluded that evaluation of the TCE in groundwater was beyond the scope of the RA (USEPA 1985).

During Phase 2 of the City's RI, groundwater samples were collected from direct-push locations upgradient and downgradient of the JRF Site. TCE was not detected (<1.0 µg/L) in the shallow groundwater sample from either of these locations, but was reported in the deep upgradient groundwater sample at 480 µg/L, and in the deep downgradient groundwater sample at 370 µg/L. C12DCE, a degradation product of TCE, was reported in the shallow upgradient sample from GP02C-04 at 18 µg/L, but was not detected (<1.0 µg/L) in the shallow downgradient sample. VC, another degradation product of TCE, was not detected (<1.0 µg/L) in the shallow groundwater sample from either location. C12DCE and VC were both detected in the deep upgradient groundwater sample at 150 µg/L and 2.2 µg/L, respectively, and in the deep downgradient groundwater sample from GP02C-06 at 120 and 39 µg/L, respectively. At the time of the final RI, no conclusive data showing TCE storage or use at the property in question had been identified.

During the source area investigation activities for the Site, the highest TCE and BEN concentrations were noted in upgradient groundwater samples.

B.2.16.2 Source Control

In 1984, the EPA conducted a removal action which consisted of removing and disposing of the waste in the tanks, dismantling the tanks, excavating soil and underground tanks, and backfilling with clay topped with gravel. Initial correspondence (1985) indicated the EPA considered the backfill a cap to be maintained to prevent future exposure. A 1996 letter from the EPA indicated that contaminant levels had been reduced at the time of the removal action to the extent that no future land use restriction or cap maintenance was required.

A groundwater sample was collected from a well onsite at the time of the removal action, which contained 1,000 ppb of TCE. Potential groundwater impact from the Johns' Refinery Site was not investigated by the EPA and is to be addressed during the NIC Site RI. The City of Wichita proposed direct-push sample locations in the NIC Work Plan for Investigation Activities at Suspect Source Areas to evaluate potential groundwater impacts from Johns' Refinery.

The JRF facility does not appear to be a continuing source of petroleum contamination, and further investigation to differentiate petroleum contamination from the Site from upgradient sources of contamination would be of minimal benefit

with respect to determining remedial options for the NIC Site. Further source control measures are not recommended for the JRF facility.

B.2.17 Northern Pipeline Construction Facility

B.2.17.1 Facility Background

The Northern Pipeline Construction (NPC) facility is located at 2915 N. Emporia, southwest of the intersection of E. 29th Street and North Emporia. RI data indicate that this area may be a potential source of chlorinated VOC contamination. Groundwater sampling data have shown an increase in concentrations of TCE along the groundwater flow path through this area. No documentation of TCE storage or use at the NPC facility has been identified to date.

During Phase 1/1a of the City's RI, TCE was reported in a shallow groundwater samples in the area of the facility at up to 200 μg/L. During Phase 2 of the City's RI, TCE was reported at 28 μg/L in a sample from the same location. TCE was also detected during Phase 2 in shallow groundwater samples collected upgradient (north) of the sample location at comparable concentrations. TCE was not detected (<1.0 μg/L) in shallow groundwater samples from locations farther upgradient of those points. Enhanced biodegradation from residual petroleum hydrocarbon contamination remaining from the Barnsdall and Golden Rule refinery operations at the northern end of the NPC facility may be influencing the observed distribution of chlorinated solvents.

Source area investigation at the NPC Site indicated that concentrations of TCE and TCE degradation-products were continuing to diminish in groundwater near the Site. The source area investigation data provided no additional evidence as to whether the NPC facility is a historic source of TCE.

Fuel odors and elevated BEN concentrations were noted during the source area investigation. The source of this petroleum contamination is either historic releases on the Site, or upgradient of the Site at the former Barnsdall/Golden Rule refineries. The NPC facility does not appear to be a continuing source of petroleum contamination.

B.2.17.2 Source Control

The source area investigation data provided no additional evidence as to whether the NPC facility is a historic source of TCE. Based on the diminishing TCE concentrations at the NPC facility and the lack of an apparent continuing source of petroleum contamination, no source control measures are proposed.

B.3 GWU3 Source Areas

B.3.1 Aero Space Controls Facility

B.3.1.1 Facility Background

The Aero Space Controls, Inc. (ASC) facility is located at 1050 N. Mosley, southeast of the intersection of 10th and Mosley. During the City's RI, TCE was detected at up to 1,100 μg/L in the shallow groundwater downgradient of the facility. TCE was also

detected in the shallow groundwater upgradient of the facility but at concentrations less than 60 µg/L. A TCE concentration of 3,100 µg/kg in soil was confirmed during the source area investigation for this Site. Based on the presence of soil contamination at the ASC, this facility was reclassified as a Confirmed Source Area as defined in the final RI and Section 1.3.2 of this report.

B.3.1.2 Source Control

No source control measures are documented for the ASC facility to date. Based on the presence of soil contamination and the current groundwater contamination levels, source control measures for TCE and TCE degradation products appear to be warranted at this facility.

111TCA was also identified in soil samples during the source area investigation (based on onsite laboratory results). The presence of 111TCA in soil may be an indicator that ASC is an additional potential source of 111TCA in the area (111TCA on the ASC property has been historically attributed to the upgradient Kansas Plating Inc. facility). However, active source control focused on remediation of 111TCA does not appear to be warranted based on declining 111TCA and 111TCA degradation compound levels in the area.

B.3.2 Cargill Elevator (CGL) at 715 East 13th Street

B.3.2.1 Facility Background

The Cargill Elevator (CGL) facility is located at 715 E. 13th Street North, northeast of the intersection of 11th Street and Santa Fe streets. CT was detected in shallow groundwater samples collected on and downgradient from the CGL facility during the City's RI at concentrations of up to 480 µg/L. CT was not detected in groundwater samples collected from upgradient of the facility. The existence of at least one UST that historically contained CT at the CGL facility has been reported. Based on information provided in the KDHE ISL information for the property, Cargill performed an additional Site investigation in 2004 and 2005 to further investigate CT and delineate the extent of EDB downgradient of the Site. The investigation was summarized in a Source Control Measures Report and addendum, which was approved by the KDHE in January 2007. Groundwater monitoring continues at the Site (KDHE 2008).

B.3.2.2 Source Control

The available data indicate that this source area is a significant source of CT groundwater contamination. Based on the information provided in the ISL information sheet, an Interim Remedial Measure Work Plan/Design has been prepared for the facility and was approved by the KDHE in September 2008. Proposed interim remedial measures include installation of two permeable reactive barriers to provide source control and limit downgradient migration of contaminants.

B.3.3 Christopher Steel Inc. Facility

B.3.3.1 Facility Background

The Christopher Steel, Inc. (CSI) facility is located at 1221 E. Murdock Street, between Ohio Avenue and Cleveland Avenue, south of Murdock. PCE was detected during onsite investigations at CSI at up to 25 μg/L in shallow groundwater samples collected on the facility in 1995. PCE was not detected at the upgradient boundary of the facility. PCE was also detected in soil samples collected at the facility at up to 22 μg/kg. Removal of unspecified chlorinated solvents in soils was also documented; however, PCE use at the facility has not been documented at this time. Additional groundwater sampling was performed during source area investigation activities. The extent of PCE contamination immediately downgradient of the CSI facility was defined at the time of the RI Addendum.

B.3.3.2 Source Control Measures

As noted above, removal of unspecified chlorinated solvents in soils was previously documented at the CSI facility. The RI Addendum included a recommendation for CSI to be reclassified as a Confirmed Source Area as defined in the final RI and in Section 1.3.2 of this report; however, based on relatively low levels of PCE and limited extent of contamination, source control measures are not recommended for the CSI Site.

B.3.4 HCI Advance Chemical (HCI) Facility/Brenntag

B.3.4.1 Facility Background

The HCI facility (now Brenntag) is located at 1520 N. Barwise. In November 2001, HCI provided a draft work plan in electronic format to the City with additional investigatory work proposed. The draft work plan contained a description of the facility and its processes and provided the results of a February 2000 direct-push sampling investigation. The following is based upon the information provided in the draft work plan.

The facility is primarily used for chemical storage and distribution. In addition to receipt and shipment of packaged chemicals, tanker trucks containing chlorinated solvents are parked in the center of the south yard of the facility and their contents transferred to drums in the drumming area. The drums are stored in the southern portion of the facility until their shipment to customers or transfer to the warehouse for storage.

The investigation conducted by HCI resulted in the detection of PCE in the soils and groundwater at the facility. The PCE concentrations in the groundwater exceeded 1,000 μg/L.

This facility is currently conducting a source area CI/CAS under Administrative Order 02-E-0279 with KDHE.

B.3.4.2 Source Control

An IRM work plan was submitted to the KDHE in October 2006 (Forrester 2006). The goal of the IRM was to remove vadose-zone soils impacted by PCE, TCE, 12DCA, and C12DCE concentrations that exceeded KDHE Tier 2 action levels (KDHE 2007) for the soil to groundwater pathway. Approximately 683 cubic yards of soil and concrete were removed and disposed of offsite during the IRM (Forrester 2007).

Based on groundwater sampling performed at the Site in February 2008, PCE and TCE concentrations exceeding KDHE Tier 2 action levels remain in shallow groundwater on the facility property (Forrester 2008). In addition, shallow and deep PCE/TCE/C12DCE impacts are noted downgradient of the Site. Cross-gradient impacts near 15th and Mosley and along 14th Street (extended) east of the Site are also noted that may be attributable to migration along utility corridors (refer to Section 3.2.2.2 of the RI Report (CDM 2007a)). No records regarding a plan for investigation of utility corridors were available at the time of this submittal.

Additional source control measures appear to be warranted to address shallow PCE and TCE contamination in groundwater at the HCI facility.

B.3.5 Kansas Plating, Inc. (KPI) Facility

B.3.5.1 Facility Background

The Kansas Plating, Inc. (KPI) facility is located at 1110 N. Mosley Avenue, and occupies most of the block between 10th and 11th and Mosley and Washington Streets. Previous investigations at the KPI facility are documented in the RI. Maximum TCE concentrations in the upgradient shallow groundwater samples on the property west of Mosley Avenue were 6.1 µg/L. 111TCA has been detected in shallow groundwater samples collected by KPI and by CDM during the City's RI downgradient of the facility at concentrations as great as 560 µg/L. 111TCA concentrations immediately upgradient of the facility in the shallow alluvial aquifer were below detection limits (<1 µg/L). RCRA files contain evidence of both 111TCA and TCE storage and use on the facility. Several metals, including lead and chromium, are also stored and used on the facility.

A separate investigation was conducted at the KPI facility in late 2004 and early 2005. This investigation was conducted by Terracon for the KDHE under the KDHE Sector Assessment Program. The findings of the investigation were summarized in a Unified Focused Assessment report (Terracon 2005) that was submitted to the KDHE in February 2005. The work conducted by Terracon for their report consisted of a Phase 1 ESA and a limited Phase 2 environmental investigation. Terracon performed limited Phase 2 soil and groundwater sampling adjacent and downgradient of the KPI property as onsite access was not granted. Cyanide, dissolved hexavalent chromium, and dissolved total hexavalent chromium values in a groundwater sample collected immediately east of the eastern property boundary exceeded the KDHE Tier 2 groundwater pathway and EPA MCL levels for total chromium (100 µg/L) and cyanide (200 µg/L). TCE concentrations also exceeded MCL levels.

KDHE conducted a supplemental investigation of the KPI facility in late 2010. The results indicate that the facility may be current contributor of TCE metals (Chromium) contamination to the groundwater at the facility. KDHE has recently indicated to the City that a full CI/CAS should be conducted for the KPI facility.

B.3.5.2 Source Control

Based on a comparison of current concentrations of 111TCA and 111TCA-degradation compounds in previously sampled locations to historical concentrations at these locations, significant degradation of 111TCA is occurring at sample locations near KPI and the adjacent Kreonite East Site. Concentrations of 11DCA, 11DCE, and CHEA are near or below detection limits and are below applicable MCLs.

Groundwater data indicate that the KPI facility is a historical 111TCA source. Based on the significant degradation of 111TCA and the lack of a continuing contaminant source, and decreased 11DCE concentrations to below MCLs, source control with respect to 111TCA VOCs does not appear to be warranted at the KPI facility. However, the 2010 KDHE field data indicates that TCE concentrations are present at levels that may require source control measures be implemented. The data indicate that remediation of the chromium and cyanide contamination may also be warranted.

B.3.6 Via Christi Medical Center, St. Francis Campus (VCM)

B.3.6.1 Facility Background

The Via Christi Medical Center, St. Francis Campus (VCM), located at 929 N. St. Francis, occupies approximately nine square blocks in the vicinity of 9th and Emporia. This facility is depicted as "Via Christi" on Figure 2-2 (CDM 2007a). The main portion of the facility is outlined by Topeka to the west, Santa Fe to the east, 10th Street to the north, and Murdock to the south. St. Francis Regional Medical Center entered into an agreement with the KDHE (Case No. 92-E-139) dated March 1994 to perform a remedial Site evaluation. Extensive field investigations were conducted at the VCM facility between 1997 and 2000. 111TCA and MECL were detected in shallow groundwater samples collected during onsite investigations by VCM at up to 29 µg/L and 11 µg/L, respectively. 111TCA and MECL were not detected (<1 µg/L) in upgradient groundwater samples. 111TCA and MECL were also reported in soil samples collected during onsite investigations by VCM at up to 1,100 µg/kg, and 1,000 µg/kg, respectively. Lead and arsenic have also been reported in soil samples collected during onsite investigations by VCM at up to 15,039 mg/kg and 32.6 mg/kg, but were not detected in filtered groundwater samples. Additionally, some petroleum hydrocarbon compounds have been reported in shallow groundwater samples at concentrations above regulatory limits. The VCM campus appears to be a minor source area for 111TCA, some metals, and some petroleum hydrocarbon contamination of the soil and groundwater. Based on the ISL information sheet for this facility, the Site was also a minor source of CHEA, CM and MECL.

B.3.6.2 Source Control

Lead-contaminated soils were excavated and removed from the Site in the summer of 2007. The Soil Excavation Report outlining the excavation activities was approved by

the KDHE in November 2007. EUC agreements may also be required for the property. Active source remediation with respect to chlorinated solvents does not appear to be warranted at this facility.

B.3.7 Copeland International Trucks, Inc. (CIT) Facility

B.3.7.1 Facility Background

The Copeland International Trucks, Inc. (CIT) facility is located at 1770 N. Broadway (18th and Broadway). The firm historically performed truck maintenance at this location but no longer operates at this location. The company conducted its own Site investigation in 1999 as part of its Certificate and Release application. PCE was detected at up to 7.9 µg/L in the shallow groundwater downgradient of the facility with no upgradient detections (<1 µg/L). Although contaminant concentrations are near the MCL of 5 µg/L for PCE, the data appear to indicate that a PCE release has occurred at this facility. No documented storage or use of PCE has been identified for this property.

B.3.7.2 Source Control

The available data indicate that this PCE source area is a minor source of groundwater contamination. Source control measures do not appear to be warranted at this facility, given the low degree of observed contamination.

B.3.8 Former Dold Foods Inc. (DLDS) Facility

B.3.8.1 Facility Background

The former Dold Foods Inc. (DLDS) facility is located at 421 E. 21st Street North (southeast of 21st and Topeka). This property is currently occupied by Trailer Parts and Supply Inc. During the City's RI, TCE was detected in the shallow groundwater downgradient of the facility at up to 120 µg/L. The maximum observed shallow upgradient TCE concentration at the property was 7.6 µg/L. No documented evidence of TCE storage or use at the facility has been identified at this time.

Comments on source identifications from the KDHE dated March 25, 2003 recommended monitoring of the wells and piezometers in the area to determine if source control is necessary. Clarification of possible pumping activities to the southeast of the facility was also requested.

Based on updated pumping well data obtained in preparation of the revised draft RI, no permitted pumping wells exist in the area of this facility, and water level measurements from August 2004 do not indicate groundwater influences from pumping activities. A former pumping well reportedly existed at the Site prior to the 1980's to provide refrigeration water for a meatpacking plant.

B.3.8.2 Source Control

TCE concentrations appear to be diminishing with respect to time. Groundwater data indicate that the DLDS Site is a historical TCE source area. It is possible that historic pumping operations at the Site pumped TCE-contaminated water from the deep portion of the aquifer to the shallow aquifer, and that TCE levels in the shallow

aquifer are an artifact of this historic pumping. Based on the current TCE levels at this Site, source control measures are not recommended for the DLDS facility.

B.3.9 Huttig Distributors/Rock Island Millworks, Inc. (HUT) Facility

B.3.9.1 Site Background

The Huttig Distributors/Rock Island Millworks, Inc. (HUT) facility is located at 1340 N. Mosley, near the intersection of 12th and Mosley Streets. TCE was detected in shallow groundwater samples collected during the City's RI downgradient of the HUT facility at concentrations of up to 360 μg/L. TCE concentrations in shallow groundwater samples collected from upgradient of the facility were less than 15 μg/L. No documented evidence of TCE storage or use at this manufacturing facility has been identified at this time. Available data indicate that the TCE source area is a moderate source of groundwater contamination.

Pumping wells that may have affected historical groundwater flow direction near the facility were known to exist to the west and southwest of the HUT facility. A well was known to exist at a grain mill facility southeast of 13th and St. Francis. Based on WWC5 records, this well is no longer an existing permitted pumping well. The City of Wichita obtained permits for a series of dewatering wells near 11th and Washington. These wells were likely operated in approximately 2000 or 2001.

B.3.9.2 Source Control

Groundwater data indicate that the HUT facility is a potential historical TCE source area. Based on the current data, source control measures are not recommended for the HUT facility.

B.3.10 Kreonite East (KRE) Facility

B.3.10.1 Facility Background

The Kreonite, Inc. - East (KRE) facility is located at 1123 N. Mosley Avenue, northwest of the intersection of Mosley and N. 10th Streets. 111TCA has been detected at up to 50 μg/L in shallow groundwater samples collected immediately downgradient of the facility during the City's RI, but was not reported above 2.6 μg/L in samples collected upgradient of the facility. A history of 111TCA use by KRE at other sites has been documented at the facilities located at 715 E. 10th St.; however, no documentation that 111TCA was either used or stored at this east facility has been identified at this time. No data suggesting a release to groundwater of 111TCA greater than MCL (100 μg/L) has been identified. The 11DCE degradation product of 111TCA does, however, represent a potential concern as its MCL is 7 μg/L. The 111TCA/11DCE source area is considered a minor source of groundwater contamination.

B.3.10.2 Source Control

Based on a comparison of current concentrations of 111TCA and 111TCA-degradation compounds in previously sampled locations to historical concentrations at these locations, significant degradation of 111TCA is occurring at sample locations near the KRE facility. Groundwater data indicate that the KRE facility is a historical 111TCA

source. Based on the significant degradation of 111TCA and the lack of a continuing contaminant source, and decreased 11DCE concentrations to below MCLs, source control does not appear to be warranted at the KRE facility.

B.3.11 Wichita Mirror and Glass (WMG) and Parker Boss (PKB) Facilities

B.3.11.1 Facility Background

The Wichita Mirror and Glass (WMG) and Parker Boss Clay Traps (PKB) facilities (WMG/PKB) were respectively located at 712 and 780 E. 15th Street, north of the intersection of Barwise and 15th Street. The WMG facility burned to the ground in 1995 and is now vacant. TCE was detected in shallow groundwater samples collected during the City's RI, downgradient of the WMG/PKB facilities at concentrations of up to 180 μg/L. TCE concentrations in shallow groundwater samples collected upgradient of the facilities did not exceed 10 μg/L. No documented storage or use of TCE was identified for either facility.

B.3.11.2 Source Control

Groundwater data indicate a historical TCE source at the WMG/PKB Site. COC concentrations were at or near detection limits in all Phase 3 samples taken from the Site. TCE concentrations have diminished significantly in the previously sampled downgradient borings. The WMG/PKB sites do not appear to warrant source control measures.

B.3.12 Western Uniform and Towel Service, Inc. (WU) Facility

B.3.12.1 Facility Background

The Western Uniform and Towel Service, Inc. (WU) facility is located at 1707 N. Mosley, northwest of the intersection of 16th and Mosley. PCE has been detected during onsite investigations by WU at up to 36 μg/L in shallow groundwater samples collected on the facility. PCE in shallow upgradient groundwater samples were less than 1 μg/L. Although most PCE concentrations in samples collected in the vicinity of the facility are near or below the MCL of 5 μg/L, previous data seem to indicate that a PCE release to the environment has occurred at this facility and that the WU facility is a continuing low-level source of PCE that has migrated from the facility. No documentation of PCE storage or use has been identified at this time.

B.3.12.2 Source Control

Groundwater data indicate the WU facility is a historical PCE source area. Based on the relatively low concentrations and minimal downgradient impact, source control measures are not recommended for this Site.

B.3.13 Altra Color Body Shop and United Steel Facilities

B.3.13.1 Facility Background

The Altra Color Body Shop (ACB) facility and United Steel (US) facility are respectively located at 1610 and 1632 N. Mosley Avenue, northeast of the intersection of 15th Street and Mosley. Previous groundwater sampling data show an increase in concentrations of TCE along the groundwater flow path through this area. TCE was

reported in shallow groundwater samples collected downgradient of the ACB and US facilities. TCE was also reported in samples collected from the east side of Mosley Street near the west edge of the facilities. The final RI determined that additional upgradient data (northwest) of these facilities were needed to evaluate the area west of Mosley and south of 16th Street to determine the significance of TCE detections near and downgradient of the US and ACB facilities. Based on information obtained during the source area investigations for this area, moderate upgradient-to-downgradient increases in TCE concentrations are noted in the area of both the US and ACB facilities.

B.3.13.2 Source Control

Groundwater data indicate that both facilities may be historical TCE source areas; however, it does not appear that either of these facilities is contributing TCE contamination at levels requiring source control measures.

B.3.14 Kreonite West Facility

B.3.14.1 Facility Background

The Kreonite, Inc. - West (KRW) facility is located at 715 E. 10th Street North, northeast of the intersection of N. Santa Fe Avenue and E. 10th Street. The facility occupies the area between Santa Fe and the alley east of Santa Fe and between 9th and 10th Streets. Groundwater sampling data collected during the City's RI indicated the presence of TCE in groundwater downgradient of the KRW facility. Groundwater flow in the area is to the south, but with a slight westerly component near 9th Street and Santa Fe. Historic and/or current pumping events may be locally affecting groundwater flow in the area of the facility.

Information supplied by Kreonite, Inc. indicates historical use of a wide variety of cleaners, solvents, paints, inks, additives, and other products that could potentially contain TCE as a component. At the time of the final RI, actual use or storage of TCE had not been documented for the KRW facility. Available data indicate the potential presence of a minor TCE source of groundwater contamination. RI data were insufficient to assess whether remedial action alternatives are necessary.

Access to the KRW facility for Site investigation purposes was not granted during either the initial RI investigation or the source area investigations; therefore, field investigation activities were limited to direct-push sampling in the City right-of-way both upgradient and downgradient of the facility. Relatively low detections of TCE, PCE, and BEN were detected in downgradient samples during the source area investigation.

B.3.14.2 Source Control

The low-level detections of TCE, PCE, and BEN in downgradient samples are indicators that the KRW facility may be a current and historical source of chlorinated solvent and/or petroleum contamination; however, source control measures are not recommended based on the current contaminant levels in this area.

B.3.15 Weaver Manufacturing, Inc. (WM) and Sherwin Williams Paint (SW) Facilities

B.3.15.1 Facility Background

The Weaver Manufacturing, Inc. (WM) facility and Sherwin Williams Paint (SW) facility are respectively located at 1005 E. 17th Street North and 1705 N. Wabash Avenue, northwest of the intersection of E. 16th Street and N. Wabash Avenue. Groundwater sampling data have shown an increase in concentrations of TCE along the groundwater flow path through this area.

A comparison of intermediate-depth sample data from Phase 1 to data for this depth from the source area investigation suggests that contaminant levels may be locally stable in the shallow aquifer zone. Based on these data, a TCE source may be present on either the WM or SW facilities; however, some upgradient sample locations also showed historically high levels of contamination upgradient of the source. In addition, the historical data appear to represent a pattern of variable spatial distribution of TCE contamination in the shallow aquifer in this area. In addition to the fluctuation in the direction of groundwater flow, it appears likely that locally high upgradient TCE concentrations are moving downgradient through this area even as overall TCE concentrations are decreasing.

Based on available well records, at least two historical sources of groundwater pumping are noted for the WM/SW area. Historical pumping of any of these wells may have contributed to movement of contaminants from the deep portion to the shallow portion of the aquifer, or to changes in groundwater flow direction over time. Further detail regarding these wells is included in the RI Addendum (CDM 2007b).

B.3.15.2 Source Control

Upgradient-to-downgradient increases in TCE are noted across the WM/SW area. Groundwater data indicate a probable historical TCE source at the WM and/or the SW facility; however, based on the variation in contaminant distribution, the lack of an apparent significant continuing source of TCE contamination, and the lack of recorded TCE use for the WM/SW facilities, a specific source release point could not be identified. Source control measures are not recommended.

B.3.16 11th Street Area/10th and Ohio Areas

B.3.16.1 Area Background

The 11th Street Area and 10th and Ohio Area are discussed concurrently in this summary, due to the proximity of the two locations and a potential apparent relation in contaminant sources. The 11th Street Area includes three areas considered suspect by the KDHE based on the KDHE Suspect Source Area Work Plan comment response letter (KDHE 2004). The general location of these suspect source areas is as follows:

- 11th and Mosley
- 11th and Wabash
- 11th and Indiana/Cleveland

The 11th Street Area is characterized by localized increases in PCE and TCE contamination with no identified contaminant sources immediately upgradient of these increases.

The 10th and Ohio area was named as a potential Suspect Source Area because elevated TCE concentrations were detected in sample locations in shallow groundwater during the downgradient investigation in August/September 2003.

Two identified source areas are located in the vicinity of these suspect areas. These include Huttig, located upgradient of both the 11th & Wabash area and the 11th & Indiana area, and Kansas Plating, Inc., located cross-gradient of the 11th & Mosley area and does not appear to affect the suspect areas on 11th Street.

Data from the Huttig Identified Source Area are referenced in this results discussion for the 11th Street and 10th and Ohio Suspect Source Areas due to the close proximity of these areas, and the possible relation of contaminants in these areas to upgradient sources. These three identified/suspect source areas are collectively referred to as the "Sites" for discussion purposes.

Contamination at the Sites is characterized by both TCE and PCE contamination. The RI Addendum included a qualitative assessment of general contaminant trends from the RI to the source area investigations (CDM 2007a and CDM 2007b). Groundwater quality downgradient of the Sites was generally characterized by increases in PCE concentrations with respect to time and decreases in TCE concentrations with respect to time, with some localized exceptions.

Numerous areas of upgradient-to-downgradient increases in contaminants were noted in the shallow sampling interval during the source area investigations. These locations may represent potential moderate and low source areas; however, the areas in question are primarily residential and no operations which may have utilized chlorinated solvents have been identified at these locations to date. The presence of PCE contamination in the area after the Phase 1 RI field program provides a time frame for when the PCE moved into the area, or was released within the area. The observed PCE and TCE spatial and temporal trends in the contaminant distribution may be the result of "slugs" of higher contamination migrating through the area, undocumented pumping altering the vertical distribution of contamination, and/or variable degradation rates within areas of the aquifer. The "slugs" of contamination may reflect individual release events from upgradient sources that did not result in the presence of significant NAPL at the release Site.

Based on the primarily residential nature of the 11th Street/10th and Ohio areas where noted temporal (increasing contaminants over time) or spatial (upgradient to downgradient) increases of contaminants are noted, no new sources of contamination were identified or confirmed for these Suspect Source Areas.

B.3.16.2 Source Control

The apparently migrating plumes in both the lower and upper portions of the alluvial aquifer merit consideration during the FS as areas that will likely require continued monitoring and/or migration control as part of the overall GWU3 remediation strategy. However, no specific source control measures for the 11th Street or 10th and Ohio areas are recommended.

B.3.17 13th and Emporia Area

B.3.17.1 Area Background

The 13th and Emporia area is north of the intersection of E. 13th Street and N. Emporia Avenue. This area was suspected to be a potential source of chlorinated VOC contamination based on the RI data. Groundwater sampling data have shown an increase in concentrations of TCE along the groundwater flow path through this area. TCE concentrations were noted up to 68 µg/L for the shallow aquifer in this area during the initial RI (CDM 2007a). The highest levels of TCE in the shallow aquifer during the source area investigation ranged from 41 to 48 µg/L.

The 13E area is primarily residential, and no businesses exist near the apparent source of the contamination. One possible source of the contamination would be a release of TCE from a remote location, and transport of TCE along the alley through a preferential pathway, such as a utility corridor. A review of historical data collected during the RI reveals previous complaints filed with the City of Wichita regarding illegal discharges near the 17th and Emporia area; however, the material discharged and specific discharge point was not identified in this complaint. Further investigation to confirm either an illegal dumping scenario or other potential sources is expected to be of minimal benefit with respect to identifying a PRP or determining remedial options for the Site.

B.3.17.2 Source Control

The level of TCE contamination in shallow groundwater is relatively persistent over time; however, based on the lack of a defined source area and the fact that a continuing source was not identified, source control is not recommended for the 13th and Emporia area.

B.3.18 14th and Washington (14W)/15th and Washington (15W) Areas

B.3.18.1 Area Background

The 14th and Washington (14W) area comprises four city blocks bounded by 15th Street on the north, Wabash Avenue on the east, 13th Street on the south, and Mosley Avenue on the west. At least 12 industrial/commercial facilities are located within the area. RI groundwater sampling data have shown relatively high concentrations of TCE, with a significant amount of variability along the groundwater flow path through this area.

At the time of the final RI, no documentation of the use or storage of TCE in the area had been identified. It was concluded in the final RI that the high TCE concentrations

detected in the deep groundwater at GP03E-13 may indicate the possible presence of DNAPL accumulation (CDM 2007a).

Based on the source area investigation data, increases in PCE contamination are noted in the 14W and 15th and Washington (15W) suspect source areas, and in a general area east of Mosley and south of 15th Street. The highest concentration of PCE in shallow groundwater was noted in a sample taken downgradient of the HCI Advance Chemical facility. PCE concentrations are variable throughout other portions of the 14W and 15W suspect source areas; however, the PCE contamination is consistently either directly downgradient of the HCI Site or is downgradient of sewer lines that run from the HCI Site. There is the potential that contamination has traveled through the backfill of these sewers and/or along other utility corridors in the area. Based on the available data and the lack of documented PCE use at other facilities in the area, the HCI Site appears to be the source of PCE contamination in the 15W and 14W suspect source areas. Refer to Section A.3.3.1 for more information regarding the HCI facility.

Source area investigation data in the vicinity of 14th and Mosley show small increases of TCE concentrations in the shallow aquifer across spatially short distances. A potential source of the TCE contamination is a property at 1502 N. Mosley currently used as an auto repair facility. The observed contaminant increase may also be representative of contaminant migration through the property.

Current investigation data in the vicinity of 14W show small increases of TCE concentrations in the shallow aquifer across spatially short distances. Based on the Polk Directory search, the facility between these borings (1515 N. Washington) was determined to be owned by Ward Trucking and appears to be used for truck loading and dispatch. It further appears that the property has been used for this purpose by various trucking companies since at least 1970. No data currently exist that show whether any of these businesses used or stored chlorinated solvents onsite. It is possible that chlorinated solvents may have been used or stored on this property in the past; it is also possible that the observed contaminant increase is representative of contaminant migration through the property.

Spatial distribution of TCE in the remainder of the shallow aquifer is variable throughout the 15W and 14W suspect source areas. One cause of this variability may be the introduction of PCE contamination and subsequent PCE to TCE degradation in some portions of the area, coupled with a continuing decline in historical TCE contamination in the area. Another cause may be temporary changes in groundwater flow and/or drawing of contaminants from the deep to shallow portion of the aquifer caused by historical groundwater pumping.

A well was abandoned at Lusco Brick and Stone in April 2004. This facility is located near the corner of 14th and Washington, where localized increases in contamination are noted. In addition, a series of dewatering wells were installed by the City of Wichita near 13th Street and Ohio Avenue (downgradient of the suspect source areas) in 1999. The 15W Site was proposed to be removed from consideration as a source

area in the RI addendum (CDM 2007b). The 14W area was proposed to remain as a Suspect Source Area, with a focus on the facilities at 14th and Mosley (1502 N. Mosley) and 14th and Washington (1515 N. Washington).

B.3.18.2 Source Control

Source control for shallow groundwater at the nearby HCI facility is recommended (refer to Section A.3.3.2). Based on the relatively low levels of TCE contamination near the 14th and Mosley and 14th and Washington areas, source control specific to these areas is not recommended.

B.4 GWU4 Source Areas

B.4.1 Apex/11th and State

B.4.1.1 Facility Background

The Apex/11th and State (Apex) area consists of three contiguous facilities north of 11th Street between State Avenue and Wellington Place. These are the former Airama/AirKem Sales and Service of Kansas facility at 202 W. 11th Street North, the former H&H Parts Company facility at 1209/1211 N. Wellington Place, and the Winding Specialist Company, Inc. facility at 1217-1225 N. Wellington Place. TCE was detected in shallow groundwater samples collected during the City's RI downgradient of the 11S area at concentrations of up to 340 µg/L. Comparable results were noted for the source area investigation. TCE concentrations in shallow groundwater samples collected from upgradient of the facilities contained less than 5.8 µg/L. TCE use has been documented for degreasing operations in the area. Available data indicate that the TCE source area appears to be a moderate source of groundwater contamination.

In September 2009 and February 2010, CDM conducted a CI in the 11th and State area and at the Apex Site. Upon review of the results, VOCs were found to have impacted soils in the Apex Site. The following Apex Site target compounds were identified based on frequency of detection, exceedances of MCLs, extent of contamination, usability in source identification, and importance as a biodegradation daughter product:

- Trichloroethene (TCE);
- *cis*-1,2-dichloroethene (C12DCE);
- Tetrachloroethene (PCE); and
- Vinyl chloride (VC).

Of the above detected compounds in soils, TCE was the most widespread, with C12DCE the second-most widespread. PCE and VC were fairly localized in extent, but are important in contamination source identification.

Chromium and TPH impacts have been documented in historical site soil and groundwater samples. Limited remedial actions have been implemented which consisted of soil excavation and removal; however, as stated in Section 1.1 of the CI

Report (CDM 2010a), "Any metals or TPH concerns resulting from current operations will be the responsibility of AEI to address as directed by the KDHE."

VOCs were also found to have impacted groundwater in the Apex Site. TCE, PCE, C12DCE, and VC were again identified as groundwater target compounds. Of the detected compounds, TCE was also the most widespread in groundwater, with C12DCE the second-most widespread. PCE and VC were again fairly localized in extent.

B.4.1.2 Source Control

No soil or groundwater remediation activities have occurred at the Site. Remedial action alternatives to address soil and/or groundwater contamination at the source area appear to be warranted. A CAS has been prepared for the Site and is currently pending approval by the KDHE.

B.4.2 Waco Handi-Wash

B.4.2.1 Site Background

The Waco Handi-Wash (WHW) facility is located at 1008 N. Waco on the northeast corner of 9th and Waco. During the City's RI, PCE was detected at up to 55 µg/L in groundwater immediately downgradient of the facility. PCE detections in shallow groundwater upgradient of the facility did not exceed 8 µg/L. Both PCE and TCE show an increase in concentration relative to samples collected upgradient of the WHW facility. In addition, PCE and TCE were reported at up to 66.7 and 12.8 µg/L, respectively, in samples collected from the property immediately downgradient of the WHW facility during an environmental investigation of that property in 1993 (TerraTech 1993). The onsite field gas chromatograph identified PCE at a concentration of 202 µg/L; however, that sample was not submitted to an offsite laboratory for confirmation. PCE is used and stored at the Waco Handi-Wash facility. The PCE source area appears to be a moderate source of groundwater contamination.

During the source area investigation, PCE levels in the area of WHW were the highest in direct-push samples taken along the alley to the north of the Site. The sanitary sewer discharge that services the WHW facility runs from the building to the alley east of the building, north along this alley to 10th Street, and then west along 10th Street to connect with a main sewer line. The PCE contaminant pattern in groundwater appears to be consistent with a potential discharge of PCE to the sewer and subsequent release from portions of the sewer line or the fill associated with the sewer line. No apparent sources of PCE were identified in the area upgradient of the Site, which is primarily residential.

B.4.2.2 Source Control

Source control measures appear to be warranted at the WHW Site.

B.5 GWU5 Source Areas

B.5.1 Coastal-Derby Refinery (DRB) Facility

B.5.1.1 Site Background

Background information for the Coastal-Derby Refinery Facility was provided by El Paso Merchant Energy – Petroleum Company (EPME-PC).

The Site is located at 1100 E. 21 Street North, immediately west of I-135 and includes property on the north and south sides of 21st Street. The Site covers approximately 104 acres. Refining operations at the Site began in 1920 under the name Derby Oil Company. The refinery manufactured gasoline, distillates, propane, residual fuels, and coke. The Site was acquired by Coastal Refining and Marketing, Inc. in 1973. Refinery operations at the Site were discontinued in July 1993. The refinery was acquired by EPME-PC during the merger between the Coastal Corporation and the El Paso Corporation, which was completed in January 2001. An asphalt blending facility was in operation at the Site until September 30, 2004. Demolition and dismantlement of the refinery was started in November 2004 and the majority of the structures and process equipment was decontaminated and demolished by late 2006. Sale and dismantling of the Fluid Catalytic Cracking Unit (FCCU) was completed January 20, 2009. As of August 2009, the structures that remain onsite include the Unilube Building, Williams Terminal, Administration Building, Guard Shack, Warehouse, Wastewater Treatment Plant, stormwater pump basin, three above-ground storage tanks formerly used for storage of storm water, and an air stripper and small tank farm used for treatment of extracted groundwater.

B.5.1.2 Source Control

Early Source Control Measures

Derby Refining Company was notified in late 1980 by the KDHE that hydrocarbons had been found in the groundwater south of the facility. The KDHE requested that Derby Refining Company delineate the extent of contamination at the refinery and determine potential sources of contamination. In November 1980, Derby installed 14 monitoring wells for detection of hydrocarbon contamination. Approximately 67 additional monitoring/recovery wells were subsequently installed. The initial eleven monitoring wells were specifically designated as groundwater monitoring wells. The remaining wells were primarily used for the detection and recovery of LNAPL.

Since 1981, Derby Refining Company and its successors have essentially continuously operated the LNAPL remediation system. The initial system consisted of vertical wells utilizing dual pumps for recovery of groundwater and LNAPL. The water pump in a recovery well was operated continuously to maintain a cone of depression in the water table to enhance LNAPL recovery. The extracted groundwater was treated for VOCs through air stripping and discharged to a concrete-lined, unnamed tributary to Chisholm Creek under a National Pollutant Discharge Elimination System (NPDES) permit. The extracted LNAPL was pumped to storage units and then recycled. Additionally, an extraction trench was originally installed in 1985 on the south side of 21st Street. The trench utilized skimmer pumps to only remove LNAPL. The trench was operated from 1985 to 1989, and was subsequently re-started

in the fall of 2003. The LNAPL recovered in the trench was stored onsite for periodic recycling. Remedial activities are being conducted under KDHE Compliance Order 86-E-145A.

The initial system of vertical recovery wells was operated from the early 1980s through late 2004. A total of 2.5 million gallons of LNAPL was recovered and recycled during this period (this volume includes the LNAPL recovered in the trench south of 21st Street).

Shutdown During Demolition

In November 2004, EPME-PC met with the KDHE to discuss a request to temporarily shut down the recovery system at the Site. The request was made by EPME-PC due to safety concerns associated with the electrical systems and demolition of the refinery during late 2004 and all of 2005. Due to significant safety concerns for the crews conducting the demolition, the existing electrical network was scheduled to be shutdown and removed during the demolition. Considering the age and complexity of the electrical system, the network of overhead and buried lines presented a significant safety risk to demolition crews if left energized. The KDHE approved the request in a letter dated November 15, 2004 and the recovery system north of 21st Street was shut down on November 23, 2004. The product recovery trench south of 21st Street was not shut down and was operated during the demolition at the Site.

Recent Source Control Measures

After completion of demolition in 2006, new product recovery interception trenches were designed and installed at the Site. The current system has two primary objectives:

1. To eliminate LNAPL seeps into the creeks adjacent to the Site, and

2. To initiate LNAPL recovery and test the trench systems for future design optimization.

To date, a total of five extraction trenches (T-1 through T-5) with a combined length over 3,200 ft have been installed to meet the objectives outlined above. The trenches were installed using biopolymer trenching techniques and were excavated to approximately 25 to 30 ft bgs. The trenches were backfilled with permeable gravel and include a number of twelve-inch diameter vertical extraction sumps (ESs) installed within the trench gravel backfill. Groundwater and LNAPL is extracted from the trenches using a dual pump system.

Trenches Designed to Eliminate LNAPL Seeps: Trenches T-1 through T-3 are Interim Measure Seep Interceptor Trenches (SIT) that began operation on June 25, 2007. They are located on the east side of the Site adjacent to the East Fork of Chisholm Creek (Creek). Trenches T-1 and T 2 are located north of 21st Street and Trench T-3 is located south of 21st Street. The objective of these groundwater and product recovery trenches is to stop the petroleum seeps into the Creek. The trenches were located in areas of active seeps or where petroleum was observed in smear zone soil in 61 direct-

push borings advanced parallel to the Creek. At least one ES was installed in the center of each trench to collect the groundwater and LNAPL. Two ESs were installed in T-2 because of the trench length; therefore, a total of four twelve inch diameter ESs (ES-01, ES-02A, ES-02B, and ES-03) were installed as part of the SIT system.

Product Recovery Trenches (PRT) Designed to Recover LNAPL and Test for Future Design Optimization: Trench T-4 (located south of 21st Street, discussed above) is an old product recovery trench (PRT). This trench was upgraded to include groundwater depression/recovery to increase product recovery rates at the southern end of the known product plume. It began enhanced operation on February 27, 2008.

Trench T-5 (also known as the 21st Street Trench) was installed in late 2007 to resume source area product recovery and to conduct pilot testing with data to be used in the upcoming CAS. Trench T-5 is the second PRT and transects much of the Site (east to west) and a large portion of the known product plume, resulting in various product thicknesses and clay/sand interface depths. To isolate these effects, T-5 was installed in five sections (T-5A, T-5B, T-5C, T-5D, and T-5E), with each trench section horizontally separated by 20 ft of native soil. Trench T-5 also began operation on February 27, 2008.

The trenches create an elliptical groundwater capture zone around each trench section. The sloping groundwater surface or ZOI enhances product migration toward the trench and subsequent recovery in each ES. Each ES uses two pumps. One submersible pump is placed in the bottom of the ES to extract groundwater and a product skimmer pump automatically adjusts its elevation to match the changing product/water interface to recover only product. Both pump risers terminate in a below-ground vault for freeze protection. Groundwater is conveyed through buried high density polyethylene (HDPE) piping to a 32,000 gallon AST, T-101, and is either treated through air strippers prior to surface water discharge, or is directed through a non-operational site wastewater treatment plant (WWTP) which discharges to the City of Wichita Municipal Sewer System for treatment at the City publicly owned treatment works (POTW). Product passes through T-102, an 8,000 gallon AST, to remove any water that may have been entrained or off-loaded from vacuum trucks. Product exits near the top of T-102 and flows into one of two 8,900 gallon ASTs (T 103 or T-104) where it is stored for eventual loading into tanker trucks for recycling. Routine performance monitoring and maintenance of the trench system is ongoing. Maintenance includes flow meter cleaning, pipe cleaning, and repair or replacement of equipment when necessary.

System Performance and Source Removal: The system is meeting or exceeding the design objectives and monitoring data indicate the system is maintaining hydraulic control. All seep activity north of 21st Street (T-1 and T-2 area) and virtually all activity south of 21st Street (T-3 area) have halted. Since startup of the seep interceptor and product recovery trenches, over 93,000 gallons of LNAPL have been removed and recycled. In addition, over 116 million gallons of groundwater have been recovered and treated.

On-Going Site Closure Activities

EPME-PC is continuing to work with the KDHE to implement Site closure under the CI/CAS/CAD process. The CI and characterization data collected to date support a thorough understanding of the nature and extent of contamination at the Site in soil, groundwater, surface water, and stream sediment. The contaminants of concern, the transport and migration mechanisms, and the resulting overall distribution of contaminants are well defined and reasonably understood. In general, the spatial distribution of LNAPL has remained relatively stable over the past years of measurements. The characterization data, therefore, are sufficient to support a transition to the site-specific human health and ecological risk assessments and corrective action phases of the project.

EPME-PC is in the process of completing the human health and ecological risk assessments. After the risk assessments are complete, EPME-PC will work with KDHE to finalize the approach for the risk-based closure and CAS. As part of the CAS process, EPME-PC is considering implementation of field testing to gain additional information on optimization of the recovery trench operation and on the recoverability of the remaining LNAPL at the Site. EPME-PC also is continuing routine groundwater monitoring and reporting.

B.6 GWU6 Source Areas

B.6.1 USD 259 Facility

Background information for the USD 259 facility is based on information provided by Golder Associates, Inc. (Golder).

B.6.1.1 Site Background

GWU6 comprises the USD 259 School Service Center (USD 259) located at the northeast corner of the intersection of 37th Street North and Hydraulic Avenue in northeast Wichita. The property is currently owned by USD 259. The USD 259 Site contact is Mr. Tim Phares. A RI for the USD 259 Site was approved by the KDHE in November 2008.

Investigations performed by the KDHE and others at the USD 259 Site and other properties indicated the presence of chlorinated VOCs in the groundwater. Based on data collected during these investigations, five potential source areas have been identified and evaluated. The primary Site-related source is the former UST basin. The former UST basin is located immediately adjacent to the east side of the primary service center structure, southeast of the northeastern loading/unloading courtyard in the building. The USD 259 Site COCs related to the former UST basin release include PCE, TCE, and C12DCE. Other identified source areas either attenuate onsite or are located offsite and not related to USD 259 Site activities. In the former UST basin, apparent leakage of solvents occurred while the USTs were in use, and VOCs continued to leach from impacted soils prior to a soil removal Interim Remedial Investigation.

B.6.1.2 Source Control

Remediation activities conducted at the USD 259 Site to date to address chlorinated VOCs in groundwater have included UST closure activities, the Soil IRM and the ongoing Groundwater IRM. Each of these activities is briefly summarized below.

UST Closure Activities

UST closure activities were conducted at the USD 259 Site in 1982 and October 1992. In 1982, one 560 gallon steel UST, which formerly contained Texsolve S-66 (mineral spirits, a petroleum hydrocarbon solvent), was excavated and removed. During excavation and removal, a leak in the product line from the UST to the dispenser was observed. Additional information concerning the closure activities for this UST is not available.

In October 1992, UST closure activities were performed by Allied Laboratories (name later changed to Allied Environmental Laboratories [AEC]). Removal activities consisted of excavating and removing the following USTs:

T-1 – One 1,000 gallon steel UST used to store Texsolve S-66;

T-2 – One 1,000 gallon steel UST used to store kerosene; and

T-3 – One 500 gallon steel UST used to store Barsol C-701 (chlorinated solvent comprised of light aliphatic solvent naphtha, MECL, and PCE).

After removal of the USTs and backfill material from the excavation, soil samples were collected from the excavation for chemical analyses. Soils from the UST excavation appeared to have been impacted by VOCs. Groundwater was not encountered in the excavation. The final dimensions of the UST excavation were about 21 ft north-south and 16 ft east-west, with depth ranging from eight ft at the east end to 16 ft at the west end. UST excavation activities were terminated at the dimensions described above and the excavation was backfilled with soils that had been removed from the excavation and contained a VOC headspace vapor concentration of less than 100 ppm, as measured in the field with a PID. Observation of the tanks by AEC personnel indicated the presence of corrosion holes in the kerosene UST (T-2) and Barsol C-701 chlorinated solvent UST (T-3). AEC prepared a UST closure report for these three USTs and submitted the report to the KDHE.

Soil IRM

Data collected during the RI, together with data collected during removal of the USTs, indicated that a strong source of chlorinated solvents might still exist in the vicinity of the former UST basin. These soils are believed to have been outside the excavation at the time of the UST removals in 1992. An IRM comprising removal of source area soils was proposed.

Investigations to Develop the Scope of the Soil Interim Remedial Measure

During January 1999, 13 borings were drilled to evaluate conditions west and south of the former UST basin. Soil samples were collected and screened visually and using a

PID, and groundwater samples were collected. All samples were analyzed for VOCs. Soil sampling results in the former UST basin area were lower than found in historic sampling conducted at the time of tank removal. The highest concentrations of PCE were detected at the former location of the source UST. BTEX constituents were only detected in one sample. Low concentrations of acetone, 2-butanone and MECL detected in soil samples during this investigation are likely laboratory artifacts. Based on the analytical data for total VOCs, TCLP VOC analyses were run for the three samples with the highest VOC content. VOCs were not detected in TCLP analyses.

Soil IRM (2000)

The objective of the Soil IRM was to remove a limited quantity of impacted soils in order to improve groundwater quality in the vicinity of the former UST basin at the USD 259 Site. Impacted fill material and soils leaching VOCs in the vicinity of the former UST basin were believed to be the source of PCE, TCE, and 12DCE that continued to be detected in groundwater downgradient from the former UST basin.

The Soil IRM activities were conducted in a phased approach. This approach made it possible to determine the relative quantities to be excavated and disposed as Hazardous Waste and Special Waste, as well as to determine which materials may be suitable for use as backfill. The phased approach also facilitated increased efficiency by allowing disposal permits to be submitted and approved prior to mobilization of excavation and transportation equipment to the USD 259 Site. USD 259 and KDHE approval were obtained prior to initiating subsequent work.

In general, Soil IRM activities consisted of:

- Excavation, transportation and proper disposal of impacted soils; and
- Backfilling of the excavation with suitable clean soils.

The Soil IRM was conducted from April 26 to May 1, 2000. During the Soil IRM, 410 cubic yards of soil were excavated. Analytical limits for delineation of the excavation activities were those stated in the KDHE-approved soil IRM work plan. A field gas chromatograph (GC) was used for rapid analytical turnaround.

Based on GC screening, no samples exceeded the limits specified in the Soil IRM Work Plan for disposal as hazardous waste; however, GC results for samples representing approximately eight cubic yards of excavated soil indicated that PCE concentrations were sufficiently close to the specified limit that USD 259 elected to dispose of these soils to the Lone Mountain facility in Oklahoma as Hazardous Waste. An additional 70 cubic yards were disposed as special waste at the WCI Rolling Meadows facility in Topeka, Kansas. The remaining material was clean or minimally impacted (had constituents detected below KDHE Tier 2 groundwater pathway action limits) and was used, with 60 cubic yards of additional clean soil, to backfill the excavation.

The majority of impacted soils were found at depths of 11 to 15 ft bgs, in the southwest corner of the former UST basin and to the west, southwest and west of that

corner. The scope of work for the Soil IRM did not include excavation of soils which might destabilize the adjacent structures. Soil properties did allow excavation to full depth in close proximity to the structure, allowing removal of the majority of impacted soils; however, a limited quantity of impacted soils may still be present beneath the structure itself (estimated quantity of 20 cubic yards, based on two-dimensional exposure). PID and visual evidence indicate that impacts decrease below a depth of 15 ft bgs. Consequently, it is anticipated that little impacted soil remains beneath the Soil IRM excavation.

Groundwater IRM

To limit contaminant migration from the USD 259 Site, USD 259 is conducting a Groundwater IRM. The Groundwater IRM is intended to treat the groundwater using commercially available microbial inoculum that have the capability to biodegrade the chlorinated hydrocarbons *in situ*. The bacterial consortium is capable of degrading chlorinated ethenes to the environmentally benign product ethene through stepwise reductive dechlorination.

Prior to implementation, Golder applied for, and received from the KDHE, a Class V Underground Injection Control (UIC) permit. Authorization was received from the KDHE in a letter dated August 11, 2003, and authorization to modify the UIC permit was received in a letter dated September 24, 2003. Golder began field work on the IRM in December 2003 with the installation of nine injection wells (IW-1 through IW-9).

Bioremediation amendments (aqueous solutions of ethanol and sodium lactate) began in early March 2004 immediately after the baseline monitoring event. The initial nutrient recipe involved injection of sodium lactate and ethanol. The nutrients were delivered as an aqueous solution by mixing them with groundwater from the injection well, or, in the case of low-yield injection wells, from well TW-1. The nutrient injection was followed by injection of additional groundwater to "push" the nutrients out of the well column and into the formation. The headspace in the nutrient drums was filled with nitrogen gas to reduce the potential for intrusion of oxygen into the system, and cysteine was added to the mixture as an oxygen scavenger.

Bio-Dechlor INOCULUM™ (BDI, a dechlorinating bacteria consortium provided by Regenesis) was injected in late May 2004 at injection wells IW-2 through IW-9, as well as MW-8R. BDI was injected in an aqueous solution with cysteine oxygen scavenger, and followed by additional groundwater containing cysteine oxygen scavenger. The nutrient recipe has been modified periodically based on results monitored in the system.

Based upon the results of groundwater monitoring through the summer of 2005, an investigation of the biogeochemical environments, and associated VOC bioremediation, was undertaken using direct-push groundwater sampling methods downgradient from two of the injection wells (IW-5 and IW-6) which are located between the former source area and the downgradient property boundary. The data

generated by that investigation have led to a refinement in the lateral extent of the plume in those locations, and a better understanding of the Groundwater IRM performance to date. The most pertinent findings from the direct-push investigation include the following:

- An anaerobic groundwater environment has been established and maintained in the vicinity of the injection wells with pH, ORP, and DO conditions conducive to anaerobic microbial reductive dechlorination processes;
- There has been a slight decrease in the total concentration of chlorinated VOCs;
- Partial step-wise dechlorination is occurring at the injection wells, indicating microbial conversion of parent compounds to daughter products (PCE and TCE to C12DCE);
- There has been limited formation of VC and ethene (also daughter products of microbial reductive dechlorination processes) at concentrations below monitoring system detection limits; and
- There is rapid consumption of nutrients as evidenced by no detectable ethanol, and no increase in TOC above background concentrations, at any of the monitoring points that were sampled 30 days after nutrient injection.

While partial microbial dechlorination of PCE and TCE had resulted in the formation of C12DCE, the limited formation of VC and ethene suggested that the treatment program should be modified to achieve complete dechlorination. One possible cause of the partial dechlorination conditions at the USD 259 Site was the potential that the former microbial consortium (BDI) used in the initial bioaugmentation had not performed well at this USD 259 Site. A second possible cause of the partial dechlorination conditions at the USD 259 Site was the rapid and complete consumption of nutrients.

In January 2006, Golder inoculated one injection well with DHC Microbial Consortium SDC-9 (provided by Shaw Environmental, Inc.,) and inoculated a second injection well with GeoSynSirem KB-1. KB-1 was included in the approved original UIC permit application. Golder followed the second bioaugmentation event with a one-time anaerobic water/nutrient supplement mix, followed by an anaerobic water (no nutrients) chaser in each well to facilitate transport of bacteria and nutrients away from the injection wells.

Lateral migration of nutrients adjacent to each injection well has been increased by increasing the volume of nutrient solution injected, and by maintaining a water column of up to 30 ft on the injection well during nutrient delivery. Nutrient recipes have continued to be adjusted based on monitoring results, and additional monitoring points have been added.

Following the January 2006 modifications and subsequent monitoring, the performance of the Groundwater IRM was evaluated using the following lines of evidence at key monitoring points:

Concentrations of chlorinated VOCs: After the amendments to the Groundwater IRM, concentrations of COCs in three monitoring points showed a significant decrease to below GWQC. At one monitoring point, a slower response to the Groundwater IRM modifications was indicated, indicating this well may be located outside the primary groundwater flow pathway.

Ratios of parent to daughter compounds: The injection wells show the most visible examples of the changes in relative concentrations of the compounds. In both of these wells, PCE and TCE concentrations rapidly declined (within about 4 months) and C12DCE concentrations decreased. After the second inoculation and modifications to the injection recipe in January 2006, C12DCE concentrations declined while VC and ethene concentrations increased. The January 2006 modifications facilitated complete dechlorination of the parent compounds where only partial dechlorination was observed prior to the modification.

Evidence of complete dechlorination: Monthly monitoring has shown that ethene is being produced above background (non-detect) in all four wells, indicating that declines in PCE, TCE, and C12DCE are associated with reductive dechlorination processes. The presence of VC in the vicinity of injection wells and performance wells, although it is an undesirable intermediate daughter product, is also evidence that reductive dechlorination is occurring.

Biogeochemical Conditions: In general, low dissolved oxygen (below 2.0 mg/L) and ORP environments that are indicative of reducing conditions have been maintained in all four evaluation wells since February 2006. Other indicator parameters for favorable biogeochemical conditions include relative concentrations of sulfate, sulfide, iron, nitrate, and alkalinity between upgradient and downgradient locations.

USD 259 is currently conducting a FS to evaluate the *in situ* bioremediation alternative for full-scale application as well as well as other remediation alternatives which may include groundwater pump and treat, zero-valent iron permeable reactive barrier wall, or monitored natural attenuation.

Appendix C
Qualitative Screening of Alternatives

Alternative 1 – No Action

Alternative Description: Limited monitoring of source area groundwater wells and Five-Year Site Reviews.

Table 1A. Effectiveness Screening – Alternative 1

Effectiveness Criteria	Evaluation Summary
Overall protection of human health and the environment	▪ Contaminated groundwater is left unaddressed; thus, this alternative does not meet this criterion.
Compliance with ARARs	▪ No further action is taken to address contaminated groundwater exceeding chemical-specific ARARs; thus this criterion is not met.
Short-term effectiveness (during the remedial construction and implementation period)	▪ No further remedial action would be undertaken to address contaminated groundwater; thus, there would not be a remedial construction and implementation period.
Long-term effectiveness and permanence (following remedial construction)	▪ No further remedial action would be undertaken to address contaminated groundwater; thus, none of these criteria are met.
Reduction of toxicity, mobility, or volume through treatment	
Overall Effectiveness Rating	⓪

Table 1B. Implementability Screening – Alternative 1

Implementability Criteria	Evaluation Summary
Ability to construct, reliably operate, and meet technology-specific regulations for process options until a remedial action is complete	▪ No further remedial action would be undertaken to address contaminated groundwater; thus, the ability to meet these criteria is high.
Ability to operate, maintain, replace, and monitor technical components after the remedial action is complete	
Ability to obtain approvals from other agencies	▪ Contaminated groundwater would be left unaddressed. No remedial action would be undertaken to address contaminated groundwater; thus, there is no need to obtain approvals from other regulatory agencies.
Availability and capacity of treatment, storage, and disposal services	▪ Contaminated groundwater would be left unaddressed. No remedial action would be undertaken to address contaminated groundwater; thus, this criterion is not applicable.
Availability of property, specific materials and equipment, and technical specialists required for a remedial action	▪ Technical equipment and specialists are available for monitoring; thus the ability to meet this criterion is high.
Overall Implementability Rating	❺

Table 1C. Cost Screening – Alternative 1

Evaluation Factors for Cost	Approx. Cost (Dollars)
Overall Cost Rating	$

Alternative 2 – Plume Stability Monitoring

Alternative Description: Tracks changes in groundwater contaminant concentrations, demonstrating trends over time.

Table 2A. Effectiveness Screening – Alternative 2

Effectiveness Criteria	Evaluation Summary
Overall protection of human health and the environment	▪ Monitoring would be performed to ensure protectiveness. ▪ For PSM to be a useful remedial approach, site-specific data should indicate that natural processes will effectively reduce contaminants in groundwater to concentrations protective of human health and the environment in a timeframe comparable to that which could be achieved through other active remedial approaches. ▪ Contingency measures may be needed in the event that natural attenuation does not progress as expected.
Compliance with ARARs	▪ Source area(s) would be addressed by direct actions but not the groundwater outside of the source area(s). Contaminated groundwater exceeding chemical-specific ARARs would still be present outside the source area and would not be significantly actively addressed by remediation technology or biologic reduction, but could be addressed by other processes such as dispersion, dilution, adsorption, etc. ▪ Chemical-specific ARARs could be addressed by the implementation of this alternative if attenuation measures are significant. If monitoring shows plume migration at end of operable unit, or no significant attenuation ARARs would not be met. ▪ Location- and action-specific ARARs may be addressed during implementation, provided that significant attenuation is occurring and plume is stable.
Short-term effectiveness (during the remedial construction and implementation period)	▪ No remedial action would be undertaken to address contaminated groundwater outside the source area(s). Safety measures such as dust suppression, use of PPE, and establishment of work zones would protect workers and the community during implementation which would consist primarily of the installation of additional monitoring wells, as needed.

Effectiveness Criteria	Evaluation Summary
Long-term effectiveness and permanence (following remedial construction)	▪ Long-term effectiveness is not entirely ensured since this alternative relies on natural processes to achieve remedial goals. ▪ Monitoring is the primary remedial component for ensuring protection of human health. ▪ If monitoring does not show natural processes are adequately addressing contaminants, enhancement of natural processes may be needed or other treatment methods may be used.
Reduction of toxicity, mobility, or volume through treatment	▪ This alternative involves treatment through natural processes; however, treatment may be variable depending on aquifer characteristics. ▪ Incomplete degradation of chlorinated compounds like TCE results in VC, a more toxic compound.
Overall Effectiveness Rating	❶ - ❷

Table 2B. Implementability Screening – Alternative 2

Implementability Criteria	Evaluation Summary
Ability to construct, reliably operate, and meet technology-specific regulations for process options until a remedial action is complete	▪ No further remedial action would be undertaken to address contaminated groundwater outside the source area(s); thus, the ability to meet these criteria is high. ▪ Monitoring well installation is straightforward.
Ability to operate, maintain, replace, and monitor technical components after the remedial action is complete	▪ Inspection, maintenance, and replacement of engineered controls and implementation of monitoring are easily implemented.
Ability to obtain approvals from other agencies	▪ Regulatory approvals for engineered controls should be obtainable.
Availability and capacity of treatment, storage, and disposal services	▪ This alternative does not call for any treatment, storage, and disposal services, thus, this criterion is not applicable.
Availability of property, specific materials and equipment, and technical specialists required for a remedial action	▪ Materials, equipment, and labor resources used for institutional/engineered controls and monitoring are easily obtainable. ▪ Technical equipment and specialists are available for implementation of monitored natural attenuation.
Overall Implementability Rating	❺

Table 2C. Cost Screening – Alternative 2

Evaluation Factors for Cost	Approx. Cost (Dollars)
Overall Cost Rating	$

Alternative 3 – Monitored Natural Attenuation

Alternative Description: Tracks changes in groundwater contaminant concentrations, demonstrating trends over time.

Table 3A. Effectiveness Screening – Alternative 3

Effectiveness Criteria	Evaluation Summary
Overall protection of human health and the environment	▪ Monitoring would be performed to ensure protectiveness. ▪ For natural attenuation to be a useful remedial approach, site-specific data should indicate that natural processes will effectively reduce contaminants in groundwater to concentrations protective of human health and the environment in a timeframe comparable to that which could be achieved through other active remedial approaches. ▪ Contingency measures may be needed in the event that natural attenuation does not progress as expected.
Compliance with ARARs	▪ Source area(s) would be addressed by direct action but not the groundwater outside of the source area(s). Contaminated groundwater exceeding chemical-specific ARARs would still be present outside the source areas and would not be actively addressed by remediation technology but would be biologically reduced. ▪ Chemical-specific ARARs would be addressed by the implementation of this alternative. ▪ Location- and action-specific ARARs for the remedy would be addressed during implementation.
Short-term effectiveness (during the remedial construction and implementation period)	▪ Safety measures such as dust suppression, use of PPE, and establishment of work zones would protect workers and the community during implementation which would consist primarily of the installation of additional monitoring wells, as needed.
Long-term effectiveness and permanence (following remedial construction)	▪ Long-term effectiveness is not entirely ensured since this alternative relies on natural processes to achieve remedial goals. ▪ Monitoring is the primary remedial component for ensuring protection of human health. ▪ If monitoring does not show natural processes are adequately addressing contaminated enhancement of natural processes may be needed or other treatment methods may be used. ▪ Natural attenuation will be more effective if source areas are contained.
Reduction of toxicity, mobility, or volume through treatment	▪ This alternative involves treatment through natural processes; however, treatment may be variable depending on aquifer characteristics. ▪ Incomplete biological degradation of chlorinated compounds like TCE results in VC, a more toxic compound.
Overall Effectiveness Rating	❷

Table 3B. Implementability Screening – Alternative 3

Implementability Criteria	Evaluation Summary
Ability to construct, reliably operate, and meet technology-specific regulations for process options until a remedial action is complete	▪ No further remedial action would be undertaken to address contaminated groundwater outside the source area(s); thus, the ability to meet these criteria is high. ▪ Monitoring well installation is relatively straightforward.
Ability to operate, maintain, replace, and monitor technical components after the remedial action is complete	▪ Inspection, maintenance, and replacement of engineered controls and implementation of monitoring are easily implemented.
Ability to obtain approvals from other agencies	▪ Regulatory approvals for engineered controls should be obtainable.
Availability and capacity of treatment, storage, and disposal services	▪ This alternative does not call for any treatment, storage, and disposal services; thus, this criterion is not applicable.
Availability of property, specific materials and equipment, and technical specialists required for a remedial action	▪ Materials, equipment, and labor resources used for institutional/engineered controls and monitoring are easily obtainable. ▪ Technical equipment and specialists are available for implementation of monitored natural attenuation.
Overall Implementability Rating	❺

Table 3C. Cost Screening – Alternative 3

Evaluation Factors for Cost	Approx. Cost (Dollars)
Overall Cost Rating	$

Alternative 4 – Anaerobic Bioremediation/Enhanced MNA

Alternative Description: Provides additional substrate and/or microorganisms to promote degradation of VOCs.

Table 4A. Effectiveness Screening – Alternative 4

Effectiveness Criteria	Evaluation Summary
Overall protection of human health and the environment	▪ Monitoring would be performed to ensure protectiveness of the remedy. ▪ For EAB/enhanced MNA to be a useful remedial approach, site-specific data should indicate that natural processes can be enhanced and will effectively reduce contaminants in groundwater to concentrations protective of human health. ▪ Contingency measures may be needed in the event that EAB does not reduce contaminant concentrations as expected.
Compliance with ARARs	▪ Chemical-specific ARARs would be addressed by the implementation of this alternative. ▪ Location- and action-specific ARARs for the remedy would be addressed during implementation.

Effectiveness Criteria	Evaluation Summary
Short-term effectiveness (during the remedial construction and implementation period)	▪ Safety measures such as dust suppression, use of PPE, and establishment of work zones would protect workers and the community during implementation which would consist primarily of the installation of injection wells and additional monitoring wells, as needed, and injection of nutrients.
Long-term effectiveness and permanence (following remedial construction)	▪ Monitoring is the primary remedial component for ensuring protection of human health. ▪ Long-term effectiveness is not entirely ensured since this alternative relies on natural processes to achieve remedial goals. ▪ EAB/enhanced MNA will be more effective if source areas are contained.
Reduction of toxicity, mobility, or volume through treatment	▪ This alternative involves *in situ* treatment by enhancing biological processes. ▪ Incomplete biological degradation of chlorinated compounds like TCE results in VC, a more toxic compound.
Overall Effectiveness Rating	❸

Table 4B. Implementability Screening – Alternative 4

Implementability Criteria	Evaluation Summary
Ability to construct, reliably operate, and meet technology-specific regulations for process options until a remedial action is complete	▪ Construction of injection and monitoring wells is relatively straightforward. ▪ Providing adequate coverage of the nutrient substrate can only be determined through pilot-scale tests.
Ability to operate, maintain, replace, and monitor technical components after the remedial action is complete	▪ Inspection, maintenance, and replacement of engineered controls and implementation of monitoring are easily implemented. ▪ Application of additional nutrient substrate is relatively straightforward.
Ability to obtain approvals from other agencies	▪ Regulatory approvals for engineered controls should be obtainable. ▪ Regulatory approvals for construction and operation of nutrient substrate and bioaugmentation injection wells should be obtainable.
Availability and capacity of treatment, storage, and disposal services	▪ This alternative does not call for any treatment, storage, and disposal services; thus, this criterion is not applicable.
Availability of property, specific materials and equipment, and technical specialists required for a remedial action	▪ Materials, equipment, and labor resources used for institutional/engineered controls and monitoring are easily obtainable. ▪ Technical equipment and specialists are available for implementation of institutional controls and monitoring. ▪ Technical equipment and specialists for the application of nutrient substrate are generally available.
Overall Implementability Rating	❹

Table 4C. Cost Screening – Alternative 4

Evaluation Factors for Cost	Approx. Cost (Dollars)
Overall Cost Rating	$$$

Alternative 5 – Groundwater Extraction and Treatment

Alternative Description: Extracts and treats groundwater via air stripper to minimize plume migration. Vapors are removed before discharge.

Table 5A. Effectiveness Screening – Alternative 5

Effectiveness Criteria	Evaluation Summary
Overall protection of human health and the environment	▪ This alternative would intercept contaminated groundwater, treat it, and discharge it to the river. ▪ Monitoring would be performed to ensure protectiveness of the remedy.
Compliance with ARARs	▪ Chemical-specific ARARs would be addressed by the implementation of this alternative. Air stripping is a presumptive technology for ex situ treatment of dissolved volatile organic compounds in extracted groundwater. ▪ Location- and action-specific ARARs for the remedy would be addressed during implementation.
Short-term effectiveness (during the remedial construction and implementation period)	▪ Safety measures such as dust suppression, use of PPE, and establishment of work zones would protect workers and the community during implementation.
Long-term effectiveness and permanence (following remedial construction)	▪ Long-term effectiveness of the alternative is ensured through operation and maintenance of the groundwater extraction and treatment system. ▪ Monitoring would be performed to ensure long-term effectiveness and permanence of the remedy.
Reduction of toxicity, mobility, or volume through treatment	▪ This alternative involves treatment and surface discharge of extracted groundwater.
Overall Effectiveness Rating	❹

Table 5B. Implementability Screening – Alternative 5

Implementability Criteria	Evaluation Summary
Ability to construct, reliably operate, and meet technology-specific regulations for process options until a remedial action is complete	▪ Regulatory approvals for construction of extraction wells, installation of piping, and construction of a treatment plant should be obtainable. ▪ Construction and installation of extraction wells, piping, and a treatment plant is relatively straightforward.

Implementability Criteria	Evaluation Summary
Ability to operate, maintain, replace, and monitor technical components after the remedial action is complete	▪ Inspection, maintenance, and replacement of engineered controls and implementation of monitoring are easily implemented. ▪ Operation and maintenance of the groundwater extraction and treatment system is relatively straightforward.
Ability to obtain approvals from other agencies	▪ Regulatory approvals for engineered controls should be obtainable. ▪ Regulatory approvals for construction and operation of the alternative should be obtainable.
Availability and capacity of treatment, storage, and disposal services	▪ This alternative requires construction of influent and effluent piping and a treatment plant. The piping and treatment plant would be sufficiently sized for any treatment and disposal of the services.
Availability of property, specific materials and equipment, and technical specialists required for a remedial action	▪ Materials, equipment, and labor resources used for institutional/engineered controls and monitoring are easily obtainable. ▪ Equipment and contractors with construction experience should be available. ▪ Technical equipment and specialists are available for operation and maintenance of a treatment plant.
Overall Implementability Rating	❹

Table 5C. Cost Screening – Alternative 5

Evaluation Factors for Cost	Approx. Cost (Dollars)
Overall Cost Rating	$$$

Alternative 6 – Emulsified Zero-Valent Iron

Alternative Description: Injection of EZVI along the leading edge of a groundwater contaminant plume to prevent further migration of the plume.

Table 6A. Effectiveness Screening – Alternative 6

Effectiveness Criteria	Evaluation Summary
Overall protection of human health and the environment	▪ Monitoring would be performed to ensure protectiveness of the remedy. ▪ Contingency measures may be needed in the event that EZVI does not reduce contaminant concentrations as expected.
Compliance with ARARs	▪ Chemical-specific ARARs would be addressed by the implementation of this alternative. ▪ Location- and action-specific ARARs for the remedy would be addressed during implementation.
Short-term effectiveness (during the remedial construction and implementation period)	▪ Safety measures such as dust suppression, use of PPE, and establishment of work zones would protect workers and the community during implementation.

Effectiveness Criteria	Evaluation Summary
Long-term effectiveness and permanence (following remedial construction)	▪ Long-term effectiveness is not entirely ensured since this alternative relies on a chemical process to achieve remedial goals. This alternative may require that the EZVI be applied more than once. ▪ Monitoring would be performed to ensure long-term effectiveness and permanence of the remedy.
Reduction of toxicity, mobility, or volume through treatment	▪ This alternative involves treatment by destroying the contaminant through a chemical process.
Overall Effectiveness Rating	❸

Table 6B. Implementability Screening – Alternative 6

Implementability Criteria	Evaluation Summary
Ability to construct, reliably operate, and meet technology-specific regulations for process options until a remedial action is complete	▪ Regulatory approvals for injection of emulsified zero-valent iron should be obtainable. ▪ Providing adequate coverage of the EZVI can only be determined through pilot-scale tests. ▪ Application of the EZVI with direct-push technology is relatively straightforward. ▪ Surface features may eliminate some areas from consideration.
Ability to operate, maintain, replace, and monitor technical components after the remedial action is complete	▪ Inspection, maintenance, and replacement of engineered controls and implementation of monitoring are easily implemented. ▪ This alternative will require
Ability to obtain approvals from other agencies	▪ Regulatory approvals for engineered controls should be obtainable. ▪ Regulatory approvals for implementation of the alternative should be obtainable.
Availability and capacity of treatment, storage, and disposal services	▪ This alternative does not call for any treatment, storage and disposal services; thus, this criterion is not applicable.
Availability of property, specific materials and equipment, and technical specialists required for a remedial action	▪ Materials, equipment, and labor resources used for institutional/engineered controls and monitoring are easily obtainable. ▪ Technical equipment and specialists are available for implementation of institutional controls and monitoring. ▪ Because EZVI is a proprietary technology only a few vendors have the necessary technical equipment, specialists, and materials for implementation of this alternative.
Overall Implementability Rating	❹

Table 6C. Cost Screening – Alternative 6

Evaluation Factors for Cost	Approx. Cost (Dollars)
Overall Cost Rating	$$$

Alternative 7 – Slurry Wall Containment

Alternative Description: Installation of slurry wall on the leading edge of the groundwater contaminant plume to prevent further migration of the plume. Installation of upgradient extraction wells to prevent mounding of groundwater within the slurry wall containment system. Treatment of groundwater via air stripper system before discharge.

Table 7A. Effectiveness Screening – Alternative 7

Effectiveness Criteria	Evaluation Summary
Overall protection of human health and the environment	▪ Monitoring would be performed to ensure protectiveness of the remedy. ▪ The slurry wall would prevent contaminated groundwater from migrating further downgradient. ▪ Contaminated groundwater would be intercepted, treated, and discharge it to the river.
Compliance with ARARs	▪ Chemical-specific ARARs would be addressed by the implementation of this alternative. ▪ Location- and action-specific ARARs for the remedy would be addressed during implementation.
Short-term effectiveness (during the remedial construction and implementation period)	▪ Safety measures such as dust suppression, use of PPE, and establishment of work zones would protect workers and the community during implementation.
Long-term effectiveness and permanence (following remedial construction)	▪ Long-term effectiveness is ensured through operation of the groundwater extraction and treatment system and monitoring of the slurry wall. ▪ Specific contaminant types may degrade the slurry wall components and reduce its long-term effectiveness. Monitoring of the integrity of the slurry wall will be needed. ▪ Monitoring would be performed to ensure long-term effectiveness and permanence of the remedy.
Reduction of toxicity, mobility, or volume through treatment	▪ This alternative involves extraction, treatment, and surface discharge of groundwater.
Overall Effectiveness Rating	❸

Table 7B. Implementability Screening – Alternative 7

Implementability Criteria	Evaluation Summary
Ability to construct, reliably operate, and meet technology-specific regulations for process options until a remedial action is complete	▪ Construction and installation of extraction wells, piping, and a treatment plant is relatively straightforward. ▪ Construction of the slurry wall in a developed area will present many challenges.
Ability to operate, maintain, replace, and monitor technical components after the remedial action is complete	▪ Inspection, maintenance, and replacement of engineered controls and implementation of monitoring are easily implemented. ▪ Operation and maintenance of the groundwater extraction and treatment system is relatively straightforward.

Implementability Criteria	Evaluation Summary
Ability to obtain approvals from other agencies	▪ Regulatory approvals for engineered controls should be obtainable. ▪ Regulatory approvals for construction and operation of the alternative should be obtainable.
Availability and capacity of treatment, storage, and disposal services	▪ This alternative requires construction of influent and effluent piping and a treatment plant. The piping and treatment plant would be sufficiently sized for any treatment and disposal of the services.
Availability of property, specific materials and equipment, and technical specialists required for a remedial action	▪ Materials, equipment, and labor resources used for institutional/engineered controls and monitoring are easily obtainable. ▪ Equipment and contractors with construction experience should be available. ▪ Technical equipment and specialists are available for operation and maintenance of a treatment plant.
Overall Implementability Rating	❷

Table 7C. Cost Screening – Alternative 7

Evaluation Factors for Cost	Approx. Cost (Dollars)
Overall Cost Rating	$$$$

Alternative 8 – Air Sparging and Soil Vapor Extraction

Alternative Description: Agitates groundwater to induce volatilization of VOCs thus cleaning the groundwater. Vapors are removed and treated before discharge.

Table 8A. Effectiveness Screening – Alternative 8

Effectiveness Criteria	Evaluation Summary
Overall protection of human health and the environment	▪ Monitoring would be performed to ensure protectiveness of the remedy. ▪ This alternative would remove contaminants from groundwater through AS and SVE.
Compliance with ARARs	▪ Chemical-specific ARARs would be addressed by the implementation of this alternative. ▪ Location- and action-specific ARARs for the remedy would be addressed during implementation.
Short-term effectiveness (during the remedial construction and implementation period)	▪ Safety measures such as dust suppression, use of PPE, and establishment of work zones would protect workers and the community during implementation.
Long-term effectiveness and permanence (following remedial construction)	▪ Long-term effectiveness is ensured through operation of the AS/SVE system. ▪ Monitoring would be performed to ensure long-term effectiveness and permanence of the remedy.

Effectiveness Criteria	Evaluation Summary
Reduction of toxicity, mobility, or volume through treatment	▪ This alternative involves *in situ* treatment of contaminated groundwater.
Overall Effectiveness Rating	❹

Table 8B. Implementability Screening – Alternative 8

Implementability Criteria	Evaluation Summary
Ability to construct, reliably operate, and meet technology-specific regulations for process options until a remedial action is complete	▪ Construction of air sparging and soil vapor extraction wells, and treatment plants is relatively straightforward. ▪ This alternative would require a pilot-scale study to determine optimum spacing of air sparging and soil vapor extraction wells. ▪ Depending on the width of the contaminant plume, the construction of more than one treatment facility may be needed.
Ability to operate, maintain, replace, and monitor technical components after the remedial action is complete	▪ Inspection, maintenance, and replacement of engineered controls and implementation of monitoring are easily implemented. ▪ Operation and maintenance of the AS/SVE system is implementable.
Ability to obtain approvals from other agencies	▪ Regulatory approvals for engineered controls should be obtainable. ▪ Regulatory approvals for construction and operation of the alternative should be obtainable.
Availability and capacity of treatment, storage, and disposal services	▪ This alternative requires construction of AS and SVE wells and associated piping and a treatment plant. The piping and treatment plant would be sufficiently sized for any treatment and disposal of the services.
Availability of property, specific materials and equipment, and technical specialists required for a remedial action	▪ Materials, equipment, and labor resources used for institutional/engineered controls and monitoring are easily obtainable. ▪ Equipment and contractors with construction experience should be available. ▪ Technical equipment and specialists are available for operation and maintenance of a treatment plant.
Overall Implementability Rating	❸

Table 8C. Cost Screening – Alternative 8

Evaluation Factors for Cost	Approx. Cost (Dollars)
Overall Cost Rating	$$$$

Alternative 9 – In-Well Vapor Stripping

Alternative Description: Installation of in-well strippers to treat groundwater. Vapors are removed and treated before discharge.

Table 9A. Effectiveness Screening – Alternative 9

Effectiveness Criteria	Evaluation Summary
Overall protection of human health and the environment	▪ Monitoring would be performed to ensure protectiveness of the remedy. ▪ This alternative would remove contaminants from groundwater through in-well stripping. Vapors would be discharged to the atmosphere or treated and then recirculated.
Compliance with ARARs	▪ Institutional/engineered controls do not physically address contaminated groundwater sources exceeding chemical-specific ARARs. ▪ Chemical-specific ARARs would be addressed by the implementation of this alternative. ▪ Location- and action-specific ARARs for the remedy would be addressed during implementation.
Short-term effectiveness (during the remedial construction and implementation period)	▪ Safety measures such as dust suppression, use of PPE, and establishment of work zones would protect workers and the community during implementation.
Long-term effectiveness and permanence (following remedial construction)	▪ Long-term effectiveness is ensured through operation of the AS/SVE system. ▪ Monitoring would be performed to ensure long-term effectiveness and permanence of the remedy.
Reduction of toxicity, mobility, or volume through treatment	▪ This alternative involves in situ treatment of contaminated groundwater.
Overall Effectiveness Rating	❸

Table 9B. Implementability Screening – Alternative 9

Implementability Criteria	Evaluation Summary
Ability to construct, reliably operate, and meet technology-specific regulations for process options until a remedial action is complete	▪ Construction of in-well stripper wells, installation of piping, and associated appurtenances is relatively straightforward. ▪ This alternative would require a pilot-scale study to determine optimum spacing of in-well stripper systems. ▪ Systems may be combined in one above-ground treatment plant or placed individually in below ground units.
Ability to operate, maintain, replace, and monitor technical components after the remedial action is complete	▪ Inspection, maintenance, and replacement of engineered controls and implementation of monitoring are easily implemented. ▪ Operation and maintenance of the groundwater extraction and treatment system is implementable.
Ability to obtain approvals from other agencies	▪ Regulatory approvals for engineered controls should be obtainable. ▪ Regulatory approvals for construction and operation of the alternative should be obtainable.

Implementability Criteria	Evaluation Summary
Availability and capacity of treatment, storage, and disposal services	▪ This alternative requires construction of influent and effluent piping and a treatment plant. The piping and treatment plant would be sufficiently sized for any treatment and disposal of the services; thus, this criterion is not applicable.
Availability of property, specific materials and equipment, and technical specialists required for a remedial action	▪ Materials, equipment, and labor resources used for institutional/engineered controls and monitoring are easily obtainable. ▪ Equipment and contractors with construction experience for installation of most items should be available; in-well stripper systems are generally proprietary technology. ▪ Technical equipment and specialists are available for operation and maintenance of the system(s).
Overall Implementability Rating	❸

Table 9C. Cost Screening – Alternative 9

Evaluation Factors for Cost	Approx. Cost (Dollars)
Overall Cost Rating	$$$$

Appendix D
Detailed Analysis of Retained Alternatives

Appendix D1
Detailed Analysis of Retained Alternatives
GWU1

Alternative GWU1-1 – No Action

Table D-GWU1-1A Evaluation Summary for Overall Protection of Human Health and the Environment – Alternative GWU1-1

Evaluation Factors for Overall Protection of Human Health and the Environment	Evaluation Summary
Adequate protection of human health and the environment (short- and long- term) from unacceptable risks posed by hazardous substances, pollutants, or contaminants present at the Site	• The No Action alternative does not address unacceptable risks posed by hazardous substances in groundwater; therefore, this criterion is not met.
Overall Protection of Human Health and the Environment Rating:	⓪

Table D-GWU1-1B Evaluation Summary for Compliance with ARARs – Alternative GWU1-1

Evaluation Factors for Compliance with ARARs	Evaluation Summary
Compliance with Chemical-Specific ARARs	• No action is taken to address groundwater contamination; therefore this criterion is not met.
Compliance with Location-Specific ARARs	• No action is taken to address groundwater contamination; therefore, this criterion is not met.
Compliance with Action-Specific ARARs	• No action is taken to address groundwater contamination; therefore, this criterion is not met.
Compliance with ARARs Rating:	⓪

Table D-GWU1-1C Short-Term Effectiveness Evaluation Summary – Alternative GWU1-1

Evaluation Factors for Short-Term Effectiveness	Evaluation Summary
Short-term risks that might be posed to the community during implementation of an alternative	• The short-term risks to the community are unchanged by this activity. No impacts to workers during implementation would occur and no adverse environmental impacts would occur during implementation; however, since short term risks are not addressed and the time frame is open ended, the criterion is not met.
Potential impacts to workers during implementation and the reliability of protective measures taken to minimize these impacts	
Potential adverse environmental impacts resulting from implementation of an alternative and the reliability of the available mitigation measure during implementation	
Short-Term Effectiveness Rating:	⓪

Table D-GWU1-1D Evaluation Summary for Long-Term Effectiveness and Permanence – Alternative GWU1-1

Evaluation Factors for Long-Term Effectiveness and Permanence	Evaluation Summary
Magnitude of residual risk remaining from untreated waste or treatment residuals remaining at the conclusion of the remedial activities	• No remedial action would be undertaken to address groundwater contamination; therefore, this criterion is not met.

Adequacy and reliability of controls that are used to manage treatment residuals and untreated waste remaining at the Site	• No controls are put in place under the No Action alternative. • Contaminated groundwater remains uncontained at the Site.
Long-Term Effectiveness and Permanence Rating:	⓪

Table D-GWU1-1E Evaluation Summary for Reduction of Toxicity, Mobility, or Volume through Treatment – Alternative GWU1-1

Evaluation Factors for Reduction of Toxicity, Mobility, or Volume through Treatment	Evaluation Summary
The treatment process, the alternative uses, and materials they will treat	• The No Action alternative does not contain a treatment component; therefore, this criterion is not met.
The degree of expected reduction in toxicity, mobility, or volume of contamination due to treatment	
The type and quantity of materials that will remain following treatment	
Whether the alternative would satisfy the statutory preference for treatment as a principal element of the remedial action.	
Reduction of Toxicity, Mobility, or Volume through Treatment:	⓪

Table D-GWU1-1F Implementability Evaluation Summary – Alternative GWU1-1

Evaluation Factors for Implementability		Evaluation Summary
Technical Feasibility	Technical difficulties and unknowns associated with the construction and operation of a technology	• The No Action alternative has no technical component and is therefore highly implementable.
	Reliability of the technology, focusing on technical problems that will lead to schedule delays	
Administrative Feasibility	Coordination issues with other office and agencies during construction or operations of the remedy.	• The No Action alternative has no administrative component and is therefore highly implementable.
	The ability and time required to obtain necessary approvals and permits from other agencies for offsite actions or discharge scenarios	
Availability of Goods and Services	Availability of adequate offsite treatment, storage capacity, and disposal capacity and services	• The No Action alternative requires no goods and services and is therefore highly implementable.
	Availability of necessary equipment and specialists required to completed construction of remedy components	
	Availability of services and materials plus the potential for obtaining competitive bids	
	Availability of prospective technologies	
	Implementability Rating:	❺

Table D-GWU1-1G Cost Evaluation Summary – Alternative GWU1-1

Evaluation Factors for Costs	Approximate Cost (Dollars)
Total Capital Costs	$129,000
Total Annual O&M Costs	$2,674,000
Total Periodic Cost	$878,000
Total Present Value Cost	$2,191,000
Cost Rating:	**$$**

Note: Total costs are for the assumed period of evaluation (Years 1 through 70). Costs are rounded to the nearest $1,000

Alternative GWU1-2 – Monitored Natural Attenuation

Table D-GWU1-2A Evaluation Summary for Overall Protection of Human Health and the Environment – Alternative GWU1-2

Evaluation Factors for Overall Protection of Human Health and the Environment	Evaluation Summary
Adequate protection of human health and the environment (short- and long- term) from unacceptable risks posed by hazardous substances, pollutants, or contaminants present at the Site	• Over time, MNA will reduce contaminant levels in groundwater to levels below health based cleanup goals; therefore, this alternative is protective of human health and the environment over time.
Overall Protection of Human Health and the Environment Rating:	❸

Table D-GWU1-2B Evaluation Summary for Compliance with ARARs – Alternative GWU1-2

Evaluation Factors for Compliance with ARARs	Evaluation Summary
Compliance with Chemical-Specific ARARs	• Over time, MNA will achieve compliance with contaminant levels specified in ARARs
Compliance with Location-Specific ARARs	• Construction of the MNA alternative monitoring wells will be compliant with all location-specific ARARs; however, this alternative would not technically address the TBC for hydraulic containment. Chisholm Creek does act as a hydraulic barrier for the majority of the leading edge of the chlorinated solvent groundwater plume associated with GWU1/GWU5.
Compliance with Action-Specific ARARs	• Since this alternative will not require discharge of treated water or storage of waste, no action-specific ARARs apply to implementation of this alternative.
Compliance with ARARs Rating:	❸

Table D-GWU1-2C Short-Term Effectiveness Evaluation Summary – Alternative GWU1-2

Evaluation Factors for Short-Term Effectiveness	Evaluation Summary
Short-term risks that might be posed to the community during implementation of an alternative	• MNA processes are locally active and contaminant reduction is occurring. Installation of MNA monitoring wells will be performed by a licensed contractor who will collect, manifest, and dispose of drill cuttings in proper disposal areas. Therefore, Alternative GWU1-2 meets this criterion.
Potential impacts to workers during implementation and the reliability of protective measures	• All workers will be OSHA trained and will be required to wear appropriate personal protective equipment while drilling and packing wells.
Potential adverse environmental impacts resulting from implementation of an alternative and the reliability of the available mitigation measure during implementation	• There are minimal adverse impacts to the environment through the installation of 1-inch mini direct-push monitoring wells. These are mitigated through proper disposal of drill cuttings.
Short-Term Effectiveness Rating:	❹

Table D-GWU1-2D Evaluation Summary for Long-Term Effectiveness and Permanence – Alternative GWU1-2

Evaluation Factors for Long-Term Effectiveness and Permanence	Evaluation Summary
Magnitude of residual risk remaining from untreated waste or treatment residuals remaining at the conclusion of the remedial activities	• Overtime, MNA will decrease concentrations of all COCs to acceptable heath risk based levels; therefore, this alternative provides an effective and permanent remedy for groundwater contamination
Adequacy and reliability of controls that are used to manage treatment residuals and untreated waste remaining at the Site	• Since there are no treatment residuals and MNA will reduce all groundwater contamination to acceptable health base levels over time, Alternative GWU1-2 meets this criteria
Long-Term Effectiveness and Permanence Rating:	❸

Table D-GWU1-2E Evaluation Summary for Reduction of Toxicity, Mobility, or Volume through Treatment – Alternative GWU1-2

Evaluation Factors for Reduction of Toxicity, Mobility, or Volume through Treatment	Evaluation Summary
The treatment process, the alternative uses, and materials they will treat	• Alternative GWU1-2 does not provide a treatment component, per se; however, MNA could reduce contaminant concentrations over time.
The degree of expected reduction in toxicity, mobility, or volume of contamination due to treatment	
The type and quantity of materials that will remain following treatment	
Whether the alternative would satisfy the statutory preference for treatment as a principal element of the remedial action.	
Reduction of Toxicity, Mobility, or Volume through Treatment:	❸

Table D-GWU1-2F Implementability Evaluation Summary – Alternative GWU1-2

Evaluation Factors for Implementability		Evaluation Summary
Technical Feasibility	Technical difficulties and unknowns associated with the construction and operation of a technology	• Implementation of Alternative GWU1-2 involves installation of two monitoring wells using standard drilling equipment and installation techniques. • Monitoring would determine the effectiveness and completeness of the contaminant reduction by natural processes.
	Reliability of the technology, focusing on technical problems that will lead to schedule delays	
Administrative Feasibility	Coordination issues with other office and agencies during construction or operations of the remedy.	• MNA monitoring requires no permitting or other agency coordination and therefore meets this criterion. • Access to/for the monitoring wells is not anticipated to be difficult.
	The ability and time required to obtain necessary approvals and permits from other agencies for offsite actions or discharge scenarios	
Availability of Goods and Services	Availability of adequate offsite treatment, storage capacity, and disposal capacity and services	• Alternative GWU1-2 requires no offsite treatment, storage, or services.

Evaluation Factors for Implementability		Evaluation Summary
	Availability of necessary equipment and specialists required to completed construction of remedy components	• The monitoring well installation could be performed by one of several local licensed drilling contractors in the Wichita area. No specialized drilling equipment would be required.
	Availability of services and materials plus the potential for obtaining competitive bids	
	Availability of prospective technologies	
	Implementability Rating:	❹

Table D-GWU1-2G Cost Evaluation Summary – Alternative GWU1-2

Evaluation Factors for Costs	Approximate Cost (Dollars)
Total Capital Costs	$183,000
Total Annual O&M Costs	$8,100,000
Total Periodic Cost	$902,000
Total Present Value Cost	$5,532,000
Cost Rating:	**$$$**

Note: Total costs are for the assumed period of evaluation (Years 1 through 70). Costs are rounded to the nearest $1,000

Alternative GWU1-3 – Enhanced Anaerobic Bioremediation/Monitored Natural Attenuation

Table D-GWU1-3A Evaluation Summary for Overall Protection of Human Health and the Environment – Alternative GWU1-3

Evaluation Factors for Overall Protection of Human Health and the Environment	Evaluation Summary
Adequate protection of human health and the environment (short- and long- term) from unacceptable risks posed by hazardous substances, pollutants, or contaminants present at the Site	• Over time, MNA, supplemented with EAB will reduce contaminant levels in groundwater to levels below health based cleanup goals; therefore, this alternative is protective of human health and the environment over time.
Overall Protection of Human Health and the Environment Rating:	❹

Table D-GWU1-3B Evaluation Summary for Compliance with ARARs – Alternative GWU1-3

Evaluation Factors for Compliance with ARARs	Evaluation Summary
Compliance with Chemical-Specific ARARs	• Over time, EAB/MNA will achieve compliance with contaminant levels specified in ARARs
Compliance with Location-Specific ARARs	• Construction of the EAB/MNA alternative injection and monitoring wells will be compliant with all location-specific ARARs; however, this alternative would not technically address the TBC for hydraulic containment. Chisholm Creek does act as a hydraulic barrier for the majority of the leading edge of the chlorinated solvent groundwater plume associated with GWU1/GWU5.
Compliance with Action-Specific ARARs	• Permitting for injection of the electron donor will be required from the state agency. Since this alternative will not require discharge of treated water or storage of waste, no action-specific ARARs apply to implementation of this alternative.
Compliance with ARARs Rating:	❸

Table D-GWU1-3C Short-Term Effectiveness Evaluation Summary – Alternative GWU1-3

Evaluation Factors for Short-Term Effectiveness	Evaluation Summary
Short-term risks that might be posed to the community during implementation of an alternative	• The MNA processes are locally active and contaminant reduction is occurring. The EAB treatment will enhance the contaminant reduction and expand the area in which active reduction will occur. Installation of the EAB injection wells and monitoring wells should not pose a risk to the community. Installation of EAB/MNA monitoring wells will be performed by a licensed contractor who will collect, manifest, and dispose of drill cuttings in proper disposal areas; therefore, Alternative GWU1-3 meets this criterion.
Potential impacts to workers during implementation and the reliability of protective	• All workers will be OSHA trained and will be required to wear appropriate personal protective equipment while

measures	drilling and packing wells.
Potential adverse environmental impacts resulting from implementation of an alternative and the reliability of the available mitigation measure during implementation	• There are minimal adverse impacts to the environment through the installation of 1-inch and 2-inch diameter wells. These are mitigated through proper disposal of drill cuttings.
Short-Term Effectiveness Rating:	❹

Table D-GWU1-3D Evaluation Summary for Long-Term Effectiveness and Permanence – Alternative GWU1-3

Evaluation Factors for Long-Term Effectiveness and Permanence	Evaluation Summary
Magnitude of residual risk remaining from untreated waste or treatment residuals remaining at the conclusion of the remedial activities	• Over time, EAB/MNA will decrease concentrations of all COCs to acceptable heath risk based levels; therefore, this alternative provides an effective and permanent remedy for groundwater contamination.
Adequacy and reliability of controls that are used to manage treatment residuals and untreated waste remaining at the Site	• Since there are no treatment residuals and EAB/MNA will reduce all groundwater contamination to acceptable health base levels over time; Alternative GWU1-3 meets this criteria. The EAB component should accelerate this process relative to an MNA only alternative.
Long-Term Effectiveness & Permanence Rating:	❹

Table D-GWU1-3E Evaluation Summary for Reduction of Toxicity, Mobility, or Volume through Treatment – Alternative GWU1-3

Evaluation Factors for Reduction of Toxicity, Mobility, or Volume through Treatment	Evaluation Summary
The treatment process, the alternative uses, and materials they will treat	• Alternative GWU1-3 does provide a treatment component through the injection of an emulsified vegetable oil amendment to serve as an electron donor to enhance the natural bioremediation processes at the Site. The treatment is expected to reduce contaminant concentrations over time. No residual material is anticipated to remain from the treatment process. This alternative will partially address the statutory preference for treatment as a principal element of the remedial action in that areas with total VOC concentrations > 100 µg/L will be subject to treatment.
The degree of expected reduction in toxicity, mobility, or volume of contamination due to treatment	
The type and quantity of materials that will remain following treatment	
Whether the alternative would satisfy the statutory preference for treatment as a principal element of the remedial action.	
Reduction of Toxicity, Mobility, or Volume through Treatment:	❹

Table D-GWU1-3F Implementability Evaluation Summary – Alternative GWU1-3

Evaluation Factors for Implementability		Evaluation Summary
Technical Feasibility	Technical difficulties and unknowns associated with the construction and operation of a technology	• Implementation of Alternative GWU1-3 involves installation of injection and

Evaluation Factors for Implementability		Evaluation Summary
	Reliability of the technology, focusing on technical problems that will lead to schedule delays	monitoring wells using standard drilling equipment and installation techniques. • Most of the proposed EAB wells are located on railroad properties. Historically, access to railroad properties has been problematic. Access to these properties is crucial if the program is move forward. • Anaerobic bioremediation using an optimum substrate is technically feasible. Bioremediation would be carefully monitored to ensure that there is not an accumulation of degradation products (e.g., VC).
Administrative Feasibility	Coordination issues with other office and agencies during construction or operations of the remedy.	• EAB/ MNA monitoring requires no permitting or other agency coordination and therefore meets this criterion. • EAB would require obtaining an underground injection permit for the injection bioremediation enhancements.
	The ability and time required to obtain necessary approvals and permits from other agencies for offsite actions or discharge scenarios	
Availability of Goods and Services	Availability of adequate offsite treatment, storage capacity, and disposal capacity and services	• Alternative GWU1-3 requires no offsite treatment, storage, or services.
	Availability of necessary equipment and specialists required to completed construction of remedy components	• The well installation could be performed by one of several local licensed drilling contractors in the Wichita area. No specialized drilling equipment would be required. • Application of substrate to enhance bioremediation could be performed by local contractors.
	Availability of services and materials plus the potential for obtaining competitive bids	
	Availability of prospective technologies	
	Implementability Rating:	❸

Table D-GWU1-3G Cost Evaluation Summary – Alternative GWU1-3

Evaluation Factors for Costs	Approximate Cost (Dollars)
Total Capital Costs	$3,630,000
Total Annual O&M Costs	$5,484,000
Total Periodic Cost	$2,526,000
Total Present Value Cost	$9,465,000
Cost Rating:	**$$$**

Note: Total costs are for the assumed period of evaluation (Years 1 through 70). Costs are rounded to the nearest $1,000

Alternative GWU1-4 – Groundwater Extraction (Containment Only), New Treatment Plant, and Discharge to Chisholm Creek

Table D-GWU1-4A Evaluation Summary for Overall Protection of Human Health and the Environment – Alternative GWU1-4

Evaluation Factors for Overall Protection of Human Health and the Environment	Evaluation Summary
Adequate protection of human health and the environment (short- and long- term) from unacceptable risks posed by hazardous substances, pollutants, or contaminants present at the Site	• Containment of the groundwater plume via extraction wells and treatment will be protective of the environment. • Ongoing ICs, limiting new well installations, are protective of human health.
Overall Protection of Human Health and the Environment Rating:	❹

Table D-GWU1-4B Evaluation Summary for compliance with ARARS – Alternative GWU1-4

Evaluation Factors for Compliance with ARARs	Evaluation Summary
Compliance with Chemical-Specific ARARS	• Compliant with all chemical-specific ARARs, providing capture of the modeled plume occurs with the extraction well.
Compliance with Location-Specific ARARS	• Compliant with all location-specific ARARs
Compliance with Action-Specific ARARS	• Compliant with all action-specific ARARs
Compliance with ARARs Rating:	❹

Table D-GWU1-4C Short-Term Effectiveness Evaluation Summary – Alternative GWU1-4

Evaluation Factors for Short-Term Effectiveness	Evaluation Summary
Short-term risks that might be posed to the community during implementation of an alternative	• Airborne dust exposure during installation of extraction wells will be mitigated through dust control measures and use of appropriate PPE for workers. • Some disruption from installation of water lines from extraction wells to a new treatment plant. Directional boring for installation of water lines would significantly reduce impact to the community during construction. • Requires installation of a new water treatment plant which would have a longer period of disruption to the surrounding community.
Potential impacts to workers during implementation and the reliability of protective measures	• Installation of extraction wells could expose workers to contaminated groundwater. This is mitigated by use of appropriate PPE.
Potential adverse environmental impacts resulting from implementation of an alternative and the reliability of the available mitigation measure during implementation	• The potential negative impact to the environment from implementation of an air stripper water treatment facility is exposure to emissions from the stripper. • All drill cuttings from extraction well installation will be collected and disposed of in an appropriate landfill.
Short-Term Effectiveness Rating:	❹

Table D-GWU1-4D Evaluation Summary for Long-Term Effectiveness and Permanence – Alternative GWU1-4

Evaluation Factors for Long-Term Effectiveness and Permanence	Evaluation Summary
Magnitude of residual risk remaining from untreated waste or treatment residuals remaining at the conclusion of the remedial activities	• The off-gas discharge from the air stripper units is not anticipated to have measureable atmospheric impacts.
Adequacy and reliability of controls that are used to manage treatment residuals and untreated waste remaining at the Site	• Extraction wells have no treatment residuals. • No treatment residuals will remain onsite from the water treatment component of this alternative.
Long-Term Effectiveness and Permanence Rating:	❹

Table D-GWU1-4E Evaluation Summary for Reduction of Toxicity, Mobility, or Volume through Treatment – Alternative GWU1-4

Evaluation Factors for Reduction of Toxicity, Mobility, or Volume through Treatment	Evaluation Summary
The treatment process, the alternative uses, and materials they will treat	• The treatment component of this alternative is comprised of an air stripper with offgas discharge to the atmosphere.
The degree of expected reduction in toxicity, mobility, or volume of contamination due to treatment	• Air stripping is a highly effective method for removal of VOCs and SVOCs from groundwater.
The type and quantity of materials that will remain following treatment	• Levels of contaminants in extracted groundwater would be reduced to below KDHE Tier 2 action levels prior to discharge.
Whether the alternative would satisfy the statutory preference for treatment as a principal element of the remedial action.	• This alternative does provide a treatment component; however, it is not designed to actively treat all contaminated groundwater within GWU1. Active treatment will only be applied to groundwater extracted through hydraulic containment. MNA processes will address non-extracted groundwater.
Reduction of Toxicity, Mobility, or Volume through Treatment:	❸

Table D-GWU1-4F Implementability Evaluation Summary – Alternative GWU1-4

Evaluation Factors for Implementability		Evaluation Summary
Technical Feasibility	Technical difficulties and unknowns associated with the construction and operation of a technology	• There are not known obstacles to drilling within GWU1.
	Reliability of the technology, focusing on technical problems that will lead to schedule delays	• Direct-push well installation is a proven technology used nationwide for well installation in formations similar to the Site's.
Administrative Feasibility	Coordination issues with other office and agencies during construction or operations of the remedy.	• This alternative would require coordination between agencies and requires no permitting for treated discharge.
	The ability and time required to obtain necessary approvals and permits from other agencies for offsite actions or discharge scenarios	
Availability of Goods and Services	Availability of adequate offsite treatment, storage capacity, and disposal capacity and services	• Use of direct-push technology is a recognized effective method for well

Evaluation Factors for Implementability		Evaluation Summary
	Availability of necessary equipment and specialists required to completed construction of remedy components	installation. Direct-push drillers are located within the Wichita area. Drillers for installation of extraction wells are located within the Wichita area. • Directional drilling contractors for installation of water lines are located within the Wichita area. • Air strippers are also easily obtainable through many different competitive vendors.
	Availability of services and materials plus the potential for obtaining competitive bids	
	Availability of prospective technologies	
Implementability Rating:		❹

Table D-GWU1-4G Cost Evaluation Summary – Alternative GWU1-4

Evaluation Factors for Costs	Approximate Cost (Dollars)
Total Capital Costs	$1,356,000
Total Annual O&M Costs	$8,709,000
Total Periodic Cost	$1,208,000
Total Present Value Cost	$8,497,000
Cost Rating:	**$$$**

Note: Total costs are for the assumed period of evaluation (Years 1 through 35). Costs are rounded to the nearest $1,000.

Appendix D2
Detailed Analysis of Retained Alternatives
GWU3

Alternative GWU3-1 – No Action

Table D-GWU3-1A Evaluation Summary for Overall Protection of Human Health and the Environment – Alternative GWU3-1

Evaluation Factors for Overall Protection of Human Health and the Environment	Evaluation Summary
Adequate protection of human health and the environment (short- and long- term) from unacceptable risks posed by hazardous substances, pollutants, or contaminants present at the Site	• The No Action alternative does not address unacceptable risks posed by hazardous substances in groundwater. Therefore, this criterion is not met
Overall Protection of Human Health and the Environment Rating:	⓪

Table D-GWU3-1B Evaluation Summary for Compliance with ARARS – Alternative GWU3-1

Evaluation Factors for Compliance with ARARs	Evaluation Summary
Compliance with Chemical-Specific ARARS	• No action is taken to address groundwater contamination; therefore this criterion is not met.
Compliance with Location-Specific ARARS	• No action is taken to address groundwater contamination; therefore, this criterion is not met
Compliance with Action-Specific ARARS	• No action is taken to address groundwater contamination; therefore, this criterion is not met
Compliance with ARARs Rating:	⓪

Table D-GWU3-1C Short-Term Effectiveness Evaluation Summary – Alternative GWU3-1

Evaluation Factors for Short-Term Effectiveness	Evaluation Summary
Short-term risks that might be posed to the community during implementation of an alternative	• The short-term risks to the community are unchanged by this activity. No impacts to workers during implementation would occur and no adverse environmental impacts would occur during implementation; however, since short term risks are not addressed and the time frame is open ended, the criterion is not met.
Potential impacts to workers during implementation and the reliability of protective measures taken to minimize these impacts	
Potential adverse environmental impacts resulting from implementation of an alternative and the reliability of the available mitigation measure during implementation	
Short-Term Effectiveness Rating:	⓪

Table D-GWU3-1D Evaluation Summary for Long-Term Effectiveness and Permanence – Alternative GWU3-1

Evaluation Factors for Long-Term Effectiveness and Permanence	Evaluation Summary
Magnitude of residual risk remaining from untreated waste or treatment residuals remaining at the conclusion of the remedial activities	• No further remedial action would be undertaken to address groundwater contamination; therefore, this criterion is not met.
Adequacy and reliability of controls that are used to manage treatment residuals and untreated waste remaining at the Site	• No controls are put in place under the no action alternative • Contaminated groundwater remains uncontained at the Site
Long-Term Effectiveness and Permanence Rating:	⓪

Table D-GWU3-1E Evaluation Summary for Reduction of Toxicity, Mobility, or Volume through Treatment – Alternative GWU3-1

Evaluation Factors for Reduction of Toxicity, Mobility, or Volume through Treatment	Evaluation Summary
The treatment process, the alternative uses, and materials they will treat	• The No Action alternative does not provide a treatment component; therefore, this criterion is not met
The degree of expected reduction in toxicity, mobility, or volume of contamination due to treatment	
The type and quantity of materials that will remain following treatment	
Whether the alternative would satisfy the statutory preference for treatment as a principal element of the remedial action.	
Reduction of Toxicity, Mobility, or Volume through Treatment:	⓪

Table D-GWU3-1F Implementability Evaluation Summary – Alternative GWU3-1

Evaluation Factors for Implementability		Evaluation Summary
Technical Feasibility	Technical difficulties and unknowns associated with the construction and operation of a technology	• The No Action alternative has no technical component and is therefore highly implementable
	Reliability of the technology, focusing on technical problems that will lead to schedule delays	
Administrative Feasibility	Coordination issues with other office and agencies during construction or operations of the remedy.	• The No Action alternative has no administrative component and is therefore highly implementable
	The ability and time required to obtain necessary approvals and permits from other agencies for offsite actions or discharge scenarios	
Availability of Goods and Services	Availability of adequate offsite treatment, storage capacity, and disposal capacity and services	• The No Action alternative requires no goods and services and is therefore highly implementable
	Availability of necessary equipment and specialists required to completed construction of remedy components	

Evaluation Factors for Implementability		Evaluation Summary
	Availability of services and materials plus the potential for obtaining competitive bids	
	Availability of prospective technologies	
	Implementability Rating:	❺

Table D-GWU3-1G Cost Evaluation Summary – Alternative GWU3-1

Evaluation Factors for Costs	Approximate Cost (Dollars)
Total Capital Costs	$122,000
Total Annual O&M Costs	$2,674,000
Total Periodic Cost	$889,000
Total Present Value Cost	$2,192,000
Cost Rating:	**$$**

Note: Total costs are for the assumed period of evaluation (Years 1 through 70). Costs are rounded to the nearest $1,000

Alternative GWU3-2 – Groundwater Extraction (Containment Only) and Discharge after Treatment at Gilbert-Mosley Treatment Plant

Table D-GWU3-2A Evaluation Summary for Overall Protection of Human Health and the Environment – Alternative GWU3-2

Evaluation Factors for Overall Protection of Human Health and the Environment	Evaluation Summary
Adequate protection of human health and the environment (short- and long- term) from unacceptable risks posed by hazardous substances, pollutants, or contaminants present at the Site	• Containment of the groundwater plume via extraction wells and treatment will be protective of the environment; however, based upon modeling there is approximately 10% of NIC plume that would migrate offsite after installation of extraction wells in GWU3. This portion would currently be captured by either the Coleman Downtown wells and/or Gilbert-Mosley well EW-B3. Depending upon long term migration results and Coleman activities, the City may need to negotiate with Coleman regarding continued operation of their downtown wells. • Ongoing ICs, limiting new well installations, are protective of human health.
Overall Protection of Human Health and the Environment Rating:	❹

Table D-GWU3-2B Evaluation Summary for compliance with ARARS – Alternative GWU3-2

Evaluation Factors for Compliance with ARARs	Evaluation Summary
Compliance with Chemical-Specific ARARS	• Compliant with all chemical-specific ARARs, providing capture of the modeled 10% plume leaving the NIC Site occurs with the Gilbert-Mosley extraction wells.
Compliance with Location-Specific ARARS	• Compliant with all location-specific ARARs
Compliance with Action-Specific ARARS	• Compliant with all action-specific ARARs
Compliance with ARARs Rating:	❹

Table D-GWU3-2C Short-Term Effectiveness Evaluation Summary – Alternative GWU3-2

Evaluation Factors for Short-Term Effectiveness	Evaluation Summary
Short-term risks that might be posed to the community during implementation of an alternative	• Airborne dust exposure during installation of extraction wells will be mitigated through dust control measures and use of appropriate PPE for workers. • Some disruption from installation of water lines from extraction wells to the tie-in location with the Gilbert-Mosley Site piping. Directional boring for installation of water lines would significantly reduce impact to the community during construction.
Potential impacts to workers during implementation and the reliability of protective measures	• Installation of extraction wells could expose workers to contaminated groundwater. This is mitigated by use of appropriate PPE.
Potential adverse environmental impacts	• The potential negative impact to the environment from

resulting from implementation of an alternative and the reliability of the available mitigation measure during implementation	implementation of an air stripper water treatment facility is exposure to emissions from the stripper. • All drill cuttings from extraction well installation will be collected and disposed of in an appropriate landfill.
Short-Term Effectiveness Rating:	❹

Table D-GWU3-2D Evaluation Summary for Long-Term Effectiveness and Permanence – Alternative GWU3-2

Evaluation Factors for Long-Term Effectiveness and Permanence	Evaluation Summary
Magnitude of residual risk remaining from untreated waste or treatment residuals remaining at the conclusion of the remedial activities	• The off-gas discharge from the air stripper units is not anticipated to have measureable atmospheric impacts at the Gilbert-Mosley Treatment Plant.
Adequacy and reliability of controls that are used to manage treatment residuals and untreated waste remaining at the site	• Extraction wells have no treatment residuals
Long-Term Effectiveness and Permanence Rating:	❹

Table D-GWU3-2E Evaluation Summary for Reduction of Toxicity, Mobility, or Volume through Treatment – Alternative GWU3-2

Evaluation Factors for Reduction of Toxicity, Mobility, or Volume through Treatment	Evaluation Summary
The treatment process, the alternative uses, and materials they will treat	• The treatment component of this alternative is comprised of an air stripper with off-gas discharge
The degree of expected reduction in toxicity, mobility, or volume of contamination due to treatment	• Air stripping is a highly effective method for removal of VOCs and SVOCs from groundwater
The type and quantity of materials that will remain following treatment	• Levels of contaminants in extracted groundwater would be reduced to below KDHE Tier 2 action levels prior to discharge
Whether the alternative would satisfy the statutory preference for treatment as a principal element of the remedial action.	• This alternative does provide a treatment component; however, it is not designed to treat all contaminated groundwater within GWU3. Treatment would only be applied to groundwater extracted through hydraulic containment.
Reduction of Toxicity, Mobility, or Volume through Treatment:	❸

Table D-GWU3-2F Implementability Evaluation Summary – Alternative GWU3-2

Evaluation Factors for Implementability		Evaluation Summary
Technical Feasibility	Technical difficulties and unknowns associated with the construction and operation of a technology	• There are no known obstacles to drilling within GWU3
	Reliability of the technology, focusing on technical problems that will lead to schedule delays	• Direct-push well installation is a proven technology used nationwide for well installation in formations similar to the Site's. • The Gilbert-Mosley Treatment Plant has the capacity to treat the projected volume of groundwater from this Alternative for GWU3.

Evaluation Factors for Implementability		Evaluation Summary
Administrative Feasibility	Coordination issues with other office and agencies during construction or operations of the remedy.	• This alternative will require permitting for treated discharge. • Agreement between the City to operate Coleman Downtown wells outside of NIC Site could be necessary to ensure containment of the modeled 10% plume not captured via this alternative from GWU3.
	The ability and time required to obtain necessary approvals and permits from other agencies for offsite actions or discharge scenarios	
Availability of Goods and Services	Availability of adequate offsite treatment, storage capacity, and disposal capacity and services	• Use of direct-push technology is a recognized effective method for well installation. Direct-push drillers are located within the Wichita area. • Drillers for installation of extraction wells are located within the Wichita area. • Directional drilling contractors for installation of water lines are located within the Wichita area.
	Availability of necessary equipment and specialists required to completed construction of remedy components	
	Availability of services and materials plus the potential for obtaining competitive bids	
	Availability of prospective technologies	
	Implementability Rating:	❹

Table D-GWU3-2G Cost Evaluation Summary – Alternative GWU3-2

Evaluation Factors for Costs	Approximate Cost (Dollars)
Total Capital Costs	$1,557,000
Total Annual O&M Costs	$14,620,000
Total Periodic Cost	$2,216,000
Total Present Value Cost	$11,304,000
Cost Rating:	**$$$$**

Note: Total costs are for the assumed period of evaluation (Years 1 through 70). Costs are rounded to the nearest $1,000

Alternative GWU3-3 – Groundwater Extraction (Containment Only), New Treatment Plant, and Discharge to Chisholm Creek

Table D-GWU3-3A Evaluation Summary for Overall Protection of Human Health and the Environment – Alternative GWU3-3

Evaluation Factors for Overall Protection of Human Health and the Environment	Evaluation Summary
Adequate protection of human health and the environment (short- and long- term) from unacceptable risks posed by hazardous substances, pollutants, or contaminants present at the Site	• Containment of the groundwater plume via extraction wells and treatment will be protective of the environment; however, based upon modeling there is approximately 10% of NIC plume that would migrate offsite after installation of extraction wells in GWU3. This portion would currently be captured by either the Coleman Downtown wells and/or Gilbert-Mosley well EW-B3. Depending upon long term migration results and Coleman activities, the City may need to negotiate with Coleman regarding continued operation of their downtown wells. • Ongoing ICs, limiting new well installations, are protective of human health.
Overall Protection of Human Health and the Environment Rating:	❹

Table D-GWU3-3B Evaluation Summary for compliance with ARARS – Alternative GWU3-3

Evaluation Factors for Compliance with ARARs	Evaluation Summary
Compliance with Chemical-Specific ARARS	• Compliant with all chemical-specific ARARs, providing capture of the modeled 10% plume leaving the NIC Site occurs with the Gilbert-Mosley extraction wells.
Compliance with Location-Specific ARARS	• Compliant with all location-specific ARARs
Compliance with Action-Specific ARARS	• Compliant with all action-specific ARARs
Compliance with ARARs Rating:	❹

Table D-GWU3-3C Short-Term Effectiveness Evaluation Summary – Alternative GWU3-3

Evaluation Factors for Short-Term Effectiveness	Evaluation Summary
Short-term risks that might be posed to the community during implementation of an alternative	• Airborne dust exposure during installation of extraction wells will be mitigated through dust control measures and use of appropriate PPE for workers. • Some disruption from installation of water lines from extraction wells to a new treatment plant. Directional boring for installation of water lines would significantly reduce impact to the community during construction. • Requires installation of a new water treatment plant which would have a longer period of disruption to the surrounding community.
Potential impacts to workers during implementation and the reliability of protective measures	• Installation of extraction wells could expose workers to contaminated groundwater. This is mitigated by use of appropriate PPE.
Potential adverse environmental impacts	• The potential negative impact to the environment from

resulting from implementation of an alternative and the reliability of the available mitigation measure during implementation	implementation of an air stripper water treatment facility is exposure to emissions from the stripper. • All drill cuttings from extraction well installation will be collected and disposed of in an appropriate landfill.
Short-Term Effectiveness Rating:	❹

Table D-GWU3-3D Evaluation Summary for Long-Term Effectiveness and Permanence – Alternative GWU3-3

Evaluation Factors for Long-Term Effectiveness and Permanence	Evaluation Summary
Magnitude of residual risk remaining from untreated waste or treatment residuals remaining at the conclusion of the remedial activities	• The off-gas discharge from the air stripper units is not anticipated to have measureable atmospheric impacts.
Adequacy and reliability of controls that are used to manage treatment residuals and untreated waste remaining at the Site	• Extraction wells have no treatment residuals. • No treatment residuals will remain onsite from the water treatment component of this alternative.
Long-Term Effectiveness and Permanence Rating:	❹

Table D-GWU3-3E Evaluation Summary for Reduction of Toxicity, Mobility, or Volume through Treatment – Alternative GWU3-3

Evaluation Factors for Reduction of Toxicity, Mobility, or Volume through Treatment	Evaluation Summary
The treatment process, the alternative uses, and materials they will treat	• The treatment component of this alternative is comprised of an air stripper with off-gas discharge to the atmosphere.
The degree of expected reduction in toxicity, mobility, or volume of contamination due to treatment	• Air stripping is a highly effective method for removal of VOCs and SVOCs from groundwater.
The type and quantity of materials that will remain following treatment	• Levels of contaminants in extracted groundwater would be reduced to below KDHE Tier 2 action levels prior to discharge.
Whether the alternative would satisfy the statutory preference for treatment as a principal element of the remedial action.	• This alternative does provide a treatment component; however, it is not designed to treat all contaminated groundwater within GWU3. Treatment will only be applied to groundwater extracted through hydraulic containment.
Reduction of Toxicity, Mobility, or Volume through Treatment:	❸

Table D-GWU3-3F Implementability Evaluation Summary – Alternative GWU3-3

Evaluation Factors for Implementability		Evaluation Summary
Technical Feasibility	Technical difficulties and unknowns associated with the construction and operation of a technology	• There are not known obstacles to drilling within GWU3
	Reliability of the technology, focusing on technical problems that will lead to schedule delays	• Direct-push well installation is a proven technology used nationwide for well installation in formations similar to the Site's.
Administrative Feasibility	Coordination issues with other office and agencies during construction or operations of the remedy.	• This alternative will require permitting for treated discharge.

Evaluation Factors for Implementability		Evaluation Summary
	The ability and time required to obtain necessary approvals and permits from other agencies for offsite actions or discharge scenarios	• Agreement between the City to operate Coleman Downtown wells outside of NIC Site could be necessary to ensure containment of the modeled 10% plume not captured via this alternative from GWU3.
Availability of Goods and Services	Availability of adequate offsite treatment, storage capacity, and disposal capacity and services	• Use of direct-push technology is a recognized effective method for well installation. Direct-push drillers are located within the Wichita area. Drillers for installation of extraction wells are located within the Wichita area. • Directional drilling contractors for installation of water lines are located within the Wichita area. • Air strippers are also easily obtainable through many different competitive vendors.
	Availability of necessary equipment and specialists required to completed construction of remedy components	
	Availability of services and materials plus the potential for obtaining competitive bids	
	Availability of prospective technologies	
	Implementability Rating:	❹

Table D-GWU3-3G Cost Evaluation Summary – Alternative GWU3-3

Evaluation Factors for Costs	Approximate Cost (Dollars)
Total Capital Costs	$1,872,000
Total Annual O&M Costs	$16,776,000
Total Periodic Cost	$2,422,000
Total Present Value Cost	$12,784,000
Cost Rating:	**$$$$**

Note: Total costs are for the assumed period of evaluation (Years 1 through 70). Costs are rounded to the nearest $1,000

Alternative GWU3-4 – Groundwater Extraction (Containment and Interior Extraction), Treatment at Either the Gilbert-Mosley GWTP or a New Treatment Plant, and Discharge

Table D-GWU3-4A Evaluation Summary for Overall Protection of Human Health and the Environment – Alternative GWU3-4

Evaluation Factors for Overall Protection of Human Health and the Environment	Evaluation Summary
Adequate protection of human health and the environment (short- and long- term) from unacceptable risks posed by hazardous substances, pollutants, or contaminants present at the Site	• Containment of the groundwater plume via extraction wells and treatment will be protective of the environment; however, based upon modeling there is approximately 10% of NIC plume that would migrate offsite after installation of extraction wells in GWU3. This portion would currently be captured by either the Coleman Downtown wells and/or Gilbert-Mosley well EW-B3. Depending upon long term migration results and Coleman activities, the City may need to negotiate with Coleman regarding continued operation of their downtown wells. • Ongoing ICs, limiting new well installations, are protective of human health.
Overall Protection of Human Health and the Environment Rating:	❹

Table D-GWU3-4B Evaluation Summary for Compliance with ARARS – Alternative GWU3-4

Evaluation Factors for Compliance with ARARs	Evaluation Summary
Compliance with Chemical-Specific ARARS	• Compliant with all chemical-specific ARARs, providing capture of the modeled 10% plume leaving the NIC Site occurs with the Gilbert-Mosley extraction wells.
Compliance with Location-Specific ARARS	• This alternative is compliant with all location-specific ARARS
Compliance with Action-Specific ARARS	• This alternative is compliant with all action-specific ARARS
Compliance with ARARs Rating:	❹

Table D-GWU3-4C Short –Term Effectiveness Evaluation Summary – Alternative GWU3-4

Evaluation Factors for Short-Term Effectiveness	Evaluation Summary
Short-term risks that might be posed to the community during implementation of an alternative	• Airborne dust exposure during installation of extraction wells will be mitigated through dust control measures and use of appropriate PPE for workers. • Some disruption from installation of water lines from extraction wells to a new treatment plant. Directional boring for installation of water lines would significantly reduce impact to the community during construction. • Requires installation of a new water treatment plant which would have a longer period of disruption to the surrounding community.

Potential impacts to workers during implementation and the reliability of protective measures	• Installation of extraction wells could expose workers to contaminated groundwater. This is mitigated by use of appropriate PPE.
Potential adverse environmental impacts resulting from implementation of an alternative and the reliability of the available mitigation measure during implementation	• The potential negative impact to the environment from implementation of an air stripper water treatment facility is exposure to emissions from the stripper. • All drill cuttings from extraction well installation will be collected and disposed of in an appropriate landfill.
Short-Term Effectiveness Rating:	❹

Table D-GWU3-4D Evaluation Summary for Long-Term Effectiveness and Permanence – Alternative GWU3-4

Evaluation Factors for Long-Term Effectiveness and Permanence	Evaluation Summary
Magnitude of residual risk remaining from untreated waste or treatment residuals remaining at the conclusion of the remedial activities	• The off-gas discharge from the air stripper units is not anticipated to have measureable atmospheric impacts.
Adequacy and reliability of controls that are used to manage treatment residuals and untreated waste remaining at the Site	• Extraction wells have no treatment residuals. • No treatment residuals will remain onsite from the water treatment component of this alternative.
Long-Term Effectiveness and Permanence Rating:	❹

Table D-GWU3-4E Evaluation Summary for Reduction of Toxicity, Mobility, or Volume through Treatment – Alternative GWU3-4

Evaluation Factors for Reduction of Toxicity, Mobility, or Volume through Treatment	Evaluation Summary
The treatment process, the alternative uses, and materials they will treat	• The treatment component of this alternative is comprised of an air stripper with vapor GAC for off-gas treatment
The degree of expected reduction in toxicity, mobility, or volume of contamination due to treatment	• Air stripping is a highly effective method for removal of VOCs and SVOCs from groundwater
The type and quantity of materials that will remain following treatment	• Levels of contaminants in extracted groundwater will be reduced to below KDHE Tier 2 action levels prior to discharge. Spent carbon from the vapor GAC system will be disposed of in a designated offsite disposal area
Whether the alternative would satisfy the statutory preference for treatment as a principal element of the remedial action.	• This alternative does provide a treatment component; however, it is not designed to treat all contaminated groundwater within GWU3. Treatment will only be applied to groundwater extracted through hydraulic containment.
Reduction of Toxicity, Mobility, or Volume through Treatment:	❸

Table D-GWU3-4F Implementability Evaluation Summary – Alternative GWU3-4

Evaluation Factors for Implementability		Evaluation Summary
Technical Feasibility	Technical difficulties and unknowns associated with the construction and operation of a technology	• There are not known obstacles to drilling within GWU3

Evaluation Factors for Implementability		Evaluation Summary
	Reliability of the technology, focusing on technical problems that will lead to schedule delays	• Direct-push well installation is a proven technology used nationwide for well installation in formations similar to the Site's.
Administrative Feasibility	Coordination issues with other office and agencies during construction or operations of the remedy.	• This alternative will require permitting for treated discharge. • Agreement between the City to operate Coleman Downtown wells outside of NIC Site could be necessary to ensure containment of the modeled 10% plume not captured via this alternative from GWU3.
	The ability and time required to obtain necessary approvals and permits from other agencies for offsite actions or discharge scenarios	
Availability of Goods and Services	Availability of adequate offsite treatment, storage capacity, and disposal capacity and services	• Use of direct-push technology is a recognized effective method for well installation. Direct-push drillers are located within the Wichita area. • Drillers for installation of extraction wells are located within the Wichita area. • Directional drilling contractors for installation of water lines are located within the Wichita area. • Air strippers and vapor GAC units are also easily obtainable through many different competitive vendors.
	Availability of necessary equipment and specialists required to completed construction of remedy components	
	Availability of services and materials plus the potential for obtaining competitive bids	
	Availability of prospective technologies	
	Implementability Rating:	❹

Table D-GWU3-4G Cost Evaluation Summary – Alternative GWU3-4

Evaluation Factors for Costs	Approximate Cost (Dollars)
Total Capital Costs	$2,631,000
Total Annual O&M Costs	$21,074,000
Total Periodic Cost	$3,364,000
Total Present Value Cost	$16,422,000
Cost Rating:	**$$$$$**

Note: Total costs are for the assumed period of evaluation (Years 1 through 70). Costs are rounded to the nearest $1,000

Alternative GWU3-5 – Groundwater Extraction (Containment and Interior Extraction (Additional Wells)), Treatment at Either the Gilbert-Mosley GWTP or a New Treatment Plant, and Discharge

Table D-GWU3-5A Evaluation Summary for Overall Protection of Human Health and the Environment – Alternative GWU3-5

Evaluation Factors for Overall Protection of Human Health and the Environment	Evaluation Summary
Adequate protection of human health and the environment (short- and long- term) from unacceptable risks posed by hazardous substances, pollutants, or contaminants present at the Site	• Containment of the groundwater plume via extraction wells and treatment will be protective of the environment; however, based upon modeling there is approximately 10% of NIC plume that would migrate offsite after installation of extraction wells in GWU3. This portion would currently be captured by either the Coleman Downtown wells and/or Gilbert-Mosley well EW-B3. Depending upon long term migration results and Coleman activities, the City may need to negotiate with Coleman regarding continued operation of their downtown wells. • Ongoing ICs, limiting new well installations, are protective of human health.
Overall Protection of Human Health and the Environment Rating:	❹

Table D-GWU3-5B Evaluation Summary for Compliance with ARARS – Alternative GWU3-5

Evaluation Factors for Compliance with ARARs	Evaluation Summary
Compliance with Chemical-Specific ARARS	• Compliant with all chemical-specific ARARs, providing capture of the modeled 10% plume leaving the NIC Site occurs with the Gilbert-Mosley extraction wells.
Compliance with Location-Specific ARARS	• This alternative is compliant with all location-specific ARARS
Compliance with Action-Specific ARARS	• This alternative is compliant with all action-specific ARARS
Compliance with ARARs Rating:	❹

Table D-GWU3-5C Short –Term Effectiveness Evaluation Summary – Alternative GWU3-5

Evaluation Factors for Short-Term Effectiveness	Evaluation Summary
Short-term risks that might be posed to the community during implementation of an alternative	• Airborne dust exposure during installation of extraction wells will be mitigated through dust control measures and use of appropriate PPE for workers. • Some disruption from installation of water lines from extraction wells to a new treatment plant. Directional boring for installation of water lines would significantly reduce impact to the community during construction. • Requires installation of a new water treatment plant which would have a longer period of disruption to the surrounding community.

Potential impacts to workers during implementation and the reliability of protective measures	• Installation of extraction wells could expose workers to contaminated groundwater. This is mitigated by use of appropriate PPE.
Potential adverse environmental impacts resulting from implementation of an alternative and the reliability of the available mitigation measure during implementation	• The potential negative impact to the environment from implementation of an air stripper water treatment facility is exposure to emissions from the stripper. • All drill cuttings from extraction well installation will be collected and disposed of in an appropriate landfill.
Short-Term Effectiveness Rating:	❹

Table D-GWU3-5D Evaluation Summary for Long-Term Effectiveness and Permanence – Alternative GWU3-5

Evaluation Factors for Long-Term Effectiveness and Permanence	Evaluation Summary
Magnitude of residual risk remaining from untreated waste or treatment residuals remaining at the conclusion of the remedial activities	• The offgas discharge from the air stripper units is not anticipated to have measureable atmospheric impacts.
Adequacy and reliability of controls that are used to manage treatment residuals and untreated waste remaining at the Site	• Extraction wells have no treatment residuals. • No treatment residuals will remain onsite from the water treatment component of this alternative.
Long-Term Effectiveness and Permanence Rating:	❹

Table D-GWU3-5E Evaluation Summary for Reduction of Toxicity, Mobility, or Volume through Treatment – Alternative GWU3-5

Evaluation Factors for Reduction of Toxicity, Mobility, or Volume through Treatment	Evaluation Summary
The treatment process, the alternative uses, and materials they will treat	• The treatment component of this alternative is comprised of an air stripper with vapor GAC for off-gas treatment
The degree of expected reduction in toxicity, mobility, or volume of contamination due to treatment	• Air stripping is a highly effective method for removal of VOCs and SVOCs from groundwater
The type and quantity of materials that will remain following treatment	• Levels of contaminants in extracted groundwater will be reduced to below KDHE Tier 2 action levels prior to discharge. Spent carbon from the vapor GAC system will be disposed of in a designated offsite disposal area
Whether the alternative would satisfy the statutory preference for treatment as a principal element of the remedial action.	• This alternative does provide a treatment component; however, it is not designed to treat all contaminated groundwater within GWU3. Treatment will only be applied to groundwater extracted through hydraulic containment.
Reduction of Toxicity, Mobility, or Volume through Treatment:	❸

Table D-GWU3-5F Implementability Evaluation Summary – Alternative GWU3-5

Evaluation Factors for Implementability		Evaluation Summary
Technical Feasibility	Technical difficulties and unknowns associated with the construction and operation of a technology	• There are not known obstacles to drilling within GWU3

Evaluation Factors for Implementability		Evaluation Summary
	Reliability of the technology, focusing on technical problems that will lead to schedule delays	• Direct-push well installation is a proven technology used nationwide for well installation in formations similar to the Site's.
Administrative Feasibility	Coordination issues with other office and agencies during construction or operations of the remedy. The ability and time required to obtain necessary approvals and permits from other agencies for offsite actions or discharge scenarios	• This alternative will require permitting for treated discharge. • Agreement between the City to operate Coleman Downtown wells outside of NIC Site could be necessary to ensure containment of the modeled 10% plume not captured via this alternative from GWU3.
Availability of Goods and Services	Availability of adequate offsite treatment, storage capacity, and disposal capacity and services Availability of necessary equipment and specialists required to completed construction of remedy components Availability of services and materials plus the potential for obtaining competitive bids Availability of prospective technologies	• Use of direct-push technology is a recognized effective method for well installation. Direct-push drillers are located within the Wichita area. • Drillers for installation of extraction wells are located within the Wichita area. • Directional drilling contractors for installation of water lines are located within the Wichita area. • Air strippers and vapor GAC units are also easily obtainable through many different competitive vendors.
	Implementability Rating:	❹

Table D-GWU3-5G Cost Evaluation Summary – Alternative GWU3-5

Evaluation Factors for Costs	Approximate Cost (Dollars)
Total Capital Costs	$3,218,000
Total Annual O&M Costs	$21,585,000
Total Periodic Cost	$3,606,000
Total Present Value Cost	$25,776,000
Cost Rating:	**$$$$$**

Note: Total costs are for the assumed period of evaluation (Years 1 through 70). Costs are rounded to the nearest $1,000

Appendix D3
Detailed Analysis of Retained Alternatives
GWU4

Alternative GWU4-1 – No Action

Table D-GWU4-1A Evaluation Summary for Overall Protection of Human Health and the Environment – Alternative GWU4-1

Evaluation Factors for Overall Protection of Human Health and the Environment	Evaluation Summary
Adequate protection of human health and the environment (short- and long- term) from unacceptable risks posed by hazardous substances, pollutants, or contaminants present at the Site	• The No Action alternative does not address unacceptable risks posed by hazardous substances in groundwater; therefore, this criterion is not met
Overall Protection of Human Health and the Environment Rating:	⓪

Table D-GWU4-1B Evaluation Summary for Compliance with ARARs – Alternative GWU4-1

Evaluation Factors for Compliance with ARARs	Evaluation Summary
Compliance with Chemical-Specific ARARs	• No action is taken to address groundwater contamination; therefore this criterion is not met.
Compliance with Location-Specific ARARs	• No action is taken to address groundwater contamination; therefore, this criterion is not met
Compliance with Action-Specific ARARs	• No action is taken to address groundwater contamination; therefore, this criterion is not met
Compliance with ARARs Rating:	⓪

Table D-GWU4-1C Short-Term Effectiveness Evaluation Summary – Alternative GWU4-1

Evaluation Factors for Short-Term Effectiveness	Evaluation Summary
Short-term risks that might be posed to the community during implementation of an alternative	• The short-term risks to the community are unchanged by this activity. No impacts to workers during implementation would occur and no adverse environmental impacts would occur during implementation; however, since short term risks are not addressed and the time frame is open ended, the criterion is not met.
Potential impacts to workers during implementation and the reliability of protective measures taken to minimize these impacts	
Potential adverse environmental impacts resulting from implementation of an alternative and the reliability of the available mitigation measure during implementation	
Short-Term Effectiveness Rating:	⓪

Table D-GWU4-1D Evaluation Summary for Long-Term Effectiveness and Permanence – Alternative GWU4-1

Evaluation Factors for Long-Term Effectiveness and Permanence	Evaluation Summary
Magnitude of residual risk remaining from untreated waste or treatment residuals remaining at the conclusion of the remedial activities	• No further remedial action would be undertaken to address groundwater contamination; therefore, this criterion is not met.
Adequacy and reliability of controls that are used to manage treatment residuals and untreated waste	• No controls are put in place under the No Action alternative

remaining at the Site	• Contaminated groundwater remains uncontained at the Site
Long-Term Effectiveness and Permanence Rating:	⓪

Table D-GWU4-1E Evaluation Summary for Reduction of Toxicity, Mobility, or Volume through Treatment – Alternative GWU4-1

Evaluation Factors for Reduction of Toxicity, Mobility, or Volume through Treatment	Evaluation Summary
The treatment process, the alternative uses, and materials they will treat	• The No Action alternative does not provide a treatment component; therefore, this criterion is not met
The degree of expected reduction in toxicity, mobility, or volume of contamination due to treatment	
The type and quantity of materials that will remain following treatment	
Whether the alternative would satisfy the statutory preference for treatment as a principal element of the remedial action.	
Reduction of Toxicity, Mobility, or Volume through Treatment:	⓪

Table D-GWU4-1F Implementability Evaluation Summary – Alternative GWU4-1

Evaluation Factors for Implementability		Evaluation Summary
Technical Feasibility	Technical difficulties and unknowns associated with the construction and operation of a technology	• The No Action alternative has no technical component and is therefore highly implementable
	Reliability of the technology, focusing on technical problems that will lead to schedule delays	
Administrative Feasibility	Coordination issues with other office and agencies during construction or operations of the remedy.	• The No Action alternative has no administrative component and is therefore highly implementable
	The ability and time required to obtain necessary approvals and permits from other agencies for offsite actions or discharge scenarios	
Availability of Goods and Services	Availability of adequate offsite treatment, storage capacity, and disposal capacity and services	• The No Action alternative requires no goods and services and is therefore highly implementable
	Availability of necessary equipment and specialists required to completed construction of remedy components	
	Availability of services and materials plus the potential for obtaining competitive bids	
	Availability of prospective technologies	
	Implementability Rating:	❺

Table D-GWU4-1G Cost Evaluation Summary – Alternative GWU4-1

Evaluation Factors for Costs	Approximate Cost (Dollars)
Total Capital Costs	$124,000
Total Annual O&M Costs	$1,304,000
Total Periodic Cost	$312,000
Total Present Value Cost	$1,418,000
Cost Rating:	**$**

Note: Total costs are for the assumed period of evaluation (Years 1 through 28). Costs are rounded to the nearest $1,000

Alternative GWU4-2 – Groundwater Extraction (Containment Only), Discharge after Treatment at Gilbert-Mosley Treatment Plant

Table D-GWU4-2A Evaluation Summary for Overall Protection of Human Health and the Environment – Alternative GWU4-2

Evaluation Factors for Overall Protection of Human Health and the Environment	Evaluation Summary
Adequate protection of human health and the environment (short- and long- term) from unacceptable risks posed by hazardous substances, pollutants, or contaminants present at the Site	• Containment of the groundwater plume via extraction wells and treatment will be protective of the environment. • Ongoing ICs, limiting new well installations, are protective of human health.
Overall Protection of Human Health and the Environment Rating:	❹

Table D-GWU4-2B Evaluation Summary for Compliance with ARARs – Alternative GWU4-2

Evaluation Factors for Compliance with ARARs	Evaluation Summary
Compliance with Chemical-Specific ARARs	• Compliant with all chemical-specific ARARs
Compliance with Location-Specific ARARs	• Compliant with all location-specific ARARs
Compliance with Action-Specific ARARs	• Compliant with all action-specific ARARs
Compliance with ARARs Rating:	❺

Table D-GWU4-2C Short-Term Effectiveness Evaluation Summary – Alternative GWU4-2

Evaluation Factors for Short-Term Effectiveness	Evaluation Summary
Short-term risks that might be posed to the community during implementation of an alternative	• Airborne dust exposure during installation of extraction wells will be mitigated through dust control measures and use of appropriate PPE for workers. • Some disruption from installation of water lines from extraction wells to the Gilbert-Mosley GWTP header pipe. Directional boring for installation of water lines would significantly reduce impact to the community during construction.
Potential impacts to workers during implementation and the reliability of protective measures	• Installation of extraction wells could expose workers to contaminated groundwater. This is mitigated by use of appropriate PPE.
Potential adverse environmental impacts resulting from implementation of an alternative and the reliability of the available mitigation measure during implementation	• The potential negative impact to the environment from implementation of an air stripper water treatment facility is exposure to emissions from the stripper. • All drill cuttings from extraction well installation will be collected and disposed of in an appropriate landfill.
Short-Term Effectiveness Rating:	❹

Table D-GWU4-2D Evaluation Summary for Long-Term Effectiveness and Permanence – Alternative GWU4-2

Evaluation Factors for Long-Term Effectiveness and Permanence	Evaluation Summary
Magnitude of residual risk remaining from untreated waste or treatment residuals remaining at the conclusion of the remedial activities	• The vapors from the air stripper will not be treated but the anticipated concentrations are anticipated to be minor
Adequacy and reliability of controls that are used to manage treatment residuals and untreated waste remaining at the Site	• Extraction well has no treatment residuals • No anticipated treatment residuals are anticipated for stripping unit • The vapors from the air stripper unit will not be treated
Long-Term Effectiveness and Permanence Rating:	❹

Table D-GWU4-2E Evaluation Summary for Reduction of Toxicity, Mobility, or Volume through Treatment – Alternative GWU4-2

Evaluation Factors for Reduction of Toxicity, Mobility, or Volume through Treatment	Evaluation Summary
The treatment process, the alternative uses, and materials they will treat	• The treatment component of this alternative is comprised of an air stripper with off-gas discharge.
The degree of expected reduction in toxicity, mobility, or volume of contamination due to treatment	• Air stripping is a highly effective method for removal of VOCs and SVOCs from groundwater.
The type and quantity of materials that will remain following treatment	• Levels of contaminants in extracted groundwater will be reduced to below KDHE Tier 2 action levels prior to discharge.
Whether the alternative would satisfy the statutory preference for treatment as a principal element of the remedial action.	• This alternative does provide a treatment component; however, it will require time to capture all of the contaminated groundwater upgradient from the EW. Treatment will be applied to groundwater extracted through hydraulic containment.
Reduction of Toxicity, Mobility, or Volume through Treatment:	❸

Table D-GWU4-2F Implementability Evaluation Summary – Alternative GWU4-2

Evaluation Factors for Implementability		Evaluation Summary
Technical Feasibility	Technical difficulties and unknowns associated with the construction and operation of a technology	• There are no known obstacles to drilling within GWU4. • Will require additional capacity than currently exists at the Gilbert-Mosley Treatment Plant if GWU3 groundwater is also discharged to the Gilbert-Mosley Treatment Plant.
	Reliability of the technology, focusing on technical problems that will lead to schedule delays	• Direct-push well installation is a proven technology used nationwide for well installation in formations similar to the Site's.
Administrative Feasibility	Coordination issues with other office and agencies during construction or operations of the remedy.	• This alternative does require permitting for treated discharge.

Evaluation Factors for Implementability		Evaluation Summary
	The ability and time required to obtain necessary approvals and permits from other agencies for offsite actions or discharge scenarios	
Availability of Goods and Services	Availability of adequate offsite treatment, storage capacity, and disposal capacity and services	• Use of direct-push technology is a recognized effective method for well installation. Direct-push drillers are located within the Wichita area. • Drillers for installation of extraction wells are located within the Wichita area. • Directional drilling contractors for installation of water lines are located within the Wichita area.
	Availability of necessary equipment and specialists required to completed construction of remedy components	
	Availability of services and materials plus the potential for obtaining competitive bids	
	Availability of prospective technologies	
	Implementability Rating:	❹

Table D-GWU4-2G Cost Evaluation Summary – Alternative GWU4-2

Evaluation Factors for Costs	Approximate Cost (Dollars)
Total Capital Costs	$789,000
Total Annual O&M Costs	$3,300,000
Total Periodic Cost	$478,000
Total Present Value Cost	$3,745,000
Cost Rating:	**$$**

Note: Total costs are for the assumed period of evaluation (Years 1 through 28). Costs are rounded to the nearest $1,000

Alternative GWU4-3 – Groundwater Extraction (Containment Only), New Treatment Plant, Discharge to Storm Sewer

Table D-GWU4-3A Evaluation Summary for Overall Protection of Human Health and the Environment – Alternative GWU4-3

Evaluation Factors for Overall Protection of Human Health and the Environment	Evaluation Summary
Adequate protection of human health and the environment (short- and long- term) from unacceptable risks posed by hazardous substances, pollutants, or contaminants present at the Site	• Containment of the groundwater plume via extraction wells and treatment will be protective of the environment. • Ongoing ICs, limiting new well installations, are protective of human health.
Overall Protection of Human Health and the Environment Rating:	❹

Table D-GWU4-3B Evaluation Summary for Compliance with ARARs – Alternative GWU4-3

Evaluation Factors for Compliance with ARARs	Evaluation Summary
Compliance with Chemical-Specific ARARs	• Compliant with all chemical-specific ARARs
Compliance with Location-Specific ARARs	• Compliant with all location-specific ARARs
Compliance with Action-Specific ARARs	• Compliant with all action-specific ARARs
Compliance with ARARs Rating:	❺

Table D-GWU4-3C Short-Term Effectiveness Evaluation Summary – Alternative GWU4-3

Evaluation Factors for Short-Term Effectiveness	Evaluation Summary
Short-term risks that might be posed to the community during implementation of an alternative	• Airborne dust exposure during installation of extraction wells will be mitigated through dust control measures and use of appropriate PPE for workers. • Some disruption from installation of water lines from extraction wells to the new treatment plant. Directional boring for installation of water lines would significantly reduce impact to the community during construction.
Potential impacts to workers during implementation and the reliability of protective measures	• Installation of extraction wells could expose workers to contaminated groundwater. This is mitigated by use of appropriate PPE.
Potential adverse environmental impacts resulting from implementation of an alternative and the reliability of the available mitigation measure during implementation	• The potential negative impact to the environment from implementation of an air stripper water treatment facility is exposure to emissions from the stripper. • All drill cuttings from extraction well installation will be collected and disposed of in an appropriate landfill.
Short-Term Effectiveness Rating:	❹

Table D-GWU4-3D Evaluation Summary for Long-Term Effectiveness and Permanence – Alternative GWU4-3

Evaluation Factors for Long-Term Effectiveness and Permanence	Evaluation Summary
Magnitude of residual risk remaining from untreated	• The vapors from the air stripper will not be treated but

waste or treatment residuals remaining at the conclusion of the remedial activities	the anticipated concentrations are anticipated to be minor.
Adequacy and reliability of controls that are used to manage treatment residuals and untreated waste remaining at the Site	• Extraction well has no treatment residuals. • No anticipated treatment residuals are anticipated for stripping unit. • The vapors from the air stripper unit will not be treated.
Long-Term Effectiveness and Permanence Rating:	❹

Table D-GWU4-3E Evaluation Summary for Reduction of Toxicity, Mobility, or Volume through Treatment – Alternative GWU4-3

Evaluation Factors for Reduction of Toxicity, Mobility, or Volume through Treatment	Evaluation Summary
The treatment process, the alternative uses, and materials they will treat	• The treatment component of this alternative is comprised of an air stripper with vapors discharged to the atmosphere.
The degree of expected reduction in toxicity, mobility, or volume of contamination due to treatment	• Air stripping is a highly effective method for removal of VOCs and SVOCs from groundwater.
The type and quantity of materials that will remain following treatment	• Levels of contaminants in extracted groundwater will be reduced to below KDHE Tier 2 action levels prior to discharge.
Whether the alternative would satisfy the statutory preference for treatment as a principal element of the remedial action.	• This alternative does provide a treatment component; however, it will require time to capture all of the contaminated groundwater upgradient from the EW. Treatment will be applied to groundwater extracted through hydraulic containment.
Reduction of Toxicity, Mobility, or Volume through Treatment:	❸

Table D-GWU4-3F Implementability Evaluation Summary – Alternative GWU4-3

Evaluation Factors for Implementability		Evaluation Summary
Technical Feasibility	Technical difficulties and unknowns associated with the construction and operation of a technology	• There are not known obstacles to drilling within GWU4
	Reliability of the technology, focusing on technical problems that will lead to schedule delays	• Direct-push well installation is a proven technology used nationwide for well installation in formations similar to the Site's.
Administrative Feasibility	Coordination issues with other office and agencies during construction or operations of the remedy.	• This alternative would require coordination between agencies and requires no permitting for treated discharge.
	The ability and time required to obtain necessary approvals and permits from other agencies for offsite actions or discharge scenarios	
Availability of Goods and Services	Availability of adequate offsite treatment, storage capacity, and disposal capacity and services	• Use of direct-push technology is a recognized effective method for well installation. Direct-push drillers are located within the Wichita area. • Drillers for installation of extraction wells are located within the Wichita area. • Directional drilling contractors for
	Availability of necessary equipment and specialists required to completed construction of remedy components	
	Availability of services and materials plus the potential for obtaining competitive bids	

Evaluation Factors for Implementability		Evaluation Summary
	Availability of prospective technologies	installation of water lines are located within the Wichita area.
	Implementability Rating:	❹

Table D-GWU4-3G Cost Evaluation Summary – Alternative GWU4-3

Evaluation Factors for Costs	Approximate Cost (Dollars)
Total Capital Costs	$1,409,000
Total Annual O&M Costs	$4,504,000
Total Periodic Cost	$618,000
Total Present Value Cost	$5,373,000
Cost Rating:	**$$$**

Note: Total costs are for the assumed period of evaluation (Years 1 through 28). Costs are rounded to the nearest $1,000

Alternative GWU4-4 – Groundwater Extraction (Containment and Interior Extraction), Treatment at Either the Gilbert-Mosley GWTP or a New Treatment Plant, and Discharge

Table D-GWU4-4A Evaluation Summary for Overall Protection of Human Health and the Environment – Alternative GWU4-4

Evaluation Factors for Overall Protection of Human Health and the Environment	Evaluation Summary
Adequate protection of human health and the environment (short- and long- term) from unacceptable risks posed by hazardous substances, pollutants, or contaminants present at the Site	• Containment of the groundwater plume via extraction wells and treatment will be protective of the environment. • Ongoing ICs, limiting new well installations, are protective of human health.
Overall Protection of Human Health and the Environment Rating:	❹

Table D-GWU4-4B Evaluation Summary for Compliance with ARARs – Alternative GWU4-4

Evaluation Factors for Compliance with ARARs	Evaluation Summary
Compliance with Chemical-Specific ARARs	• Compliant with all chemical-specific ARARs
Compliance with Location-Specific ARARs	• Compliant with all location-specific ARARs
Compliance with Action-Specific ARARs	• Compliant with all action-specific ARARs
Compliance with ARARs Rating:	❺

Table D-GWU4-4C Short-Term Effectiveness Evaluation Summary – Alternative GWU4-4

Evaluation Factors for Short-Term Effectiveness	Evaluation Summary
Short-term risks that might be posed to the community during implementation of an alternative	• Airborne dust exposure during installation of extraction wells will be mitigated through dust control measures and use of appropriate PPE for workers. • Some disruption from installation of water lines from extraction wells to the new treatment plant. Directional boring for installation of water lines would significantly reduce impact to the community during construction.
Potential impacts to workers during implementation and the reliability of protective measures	• Installation of extraction wells could expose workers to contaminated groundwater. This is mitigated by use of appropriate PPE.
Potential adverse environmental impacts resulting from implementation of an alternative and the reliability of the available mitigation measure during implementation	• The potential negative impact to the environment from implementation of an air stripper water treatment facility is exposure to emissions from the stripper. • All drill cuttings from extraction well installation will be collected and disposed of in an appropriate landfill.
Short-Term Effectiveness Rating:	❹

Table D-GWU4-4D Evaluation Summary for Long-Term Effectiveness and Permanence – Alternative GWU4-4

Evaluation Factors for Long-Term Effectiveness and Permanence	Evaluation Summary
Magnitude of residual risk remaining from untreated waste or treatment residuals remaining at the conclusion of the remedial activities	• The vapors from the air stripper will not be treated but the anticipated concentrations are anticipated to be minor.
Adequacy and reliability of controls that are used to manage treatment residuals and untreated waste remaining at the Site	• Extraction well has no treatment residuals. • No anticipated treatment residuals are anticipated for stripping unit. • The vapors from the air stripper unit will not be treated.
Long-Term Effectiveness and Permanence Rating:	❺

Table D-GWU4-4E Evaluation Summary for Reduction of Toxicity, Mobility, or Volume through Treatment – Alternative GWU4-4

Evaluation Factors for Reduction of Toxicity, Mobility, or Volume through Treatment	Evaluation Summary
The treatment process, the alternative uses, and materials they will treat	• The treatment component of this alternative is comprised of an air stripper with vapors discharged to the atmosphere.
The degree of expected reduction in toxicity, mobility, or volume of contamination due to treatment	• Air stripping is a highly effective method for removal of VOCs and SVOCs from groundwater.
The type and quantity of materials that will remain following treatment	• Levels of contaminants in extracted groundwater will be reduced to below KDHE Tier 2 action levels prior to discharge.
Whether the alternative would satisfy the statutory preference for treatment as a principal element of the remedial action.	• This alternative does provide a treatment component; however, it will require time to capture all of the contaminated groundwater upgradient from the EWs. Treatment will be applied to groundwater extracted through hydraulic containment.
Reduction of Toxicity, Mobility, or Volume through Treatment:	❸

Table D-GWU4-4F Implementability Evaluation Summary – Alternative GWU4-4

Evaluation Factors for Implementability		Evaluation Summary
Technical Feasibility	Technical difficulties and unknowns associated with the construction and operation of a technology	• There are not known obstacles to drilling within GWU4
	Reliability of the technology, focusing on technical problems that will lead to schedule delays	• Direct-push well installation is a proven technology used nationwide for well installation in formations similar to the Site's. • The Gilbert-Mosley Treatment Plant has the capacity to treat the projected volume of groundwater from this Alternative for GWU4.
Administrative Feasibility	Coordination issues with other office and agencies during construction or operations of the remedy.	• This alternative would require coordination between agencies and

Evaluation Factors for Implementability		Evaluation Summary
	The ability and time required to obtain necessary approvals and permits from other agencies for offsite actions or discharge scenarios	requires no permitting for treated discharge.
Availability of Goods and Services	Availability of adequate offsite treatment, storage capacity, and disposal capacity and services	• Use of direct-push technology is a recognized effective method for well installation. Direct-push drillers are located within the Wichita area. • Drillers for installation of extraction wells are located within the Wichita area. • Directional drilling contractors for installation of water lines are located within the Wichita area.
	Availability of necessary equipment and specialists required to completed construction of remedy components	
	Availability of services and materials plus the potential for obtaining competitive bids	
	Availability of prospective technologies	
	Implementability Rating:	❹

Table D-GWU4-4G Cost Evaluation Summary – Alternative GWU4-4

Evaluation Factors for Costs	Approximate Cost (Dollars)
Total Capital Costs	$1,878,000
Total Annual O&M Costs	$3,670,000
Total Periodic Cost	$427,000
Total Present Value Cost	$7,298,000
Cost Rating:	**$$$**

Note: Total costs are for the assumed period of evaluation (Years 1 through 18). Costs are rounded to the nearest $1,000

Appendix E
Detailed Cost Analysis of Retained Alternatives

Appendix E1
Detailed Cost Analysis of Retained Alternatives for GWU1

COST SUMMARY INDEX

Sheet Name	Subtitle Name	Description
CS-S-GWU1	Alternative Cost Summary	Summary of GWU1 Alternative Costs
CS-GWU1-1	Cost Estimate Summary	Alternative GWU1-1 No Action
PV-GWU1-1	Present Value Analysis	Alternative GWU1-1 No Action
CS-GWU1-2	Cost Estimate Summary	Alternative GWU1-2 Monitored Natural Attentuation
PV-GWU1-2	Present Value Analysis	Alternative GWU1-2 Monitored Natural Attentuation
CS-GWU1-3	Cost Estimate Summary	Alternative GWU1-3 Anaerobic Bioremediation/Enhanced MNA
PV-GWU1-3	Present Value Analysis	Alternative GWU1-3 Anaerobic Bioremediation/Enhanced MNA
CS-GWU1-4	Cost Estimate Summary	Alternative GWU1-4 Extraction Well and MNA
PV-GWU1-4	Present Value Analysis	Alternative GWU1-4 Extraction Well and MNA
PV-AERFT	Annual Escalation Rate	Summary of Annual Escalation Rate Factors Table
PV-ADRFT	Annual Discount Rate Factors	Summary of Annual Discount Rate Factors Table

TABLE CS-S-GWU1

ALTERNATIVE COST SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Alternative	Total Capital Cost	Total Annual O&M Cost	Total Periodic Cost	Present Value Cost
GWU1-1	$129,000	$2,674,000	$878,000	$2,191,000
GWU1-2	$183,000	$8,100,000	$902,000	$5,532,000
GWU1-3	$3,630,000	$5,484,000	$2,526,000	$9,465,000
GWU1-4	$1,356,000	$8,709,000	$1,208,000	$8,497,000

Notes:

1 - Capital costs, annual costs, and periodic costs are presented on tables CS-GWU1-1 through CS-GWU1-4
2 - Estimated remedial timeframes and associated present value analysis for each remedial alternative are provided on tables PV-GWU1-1 through PV-GWU1-4.
3 - Costs presented have an expected accuracy range for feasibility study estimates (-30% to +50% of the actual cost of the alternative).

TABLE CS-GWU1-1

ALTERNATIVE GWU1-1
NO ACTION

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Alternative GWU1-1 would include ongoing monitoring to determine the extent of the groundwater plume. There would be no change in groundwater contaminant concentrations because no treatment, containment or removal of contaminated groundwater is included in this alternative. The No Action alternative is carried through the FS process as required by the NCP to provide a baseline set of conditions can be established against which other remedial actions may be compared.

CAPITAL COSTS: (Assumed to be Incurred During Year 1)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Institutional Controls	CW-1-GWU1	1	LS	$20,014	$20,014	
Miscellaneous Requirements for Sampling	CW-11-GWU1	1	LS	$50,143	$50,143	
				SUBTOTAL	$70,157	
Contingency (Scope and Bid)		20%			$14,031	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$84,188	
Project Management		10%			$8,419	Percentage from Exhibit 5-8 was used.
Remedial Design		0%			$0	No remedial design required under this alternative.
Construction Management		0%			$0	No construction management required under this alternative.
Technical Support		15%			$12,628	Middle value of the recommended range was used.
				TOTAL	$105,235	
				TOTAL CAPITAL COST	**$105,000**	Total capital cost is rounded to the nearest $1,000.

FUTURE CAPITAL COSTS: (Assumed to be Incurred During Year 70)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Monitoring Well Abandonment - No Action Alternative	CW-17-GWU1	1	LS	$12,377	$12,377	
				SUBTOTAL	$12,377	
Contingency (Scope and Bid)		20%			$2,475	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$14,852	
Project Management		10%			$1,485	Percentage from Exhibit 5-8 was used.
Remedial Design		20%			$2,970	Percentage from Exhibit 5-8 was used.
Construction Management		15%			$2,228	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$2,228	Middle value of the recommended range was used.
				TOTAL	$23,763	
				TOTAL FUTURE CAPITAL COST	**$24,000**	Total future capital cost is rounded to the nearest $1,000.

TABLE CS-GWU1-1

ALTERNATIVE GWU1-1

NO ACTION

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Alternative GWU1-1 would include ongoing monitoring to determine the extent of the groundwater plume. There would be no change in groundwater contaminant concentrations because no treatment, containment or removal of contaminated groundwater is included in this alternative. The No Action alternative is carried through the FS process as required by the NCP to provide a baseline set of conditions can be established against which other remedial actions may be compared.

QUARTERLY MONITORING COSTS: (Assumed to be Incurred During Year 1 through 2

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Groundwater Sampling Event - No Action Alternative	CW-7-GWU1	4	EA	$7,975	$31,900	
Groundwater Monitoring Event Report Preparation	CW-3-GWU1	4	EA	$13,165	$52,660	
				SUBTOTAL	$84,560	
Contingency (Scope and Bid)		20%			$16,912	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$101,472	
Project Management		8%			$8,118	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$15,221	Middle value of the recommended range was used.
				TOTAL	$124,811	
	TOTAL QUARTERLY MONITORING COSTS (Years 1 through 2)				**$125,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

SEMIANNUAL MONITORING COSTS: (Assumed to be Incurred During Year 3 through 10

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Groundwater Sampling Event - No Action Alternative	CW-7-GWU1	2	EA	$7,975	$15,950	
Groundwater Monitoring Event Report Preparation	CW-3-GWU1	2	EA	$13,165	$26,330	
				SUBTOTAL	$42,280	
Contingency (Scope and Bid)		20%			$8,456	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$50,736	
Project Management		10%			$5,074	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$7,610	Middle value of the recommended range was used.
				TOTAL	$63,420	
	TOTAL SEMIANNUAL MONITORING COST (Year 3 through 10)				**$63,000**	Total semiannual monitoring cost is rounded to the nearest $1,000.

ANNUAL MONITORING COSTS: (Assumed to be Incurred During Year 11 through 70

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Groundwater Sampling Event - No Action Alternative	CW-7-GWU1	1	EA	$7,975	$7,975	
Groundwater Monitoring Event Report Preparation	CW-3-GWU1	1	EA	$13,165	$13,165	
				SUBTOTAL	$21,140	
Contingency (Scope and Bid)		20%			$4,228	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$25,368	
Project Management		10%			$2,537	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$3,805	Middle value of the recommended range was used.
				TOTAL	$31,710	
	TOTAL ANNUAL MONITORING COST (Year 11 through 70)				**$32,000**	Total annual monitoring cost is rounded to the nearest $1,000.

TABLE CS-GWU1-1

ALTERNATIVE GWU1-1

NO ACTION

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Alternative GWU1-1 would include ongoing monitoring to determine the extent of the groundwater plume. There would be no change in groundwater contaminant concentrations because no treatment, containment or removal of contaminated groundwater is included in this alternative. The No Action alternative is carried through the FS process as required by the NCP to provide a baseline set of conditions can be established against which other remedial actions may be compared.

MONITORING WELL MAINTENANCE PERIODIC COSTS (Years 10, 20, 30, 40, 50, and 60)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Monitoring Well Maintenance - No Action Alternative	CW-14-GWU1	1	LS	$7,515	$7,515	Assumes well head repairs and development required.
				SUBTOTAL	$7,515	
Contingency (Scope and Bid)		20%			$1,503	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$9,018	
Project Management		10%			$902	The high end of the recommended range was used.
Technical Support		15%			$1,353	Middle value of the recommended range was used.
				TOTAL	$11,273	
	TOTAL MOINITORING WELL MAINTENANCE PERIODIC COST				**$11,000**	Periodic cost is rounded to the nearest $1,000.

FIVE-YEAR SITE REVIEW PERIODIC COSTS (Years 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, and 70)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Five-Year Site Review	CW-2-GWU1	1	LS	$38,547	$38,547	
				SUBTOTAL	$38,547	
Contingency (Scope and Bid)		20%			$7,709	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$46,256	
Project Management		10%			$4,626	The high end of the recommended range was used.
Technical Support		15%			$6,938	Middle value of the recommended range was used.
				TOTAL	$57,820	
	TOTAL FIVE-YEAR SITE REVIEW PERIODIC COST				**$58,000**	Periodic cost is rounded to the nearest $1,000.

Notes:
Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.

Abbreviations:

EA	Each
QTY	Quantity
LS	Lump Sum

TABLE PV-GWU1-1

ALTERNATIVE GWU1-1
NO ACTION

PRESENT VALUE ANALYSIS

Site:	North Industrial Corridor
Operable Unit:	GWU1
Location:	Wichita, Kansas
Phase:	Feasibility Study
Base Year:	2011

Escalation Rate:	**3%**
Discount Rate:	**5%**

		O&M COSTS		PERIODIC COSTS						
Year[1]	**Capital Costs[2]**	**O&M Costs[2]**	**Monitoring Costs[2]**	**Monitoring Well Maintenance[2,3]**	**Five-year Review Costs[2]**	**Total Annual Expenditure[4]**	**Escalation Factor (3%)**	**Escalated Cost[5]**	**Discount Factor (5%)**	**Present Value[6,7]**
0	$105,000	$0	$0	$0	$0	$105,000	1.0000	$105,000	1.0000	$105,000
1	$0	$0	$125,000	$0	$0	$125,000	1.0300	$128,750	0.9524	$122,622
2	$0	$0	$125,000	$0	$0	$125,000	1.0609	$132,613	0.9070	$120,280
3	$0	$0	$63,000	$0	$0	$63,000	1.0927	$68,840	0.8638	$59,464
4	$0	$0	$63,000	$0	$0	$63,000	1.1255	$70,907	0.8227	$58,335
5	$0	$0	$63,000	$0	$58,000	$121,000	1.1593	$140,275	0.7835	$109,906
6	$0	$0	$63,000	$0	$0	$63,000	1.1941	$75,228	0.7462	$56,135
7	$0	$0	$63,000	$0	$0	$63,000	1.2299	$77,484	0.7107	$55,068
8	$0	$0	$63,000	$0	$0	$63,000	1.2668	$79,808	0.6768	$54,014
9	$0	$0	$63,000	$0	$0	$63,000	1.3048	$82,202	0.6446	$52,988
10	$0	$0	$63,000	$11,000	$58,000	$132,000	1.3439	$177,395	0.6139	$108,903
11	$0	$0	$32,000	$0	$0	$32,000	1.3842	$44,294	0.5847	$25,899
12	$0	$0	$32,000	$0	$0	$32,000	1.4258	$45,626	0.5568	$25,404
13	$0	$0	$32,000	$0	$0	$32,000	1.4685	$46,992	0.5303	$24,920
14	$0	$0	$32,000	$0	$0	$32,000	1.5126	$48,403	0.5051	$24,448
15	$0	$0	$32,000	$0	$58,000	$90,000	1.5580	$140,220	0.4810	$67,446
16	$0	$0	$32,000	$0	$0	$32,000	1.6047	$51,350	0.4581	$23,524
17	$0	$0	$32,000	$0	$0	$32,000	1.6528	$52,890	0.4363	$23,076
18	$0	$0	$32,000	$0	$0	$32,000	1.7024	$54,477	0.4155	$22,635
19	$0	$0	$32,000	$0	$0	$32,000	1.7535	$56,112	0.3957	$22,204
20	$0	$0	$32,000	$11,000	$58,000	$101,000	1.8061	$182,416	0.3769	$68,753
21	$0	$0	$32,000	$0	$0	$32,000	1.8603	$59,530	0.3589	$21,365
22	$0	$0	$32,000	$0	$0	$32,000	1.9161	$61,315	0.3418	$20,958
23	$0	$0	$32,000	$0	$0	$32,000	1.9736	$63,155	0.3256	$20,563
24	$0	$0	$32,000	$0	$0	$32,000	2.0328	$65,050	0.3101	$20,172
25	$0	$0	$32,000	$0	$58,000	$90,000	2.0938	$188,442	0.2953	$55,647
26	$0	$0	$32,000	$0	$0	$32,000	2.1566	$69,011	0.2812	$19,406
27	$0	$0	$32,000	$0	$0	$32,000	2.2213	$71,082	0.2678	$19,036
28	$0	$0	$32,000	$0	$0	$32,000	2.2879	$73,213	0.2551	$18,677
29	$0	$0	$32,000	$0	$0	$32,000	2.3566	$75,411	0.2429	$18,317
30	$0	$0	$32,000	$11,000	$58,000	$101,000	2.4273	$245,157	0.2314	$56,729
31	$0	$0	$32,000	$0	$0	$32,000	2.5001	$80,003	0.2204	$17,633
32	$0	$0	$32,000	$0	$0	$32,000	2.5751	$82,403	0.2099	$17,296
33	$0	$0	$32,000	$0	$0	$32,000	2.6523	$84,874	0.1999	$16,966

TABLE PV-GWU1-1

ALTERNATIVE GWU1-1
NO ACTION

PRESENT VALUE ANALYSIS

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Escalation Rate:	**3%**
Discount Rate:	**5%**

		O&M COSTS		PERIODIC COSTS						
Year[1]	**Capital Costs[2]**	**O&M Costs[2]**	**Monitoring Costs[2]**	**Monitoring Well Maintenance[2,3]**	**Five-year Review Costs[2]**	**Total Annual Expenditure[4]**	**Escalation Factor (3%)**	**Escalated Cost[5]**	**Discount Factor (5%)**	**Present Value[6,7]**
34	$0	$0	$32,000	$0	$0	$32,000	2.7319	$87,421	0.1904	$16,645
35	$0	$0	$32,000	$0	$58,000	$90,000	2.8139	$253,251	0.1813	$45,914
36	$0	$0	$32,000	$0	$0	$32,000	2.8983	$92,746	0.1727	$16,017
37	$0	$0	$32,000	$0	$0	$32,000	2.9852	$95,526	0.1644	$15,705
38	$0	$0	$32,000	$0	$0	$32,000	3.0748	$98,394	0.1566	$15,408
39	$0	$0	$32,000	$0	$0	$32,000	3.1670	$101,344	0.1491	$15,110
40	$0	$0	$32,000	$11,000	$58,000	$101,000	3.2620	$329,462	0.1420	$46,784
41	$0	$0	$32,000	$0	$0	$32,000	3.3599	$107,517	0.1353	$14,547
42	$0	$0	$32,000	$0	$0	$32,000	3.4607	$110,742	0.1288	$14,264
43	$0	$0	$32,000	$0	$0	$32,000	3.5645	$114,064	0.1227	$13,996
44	$0	$0	$32,000	$0	$0	$32,000	3.6715	$117,488	0.1169	$13,734
45	$0	$0	$32,000	$0	$58,000	$90,000	3.7816	$340,344	0.1113	$37,880
46	$0	$0	$32,000	$0	$0	$32,000	3.8950	$124,640	0.1060	$13,212
47	$0	$0	$32,000	$0	$0	$32,000	4.0119	$128,381	0.1009	$12,954
48	$0	$0	$32,000	$0	$0	$32,000	4.1323	$132,234	0.0961	$12,708
49	$0	$0	$32,000	$0	$0	$32,000	4.2562	$136,198	0.0916	$12,476
50	$0	$0	$32,000	$11,000	$58,000	$101,000	4.3839	$442,774	0.0872	$38,610
51	$0	$0	$32,000	$0	$0	$32,000	4.5154	$144,493	0.0831	$12,007
52	$0	$0	$32,000	$0	$0	$32,000	4.6509	$148,829	0.0791	$11,772
53	$0	$0	$32,000	$0	$0	$32,000	4.7904	$153,293	0.0753	$11,543
54	$0	$0	$32,000	$0	$0	$32,000	4.9341	$157,891	0.0717	$11,321
55	$0	$0	$32,000	$0	$58,000	$90,000	5.0821	$457,389	0.0683	$31,240
56	$0	$0	$32,000	$0	$0	$32,000	5.2346	$167,507	0.0651	$10,905
57	$0	$0	$32,000	$0	$0	$32,000	5.3917	$172,534	0.0620	$10,697
58	$0	$0	$32,000	$0	$0	$32,000	5.5534	$177,709	0.0590	$10,485
59	$0	$0	$32,000	$0	$0	$32,000	5.7200	$183,040	0.0562	$10,287
60	$0	$0	$32,000	$11,000	$58,000	$101,000	5.8916	$595,052	0.0535	$31,835
61	$0	$0	$32,000	$0	$0	$32,000	6.0684	$194,189	0.0510	$9,904
62	$0	$0	$32,000	$0	$0	$32,000	6.2504	$200,013	0.0486	$9,721
63	$0	$0	$32,000	$0	$0	$32,000	6.4379	$206,013	0.0462	$9,518
64	$0	$0	$32,000	$0	$0	$32,000	6.6311	$212,195	0.0440	$9,337
65	$0	$0	$32,000	$0	$58,000	$90,000	6.8300	$614,700	0.0419	$25,756
66	$0	$0	$32,000	$0	$0	$32,000	7.0349	$225,117	0.0399	$8,982
67	$0	$0	$32,000	$0	$0	$32,000	7.2459	$231,869	0.0380	$8,811

TABLE PV-GWU1-1

ALTERNATIVE GWU1-1
NO ACTION

PRESENT VALUE ANALYSIS

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Escalation Rate:	**3%**
Discount Rate:	**5%**

		O&M COSTS		PERIODIC COSTS						
Year[1]	**Capital Costs[2]**	**O&M Costs[2]**	**Monitoring Costs[2]**	**Monitoring Well Maintenance[2,3]**	**Five-year Review Costs[2]**	**Total Annual Expenditure[4]**	**Escalation Factor (3%)**	**Escalated Cost[5]**	**Discount Factor (5%)**	**Present Value[6,7]**
68	$0	$0	$32,000	$0	$0	$32,000	7.4633	$238,826	0.0362	$8,645
69	$0	$0	$32,000	$0	$0	$32,000	7.6872	$245,990	0.0345	$8,487
70	$24,000	$0	$32,000	$0	$58,000	$114,000	7.9178	$902,629	0.0329	$29,697
TOTALS:	**$129,000**	**$0**	**$2,674,000**	**$66,000**	**$812,000**	**$3,681,000**		**$11,521,730**		$2,190,703
TOTAL PRESENT VALUE OF ALTERNATIVE GWU1-1										**$2,191,000**

Notes:

1 - Duration is assumed to be 70 years for present value analysis. Estimated remedial timeframes are discussed within the FS report.

2 - Capital costs, for purposes of this analysis, are assumed to be distributed as indicated on Table CS-GWU1-1

3 - Includes replacement of monitoring well vault and development.

4 - Total annual expenditure is the total cost per year with no escalation or discounting.

5 - Escalation cost is the total cost per year including an escalation rate for that year. See Table PV-AERFT for details.

6 - Present value is the total cost per year including a discount factor for that year. See Table PV-ADRFT for details.

7 - Total present value is rounded to the nearest $1,000. Depreciation is excluded from the present value cost.

TABLE CS-GWU1-2

ALTERNATIVE GWU1-2

MONITORED NATURAL ATTENTUATION

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Alternative GWU1-2 tracks the natural attenuation process occurring, demonstrating decreasing trends in COC contamination within the groundwater plume overtime. The MNA potential determined for each GWU at the Site was highest downgradient of GWU1 due in part to carbon source contaminants from the former refinery operations downgradient of GWU1. All MNA monitoring will be conducted downgradient of GWU1.

Should the monitoring and statistical analysis of data collected in support of MNA demonstrate an increasing trend in COC contaminant concentrations, anaerobic bioremediation would be instituted along the hydraulic boundary formed by Chisholm Creek adjacent to and downgradient of GWU1 near the leading edge of the chlorinated solvent groundwater plume downgradient from GWU1.

CAPITAL COSTS: (Assumed to be Incurred During Year 1)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Institutional Controls	CW-1-GWU1	1	LS	$20,014	$20,014	
Miscellaneous Requirements for Sampling	CW-11-GWU1	1	LS	$50,143	$50,143	Contractor plans
Monitoring Well Installation	CW-13-GWU1	1	LS	$6,547	$6,547	Additional monitoring well clusters to increase monitoring coverage.
				SUBTOTAL	$76,704	
Contingency (Scope and Bid)		20%			$15,341	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$92,045	
Project Management		10%			$9,205	Percentage from Exhibit 5-8 was used.
Remedial Design		20%			$18,409	Percentage from Exhibit 5-8 was used.
Construction Management		15%			$13,807	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$13,807	Middle value of the recommended range was used.
				TOTAL	$147,273	
				TOTAL CAPITAL COST	**$147,000**	Total capital cost is rounded to the nearest $1,000.

FUTURE CAPITAL COSTS: (Assumed to be Incurred During Year 70)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Monitoring Well Abandonment - MNA	CW-19-GWU1	1	LS	$18,532	$18,532	
				SUBTOTAL	$18,532	
Contingency (Scope and Bid)		20%			$3,706	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$22,238	
Project Management		10%			$2,224	Percentage from Exhibit 5-8 was used.
Remedial Design		20%			$4,448	Percentage from Exhibit 5-8 was used.
Construction Management		15%			$3,336	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$3,336	Middle value of the recommended range was used.
				TOTAL	$35,582	
				TOTAL FUTURE CAPITAL COST	**$36,000**	Total future capital cost is rounded to the nearest $1,000.

TABLE CS-GWU1-2

ALTERNATIVE GWU1-2

MONITORED NATURAL ATTENTUATION

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Alternative GWU1-2 tracks the natural attenuation process occurring, demonstrating decreasing trends in COC contamination within the groundwater plume overtime. The MNA potential determined for each GWU at the Site was highest downgradient of GWU1 due in part to carbon source contaminants from the former refinery operations downgradient of GWU1. All MNA monitoring will be conducted downgradient of GWU1.

Should the monitoring and statistical analysis of data collected in support of MNA demonstrate an increasing trend in COC contaminant concentrations, anaerobic bioremediation would be instituted along the hydraulic boundary formed by Chisholm Creek adjacent to and downgradient of GWU1 near the leading edge of the chlorinated solvent groundwater plume downgradient from GWU1.

QUARTERLY MONITORING ANNUAL COSTS: (Assumed to be Incurred During Year 1 through 2

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
MNA Groundwater Sampling Event	CW-8-GWU1	4	EA	$24,751	$99,004	Includes 4 surface water sampling points for VOCs only
MNA Groundwater Monitoring Event Report Preparation	CW-4-GWU1	4	EA	$39,656	$158,624	
				SUBTOTAL	$257,628	
Contingency (Scope and Bid)		20%			$51,526	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$309,154	
Project Management		8%			$24,732	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$46,373	Middle value of the recommended range was used.
				TOTAL	$380,259	
	TOTAL QUARTERLY MONITORING COSTS (Years 1 through 2)				**$380,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

SEMIANNUAL MONITORING ANNUAL COSTS: (Assumed to be Incurred During Year 3 through 10

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
MNA Groundwater Sampling Event	CW-8-GWU1	2	EA	$24,751	$49,502	Includes 4 surface water sampling points for VOCs only
MNA Groundwater Monitoring Event Report Preparation	CW-4-GWU1	2	EA	$39,656	$79,312	
				SUBTOTAL	$128,814	
Contingency (Scope and Bid)		20%			$25,763	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$154,577	
Project Management		8%			$12,366	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$23,187	Middle value of the recommended range was used.
				TOTAL	$190,130	
	TOTAL SEMIANNUAL MONITORING COST (Year 3 through 10)				**$190,000**	Total semiannual monitoring cost is rounded to the nearest $1,000.

ANNUAL MONITORING ANNUAL COSTS: (Assumed to be Incurred During Year 11 through 70

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
MNA Groundwater Sampling Event	CW-8-GWU1	1	EA	$24,751	$24,751	Includes 4 surface water sampling points for VOCs only
MNA Groundwater Monitoring Event Report Preparation	CW-4-GWU1	1	EA	$39,656	$39,656	
				SUBTOTAL	$64,407	
Contingency (Scope and Bid)		20%			$12,881	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$77,288	
Project Management		10%			$7,729	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$11,593	Middle value of the recommended range was used.
				TOTAL	$96,610	
	TOTAL ANNUAL MONITORING COST (Year 11 through 70)				**$97,000**	Total annual monitoring cost is rounded to the nearest $1,000.

TABLE CS-GWU1-2

ALTERNATIVE GWU1-2

MONITORED NATURAL ATTENTUATION

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Alternative GWU1-2 tracks the natural attenuation process occurring, demonstrating decreasing trends in COC contamination within the groundwater plume overtime. The MNA potential determined for each GWU at the Site was highest downgradient of GWU1 due in part to carbon source contaminants from the former refinery operations downgradient of GWU1. All MNA monitoring will be conducted downgradient of GWU1.

Should the monitoring and statistical analysis of data collected in support of MNA demonstrate an increasing trend in COC contaminant concentrations, anaerobic bioremediation would be instituted along the hydraulic boundary formed by Chisholm Creek adjacent to and downgradient of GWU1 near the leading edge of the chlorinated solvent groundwater plume downgradient from GWU1.

MONITORING WELL MAINTENANCE PERIODIC COSTS (Years 10, 20, 30, 40, 50, and 60)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Monitoring Well Maintenance - MNA	CW-16-GWU1	1	LS	$9,980	$9,980	
				SUBTOTAL	$9,980	
Contingency (Scope and Bid)		20%			$1,996	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$11,976	
Project Management		10%			$1,198	The high end of the recommended range was used.
Technical Support		15%			$1,796	Middle value of the recommended range was used.
				TOTAL	$14,970	
	TOTAL MOINITORING WELL MAINTENANCE PERIODIC COST				**$15,000**	Periodic cost is rounded to the nearest $1,000.

FIVE-YEAR SITE REVIEW PERIODIC COSTS (Years 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, and 70)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Five-Year Site Review	CW-2-GWU1	1	LS	$38,547	$38,547	
				SUBTOTAL	$38,547	
Contingency (Scope and Bid)		20%			$7,709	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$46,256	
Project Management		10%			$4,626	The high end of the recommended range was used.
Technical Support		15%			$6,938	Middle value of the recommended range was used.
				TOTAL	$57,820	
	TOTAL FIVE-YEAR SITE REVIEW PERIODIC COST				**$58,000**	Periodic cost is rounded to the nearest $1,000.

Notes:
Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.

Abbreviations:

EA	Each
QTY	Quantity
LS	Lump Sum

TABLE PV-GWU1-2

ALTERNATIVE GWU1-2
MONITORED NATURAL ATTENTUATION

PRESENT VALUE ANALYSIS

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Escalation Rate:	**3%**
Discount Rate:	**5%**

		O&M COSTS		PERIODIC COSTS						
Year[1]	**Capital Costs[2]**	**O&M Costs[2]**	**Monitoring Costs[2]**	**Monitoring Well Maintenance[2,3]**	**Five-year Review Costs[2]**	**Total Annual Expenditure[4]**	**Escalation Factor (3%)**	**Escalated Cost[5]**	**Discount Factor (5%)**	**Present Value[6,7]**
0	$147,000	$0	$0	$0	$0	$147,000	1.0000	$147,000	1.0000	$147,000
1	$0	$0	$380,000	$0	$0	$380,000	1.0300	$391,400	0.9524	$372,769
2	$0	$0	$380,000	$0	$0	$380,000	1.0609	$403,142	0.9070	$365,650
3	$0	$0	$190,000	$0	$0	$190,000	1.0927	$207,613	0.8638	$179,336
4	$0	$0	$190,000	$0	$0	$190,000	1.1255	$213,845	0.8227	$175,930
5	$0	$0	$190,000	$0	$58,000	$248,000	1.1593	$287,506	0.7835	$225,261
6	$0	$0	$190,000	$0	$0	$190,000	1.1941	$226,879	0.7462	$169,297
7	$0	$0	$190,000	$0	$0	$190,000	1.2299	$233,681	0.7107	$166,077
8	$0	$0	$190,000	$0	$0	$190,000	1.2668	$240,692	0.6768	$162,900
9	$0	$0	$190,000	$0	$0	$190,000	1.3048	$247,912	0.6446	$159,804
10	$0	$0	$190,000	$15,000	$58,000	$263,000	1.3439	$353,446	0.6139	$216,980
11	$0	$0	$97,000	$0	$0	$97,000	1.3842	$134,267	0.5847	$78,506
12	$0	$0	$97,000	$0	$0	$97,000	1.4258	$138,303	0.5568	$77,007
13	$0	$0	$97,000	$0	$0	$97,000	1.4685	$142,445	0.5303	$75,538
14	$0	$0	$97,000	$0	$0	$97,000	1.5126	$146,722	0.5051	$74,109
15	$0	$0	$97,000	$0	$58,000	$155,000	1.5580	$241,490	0.4810	$116,157
16	$0	$0	$97,000	$0	$0	$97,000	1.6047	$155,656	0.4581	$71,306
17	$0	$0	$97,000	$0	$0	$97,000	1.6528	$160,322	0.4363	$69,948
18	$0	$0	$97,000	$0	$0	$97,000	1.7024	$165,133	0.4155	$68,613
19	$0	$0	$97,000	$0	$0	$97,000	1.7535	$170,090	0.3957	$67,304
20	$0	$0	$97,000	$15,000	$58,000	$170,000	1.8061	$307,037	0.3769	$115,722
21	$0	$0	$97,000	$0	$0	$97,000	1.8603	$180,449	0.3589	$64,763
22	$0	$0	$97,000	$0	$0	$97,000	1.9161	$185,862	0.3418	$63,528
23	$0	$0	$97,000	$0	$0	$97,000	1.9736	$191,439	0.3256	$62,333
24	$0	$0	$97,000	$0	$0	$97,000	2.0328	$197,182	0.3101	$61,146
25	$0	$0	$97,000	$0	$58,000	$155,000	2.0938	$324,539	0.2953	$95,836
26	$0	$0	$97,000	$0	$0	$97,000	2.1566	$209,190	0.2812	$58,824
27	$0	$0	$97,000	$0	$0	$97,000	2.2213	$215,466	0.2678	$57,702
28	$0	$0	$97,000	$0	$0	$97,000	2.2879	$221,926	0.2551	$56,613
29	$0	$0	$97,000	$0	$0	$97,000	2.3566	$228,590	0.2429	$55,525
30	$0	$0	$97,000	$15,000	$58,000	$170,000	2.4273	$412,641	0.2314	$95,485
31	$0	$0	$97,000	$0	$0	$97,000	2.5001	$242,510	0.2204	$53,449
32	$0	$0	$97,000	$0	$0	$97,000	2.5751	$249,785	0.2099	$52,430
33	$0	$0	$97,000	$0	$0	$97,000	2.6523	$257,273	0.1999	$51,429
34	$0	$0	$97,000	$0	$0	$97,000	2.7319	$264,994	0.1904	$50,455

TABLE PV-GWU1-2

ALTERNATIVE GWU1-2
MONITORED NATURAL ATTENTUATION

PRESENT VALUE ANALYSIS

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Escalation Rate:	**3%**
Discount Rate:	**5%**

		O&M COSTS		PERIODIC COSTS						
Year[1]	**Capital Costs[2]**	**O&M Costs[2]**	**Monitoring Costs[2]**	**Monitoring Well Maintenance[2,3]**	**Five-year Review Costs[2]**	**Total Annual Expenditure[4]**	**Escalation Factor (3%)**	**Escalated Cost[5]**	**Discount Factor (5%)**	**Present Value[6,7]**
35	$0	$0	$97,000	$0	$58,000	$155,000	2.8139	$436,155	0.1813	$79,075
36	$0	$0	$97,000	$0	$0	$97,000	2.8983	$281,135	0.1727	$48,552
37	$0	$0	$97,000	$0	$0	$97,000	2.9852	$289,564	0.1644	$47,604
38	$0	$0	$97,000	$0	$0	$97,000	3.0748	$298,256	0.1566	$46,707
39	$0	$0	$97,000	$0	$0	$97,000	3.1670	$307,199	0.1491	$45,803
40	$0	$0	$97,000	$15,000	$58,000	$170,000	3.2620	$554,540	0.1420	$78,745
41	$0	$0	$97,000	$0	$0	$97,000	3.3599	$325,910	0.1353	$44,096
42	$0	$0	$97,000	$0	$0	$97,000	3.4607	$335,688	0.1288	$43,237
43	$0	$0	$97,000	$0	$0	$97,000	3.5645	$345,757	0.1227	$42,424
44	$0	$0	$97,000	$0	$0	$97,000	3.6715	$356,136	0.1169	$41,632
45	$0	$0	$97,000	$0	$58,000	$155,000	3.7816	$586,148	0.1113	$65,238
46	$0	$0	$97,000	$0	$0	$97,000	3.8950	$377,815	0.1060	$40,048
47	$0	$0	$97,000	$0	$0	$97,000	4.0119	$389,154	0.1009	$39,266
48	$0	$0	$97,000	$0	$0	$97,000	4.1323	$400,833	0.0961	$38,520
49	$0	$0	$97,000	$0	$0	$97,000	4.2562	$412,851	0.0916	$37,817
50	$0	$0	$97,000	$15,000	$58,000	$170,000	4.3839	$745,263	0.0872	$64,987
51	$0	$0	$97,000	$0	$0	$97,000	4.5154	$437,994	0.0831	$36,397
52	$0	$0	$97,000	$0	$0	$97,000	4.6509	$451,137	0.0791	$35,685
53	$0	$0	$97,000	$0	$0	$97,000	4.7904	$464,669	0.0753	$34,990
54	$0	$0	$97,000	$0	$0	$97,000	4.9341	$478,608	0.0717	$34,316
55	$0	$0	$97,000	$0	$58,000	$155,000	5.0821	$787,726	0.0683	$53,802
56	$0	$0	$97,000	$0	$0	$97,000	5.2346	$507,756	0.0651	$33,055
57	$0	$0	$97,000	$0	$0	$97,000	5.3917	$522,995	0.0620	$32,426
58	$0	$0	$97,000	$0	$0	$97,000	5.5534	$538,680	0.0590	$31,782
59	$0	$0	$97,000	$0	$0	$97,000	5.7200	$554,840	0.0562	$31,182
60	$0	$0	$97,000	$15,000	$58,000	$170,000	5.8916	$1,001,572	0.0535	$53,584
61	$0	$0	$97,000	$0	$0	$97,000	6.0684	$588,635	0.0510	$30,020
62	$0	$0	$97,000	$0	$0	$97,000	6.2504	$606,289	0.0486	$29,466
63	$0	$0	$97,000	$0	$0	$97,000	6.4379	$624,476	0.0462	$28,851
64	$0	$0	$97,000	$0	$0	$97,000	6.6311	$643,217	0.0440	$28,302
65	$0	$0	$97,000	$0	$58,000	$155,000	6.8300	$1,058,650	0.0419	$44,357
66	$0	$0	$97,000	$0	$0	$97,000	7.0349	$682,385	0.0399	$27,227
67	$0	$0	$97,000	$0	$0	$97,000	7.2459	$702,852	0.0380	$26,708
68	$0	$0	$97,000	$0	$0	$97,000	7.4633	$723,940	0.0362	$26,207
69	$0	$0	$97,000	$0	$0	$97,000	7.6872	$745,658	0.0345	$25,725

TABLE PV-GWU1-2

ALTERNATIVE GWU1-2
MONITORED NATURAL ATTENTUATION

PRESENT VALUE ANALYSIS

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Escalation Rate:	**3%**
Discount Rate:	**5%**

		O&M COSTS		PERIODIC COSTS						
Year[1]	**Capital Costs[2]**	**O&M Costs[2]**	**Monitoring Costs[2]**	**Monitoring Well Maintenance[2,3]**	**Five-year Review Costs[2]**	**Total Annual Expenditure[4]**	**Escalation Factor (3%)**	**Escalated Cost[5]**	**Discount Factor (5%)**	**Present Value[6,7]**
70	$36,000	$0	$97,000	$0	$58,000	$191,000	7.9178	$1,512,300	0.0329	$49,755
TOTALS:	**$183,000**	**$0**	**$8,100,000**	**$90,000**	**$812,000**	**$9,185,000**		**$28,173,208**		$5,532,320
TOTAL PRESENT VALUE OF ALTERNATIVE GWU1-2										**$5,532,000**

Notes:

1 - Duration is assumed to be 70 years for present value analysis. Estimated remedial timeframes are discussed within the FS report.

2 - Capital costs, for purposes of this analysis, are assumed to be distributed as indicated on Table CS-GWU1-2

3 - Includes replacement of monitoring well vault and development.

4 - Includes replacement of pumps, generator, hoses, fittings, etc.

5 - Escalation cost is the total cost per year including an escalation rate for that year. See Table PV-AERFT for details.

6 - Present value is the total cost per year including a discount factor for that year. See Table PV-ADRFT for details.

7 - Total present value is rounded to the nearest $1,000. Depreciation is excluded from the present value cost.

TABLE CS-GWU1-3

ALTERNATIVE GWU1-3

ANAEROBIC BIOREMEDIATION/ENHANCED MNA

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Alternative GWU1-3 involves installing a series of injection wells at the leading edge of a groundwater contaminant plume to inject a carbon source, electron donor, or possible bioaugmentation into the saturated zone of the aquifer, enhancing MNA of chlorinated COCs in the groundwater. Pilot studies will determine the optimum substrate, injection mechanism (gravity feed or low pressure) and the injection well configuration. The existing groundwater monitoring system would be expanded as needed to determine the rate of degradation and to determine the need for bioaugmentation. Assumes an initial full-scale injection event, followed by a second injection event at 2 years, and a third injection event at 4 years.

CAPITAL COSTS: (Assumed to be Incurred During Year 1)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Institutional Controls	CW-1-GWU1	1	LS	$20,014	$20,014	
Miscellaneous Requirements for Sampling	CW-11-GWU1	1	LS	$50,143	$50,143	Contractor plans
Mobilization and Demobilization of Drill Rig	CW-23-GWU1	1	LS	$10,610	$10,610	For installation of pilot-test injection wells
Injection Well Installation	CW-24-GWU1	4	EA	$2,609	$10,436	Pilot-test injection wells
EAB Pilot-Test Injection	CW-20-GWU1	1	LS	$19,605	$19,605	Pilot test for EAB
EAB Pilot-Test Monitoring Well Installation	CW-21-GWU1	1	LS	$9,659	$9,659	Temporary monitoring wells
EAB Pilot-Test Sampling Event	CW-22-GWU1	3	EA	$12,291	$36,873	Sampling pre-injection, and twice post-injection
Mobilization and Demobilization of Drill Rig	CW-23-GWU1	1	LS	$10,610	$10,610	For installation of full-scale monitoring wells
Monitoring Well Installation	CW-13-GWU1	10	EA	$2,779	$27,790	Additional monitoring well clusters (1 shallow/1 deep) for biobarrier monitoring.
Injection Well Installation	CW-24-GWU1	37	EA	$2,609	$96,533	Biobarrier Line 1A
Injection Well Installation	CW-24-GWU1	9	EA	$2,609	$23,481	Biobarrier Line 1B
Injection Well Installation	CW-24-GWU1	59	EA	$2,609	$153,931	Biobarrier Line 2
Injection Well Installation	CW-24-GWU1	49	EA	$2,609	$127,841	Biobarrier Line 3
Injection Well Installation	CW-24-GWU1	29	EA	$2,609	$75,661	Biobarrier Line 4
Biobarrier Injection Event - Equipment Purchase	CW-25-GWU1	1	LS	$6,738	$6,738	Miscellaneous equipment including hoses, quick couplers, and other fittings
Biobarrier Bioaugmentation	CW-31-GWU1	1	LS	$465,868	$465,868	Assumes bioaugmentation may be necessary
Biobarrier Injection Event - Line 1A	CW-26-GWU1	1	LS	$113,012	$113,012	
Biobarrier Injection Event - Line 1B	CW-27-GWU1	1	LS	$29,911	$29,911	
Biobarrier Injection Event - Line 2	CW-28-GWU1	1	LS	$179,209	$179,209	
Biobarrier Injection Event - Line 3	CW-29-GWU1	1	LS	$146,838	$146,838	
Biobarrier Injection Event - Line 4	CW-30-GWU1	1	LS	$90,150	$90,150	
				SUBTOTAL	$1,704,913	
Contingency (Scope and Bid)		20%			$340,983	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$2,045,896	
Project Management		5%			$102,295	Percentage from Exhibit 5-8 was used.
Remedial Design		8%			$163,672	Percentage from Exhibit 5-8 was used.
Construction Management		6%			$122,754	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$306,884	Middle value of the recommended range was used.
				TOTAL	$2,741,501	
				TOTAL CAPITAL COST	**$2,742,000**	Total capital cost is rounded to the nearest $1,000.

TABLE CS-GWU1-3

ALTERNATIVE GWU1-3

ANAEROBIC BIOREMEDIATION/ENHANCED MNA

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Alternative GWU1-3 involves installing a series of injection wells at the leading edge of a groundwater contaminant plume to inject a carbon source, electron donor, or possible bioaugmentation into the saturated zone of the aquifer, enhancing MNA of chlorinated COCs in the groundwater. Pilot studies will determine the optimum substrate, injection mechanism (gravity feed or low pressure) and the injection well configuration. The existing groundwater monitoring system would be expanded as needed to determine the rate of degradation and to determine the need for bioaugmentation. Assumes an initial full-scale injection event, followed by a second injection event at 2 years, and a third injection event at 4 years.

FUTURE CAPITAL COSTS: (Assumed to be Incurred During Year 10)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Mobilization and Demobilization of Drill Rig	CW-23-GWU1	1	LS	$10,610	$10,610	For abandonment of injection wells
Injection Well Abandonment	CW-32-GWU1	187	EA	$1,604	$299,948	For abandonment of injection wells
Mobilization and Demobilization of DPT Rig	CW-18-GWU1	1	LS	$1,523	$1,523	For abandonment of monitoring wells associated with biobarriers
Monitoring Well Abandonment - EAB	CW-18-GWU1	10	EA	$19,153	$191,530	For abandonment of monitoring wells associated with biobarriers
				SUBTOTAL	$503,611	
Contingency (Scope and Bid)		20%			$100,722	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$604,333	
Project Management		6%			$36,260	Percentage from Exhibit 5-8 was used.
Remedial Design		12%			$72,520	Percentage from Exhibit 5-8 was used.
Construction Management		8%			$48,347	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$90,650	Middle value of the recommended range was used.
				TOTAL	$852,110	
				TOTAL FUTURE CAPITAL COST	**$852,000**	Total future capital cost is rounded to the nearest $1,000.

FUTURE CAPITAL COSTS: (Assumed to be Incurred During Year 70)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Mobilization and Demobilization of DPT Rig	CW-19-GWU1	1	LS	$1,523	$1,523	For abandonment of existing 13 monitoring wells
Monitoring Well Abandonment - MNA	CW-19-GWU1	1	LS	$17,009	$17,009	
				SUBTOTAL	$18,532	
Contingency (Scope and Bid)		20%			$3,706	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$22,238	
Project Management		10%			$2,224	Percentage from Exhibit 5-8 was used.
Remedial Design		20%			$4,448	Percentage from Exhibit 5-8 was used.
Construction Management		15%			$3,336	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$3,336	Middle value of the recommended range was used.
				TOTAL	$35,582	
				TOTAL FUTURE CAPITAL COST	**$36,000**	Total future capital cost is rounded to the nearest $1,000.

TABLE CS-GWU1-3

ALTERNATIVE GWU1-3

ANAEROBIC BIOREMEDIATION/ENHANCED MNA

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Alternative GWU1-3 involves installing a series of injection wells at the leading edge of a groundwater contaminant plume to inject a carbon source, electron donor, or possible bioaugmentation into the saturated zone of the aquifer, enhancing MNA of chlorinated COCs in the groundwater. Pilot studies will determine the optimum substrate, injection mechanism (gravity feed or low pressure) and the injection well configuration. The existing groundwater monitoring system would be expanded as needed to determine the rate of degradation and to determine the need for bioaugmentation. Assumes an initial full-scale injection event, followed by a second injection event at 2 years, and a third injection event at 4 years.

BIOBARRIER INJECTION PERIODIC COSTS: (Assumed to be Incurred Durning Years 2 and 4

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Biobarrier Injection Event - Line 1A	CW-26-GWU1	1	LS	$113,012	$113,012	
Biobarrier Injection Event - Line 1B	CW-27-GWU1	1	LS	$29,911	$29,911	
Biobarrier Injection Event - Line 2	CW-28-GWU1	1	LS	$179,209	$179,209	
Biobarrier Injection Event - Line 3	CW-29-GWU1	1	LS	$146,838	$146,838	
Biobarrier Injection Event - Line 4	CW-30-GWU1	1	LS	$90,150	$90,150	
				SUBTOTAL	$559,120	
Contingency (Scope and Bid)		20%			$111,824	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$670,944	
Project Management		6%			$40,257	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$100,642	Middle value of the recommended range was used.
				TOTAL	$811,843	
				TOTAL BIOBARRIER INJECTION PERIODIC COST	**$812,000**	Total periodic biobarrier injection cost is rounded to the nearest $1,000.

QUARTERLY MONITORING ANNUAL COSTS: (Assumed to be Incurred During Year 1 through 2

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
EAB Groundwater Sampling Event	CW-9-GWU1	4	EA	$42,521	$170,084	33 wells; Includes 4 surface water sampling points for VOCs only
EAB Groundwater Monitoring Event Report Preparation	CW-5-GWU1	4	EA	$46,181	$184,724	
				SUBTOTAL	$354,808	
Contingency (Scope and Bid)		20%			$70,962	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$425,770	
Project Management		8%			$34,062	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$63,866	Middle value of the recommended range was used.
				TOTAL	$523,698	
				TOTAL QUARTERLY MONITORING COSTS (Years 1 through 2	**$524,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

TABLE CS-GWU1-3

ALTERNATIVE GWU1-3

ANAEROBIC BIOREMEDIATION/ENHANCED MNA

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Alternative GWU1-3 involves installing a series of injection wells at the leading edge of a groundwater contaminant plume to inject a carbon source, electron donor, or possible bioaugmentation into the saturated zone of the aquifer, enhancing MNA of chlorinated COCs in the groundwater. Pilot studies will determine the optimum substrate, injection mechanism (gravity feed or low pressure) and the injection well configuration. The existing groundwater monitoring system would be expanded as needed to determine the rate of degradation and to determine the need for bioaugmentation. Assumes an initial full-scale injection event, followed by a second injection event at 2 years, and a third injection event at 4 years.

SEMIANNUAL MONITORING ANNUAL COSTS: (Assumed to be Incurred During Year 3 through 10

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
EAB Groundwater Sampling Event	CW-9-GWU1	2	EA	$42,521	$85,042	33 wells; Includes 4 surface water sampling points for VOCs only
EAB Groundwater Monitoring Event Report Preparation	CW-5-GWU1	2	EA	$46,181	$92,362	
				SUBTOTAL	$177,404	
Contingency (Scope and Bid)		20%			$35,481	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$212,885	
Project Management		8%			$17,031	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$31,933	Middle value of the recommended range was used.
				TOTAL	$261,849	
	TOTAL SEMIANNUAL MONITORING COST (Year 3 through 10				**$262,000**	Total semiannual monitoring cost is rounded to the nearest $1,000.

ANNUAL MONITORING ANNUAL COSTS: (Assumed to be Incurred During Year 11 through 70

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Post-EAB Groundwater Sampling Event	CW-10-GWU1	1	EA	$9,571	$9,571	13 wells; Includes 4 surface water sampling points for VOCs only
Post-EAB Groundwater Monitoring Event Report Preparation	CW-6-GWU1	1	EA	$16,401	$16,401	
				SUBTOTAL	$25,972	
Contingency (Scope and Bid)		20%			$5,194	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$31,166	
Project Management		10%			$3,117	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$4,675	Middle value of the recommended range was used.
				TOTAL	$38,958	
	TOTAL ANNUAL MONITORING COST (Year 11 through 70				**$39,000**	Total annual monitoring cost is rounded to the nearest $1,000.

MONITORING WELL MAINTENANCE PERIODIC COSTS (Years 10, 20, 30, 40, 50, and 60)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Monitoring Well Maintenance - EAB	CW-15-GWU1	1	LS	$9,980	$9,980	
				SUBTOTAL	$9,980	
Contingency (Scope and Bid)		20%			$1,996	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$11,976	
Project Management		10%			$1,198	The high end of the recommended range was used.
Technical Support		15%			$1,796	Middle value of the recommended range was used.
				TOTAL	$14,970	
	TOTAL MOINITORING WELL MAINTENANCE PERIODIC COST				**$15,000**	Periodic cost is rounded to the nearest $1,000.

TABLE CS-GWU1-3

ALTERNATIVE GWU1-3

ANAEROBIC BIOREMEDIATION/ENHANCED MNA

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Alternative GWU1-3 involves installing a series of injection wells at the leading edge of a groundwater contaminant plume to inject a carbon source, electron donor, or possible bioaugmentation into the saturated zone of the aquifer, enhancing MNA of chlorinated COCs in the groundwater. Pilot studies will determine the optimum substrate, injection mechanism (gravity feed or low pressure) and the injection well configuration. The existing groundwater monitoring system would be expanded as needed to determine the rate of degradation and to determine the need for bioaugmentation. Assumes an initial full-scale injection event, followed by a second injection event at 2 years, and a third injection event at 4 years.

FIVE-YEAR SITE REVIEW PERIODIC COSTS (Years 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, and 70)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Five-Year Site Review	CW-2-GWU1	1	LS	$38,547	$38,547	
				SUBTOTAL	$38,547	
Contingency (Scope and Bid)		20%			$7,709	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$46,256	
Project Management		10%			$4,626	The high end of the recommended range was used.
Technical Support		15%			$6,938	Middle value of the recommended range was used.
				TOTAL	$57,820	
				TOTAL FIVE-YEAR SITE REVIEW PERIODIC COST	**$58,000**	Periodic cost is rounded to the nearest $1,000.

Notes:
Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.

Abbreviations:

EA	Each
QTY	Quantity
LS	Lump Sum

TABLE PV-GWU1-3

ALTERNATIVE GWU1-3
ANAEROBIC BIOREMEDIATION/ENHANCED MNA

PRESENT VALUE

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Escalation Rate:	**3%**
Discount Rate:	**5%**

		O&M COSTS		PERIODIC COSTS							
Year[1]	Capital Costs[2]	O&M Costs[2]	Monitoring Costs[2]	Barrier Injection Costs	Monitoring Well Maintenance[2,3]	Five-year Review Costs[2]	Total Annual Expenditure[5]	Escalation Factor (3%)	Escalated Cost[6]	Discount Factor (5%)	Present Value[7,8]
0	$2,742,000	$0	$0	$0	$0	$0	$2,742,000	1.0000	$2,742,000	1.0000	$2,742,000
1	$0	$0	$524,000	$0	$0	$0	$524,000	1.0300	$539,720	0.9524	$514,029
2	$0	$0	$524,000	$812,000	$0	$0	$1,336,000	1.0609	$1,417,362	0.9070	$1,285,548
3	$0	$0	$262,000	$0	$0	$0	$262,000	1.0927	$286,287	0.8638	$247,295
4	$0	$0	$262,000	$812,000	$0	$0	$1,074,000	1.1255	$1,208,787	0.8227	$994,469
5	$0	$0	$262,000	$0	$0	$58,000	$320,000	1.1593	$370,976	0.7835	$290,660
6	$0	$0	$262,000	$0	$0	$0	$262,000	1.1941	$312,854	0.7462	$233,452
7	$0	$0	$262,000	$0	$0	$0	$262,000	1.2299	$322,234	0.7107	$229,012
8	$0	$0	$262,000	$0	$0	$0	$262,000	1.2668	$331,902	0.6768	$224,631
9	$0	$0	$262,000	$0	$0	$0	$262,000	1.3048	$341,858	0.6446	$220,361
10	$852,000	$0	$262,000	$0	$15,000	$58,000	$1,187,000	1.3439	$1,595,209	0.6139	$979,299
11	$0	$0	$39,000	$0	$0	$0	$39,000	1.3842	$53,984	0.5847	$31,564
12	$0	$0	$39,000	$0	$0	$0	$39,000	1.4258	$55,606	0.5568	$30,962
13	$0	$0	$39,000	$0	$0	$0	$39,000	1.4685	$57,272	0.5303	$30,371
14	$0	$0	$39,000	$0	$0	$0	$39,000	1.5126	$58,991	0.5051	$29,797
15	$0	$0	$39,000	$0	$0	$58,000	$97,000	1.5580	$151,126	0.4810	$72,692
16	$0	$0	$39,000	$0	$0	$0	$39,000	1.6047	$62,583	0.4581	$28,669
17	$0	$0	$39,000	$0	$0	$0	$39,000	1.6528	$64,459	0.4363	$28,124
18	$0	$0	$39,000	$0	$0	$0	$39,000	1.7024	$66,394	0.4155	$27,587
19	$0	$0	$39,000	$0	$0	$0	$39,000	1.7535	$68,387	0.3957	$27,061
20	$0	$0	$39,000	$0	$15,000	$58,000	$112,000	1.8061	$202,283	0.3769	$76,241
21	$0	$0	$39,000	$0	$0	$0	$39,000	1.8603	$72,552	0.3589	$26,039
22	$0	$0	$39,000	$0	$0	$0	$39,000	1.9161	$74,728	0.3418	$25,542
23	$0	$0	$39,000	$0	$0	$0	$39,000	1.9736	$76,970	0.3256	$25,062
24	$0	$0	$39,000	$0	$0	$0	$39,000	2.0328	$79,279	0.3101	$24,584
25	$0	$0	$39,000	$0	$0	$58,000	$97,000	2.0938	$203,099	0.2953	$59,975
26	$0	$0	$39,000	$0	$0	$0	$39,000	2.1566	$84,107	0.2812	$23,651
27	$0	$0	$39,000	$0	$0	$0	$39,000	2.2213	$86,631	0.2678	$23,200
28	$0	$0	$39,000	$0	$0	$0	$39,000	2.2879	$89,228	0.2551	$22,762
29	$0	$0	$39,000	$0	$0	$0	$39,000	2.3566	$91,907	0.2429	$22,324
30	$0	$0	$39,000	$0	$15,000	$58,000	$112,000	2.4273	$271,858	0.2314	$62,908
31	$0	$0	$39,000	$0	$0	$0	$39,000	2.5001	$97,504	0.2204	$21,490
32	$0	$0	$39,000	$0	$0	$0	$39,000	2.5751	$100,429	0.2099	$21,080
33	$0	$0	$39,000	$0	$0	$0	$39,000	2.6523	$103,440	0.1999	$20,678

TABLE PV-GWU1-3

ALTERNATIVE GWU1-3
ANAEROBIC BIOREMEDIATION/ENHANCED MNA

PRESENT VALUE

Escalation Rate:	**3%**
Discount Rate:	**5%**

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

		O&M COSTS		PERIODIC COSTS							
Year[1]	Capital Costs[2]	O&M Costs[2]	Monitoring Costs[2]	Barrier Injection Costs	Monitoring Well Maintenance[2,3]	Five-year Review Costs[2]	Total Annual Expenditure[5]	Escalation Factor (3%)	Escalated Cost[6]	Discount Factor (5%)	Present Value[7,8]
34	$0	$0	$39,000	$0	$0	$0	$39,000	2.7319	$106,544	0.1904	$20,286
35	$0	$0	$39,000	$0	$0	$58,000	$97,000	2.8139	$272,948	0.1813	$49,486
36	$0	$0	$39,000	$0	$0	$0	$39,000	2.8983	$113,034	0.1727	$19,521
37	$0	$0	$39,000	$0	$0	$0	$39,000	2.9852	$116,423	0.1644	$19,140
38	$0	$0	$39,000	$0	$0	$0	$39,000	3.0748	$119,917	0.1566	$18,779
39	$0	$0	$39,000	$0	$0	$0	$39,000	3.1670	$123,513	0.1491	$18,416
40	$0	$0	$39,000	$0	$15,000	$58,000	$112,000	3.2620	$365,344	0.1420	$51,879
41	$0	$0	$39,000	$0	$0	$0	$39,000	3.3599	$131,036	0.1353	$17,729
42	$0	$0	$39,000	$0	$0	$0	$39,000	3.4607	$134,967	0.1288	$17,384
43	$0	$0	$39,000	$0	$0	$0	$39,000	3.5645	$139,016	0.1227	$17,057
44	$0	$0	$39,000	$0	$0	$0	$39,000	3.6715	$143,189	0.1169	$16,739
45	$0	$0	$39,000	$0	$0	$58,000	$97,000	3.7816	$366,815	0.1113	$40,827
46	$0	$0	$39,000	$0	$0	$0	$39,000	3.8950	$151,905	0.1060	$16,102
47	$0	$0	$39,000	$0	$0	$0	$39,000	4.0119	$156,464	0.1009	$15,787
48	$0	$0	$39,000	$0	$0	$0	$39,000	4.1323	$161,160	0.0961	$15,487
49	$0	$0	$39,000	$0	$0	$0	$39,000	4.2562	$165,992	0.0916	$15,205
50	$0	$0	$39,000	$0	$15,000	$58,000	$112,000	4.3839	$490,997	0.0872	$42,815
51	$0	$0	$39,000	$0	$0	$0	$39,000	4.5154	$176,101	0.0831	$14,634
52	$0	$0	$39,000	$0	$0	$0	$39,000	4.6509	$181,385	0.0791	$14,348
53	$0	$0	$39,000	$0	$0	$0	$39,000	4.7904	$186,826	0.0753	$14,068
54	$0	$0	$39,000	$0	$0	$0	$39,000	4.9341	$192,430	0.0717	$13,797
55	$0	$0	$39,000	$0	$0	$58,000	$97,000	5.0821	$492,964	0.0683	$33,669
56	$0	$0	$39,000	$0	$0	$0	$39,000	5.2346	$204,149	0.0651	$13,290
57	$0	$0	$39,000	$0	$0	$0	$39,000	5.3917	$210,276	0.0620	$13,037
58	$0	$0	$39,000	$0	$0	$0	$39,000	5.5534	$216,583	0.0590	$12,778
59	$0	$0	$39,000	$0	$0	$0	$39,000	5.7200	$223,080	0.0562	$12,537
60	$0	$0	$39,000	$0	$15,000	$58,000	$112,000	5.8916	$659,859	0.0535	$35,302
61	$0	$0	$39,000	$0	$0	$0	$39,000	6.0684	$236,668	0.0510	$12,070
62	$0	$0	$39,000	$0	$0	$0	$39,000	6.2504	$243,766	0.0486	$11,847
63	$0	$0	$39,000	$0	$0	$0	$39,000	6.4379	$251,078	0.0462	$11,600
64	$0	$0	$39,000	$0	$0	$0	$39,000	6.6311	$258,613	0.0440	$11,379
65	$0	$0	$39,000	$0	$0	$58,000	$97,000	6.8300	$662,510	0.0419	$27,759
66	$0	$0	$39,000	$0	$0	$0	$39,000	7.0349	$274,361	0.0399	$10,947
67	$0	$0	$39,000	$0	$0	$0	$39,000	7.2459	$282,590	0.0380	$10,738

TABLE PV-GWU1-3

ALTERNATIVE GWU1-3
ANAEROBIC BIOREMEDIATION/ENHANCED MNA

PRESENT VALUE

Site:	North Industrial Corridor
Operable Unit:	GWU1
Location:	Wichita, Kansas
Phase:	Feasibility Study
Base Year:	2011

Escalation Rate:	**3%**
Discount Rate:	**5%**

		O&M COSTS		PERIODIC COSTS							
Year[1]	**Capital Costs[2]**	**O&M Costs[2]**	**Monitoring Costs[2]**	**Barrier Injection Costs**	**Monitoring Well Maintenance[2,3]**	**Five-year Review Costs[2]**	**Total Annual Expenditure[5]**	**Escalation Factor (3%)**	**Escalated Cost[6]**	**Discount Factor (5%)**	**Present Value[7,8]**
68	$0	$0	$39,000	$0	$0	$0	$39,000	7.4633	$291,069	0.0362	$10,537
69	$0	$0	$39,000	$0	$0	$0	$39,000	7.6872	$299,801	0.0345	$10,343
70	$36,000	$0	$39,000	$0	$0	$58,000	$133,000	7.9178	$1,053,067	0.0329	$34,646
TOTALS:	**$3,630,000**	**$0**	**$5,484,000**	**$1,624,000**	**$90,000**	**$812,000**	**$11,640,000**		**$21,598,443**		$9,465,084
TOTAL PRESENT VALUE OF ALTERNATIVE GWU1-3											**$9,465,000**

Notes:

1 - Duration is assumed to be 70 years for present value analysis. Estimated remedial timeframes are discussed within the FS report.

2 - Capital costs, for purposes of this analysis, are assumed to be distributed as indicated on Table CS-GWU1-3

3 - Includes replacement of monitoring well vault and development.

4 - Includes replacement of pumps, generator, hoses, fittings, etc.

5 - Total annual expenditure is the total cost per year with no escalation or discounting.

6 - Escalation cost is the total cost per year including an escalation rate for that year. See Table PV-AERFT for de

7 - Present value is the total cost per year including a discount factor for that year. See Table PV-ADRFT for detai

8 - Total present value is rounded to the nearest $1,000. Depreciation is excluded from the present value cost.

TABLE CS-GWU1-4

ALTERNATIVE GWU1-4

GROUNDWATER EXTRACTION, DISCHARGE TO NEW TREATMENT PLANT

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Under Alternative GWU1-4, an extraction well would be installed on the leading edge of the groundwater plume. Extracted groundwater would be discharged to a newly constructed treatment plant. MNA groundwater monitoring, both upgradient and downgradient of the extraction well, would be performed as part of this alternative to demonstrate the effectiveness of the containment system.

CAPITAL COSTS: (Assumed to be Incurred During Year 1)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Institutional Controls	CW-1-GWU1	1	LS	$20,014	$20,014	
Miscellaneous Requirements for Sampling	CW-11-GWU1	1	LS	$50,143	$50,143	
Miscellaneous Requirements for Construction	CW-12-GWU1	1	LS	$91,725	$91,725	
Mobilization and Demobilization of Drill Rig	CW-23-GWU1	1	LS	$10,610	$10,610	
Extraction Well Installation	CW-33-GWU1	1	EA	$48,460	$48,460	Extraction well NIC#1-1
Extraction Well Vault	CW-34-GWU1	1	EA	$49,416	$49,416	
Mobilization or Demobilization of Construction Equipment	CW-35-GWU1	2	EA	$2,086	$4,172	
Influent Piping - NIC#1-1 to New Treatment Plant	CW-42-GWU1	250	LF	$34.06	$8,515	
Effluent Piping - New Treatment Plant to Unnamed Creek	CW-43-GWU1	250	LF	$33.48	$8,370	
Geotechnical Investigation for Treatment Building	CW-44-GWU1	1	LS	$15,287	$15,287	
Groundwater Treatment Plant - Building	CW-45-GWU1	1	LS	$191,870	$191,870	Includes earthwork, foundation, HVAC, lighting, insulation, etc.
Groundwater Treatment Plant - Equipment and Piping	CW-38-GWU1	1	LS	$141,130	$141,130	
Groundwater Treatment Plant - Facility Control System	CW-41-GWU1	1	LS	$77,900	$77,900	
Groundwater Treatment Plant - Startup	CW-46-GWU1	1	LS	$21,355	$21,355	
				SUBTOTAL	$738,967	
Contingency (Scope and Bid)		20%			$147,793	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$886,760	
Project Management		6%			$53,206	Percentage from Exhibit 5-8 was used.
Remedial Design		12%			$106,411	Percentage from Exhibit 5-8 was used.
Construction Management		8%			$70,941	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$133,014	Middle value of the recommended range was used.
				TOTAL	$1,250,332	
				TOTAL CAPITAL COST	**$1,250,000**	Total capital cost is rounded to the nearest $1,000.

TABLE CS-GWU1-4

ALTERNATIVE GWU1-4

GROUNDWATER EXTRACTION, DISCHARGE TO NEW TREATMENT PLANT

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Under Alternative GWU1-4, an extraction well would be installed on the leading edge of the groundwater plume. Extracted groundwater would be discharged to a newly constructed treatment plant. MNA groundwater monitoring, both upgradient and downgradient of the extraction well, would be performed as part of this alternative to demonstrate the effectiveness of the containment system.

FUTURE CAPITAL COSTS: (Assumed to be Incurred During Year 35)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Mobilization and Demobilization of Drill Rig	CW-23-GWU1	1	LS	$10,610	$10,610	
Extraction Well Abandonment	CW-39-GWU1	1	EA	$9,203	$9,203	Extraction well NIC#1-1
Decommissioning Treatment System	CW-47-GWU1	1	LS	$24,939	$24,939	
				SUBTOTAL	$44,752	
Contingency (Scope and Bid)		20%			$8,950	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$53,702	
Project Management		10%			$5,370	Percentage from Exhibit 5-8 was used.
Construction Management		15%			$8,055	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$8,055	Middle value of the recommended range was used.
				TOTAL	$75,182	
				TOTAL FUTURE CAPITAL COST	**$75,000**	Total future capital cost is rounded to the nearest $1,000.

FUTURE CAPITAL COSTS: (Assumed to be Incurred During Year 42)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Mobilization and Demobilization of DPT Rig	CW-19-GWU1	1	LS	$1,523	$1,523	For abandonment of existing 13 monitoring wells
Monitoring Well Abandonment - MNA	CW-19-GWU1	1	LS	$17,009	$17,009	
				SUBTOTAL	$18,532	
Contingency (Scope and Bid)		20%			$3,706	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$22,238	
Project Management		10%			$2,224	Percentage from Exhibit 5-8 was used.
Construction Management		15%			$3,336	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$3,336	Middle value of the recommended range was used.
				TOTAL	$31,134	
				TOTAL FUTURE CAPITAL COST	**$31,000**	Total future capital cost is rounded to the nearest $1,000.

TABLE CS-GWU1-4

ALTERNATIVE GWU1-4

GROUNDWATER EXTRACTION, DISCHARGE TO NEW TREATMENT PLANT

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Under Alternative GWU1-4, an extraction well would be installed on the leading edge of the groundwater plume. Extracted groundwater would be discharged to a newly constructed treatment plant. MNA groundwater monitoring, both upgradient and downgradient of the extraction well, would be performed as part of this alternative to demonstrate the effectiveness of the containment system.

QUARTERLY MONITORING ANNUAL COSTS: (Assumed to be Incurred During Year 1 through 2

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
MNA Groundwater Sampling Event	CW-8-GWU1	4	EA	$24,751	$99,004	Includes 4 surface water sampling points for VOCs only
MNA Groundwater Monitoring Event Report Preparation	CW-4-GWU1	4	EA	$39,656	$158,624	
				SUBTOTAL	$257,628	
Contingency (Scope and Bid)		20%			$51,526	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$309,154	
Project Management		8%			$24,732	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$46,373	Middle value of the recommended range was used.
				TOTAL	$380,259	
	TOTAL QUARTERLY MONITORING COSTS (Years 1 through 2				**$380,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

SEMIANNUAL MONITORING ANNUAL COSTS: (Assumed to be Incurred During Year 3 through 10

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
MNA Groundwater Sampling Event	CW-8-GWU1	2	EA	$24,751	$49,502	Includes 4 surface water sampling points for VOCs only
MNA Groundwater Monitoring Event Report Preparation	CW-4-GWU1	2	EA	$39,656	$79,312	
				SUBTOTAL	$128,814	
Contingency (Scope and Bid)		20%			$25,763	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$154,577	
Project Management		8%			$12,366	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$23,187	Middle value of the recommended range was used.
				TOTAL	$190,130	
	TOTAL SEMIANNUAL MONITORING COST (Year 3 through 10				**$190,000**	Total semiannual monitoring cost is rounded to the nearest $1,000.

ANNUAL MONITORING ANNUAL COSTS: (Assumed to be Incurred During Year 11 through 42

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
MNA Groundwater Sampling Event	CW-8-GWU1	1	EA	$24,751	$24,751	Includes 4 surface water sampling points for VOCs only
MNA Groundwater Monitoring Event Report Preparation	CW-4-GWU1	1	EA	$39,656	$39,656	
				SUBTOTAL	$64,407	
Contingency (Scope and Bid)		20%			$12,881	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$77,288	
Project Management		10%			$7,729	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$11,593	Middle value of the recommended range was used.
				TOTAL	$96,610	
	TOTAL ANNUAL MONITORING COST (Year 11 through 42				**$97,000**	Total annual monitoring cost is rounded to the nearest $1,000.

TABLE CS-GWU1-4

ALTERNATIVE GWU1-4

GROUNDWATER EXTRACTION, DISCHARGE TO NEW TREATMENT PLANT

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Under Alternative GWU1-4, an extraction well would be installed on the leading edge of the groundwater plume. Extracted groundwater would be discharged to a newly constructed treatment plant. MNA groundwater monitoring, both upgradient and downgradient of the extraction well, would be performed as part of this alternative to demonstrate the effectiveness of the containment system.

ANNUAL OPERATING AND MAINTENANCE COSTS: (Assumed to be Incurred During Year 1 through 35

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Operation and Maintenance - Extraction Well	CW-36-GWU1	1	EA	$7,194	$7,194	Electrical comsumption by extraction well.
Operation and Maintenance - Extraction Well Maintenance	CW-37-GWU1	1	EA	$10,249	$10,249	Assume annual maintenance for each extraction well.
Operation and Maintenance - Treatment Plant	CW-48-GWU1	1	LS	$46,124	$46,124	
				SUBTOTAL	$63,567	
Contingency (Scope and Bid)		20%			$12,713	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$76,280	
Project Management		10%			$7,628	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$11,442	Middle value of the recommended range was used.
				TOTAL	$95,350	
TOTAL ANNUAL OPERATING AND MAINTENANCE COST (Year 1 through 35					**$95,000**	Total annual O&M cost is rounded to the nearest $1,000.

PERIODIC MINOR EQUIPMENT REPLACEMENT COSTS: (Years 5, 10, 15, 20, 25, and 30)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Replace Equipment - Extraction Well Pumps	CW-40-GWU1	1	EA	$19,916	$19,916	Assume pump replacement every 5 years
Minor Equipment Replacement - Treatment Plant	CW-49-GWU1	1	LS	$18,558	$18,558	
				SUBTOTAL	$19,916	
Contingency (Scope and Bid)		20%			$3,983	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$23,899	
Project Management		10%			$2,390	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$3,585	Middle value of the recommended range was used.
				TOTAL	$29,874	
TOTAL PERIODIC MINOR EQUIPMENT REPLACEMENT COST					**$30,000**	Total periodic minor equipment replacement cost is rounded to the nearest $1,000.

PERIODIC MAJOR EQUIPMENT REPLACEMENT COSTS: (Year 30)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Major Equipment Replacement - Treatment Plant	CW-50-GWU1	1	LS	$86,327	$86,327	
General Maintenance - New Treatment Plant	CW-51-GWU1	1	LS	$27,550	$27,550	
				SUBTOTAL	$113,877	
Contingency (Scope and Bid)		20%			$22,775	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$136,652	
Project Management		8%			$10,932	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$20,498	Middle value of the recommended range was used.
				TOTAL	$168,082	
TOTAL PERIODIC MAJOR EQUIPMENT REPLACEMENT COST					**$168,000**	Total periodic major equipment replacement cost is rounded to the nearest $1,000.

TABLE CS-GWU1-4

ALTERNATIVE GWU1-4

GROUNDWATER EXTRACTION, DISCHARGE TO NEW TREATMENT PLANT

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Under Alternative GWU1-4, an extraction well would be installed on the leading edge of the groundwater plume. Extracted groundwater would be discharged to a newly constructed treatment plant. MNA groundwater monitoring, both upgradient and downgradient of the extraction well, would be performed as part of this alternative to demonstrate the effectiveness of the containment system.

MONITORING WELL MAINTENANCE PERIODIC COSTS (Years 10, 20, 30, and 40)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Monitoring Well Maintenance - MNA	CW-16-GWU1	1	LS	$9,980	$9,980	
				SUBTOTAL	$9,980	
Contingency (Scope and Bid)		20%			$1,996	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$11,976	
Project Management		10%			$1,198	The high end of the recommended range was used.
Technical Support		15%			$1,796	Middle value of the recommended range was used.
				TOTAL	$14,970	
	TOTAL MONITORING WELL MAINTENANCE PERIODIC COST				**$15,000**	Total periodic monitoring well maintenance cost is rounded to the nearest $1,000.

FIVE-YEAR SITE REVIEW PERIODIC COSTS (Years 5, 10, 15, 20, 25, 30, 35, and 40)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Five-Year Site Review	CW-2-GWU1	1	LS	$38,547	$38,547	
				SUBTOTAL	$38,547	
Contingency (Scope and Bid)		20%			$7,709	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$46,256	
Project Management		10%			$4,626	The high end of the recommended range was used.
Technical Support		15%			$6,938	Middle value of the recommended range was used.
				TOTAL	$57,820	
	TOTAL FIVE-YEAR SITE REVIEW PERIODIC COST				**$58,000**	Total Five-Year Review periodic cost is rounded to the nearest $1,000.

Notes:
Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.

Abbreviations:

EA	Each
QTY	Quantity
LS	Lump Sum

TABLE PV-GWU1-4

ALTERNATIVE GWU1-4
GROUNDWATER EXTRACTION (CONTAINMENT ONLY), TREATMENT AND DISCHARGE TO UNNAMED CREEK

PRESENT VALUE ANALYSIS

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Escalation Rate:	**3%**
Discount Rate:	**5%**

		O&M COSTS		PERIODIC COSTS								
Year[1]	**Capital Costs[2]**	**O&M Costs[2]**	**Monitoring Costs[2]**	**Monitoring Well Maintenance[2,3]**	**Minor Equipment Replacement Costs[2,4]**	**Major Equipment Replacement Costs[2,4]**	**Five-year Review Costs[2]**	**Total Annual Expenditure[5]**	**Escalation Factor (3%)**	**Escalated Cost[6]**	**Discount Factor (5%)**	**Present Value[7,8]**
0	$1,250,000	$0	$0	$0	$0	$0	$0	$1,250,000	1.0000	$1,250,000	1.0000	$1,250,000
1	$0	$95,000	$380,000	$0	$0	$0	$0	$475,000	1.0300	$489,250	0.9524	$465,962
2	$0	$95,000	$380,000	$0	$0	$0	$0	$475,000	1.0609	$503,928	0.9070	$457,062
3	$0	$95,000	$190,000	$0	$0	$0	$0	$285,000	1.0927	$311,420	0.8638	$269,004
4	$0	$95,000	$190,000	$0	$0	$0	$0	$285,000	1.1255	$320,768	0.8227	$263,895
5	$0	$95,000	$190,000	$0	$30,000	$0	$58,000	$373,000	1.1593	$432,419	0.7835	$338,800
6	$0	$95,000	$190,000	$0	$0	$0	$0	$285,000	1.1941	$340,319	0.7462	$253,946
7	$0	$95,000	$190,000	$0	$0	$0	$0	$285,000	1.2299	$350,522	0.7107	$249,116
8	$0	$95,000	$190,000	$0	$0	$0	$0	$285,000	1.2668	$361,038	0.6768	$244,351
9	$0	$95,000	$190,000	$0	$0	$0	$0	$285,000	1.3048	$371,868	0.6446	$239,706
10	$0	$95,000	$190,000	$15,000	$30,000	$168,000	$58,000	$556,000	1.3439	$747,208	0.6139	$458,711
11	$0	$95,000	$97,000	$0	$0	$0	$0	$192,000	1.3842	$265,766	0.5847	$155,394
12	$0	$95,000	$97,000	$0	$0	$0	$0	$192,000	1.4258	$273,754	0.5568	$152,426
13	$0	$95,000	$97,000	$0	$0	$0	$0	$192,000	1.4685	$281,952	0.5303	$149,519
14	$0	$95,000	$97,000	$0	$0	$0	$0	$192,000	1.5126	$290,419	0.5051	$146,691
15	$0	$95,000	$97,000	$0	$30,000	$0	$58,000	$280,000	1.5580	$436,240	0.4810	$209,831
16	$0	$95,000	$97,000	$0	$0	$0	$0	$192,000	1.6047	$308,102	0.4581	$141,142
17	$0	$95,000	$97,000	$0	$0	$0	$0	$192,000	1.6528	$317,338	0.4363	$138,454
18	$0	$95,000	$97,000	$0	$0	$0	$0	$192,000	1.7024	$326,861	0.4155	$135,811
19	$0	$95,000	$97,000	$0	$0	$0	$0	$192,000	1.7535	$336,672	0.3957	$133,221
20	$0	$95,000	$97,000	$15,000	$30,000	$168,000	$58,000	$463,000	1.8061	$836,224	0.3769	$315,173
21	$0	$95,000	$97,000	$0	$0	$0	$0	$192,000	1.8603	$357,178	0.3589	$128,191
22	$0	$95,000	$97,000	$0	$0	$0	$0	$192,000	1.9161	$367,891	0.3418	$125,745
23	$0	$95,000	$97,000	$0	$0	$0	$0	$192,000	1.9736	$378,931	0.3256	$123,380
24	$0	$95,000	$97,000	$0	$0	$0	$0	$192,000	2.0328	$390,298	0.3101	$121,031
25	$0	$95,000	$97,000	$0	$30,000	$0	$58,000	$280,000	2.0938	$586,264	0.2953	$173,124
26	$0	$95,000	$97,000	$0	$0	$0	$0	$192,000	2.1566	$414,067	0.2812	$116,436
27	$0	$95,000	$97,000	$0	$0	$0	$0	$192,000	2.2213	$426,490	0.2678	$114,214
28	$0	$95,000	$97,000	$0	$0	$0	$0	$192,000	2.2879	$439,277	0.2551	$112,060
29	$0	$95,000	$97,000	$0	$0	$0	$0	$192,000	2.3566	$452,467	0.2429	$109,904
30	$0	$95,000	$97,000	$15,000	$30,000	$168,000	$58,000	$463,000	2.4273	$1,123,840	0.2314	$260,057
31	$0	$95,000	$97,000	$0	$0	$0	$0	$192,000	2.5001	$480,019	0.2204	$105,796
32	$0	$95,000	$97,000	$0	$0	$0	$0	$192,000	2.5751	$494,419	0.2099	$103,779
33	$0	$95,000	$97,000	$0	$0	$0	$0	$192,000	2.6523	$509,242	0.1999	$101,797
34	$0	$95,000	$97,000	$0	$0	$0	$0	$192,000	2.7319	$524,525	0.1904	$99,870
35	$75,000	$95,000	$97,000	$0	$0	$0	$58,000	$325,000	2.8139	$914,518	0.1813	$165,802
36	$0	$0	$97,000	$0	$0	$0	$0	$97,000	2.8983	$281,135	0.1727	$48,552
37	$0	$0	$97,000	$0	$0	$0	$0	$97,000	2.9852	$289,564	0.1644	$47,604

TABLE PV-GWU1-4

ALTERNATIVE GWU1-4
GROUNDWATER EXTRACTION (CONTAINMENT ONLY), TREATMENT AND DISCHARGE TO UNNAMED CREEK

PRESENT VALUE ANALYSIS

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Escalation Rate:	**3%**
Discount Rate:	**5%**

		O&M COSTS		PERIODIC COSTS								
Year[1]	**Capital Costs[2]**	**O&M Costs[2]**	**Monitoring Costs[2]**	**Monitoring Well Maintenance[2,3]**	**Minor Equipment Replacement Costs[2,4]**	**Major Equipment Replacement Costs[2,4]**	**Five-year Review Costs[2]**	**Total Annual Expenditure[5]**	**Escalation Factor (3%)**	**Escalated Cost[6]**	**Discount Factor (5%)**	**Present Value[7,8]**
38	$0	$0	$97,000	$0	$0	$0	$0	$97,000	3.0748	$298,256	0.1566	$46,707
39	$0	$0	$97,000	$0	$0	$0	$0	$97,000	3.1670	$307,199	0.1491	$45,803
40	$0	$0	$97,000	$15,000	$0	$0	$58,000	$170,000	3.2620	$554,540	0.1420	$78,745
41	$0	$0	$97,000	$0	$0	$0	$0	$97,000	3.3599	$325,910	0.1353	$44,096
42	$31,000	$0	$97,000	$0	$0	$0	$0	$128,000	3.5645	$456,256	0.1227	$55,983
TOTALS:	**$1,356,000**	**$3,325,000**	**$5,384,000**	**$60,000**	**$180,000**	**$504,000**	**$464,000**	**$11,273,000**		**$19,524,351**		$8,496,891
TOTAL PRESENT VALUE OF ALTERNATIVE GWU1-4												**$8,497,000**

Notes:

1 - Duration is assumed to be 35 years of pumping and 42 years of MNA for present value analysis. Estimated remedial timeframes are discussed within the FS report.
2 - Capital costs, for purposes of this analysis, are assumed to be distributed as indicated on Table CS-GWU1-4
3 - Includes replacement of monitoring well vault and development.
4 - Includes replacement of pumps, generator, hoses, fittings, etc.
5 - Total annual expenditure is the total cost per year with no escalation or discounting.
6 - Escalation cost is the total cost per year including an escalation rate for that year. See Table PV-AERFT for deta
7 - Present value is the total cost per year including a discount factor for that year. See Table PV-ADRFT for details
8 - Total present value is rounded to the nearest $1,000. Depreciation is excluded from the present value cost.

TABLE PV-AERFT

ANNUAL ESCALATION RATE FACTORS TABLE

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Escalation Rate (Percent): 3%

Year	Escalation Factor	Year	Escalation Factor	Year	Escalation Factor
0	1.0000	36	2.8983	72	8.4000
1	1.0300	37	2.9852	73	8.6520
2	1.0609	38	3.0748	74	8.9116
3	1.0927	39	3.1670	75	9.1789
4	1.1255	40	3.2620	76	9.4543
5	1.1593	41	3.3599	77	9.7379
6	1.1941	42	3.4607	78	10.0301
7	1.2299	43	3.5645	79	10.3310
8	1.2668	44	3.6715	80	10.6409
9	1.3048	45	3.7816	81	10.9601
10	1.3439	46	3.8950	82	11.2889
11	1.3842	47	4.0119	83	11.6276
12	1.4258	48	4.1323	84	11.9764
13	1.4685	49	4.2562	85	12.3357
14	1.5126	50	4.3839	86	12.7058
15	1.5580	51	4.5154	87	13.0870
16	1.6047	52	4.6509	88	13.4796
17	1.6528	53	4.7904	89	13.8839
18	1.7024	54	4.9341	90	14.3005
19	1.7535	55	5.0821	91	14.7295
20	1.8061	56	5.2346	92	15.1714
21	1.8603	57	5.3917	93	15.6265
22	1.9161	58	5.5534	94	16.0953
23	1.9736	59	5.7200	95	16.5782
24	2.0328	60	5.8916	96	17.0755
25	2.0938	61	6.0684	97	17.5878
26	2.1566	62	6.2504	98	18.1154
27	2.2213	63	6.4379	99	18.6589
28	2.2879	64	6.6311	100	19.2186
29	2.3566	65	6.8300		
30	2.4273	66	7.0349		
31	2.5001	67	7.2459		
32	2.5751	68	7.4633		
33	2.6523	69	7.6872		
34	2.7319	70	7.9178		
35	2.8139	71	8.1554		

Notes:
The net present value will not be calculated with the real discount rate as recommended by EPA's *Guide to Developing and Documenting Cost Estimates during the Feasibility Study*; rather an inflation rate of 3 percent and a nominal discount (interest) rate of 5 percent (typical of city bonds) was applied separately in the determination of net present value.

TABLE PV-ADRFT

ANNUAL DISCOUNT RATE FACTORS TABLE

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Discount Rate (Percent): 5%

Year	Discount Factor[1,2]	Year	Discount Factor[1,2]	Year	Discount Factor[1,2]
0	1.0000	34	0.1904	68	0.0362
1	0.9524	35	0.1813	69	0.0345
2	0.9070	36	0.1727	70	0.0329
3	0.8638	37	0.1644	71	0.0313
4	0.8227	38	0.1566	72	0.0298
5	0.7835	39	0.1491	73	0.0284
6	0.7462	40	0.1420	74	0.0270
7	0.7107	41	0.1353	75	0.0258
8	0.6768	42	0.1288	76	0.0245
9	0.6446	43	0.1227	77	0.0234
10	0.6139	44	0.1169	78	0.0222
11	0.5847	45	0.1113	79	0.0212
12	0.5568	46	0.1060	80	0.0202
13	0.5303	47	0.1009	81	0.0192
14	0.5051	48	0.0961	82	0.0183
15	0.4810	49	0.0916	83	0.0174
16	0.4581	50	0.0872	84	0.0166
17	0.4363	51	0.0831	85	0.0158
18	0.4155	52	0.0791	86	0.0151
19	0.3957	53	0.0753	87	0.0143
20	0.3769	54	0.0717	88	0.0137
21	0.3589	55	0.0683	89	0.0130
22	0.3418	56	0.0651	90	0.0124
23	0.3256	57	0.0620	91	0.0118
24	0.3101	58	0.0590	92	0.0112
25	0.2953	59	0.0562	93	0.0107
26	0.2812	60	0.0535	94	0.0102
27	0.2678	61	0.0510	95	0.0097
28	0.2551	62	0.0486	96	0.0092
29	0.2429	63	0.0462	97	0.0088
30	0.2314	64	0.0440	98	0.0084
31	0.2204	65	0.0419	99	0.0080
32	0.2099	66	0.0399	100	0.0076
33	0.1999	67	0.0380		

Notes:

[1] Annual discount factors were calculated using the formulas and guidance presented in Section 4.0 of A *Guide to Developing and Documenting Cost Estimates During the Feasibility Study*, EPA 2000.

[2] The net present value will not be calculated with the real discount rate as recommended by EPA's *Guide to Developing and Documenting Cost Estimates during the Feasibility Study*; rather an inflation rate of 3 percent and a nominal discount (interest) rate of 5 percent (typical of city bonds) was applied separately in the determination of net present value.

COST WORKSHEET INDEX

Wrksht No.	Description
CW-1-GWU1	Institutional Controls
CW-2-GWU1	Five-Year Site Review
CW-3-GWU1	Groundwater Monitoring Event Report Preparation
CW-4-GWU1	MNA Groundwater Monitoring Event Report Preparation
CW-5-GWU1	EAB Groundwater Monitoring Event Report Preparation
CW-6-GWU1	Post-EAB Groundwater Monitoring Event Report Preparation
CW-7-GWU1	Groundwater Sampling Event - No Action Alternative
CW-8-GWU1	MNA Groundwater Sampling Event
CW-9-GWU1	EAB Groundwater Sampling Event
CW-10-GWU1	Post-EAB Groundwater Sampling Event
CW-11-GWU1	Miscellaneous Requirements for Sampling
CW-12-GWU1	Miscellaneous Requirements for Construction
CW-13-GWU1	Monitoring Well Installation
CW-14-GWU1	Monitoring Well Maintenance - No Action Alternative
CW-15-GWU1	Monitoring Well Maintenance - EAB
CW-16-GWU1	Monitoring Well Maintenance - MNA
CW-17-GWU1	Monitoring Well Abandonment - No Action Alternative
CW-18-GWU1	Monitoring Well Abandonment - EAB
CW-19-GWU1	Monitoring Well Abandonment - MNA
CW-20-GWU1	EAB Pilot-Test Injection
CW-21-GWU1	EAB Pilot-Test Monitoring Well Installation
CW-22-GWU1	EAB Pilot-Test Sampling Event
CW-23-GWU1	Mobilization and Demobilization of Drill Rig
CW-24-GWU1	Injection Well Installation
CW-25-GWU1	Biobarrier Injection Event - Equipment Purchase
CW-26-GWU1	Biobarrier Injection Event - Line 1A
CW-27-GWU1	Biobarrier Injection Event - Line 1B
CW-28-GWU1	Biobarrier Injection Event - Line 2
CW-29-GWU1	Biobarrier Injection Event - Line 3
CW-30-GWU1	Biobarrier Injection Event - Line 4
CW-31-GWU1	Biobarrier Bioaugmentation
CW-32-GWU1	Injection Well Abandonment
CW-33-GWU1	Extraction Well Installation
CW-34-GWU1	Extraction Well Vault
CW-35-GWU1	Mobilization or Demobilization of Construction Equipment
CW-36-GWU1	Operation and Maintenance - Extraction Well
CW-37-GWU1	Operation and Maintenance - Extraction Well Maintenance
CW-38-GWU1	Groundwater Treatment Plant - Equipment and Piping
CW-39-GWU1	Extraction Well Abandonment
CW-40-GWU1	Replace Equipment - Extraction Well Pumps
CW-41-GWU1	Groundwater Treatment Plant - Facility Control System
CW-42-GWU1	Influent Piping - NIC#1-1 to New Treatment Plant
CW-43-GWU1	Effluent Piping - New Treatment Plant to Unnamed Creek
CW-44-GWU1	Geotechnical Investigation for Treatment Building
CW-45-GWU1	Groundwater Treatment Plant - Building
CW-46-GWU1	Groundwater Treatment Plant - Startup
CW-47-GWU1	Decommissioning Treatment System
CW-48-GWU1	Operation and Maintenance - Treatment Plant
CW-49-GWU1	Minor Equipment Replacement - Treatment Plant
CW-50-GWU1	Major Equipment Replacement - Treatment Plant
CW-51-GWU1	General Maintenance - New Treatment Plant

TABLE CW-1-GWU1

Institutional Controls
Capital Cost Sub-Element

Cost Worksheet: CW-1-GWU1

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves implemention of institutional control for the site. The following cost includes hours for legal procedures and cost for document submission.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
L6	Environmental Lawyer	120	HR	1.00	$114.32	$114.32	$0.00	$0.00	$0.00	$0.00	$114.32	$13,718.40	0%	9%	$14,953	SE SalaryExpert.com	Overhead included in unit labor rate.
L18	Paralegal	60	HR	1.00	$47.27	$47.27	$0.00	$0.00	$0.00	$0.00	$47.27	$2,836.20	0%	9%	$3,091	SE SalaryExpert.com	Overhead included in unit labor rate.
L3	Clerks, Typist, Bookkeeper & Receptionist	40	HR	1.00	$30.90	$30.90	$0.00	$0.00	$0.00	$0.00	$30.90	$1,236.00	0%	9%	$1,347	SE SalaryExpert.com	Overhead included in unit labor rate.
M1	Reproduction Costs for Institutional Controls	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$520.00	$520.00	$520.00	10%	9%	$623	PE N/A	Includes copying and shipping
												TOTAL UNIT COST:			$20,014		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KGAL	thousand gallons
UNMOD UC	unmodified unit cost	KW-HR	kilowatt-hour
UNMOD LIC	unmodified line item cost	LBS	pounds
UNBUR LIC	unburdened line item cost	LCY	loose cubic yards
PC OH	prime contractor overhead	LF	linear foot
PC PF	prime contractor profit	LS	lump sum
BUR LIC	burdened line item cost	SF	square feet
BCY	bank cubic yard	TN	ton
CLF	hundred linear feet	VLF	vertical linear foot
CY	cubic yards	WK	week

TABLE CW-2-GWU1

Five-Year Site Review
Periodic Cost Sub-Element

Cost Worksheet: CW-2-GWU1

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves preparation of Five-Year site review report.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
E1	Pickup Truck Rental	1	WK	1.00	$0.00	$0.00	$393.72	$393.72	$0.00	$0.00	$393.72	$393.72	10%	9%	$472	V Enterprise	Includes applicable taxes.
L23	General Operator/Technician	40	HR	1.00	$50.70	$50.70	$0.00	$0.00	$0.00	$0.00	$50.70	$2,028.00	0%	9%	$2,211	SE SalaryExpert.com	Overhead included in unit labor rate.
L15	Project Manager	40	HR	1.00	$124.22	$124.22	$0.00	$0.00	$0.00	$0.00	$124.22	$4,968.80	0%	9%	$5,416	SE SalaryExpert.com	Overhead included in unit labor rate.
L5	Environmental Engineer	120	HR	1.00	$86.14	$86.14	$0.00	$0.00	$0.00	$0.00	$86.14	$10,336.80	0%	9%	$11,267	SE SalaryExpert.com	Overhead included in unit labor rate.
L7	Environmental Scientist	160	HR	1.00	$64.56	$64.56	$0.00	$0.00	$0.00	$0.00	$64.56	$10,329.60	0%	9%	$11,259	SE SalaryExpert.com	Overhead included in unit labor rate.
L16	Quality Control Engineer	24	HR	1.00	$73.57	$73.57	$0.00	$0.00	$0.00	$0.00	$73.57	$1,765.68	0%	9%	$1,925	SE SalaryExpert.com	Overhead included in unit labor rate.
L1	CAD Drafter	40	HR	1.00	$78.06	$78.06	$0.00	$0.00	$0.00	$0.00	$78.06	$3,122.40	0%	9%	$3,403	SE SalaryExpert.com	Overhead included in unit labor rate.
L3	Clerks, Typist, Bookkeeper & Receptionist	40	HR	1.00	$30.90	$30.90	$0.00	$0.00	$0.00	$0.00	$30.90	$1,236.00	0%	9%	$1,347	SE SalaryExpert.com	Overhead included in unit labor rate.
M2	Reports	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$1,040.00	$1,040.00	$1,040.00	10%	9%	$1,247	PE N/A	Includes copying and shipping
												TOTAL UNIT COST:			$38,547		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KGAL	thousand gallons
UNMOD UC	unmodified unit cost	KW-HR	kilowatt-hour
UNMOD LIC	unmodified line item cost	LBS	pounds
UNBUR LIC	unburdened line item cost	LCY	loose cubic yards
PC OH	prime contractor overhead	LF	linear foot
PC PF	prime contractor profit	LS	lump sum
BUR LIC	burdened line item cost	SF	square feet
BCY	bank cubic yard	TN	ton
CLF	hundred linear feet	VLF	vertical linear foot
CY	cubic yards	WK	week

TABLE CW-3-GWU1

Groundwater Monitoring **Cost Worksheet: CW-3-GWU1**
Annual Cost Sub-Element
Groundwater Monitoring Event Report Preparation

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves preparation of a report under the No Action alternative summarizing groundwater sample results. The following cost includes hours for preparation of document with contaminant plume and potentiometric surface maps, analysis of groundwater sample results, review, reproduction and shipping.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
L15	Project Manager	8	HR	1.00	$124.22	$124.22	$0.00	$0.00	$0.00	$0.00	$124.22	$993.76	0%	9%	$1,083	SE SalaryExpert.com	Overhead included in unit labor rate.
L1	CAD Drafter	20	HR	1.00	$78.06	$78.06	$0.00	$0.00	$0.00	$0.00	$78.06	$1,561.20	0%	9%	$1,702	SE SalaryExpert.com	Overhead included in unit labor rate.
L11	Geologist	100	HR	1.00	$81.29	$81.29	$0.00	$0.00	$0.00	$0.00	$81.29	$8,129.00	0%	9%	$8,861	SE SalaryExpert.com	Overhead included in unit labor rate.
L17	Quality Assurance Director	4	HR	1.00	$146.55	$146.55	$0.00	$0.00	$0.00	$0.00	$146.55	$586.20	0%	9%	$639	SE SalaryExpert.com	Overhead included in unit labor rate.
L3	Clerks, Typist, Bookkeeper & Receptionist	8	HR	1.00	$30.90	$30.90	$0.00	$0.00	$0.00	$0.00	$30.90	$247.20	0%	9%	$269	SE SalaryExpert.com	Overhead included in unit labor rate.
M30	Reproduction Costs for Groundwater Sampling Event Reports	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$510.00	$510.00	$510.00	10%	9%	$611	PE N/A	Includes copying and shipping
												TOTAL UNIT COST:			$13,165		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KGAL	thousand gallons
UNMOD UC	unmodified unit cost	KW-HR	kilowatt-hour
UNMOD LIC	unmodified line item cost	LBS	pounds
UNBUR LIC	unburdened line item cost	LCY	loose cubic yards
PC OH	prime contractor overhead	LF	linear foot
PC PF	prime contractor profit	LS	lump sum
BUR LIC	burdened line item cost	SF	square feet
BCY	bank cubic yard	TN	ton
CLF	hundred linear feet	VLF	vertical linear foot
CY	cubic yards	WK	week

TABLE CW-4-GWU1

Groundwater Monitoring **Cost Worksheet: CW-4-GWU1**
Annual Cost Sub-Element
MNA Groundwater Monitoring Event Report Preparation

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves preparation of a report summarizing groundwater sample results. The following cost includes hours for preparation of document with contaminant plume and potentiometric surface maps, analysis of groundwater and MNA sample results, review, reproduction and shipping.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
L15	Project Manager	8	HR	1.00	$124.22	$124.22	$0.00	$0.00	$0.00	$0.00	$124.22	$993.76	0%	9%	$1,083	SE SalaryExpert.com	Overhead included in unit labor rate.
L1	CAD Drafter	84	HR	1.00	$78.06	$78.06	$0.00	$0.00	$0.00	$0.00	$78.06	$6,557.04	0%	9%	$7,147	SE SalaryExpert.com	Overhead included in unit labor rate.
L11	Geologist	336	HR	1.00	$81.29	$81.29	$0.00	$0.00	$0.00	$0.00	$81.29	$27,313.44	0%	9%	$29,772	SE SalaryExpert.com	Overhead included in unit labor rate.
L17	Quality Assurance Director	4	HR	1.00	$146.55	$146.55	$0.00	$0.00	$0.00	$0.00	$146.55	$586.20	0%	9%	$639	SE SalaryExpert.com	Overhead included in unit labor rate.
L3	Clerks, Typist, Bookkeeper & Receptionist	12	HR	1.00	$30.90	$30.90	$0.00	$0.00	$0.00	$0.00	$30.90	$370.80	0%	9%	$404	SE SalaryExpert.com	Overhead included in unit labor rate.
M30	Reproduction Costs for Groundwater Sampling Event Reports	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$510.00	$510.00	$510.00	10%	9%	$611	PE N/A	Includes copying and shipping
												TOTAL UNIT COST:			$39,656		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KGAL	thousand gallons
UNMOD UC	unmodified unit cost	KW-HR	kilowatt-hour
UNMOD LIC	unmodified line item cost	LBS	pounds
UNBUR LIC	unburdened line item cost	LCY	loose cubic yards
PC OH	prime contractor overhead	LF	linear foot
PC PF	prime contractor profit	LS	lump sum
BUR LIC	burdened line item cost	SF	square feet
BCY	bank cubic yard	TN	ton
CLF	hundred linear feet	VLF	vertical linear foot
CY	cubic yards	WK	week

TABLE CW-5-GWU1

Groundwater Monitoring **Cost Worksheet: CW-5-GWU1**
Annual Cost Sub-Element
EAB Groundwater Monitoring Event Report Preparation

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves preparation of a EAB monitoring report summarizing groundwater sample results. The following cost includes hours for preparation of document with contaminant plume and potentiometric surface maps, analysis of groundwater sample results, review, reproduction and shipping. Assumes local sampling crew; no per diem included.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
L15	Project Manager	8	HR	1.00	$124.22	$124.22	$0.00	$0.00	$0.00	$0.00	$124.22	$993.76	0%	9%	$1,083	SE SalaryExpert.com	Overhead included in unit labor rate.
L1	CAD Drafter	99	HR	1.00	$78.06	$78.06	$0.00	$0.00	$0.00	$0.00	$78.06	$7,727.94	0%	9%	$8,423	SE SalaryExpert.com	Overhead included in unit labor rate.
L11	Geologist	396	HR	1.00	$81.29	$81.29	$0.00	$0.00	$0.00	$0.00	$81.29	$32,190.84	0%	9%	$35,088	SE SalaryExpert.com	Overhead included in unit labor rate.
L17	Quality Assurance Director	4	HR	1.00	$146.55	$146.55	$0.00	$0.00	$0.00	$0.00	$146.55	$586.20	0%	9%	$639	SE SalaryExpert.com	Overhead included in unit labor rate.
L3	Clerks, Typist, Bookkeeper & Receptionist	10	HR	1.00	$30.90	$30.90	$0.00	$0.00	$0.00	$0.00	$30.90	$309.00	0%	9%	$337	SE SalaryExpert.com	Overhead included in unit labor rate.
M30	Reproduction Costs for Groundwater Sampling Event Reports	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$510.00	$510.00	$510.00	10%	9%	$611	PE N/A	Includes copying and shipping
												TOTAL UNIT COST:			$46,181		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KGAL	thousand gallons
UNMOD UC	unmodified unit cost	KW-HR	kilowatt-hour
UNMOD LIC	unmodified line item cost	LBS	pounds
UNBUR LIC	unburdened line item cost	LCY	loose cubic yards
PC OH	prime contractor overhead	LF	linear foot
PC PF	prime contractor profit	LS	lump sum
BUR LIC	burdened line item cost	SF	square feet
BCY	bank cubic yard	TN	ton
CLF	hundred linear feet	VLF	vertical linear foot
CY	cubic yards	WK	week

TABLE CW-6-GWU1

Groundwater Monitoring **Cost Worksheet: CW-6-GWU1**
Annual Cost Sub-Element
Post-EAB Groundwater Monitoring Event Report Preparation

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves preparation of a EAB monitoring report summarizing groundwater sample results. The following cost includes hours for preparation of document with contaminant plume and potentiometric surface maps, analysis of groundwater sample results, review, reproduction and shipping. Assumes local sampling crew; no per diem included.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
L15	Project Manager	8	HR	1.00	$124.22	$124.22	$0.00	$0.00	$0.00	$0.00	$124.22	$993.76	0%	9%	$1,083	SE SalaryExpert.com	Overhead included in unit labor rate.
L1	CAD Drafter	26	HR	1.00	$78.06	$78.06	$0.00	$0.00	$0.00	$0.00	$78.06	$2,029.56	0%	9%	$2,212	SE SalaryExpert.com	Overhead included in unit labor rate.
L11	Geologist	130	HR	1.00	$81.29	$81.29	$0.00	$0.00	$0.00	$0.00	$81.29	$10,567.70	0%	9%	$11,519	SE SalaryExpert.com	Overhead included in unit labor rate.
L17	Quality Assurance Director	4	HR	1.00	$146.55	$146.55	$0.00	$0.00	$0.00	$0.00	$146.55	$586.20	0%	9%	$639	SE SalaryExpert.com	Overhead included in unit labor rate.
L3	Clerks, Typist, Bookkeeper & Receptionist	10	HR	1.00	$30.90	$30.90	$0.00	$0.00	$0.00	$0.00	$30.90	$309.00	0%	9%	$337	SE SalaryExpert.com	Overhead included in unit labor rate.
M30	Reproduction Costs for Groundwater Sampling Event Reports	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$510.00	$510.00	$510.00	10%	9%	$611	PE N/A	Includes copying and shipping
												TOTAL UNIT COST:			$16,401		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KGAL	thousand gallons
UNMOD UC	unmodified unit cost	KW-HR	kilowatt-hour
UNMOD LIC	unmodified line item cost	LBS	pounds
UNBUR LIC	unburdened line item cost	LCY	loose cubic yards
PC OH	prime contractor overhead	LF	linear foot
PC PF	prime contractor profit	LS	lump sum
BUR LIC	burdened line item cost	SF	square feet
BCY	bank cubic yard	TN	ton
CLF	hundred linear feet	VLF	vertical linear foot
CY	cubic yards	WK	week

TABLE CW-7-GWU1

Groundwater Monitoring **Cost Worksheet: CW-7-GWU1**
Annual Cost Sub-Element
Groundwater Sampling Event - No Action Alternative

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves limited groundwater sampling at the site under the No Action alternative. The following cost includes hours for sample collection and management and costs for sample analysis, sampling equipment, and vehicle rental. Assumes local sampling crew; no per diem included.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M3	VOCs, EPA Method SW-846 8260	12	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$80.08	$80.08	$960.96	0%	9%	$1,047	V Teklab	
M19	Water Quality Meter and Flow Through Cell	1	WK	1.00	$0.00	$0.00	$0.00	$0.00	$461.85	$0.00	$461.85	$461.85	0%	9%	$503	V Pine Env	
M20	Photoionization Detector (PID)	1	WK	1.00	$0.00	$0.00	$0.00	$0.00	$214.81	$0.00	$214.81	$214.81	0%	9%	$234	V Pine Env	Includes calibration gas
M21	Water Level Meter	1	WK	1.00	$0.00	$0.00	$0.00	$0.00	$64.44	$0.00	$64.44	$64.44	0%	9%	$70	V Pine Env	
M22	Turbidimeter	1	WK	1.00	$0.00	$0.00	$0.00	$0.00	$80.55	$0.00	$80.55	$80.55	0%	9%	$88	V Pine Env	
M23	Portable Bladder Pump	1	WK	1.00	$0.00	$0.00	$0.00	$0.00	$161.11	$0.00	$161.11	$161.11	0%	9%	$176	V Pine Env	
M24	Replacement Poly Bladders	12	EA	1.00	$0.00	$0.00	$0.00	$0.00	$8.59	$0.00	$8.59	$103.08	0%	9%	$112	V Pine Env	
M25	Bladder Pump Controller and Compressor	1	WK	1.00	$0.00	$0.00	$0.00	$0.00	$322.22	$0.00	$322.22	$322.22	0%	9%	$351	V Pine Env	
M26	Combination Tubing for Bladder Pump	600	LF	1.00	$0.00	$0.00	$0.00	$0.00	$0.54	$0.00	$0.54	$324.00	0%	9%	$353	V Pine Env	
M27	Shipping Rental Equipment	2	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$255.00	$255.00	$510.00	10%	9%	$611	PE N/A	
M28	55-gallon Open Head Steel Drum	2	EA	1.00	$0.00	$0.00	$0.00	$0.00	$137.43	$0.00	$137.43	$274.86	10%	9%	$330	V Global Indust.	Includes shipping
M29	Miscellaneous Sampling Equipment	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$204.00	$204.00	$204.00	10%	9%	$245	PE N/A	Paper towels, gloves, garbage bags, etc.
L15	Project Manager	1	HR	1.00	$124.22	$124.22	$0.00	$0.00	$0.00	$0.00	$124.22	$124.22	0%	9%	$135	SE SalaryExpert.com	Overhead included in unit labor rate.
L23	General Operator/Technician	56	HR	1.00	$50.70	$50.70	$0.00	$0.00	$0.00	$0.00	$50.70	$2,839.20	0%	9%	$3,095	SE SalaryExpert.com	Overhead included in unit labor rate.
L24	Contracting/Procurement Specialist	2	HR	1.00	$46.54	$46.54	$0.00	$0.00	$0.00	$0.00	$46.54	$93.08	0%	9%	$101	SE SalaryExpert.com	Overhead included in unit labor rate.
E1	Pickup Truck Rental	1	WK	1.00	$0.00	$0.00	$393.72	$393.72	$0.00	$0.00	$393.72	$393.72	10%	9%	$472	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	4	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$42.96	10%	9%	$52	PE N/A	
												TOTAL UNIT COST:			$7,975		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KGAL	thousand gallons
UNMOD UC	unmodified unit cost	KW-HR	kilowatt-hour
UNMOD LIC	unmodified line item cost	LBS	pounds
UNBUR LIC	unburdened line item cost	LCY	loose cubic yards
PC OH	prime contractor overhead	LF	linear foot
PC PF	prime contractor profit	LS	lump sum
BUR LIC	burdened line item cost	SF	square feet
BCY	bank cubic yard	TN	ton
CLF	hundred linear feet	VLF	vertical linear foot
CY	cubic yards	WK	week

TABLE CW-8-GWU1

MNA Monitoring
Annual Cost Sub-Element
MNA Groundwater Sampling Event

Cost Worksheet: CW-8-GWU1

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves implemention of MNA sampling. The following cost includes MNA sample parameters analysis and additonal labor hours for collection of MNA sample parameters. Cost also includes sampling at four surface water locations. Assumes that MNA sampling will be conducted concurrently with general groundwater sampling; therefore rental equipment, project management, and rental vehicle costs are not double counted. Assumes local sampling crew; no per diem included.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M3	VOCs, EPA Method SW-846 8260	38	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$80.08	$80.08	$3,043.04	0%	9%	$3,317	V Teklab	
M4	Filtered	21	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$72.80	$72.80	$1,528.80	0%	9%	$1,666	V Teklab	
M9	Nitrate/Nitrite (NO3/NO2)	21	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$17.68	$17.68	$371.28	0%	9%	$405	V Teklab	
M14	Sulfate, EPA MCAWW, 300, Field Filtered	21	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$20.80	$20.80	$436.80	0%	9%	$476	V Teklab	
M15	Sulfide, SM 4500S2 E	21	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$26.00	$26.00	$546.00	0%	9%	$595	V Teklab	
M11	Total Iron (Fe)	21	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$11.44	$11.44	$240.24	0%	9%	$262	V Hach	
M10	Total Manganese (Mn)	21	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$11.44	$11.44	$240.24	0%	9%	$262	V Teklab	
M18	Chloride, EPA MCAWW, 300, Field Filtered	21	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$20.80	$20.80	$436.80	0%	9%	$476	V Teklab	
M16	Alkalinity, EPA MCAWW, 310.1, Field Filtered	21	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$20.80	$20.80	$436.80	0%	9%	$476	V Teklab	
M5	Dissolved Total Organic Carbon (TOC)	21	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$31.20	$31.20	$655.20	0%	9%	$714	V Teklab	
M17	Carbon Dioxide (CO2)	21	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$41.60	$41.60	$873.60	0%	9%	$952	V Teklab	
M6	Volatile Fatty Acids (VFAs)	21	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$166.40	$166.40	$3,494.40	0%	9%	$3,809	V Teklab	
M12	Methane/Ethane/Ethene	21	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$78.00	$78.00	$1,638.00	0%	9%	$1,785	V Hach	One time purchase
M7	ppm	1	EA	1.00	$0.00	$0.00	$0.00	$0.00	$48.44	$0.00	$48.44	$48.44	0%	9%	$53	V Chemtec	30 tests per kit, Comparator included
M8	ppm	1	EA	1.00	$0.00	$0.00	$0.00	$0.00	$48.44	$0.00	$48.44	$48.44	0%	9%	$53	V Chemtec	30 tests per kit, Comparator included
M13	Field Filter, 0.45 micron filter	18	EA	1.00	$0.00	$0.00	$0.00	$0.00	$23.63	$0.00	$23.63	$425.34	0%	9%	$464	V Teklab	
M19	Water Quality Meter and Flow Through Cell	1	WK	1.00	$0.00	$0.00	$0.00	$0.00	$461.85	$0.00	$461.85	$461.85	0%	9%	$503	V Pine Env	
M20	Photoionization Detector (PID)	1	WK	1.00	$0.00	$0.00	$0.00	$0.00	$214.81	$0.00	$214.81	$214.81	0%	9%	$234	V Pine Env	Includes calibration gas
M21	Water Level Meter	1	WK	1.00	$0.00	$0.00	$0.00	$0.00	$64.44	$0.00	$64.44	$64.44	0%	9%	$70	V Pine Env	
M22	Turbidimeter	1	WK	1.00	$0.00	$0.00	$0.00	$0.00	$80.55	$0.00	$80.55	$80.55	0%	9%	$88	V Pine Env	
M23	Portable Bladder Pump	1	WK	1.00	$0.00	$0.00	$0.00	$0.00	$161.11	$0.00	$161.11	$161.11	0%	9%	$176	V Pine Env	
M24	Replacement Poly Bladders	20	EA	1.00	$0.00	$0.00	$0.00	$0.00	$8.59	$0.00	$8.59	$171.80	0%	9%	$187	V Pine Env	
M25	Bladder Pump Controller and Compressor	1	WK	1.00	$0.00	$0.00	$0.00	$0.00	$322.22	$0.00	$322.22	$322.22	0%	9%	$351	V Pine Env	
M26	Combination Tubing for Bladder Pump	1,100	LF	1.00	$0.00	$0.00	$0.00	$0.00	$0.54	$0.00	$0.54	$594.00	0%	9%	$647	V Pine Env	
M27	Shipping Rental Equipment	2	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$255.00	$255.00	$510.00	10%	9%	$611	PE N/A	
M28	55-gallon Open Head Steel Drum	3	EA	1.00	$0.00	$0.00	$0.00	$0.00	$137.43	$0.00	$137.43	$412.29	10%	9%	$494	V Global Indust.	Includes shipping
M29	Miscellaneous Sampling Equipment	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$204.00	$204.00	$204.00	10%	9%	$245	PE N/A	Paper towels, gloves, garbage bags, etc.
L15	Project Manager	2	HR	1.00	$124.22	$124.22	$0.00	$0.00	$0.00	$0.00	$124.22	$248.44	0%	9%	$271	SE SalaryExpert.com	Overhead included in unit labor rate.
L23	General Operator/Technician	80	HR	1.00	$50.70	$50.70	$0.00	$0.00	$0.00	$0.00	$50.70	$4,056.00	0%	9%	$4,421	SE SalaryExpert.com	Overhead included in unit labor rate.
L24	Contracting/Procurement Specialist	3	HR	1.00	$46.54	$46.54	$0.00	$0.00	$0.00	$0.00	$46.54	$139.62	0%	9%	$152	SE SalaryExpert.com	Overhead included in unit labor rate.
E1	Pickup Truck Rental	1	WK	1.00	$0.00	$0.00	$393.72	$393.72	$0.00	$0.00	$393.72	$393.72	10%	9%	$472	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	5	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$53.70	10%	9%	$64	PE N/A	
												TOTAL UNIT COST:			$24,751		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KGAL	thousand gallons
UNMOD UC	unmodified unit cost	KW-HR	kilowatt-hour
UNMOD LIC	unmodified line item cost	LBS	pounds
UNBUR LIC	unburdened line item cost	LCY	loose cubic yards
PC OH	prime contractor overhead	LF	linear foot
PC PF	prime contractor profit	LS	lump sum
BUR LIC	burdened line item cost	SF	square feet
BCY	bank cubic yard	TN	ton
CLF	hundred linear feet	VLF	vertical linear foot
CY	cubic yards	WK	week

TABLE CW-9-GWU1

Groundwater Monitoring
Annual Cost Sub-Element
EAB Groundwater Sampling Event

Cost Worksheet: CW-9-GWU1

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves groundwater sampling at the site. Cost also includes sampling at four surface water locations. The following cost includes hours for sample collection and management and costs for sample analysis, sampling equipment, and vehicle rental. Assumes local sampling crew; no per diem included.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M3	VOCs, EPA Method SW-846 8260	43	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$80.08	$80.08	$3,443.44	0%	9%	$3,753	V Teklab	
M4	Filtered	39	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$72.80	$72.80	$2,839.20	0%	9%	$3,095	V Teklab	
M9	Nitrate/Nitrite (NO3/NO2)	39	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$17.68	$17.68	$689.52	0%	9%	$752	V Teklab	
M14	Sulfate, EPA MCAWW, 300, Field Filtered	39	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$20.80	$20.80	$811.20	0%	9%	$884	V Teklab	
M15	Sulfide, SM 4500S2 E	39	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$26.00	$26.00	$1,014.00	0%	9%	$1,105	V Teklab	
M11	Total Iron (Fe)	39	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$11.44	$11.44	$446.16	0%	9%	$486	V Hach	
M10	Total Manganese (Mn)	39	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$11.44	$11.44	$446.16	0%	9%	$486	V Teklab	
M18	Chloride, EPA MCAWW, 300, Field Filtered	39	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$20.80	$20.80	$811.20	0%	9%	$884	V Teklab	
M16	Alkalinity, EPA MCAWW, 310.1, Field Filtered	39	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$20.80	$20.80	$811.20	0%	9%	$884	V Teklab	
M5	Dissolved Total Organic Carbon (TOC)	39	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$31.20	$31.20	$1,216.80	0%	9%	$1,326	V Teklab	
M17	Carbon Dioxide (CO2)	39	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$41.60	$41.60	$1,622.40	0%	9%	$1,768	V Teklab	
M6	Volatile Fatty Acids (VFAs)	39	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$166.40	$166.40	$6,489.60	0%	9%	$7,074	V Teklab	
M12	Methane/Ethane/Ethene	39	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$78.00	$78.00	$3,042.00	0%	9%	$3,316	V Hach	One time purchase
M7	ppm	2	EA	1.00	$0.00	$0.00	$0.00	$0.00	$48.44	$0.00	$48.44	$96.88	0%	9%	$106	V Chemtec	30 tests per kit, Comparator included
M8	Dissolved Oxygen, Colormetic Test Kits, 1 to 12 ppm	2	EA	1.00	$0.00	$0.00	$0.00	$0.00	$48.44	$0.00	$48.44	$96.88	0%	9%	$106	V Chemtec	30 tests per kit, Comparator included
M13	Field Filter, 0.45 micron filter	33	EA	1.00	$0.00	$0.00	$0.00	$0.00	$23.63	$0.00	$23.63	$779.79	0%	9%	$850	V Teklab	
M19	Water Quality Meter and Flow Through Cell	2	WK	1.00	$0.00	$0.00	$0.00	$0.00	$461.85	$0.00	$461.85	$923.70	0%	9%	$1,007	V Pine Env	
M20	Photoionization Detector (PID)	2	WK	1.00	$0.00	$0.00	$0.00	$0.00	$214.81	$0.00	$214.81	$429.62	0%	9%	$468	V Pine Env	Includes calibration gas
M21	Water Level Meter	2	WK	1.00	$0.00	$0.00	$0.00	$0.00	$64.44	$0.00	$64.44	$128.88	0%	9%	$140	V Pine Env	
M22	Turbidimeter	2	WK	1.00	$0.00	$0.00	$0.00	$0.00	$80.55	$0.00	$80.55	$161.10	0%	9%	$176	V Pine Env	
M23	Portable Bladder Pump	2	WK	1.00	$0.00	$0.00	$0.00	$0.00	$161.11	$0.00	$161.11	$322.22	0%	9%	$351	V Pine Env	
M24	Replacement Poly Bladders	35	EA	1.00	$0.00	$0.00	$0.00	$0.00	$8.59	$0.00	$8.59	$300.65	0%	9%	$328	V Pine Env	
M25	Bladder Pump Controller and Compressor	2	WK	1.00	$0.00	$0.00	$0.00	$0.00	$322.22	$0.00	$322.22	$644.44	0%	9%	$702	V Pine Env	
M26	Combination Tubing for Bladder Pump	2,000	LF	1.00	$0.00	$0.00	$0.00	$0.00	$0.54	$0.00	$0.54	$1,080.00	0%	9%	$1,177	V Pine Env	
M27	Shipping Rental Equipment	2	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$255.00	$255.00	$510.00	10%	9%	$611	PE N/A	
M28	55-gallon Open Head Steel Drum	5	EA	1.00	$0.00	$0.00	$0.00	$0.00	$137.43	$0.00	$137.43	$687.15	10%	9%	$824	V Global Indust.	Includes shipping
M29	Miscellaneous Sampling Equipment	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$204.00	$204.00	$204.00	10%	9%	$245	PE N/A	Paper towels, gloves, garbage bags, etc.
L15	Project Manager	3	HR	1.00	$124.22	$124.22	$0.00	$0.00	$0.00	$0.00	$124.22	$372.66	0%	9%	$406	SE SalaryExpert.com	Overhead included in unit labor rate.
L23	General Operator/Technician	142	HR	1.00	$50.70	$50.70	$0.00	$0.00	$0.00	$0.00	$50.70	$7,199.40	0%	9%	$7,847	SE SalaryExpert.com	Overhead included in unit labor rate.
L24	Contracting/Procurement Specialist	6	HR	1.00	$46.54	$46.54	$0.00	$0.00	$0.00	$0.00	$46.54	$279.24	0%	9%	$304	SE SalaryExpert.com	Overhead included in unit labor rate.
E1	Pickup Truck Rental	2	WK	1.00	$0.00	$0.00	$393.72	$393.72	$0.00	$0.00	$393.72	$787.44	10%	9%	$944	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	9	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$96.66	10%	9%	$116	PE N/A	
												TOTAL UNIT COST:			$42,521		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KGAL	thousand gallons
UNMOD UC	unmodified unit cost	KW-HR	kilowatt-hour
UNMOD LIC	unmodified line item cost	LBS	pounds
UNBUR LIC	unburdened line item cost	LCY	loose cubic yards
PC OH	prime contractor overhead	LF	linear foot
PC PF	prime contractor profit	LS	lump sum
BUR LIC	burdened line item cost	SF	square feet
BCY	bank cubic yard	TN	ton
CLF	hundred linear feet	VLF	vertical linear foot
CY	cubic yards	WK	week

TABLE CW-10-GWU1

Groundwater Monitoring
Annual Cost Sub-Element
Post-EAB Groundwater Sampling Event

Cost Worksheet: CW-10-GWU1

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves groundwater sampling at the site. Cost also includes sampling at four surface water locations. The following cost includes hours for sample collection and management and costs for sample analysis, sampling equipment, and vehicle rental. Assumes local sampling crew; no per diem included.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M3	VOCs, EPA Method SW-846 8260	20	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$80.08	$80.08	$1,601.60	0%	9%	$1,746	V Teklab	
M19	Water Quality Meter and Flow Through Cell	1	WK	1.00	$0.00	$0.00	$0.00	$0.00	$461.85	$0.00	$461.85	$461.85	0%	9%	$503	V Pine Env	
M20	Photoionization Detector (PID)	1	WK	1.00	$0.00	$0.00	$0.00	$0.00	$214.81	$0.00	$214.81	$214.81	0%	9%	$234	V Pine Env	Includes calibration gas
M21	Water Level Meter	1	WK	1.00	$0.00	$0.00	$0.00	$0.00	$64.44	$0.00	$64.44	$64.44	0%	9%	$70	V Pine Env	
M22	Turbidimeter	1	WK	1.00	$0.00	$0.00	$0.00	$0.00	$80.55	$0.00	$80.55	$80.55	0%	9%	$88	V Pine Env	
M23	Portable Bladder Pump	1	WK	1.00	$0.00	$0.00	$0.00	$0.00	$161.11	$0.00	$161.11	$161.11	0%	9%	$176	V Pine Env	
M24	Replacement Poly Bladders	15	EA	1.00	$0.00	$0.00	$0.00	$0.00	$8.59	$0.00	$8.59	$128.85	0%	9%	$140	V Pine Env	
M25	Bladder Pump Controller and Compressor	1	WK	1.00	$0.00	$0.00	$0.00	$0.00	$322.22	$0.00	$322.22	$322.22	0%	9%	$351	V Pine Env	
M26	Combination Tubing for Bladder Pump	800	LF	1.00	$0.00	$0.00	$0.00	$0.00	$0.54	$0.00	$0.54	$432.00	0%	9%	$471	V Pine Env	
M27	Shipping Rental Equipment	2	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$255.00	$255.00	$510.00	10%	9%	$611	PE N/A	
M28	55-gallon Open Head Steel Drum	2	EA	1.00	$0.00	$0.00	$0.00	$0.00	$137.43	$0.00	$137.43	$274.86	10%	9%	$330	V Global Indust.	Includes shipping
M29	Miscellaneous Sampling Equipment	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$204.00	$204.00	$204.00	10%	9%	$245	PE N/A	Paper towels, gloves, garbage bags, etc.
L15	Project Manager	2	HR	1.00	$124.22	$124.22	$0.00	$0.00	$0.00	$0.00	$124.22	$248.44	0%	9%	$271	SE SalaryExpert.com	Overhead included in unit labor rate.
L23	General Operator/Technician	66	HR	1.00	$50.70	$50.70	$0.00	$0.00	$0.00	$0.00	$50.70	$3,346.20	0%	9%	$3,647	SE SalaryExpert.com	Overhead included in unit labor rate.
L24	Contracting/Procurement Specialist	3	HR	1.00	$46.54	$46.54	$0.00	$0.00	$0.00	$0.00	$46.54	$139.62	0%	9%	$152	SE SalaryExpert.com	Overhead included in unit labor rate.
E1	Pickup Truck Rental	1	WK	1.00	$0.00	$0.00	$393.72	$393.72	$0.00	$0.00	$393.72	$393.72	10%	9%	$472	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	5	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$53.70	10%	9%	$64	PE N/A	
												TOTAL UNIT COST:			$9,571		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KGAL	thousand gallons
UNMOD UC	unmodified unit cost	KW-HR	kilowatt-hour
UNMOD LIC	unmodified line item cost	LBS	pounds
UNBUR LIC	unburdened line item cost	LCY	loose cubic yards
PC OH	prime contractor overhead	LF	linear foot
PC PF	prime contractor profit	LS	lump sum
BUR LIC	burdened line item cost	SF	square feet
BCY	bank cubic yard	TN	ton
CLF	hundred linear feet	VLF	vertical linear foot
CY	cubic yards	WK	week

TABLE CW-11-GWU1

Miscellaneous Requirements **Cost Worksheet: CW-11-GWU1**
Capital Cost Sub-Element
Miscellaneous Requirements for Sampling

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element includes all miscellaneous tasks and items that are required for preparing plans for the quality assurance plan and sampling and analysis plan for general, EAB, and MNA sampling at the site, and are not included under other cost worksheet tasks or professional/technical services.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M31	Contractor Quality Assurance Plan	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$15,300.00	$15,300.00	$15,300.00	10%	9%	$18,345	PE N/A	
M34	Sampling and Analysis Plan	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$20,400.00	$20,400.00	$20,400.00	10%	9%	$24,460	PE N/A	
M35	Site Safety and Health Plan	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$6,120.00	$6,120.00	$6,120.00	10%	9%	$7,338	PE N/A	
												TOTAL UNIT COST:			$50,143		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KGAL	thousand gallons
UNMOD UC	unmodified unit cost	KW-HR	kilowatt-hour
UNMOD LIC	unmodified line item cost	LBS	pounds
UNBUR LIC	unburdened line item cost	LCY	loose cubic yards
PC OH	prime contractor overhead	LF	linear foot
PC PF	prime contractor profit	LS	lump sum
BUR LIC	burdened line item cost	SF	square feet
BCY	bank cubic yard	TN	ton
CLF	hundred linear feet	VLF	vertical linear foot
CY	cubic yards	WK	week

TABLE CW-12-GWU1

Miscellaneous Requirements **Cost Worksheet: CW-12-GWU1**
Capital Cost Sub-Element
Miscellaneous Requirements for Construction

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element includes all miscellaneous tasks and items that are required for completion of the alternative, and are not included under other cost worksheet tasks or professional/technical services. Items included in this sub-element include contratctor work plans.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M31	Contractor Quality Assurance Plan	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$15,300.00	$15,300.00	$15,300.00	10%	9%	$18,345	PE N/A	
M32	Construction Schedule	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$4,080.00	$4,080.00	$4,080.00	10%	9%	$4,892	PE N/A	
M33	Environmental Protection Plan	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$8,160.00	$8,160.00	$8,160.00	10%	9%	$9,784	PE N/A	
M34	Sampling and Analysis Plan	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$20,400.00	$20,400.00	$20,400.00	10%	9%	$24,460	PE N/A	
M35	Site Safety and Health Plan	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$6,120.00	$6,120.00	$6,120.00	10%	9%	$7,338	PE N/A	
M36	Site Work Plan	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$10,200.00	$10,200.00	$10,200.00	10%	9%	$12,230	PE N/A	
M37	Miscellaneous Submittals	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$12,240.00	$12,240.00	$12,240.00	10%	9%	$14,676	PE N/A	
												TOTAL UNIT COST:			$91,725		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KGAL	thousand gallons
UNMOD UC	unmodified unit cost	KW-HR	kilowatt-hour
UNMOD LIC	unmodified line item cost	LBS	pounds
UNBUR LIC	unburdened line item cost	LCY	loose cubic yards
PC OH	prime contractor overhead	LF	linear foot
PC PF	prime contractor profit	LS	lump sum
BUR LIC	burdened line item cost	SF	square feet
BCY	bank cubic yard	TN	ton
CLF	hundred linear feet	VLF	vertical linear foot
CY	cubic yards	WK	week

TABLE CW-13-GWU1

Groundwater Monitoring
Capital Cost Sub-Element
Monitoring Well Installation

Cost Worksheet: CW-13-GWU1

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves construction of additional monitoring well cluster (1 shallow/1 deep). Cost assumes local oversight and no per diem.

Cost Analysis:
Cost for Mobilize/Demobilize

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M70	Mobilization and Demobilization of DPT Rig	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$510.00	$510.00	$510.00	10%	9%	$611	P N/A	
M41	Decontamination Pad Construction/Removal	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$760.38	$760.38	$760.38	10%	9%	$912	P N/A	
												TOTAL UNIT COST:			$1,523		

Cost Analysis:
Cost to Install Monitoring Wells

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
S1	Geoprobe rig and crew	1	DY	0.95	$0.00	$0.00	$0.00	$0.00	$0.00	$1,560.00	$1,560.00	$1,560.00	0%	0%	$1,560	P N/A	Overhead and profit included in rate
M71	Mini-Well Pre-Packed Screen	4	EA	1.00	$0.00	$0.00	$0.00	$0.00	$103.24	$0.00	$103.24	$412.96	10%	9%	$495	P N/A	
M72	PVC Casing	50	LF	1.00	$0.00	$0.00	$0.00	$0.00	$3.70	$0.00	$3.70	$185.00	10%	9%	$222	P N/A	
M73	Well Grout	50	LF	1.00	$0.00	$0.00	$0.00	$0.00	$6.00	$0.00	$6.00	$300.00	10%	9%	$360	P N/A	
M74	Locking J-Plug	2	EA	1.00	$0.00	$0.00	$0.00	$0.00	$13.80	$0.00	$13.80	$27.60	10%	9%	$33	P N/A	
M75	8" Vault	2	EA	1.00	$0.00	$0.00	$0.00	$0.00	$60.02	$0.00	$60.02	$120.04	10%	9%	$144	P N/A	
M44	Monitoring Well Completion	2	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$156.00	$156.00	$312.00	10%	9%	$374	P N/A	
M45	Monitoring Well Development	2	HR	0.95	$0.00	$0.00	$0.00	$0.00	$0.00	$182.40	$182.40	$364.80	10%	9%	$437	P N/A	
M46	IDW Handling	1	HR	0.95	$0.00	$0.00	$0.00	$0.00	$0.00	$192.66	$192.66	$192.66	10%	9%	$231	P N/A	
M47	Decontamination	1	HR	0.95	$0.00	$0.00	$0.00	$0.00	$0.00	$192.66	$192.66	$192.66	10%	9%	$231	P N/A	
M48	Standby Time	2	HR	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$148.20	$148.20	$296.40	10%	9%	$355	P N/A	
M28	55-gallon Open Head Steel Drum	1	EA	1.00	$0.00	$0.00	$0.00	$0.00	$137.43	$0.00	$137.43	$137.43	10%	9%	$165	V Global Indust.	Includes shipping
L11	Geologist	4	HR	1.00	$81.29	$81.29	$0.00	$0.00	$0.00	$0.00	$81.29	$284.52	0%	9%	$310	SE SalaryExpert.com	Overhead included in unit labor rate.
E2	Pickup Truck Rental	1	DY	1.00	$0.00	$0.00	$78.74	$78.74	$0.00	$0.00	$78.74	$78.74	10%	9%	$94	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	1	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$10.74	10%	9%	$13	PE N/A	
												TOTAL UNIT COST:			$5,024		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KGAL	thousand gallons
UNMOD UC	unmodified unit cost	KW-HR	kilowatt-hour
UNMOD LIC	unmodified line item cost	LBS	pounds
UNBUR LIC	unburdened line item cost	LCY	loose cubic yards
PC OH	prime contractor overhead	LF	linear foot
PC PF	prime contractor profit	LS	lump sum
BUR LIC	burdened line item cost	SF	square feet
BCY	bank cubic yard	TN	ton
CLF	hundred linear feet	VLF	vertical linear foot
CY	cubic yards	WK	week

TABLE CW-14-GWU1

Groundwater Monitoring
Periodic Cost Sub-Element
Monitoring Well Maintenance - No Action Alternative

Cost Worksheet: CW-14-GWU1

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves maintenance of monitoring wells for No Action monitoring. Assumes well head repairs (replace vault, j-plug, etc.) and well development. Assumes well development fluid will be collected in a mobile tank and decanted at treatment facility. Cost assumes local oversight and no per diem.

Cost Analysis:
Cost for Mobilize/Demobilize

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M70	Mobilization and Demobilization of DPT Rig	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$510.00	$510.00	$510.00	10%	9%	$611	P N/A	
M41	Decontamination Pad Construction/Removal	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$760.38	$760.38	$760.38	10%	9%	$912	P N/A	
												TOTAL UNIT COST:			$1,523		

Cost Analysis:
Cost to Maintain Monitoring Wells

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
S1	Geoprobe rig and crew	2	DY	0.95	$0.00	$0.00	$0.00	$0.00	$0.00	$1,560.00	$1,560.00	$3,120.00	0%	0%	$3,120	P N/A	Overhead and profit included in rate
M74	Locking J-Plug	10	EA	1.00	$0.00	$0.00	$0.00	$0.00	$13.80	$0.00	$13.80	$138.00	10%	9%	$165	P N/A	
M75	8" Vault	10	EA	1.00	$0.00	$0.00	$0.00	$0.00	$60.02	$0.00	$60.02	$600.20	10%	9%	$720	P N/A	
L11	Geologist	20	HR	1.00	$81.29	$81.29	$0.00	$0.00	$0.00	$0.00	$81.29	$1,625.80	0%	9%	$1,772	SE SalaryExpert.com	Overhead included in unit labor rate.
E2	Pickup Truck Rental	2	DY	1.00	$0.00	$0.00	$78.74	$78.74	$0.00	$0.00	$78.74	$157.49	10%	9%	$189	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	2	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$21.48	10%	9%	$26	PE N/A	
												TOTAL UNIT COST:			$5,992		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KGAL	thousand gallons
UNMOD UC	unmodified unit cost	KW-HR	kilowatt-hour
UNMOD LIC	unmodified line item cost	LBS	pounds
UNBUR LIC	unburdened line item cost	LCY	loose cubic yards
PC OH	prime contractor overhead	LF	linear foot
PC PF	prime contractor profit	LS	lump sum
BUR LIC	burdened line item cost	SF	square feet
BCY	bank cubic yard	TN	ton
CLF	hundred linear feet	VLF	vertical linear foot
CY	cubic yards	WK	week

TABLE CW-15-GWU1

Groundwater Monitoring
Periodic Cost Sub-Element
Monitoring Well Maintenance - EAB

Cost Worksheet: CW-15-GWU1

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves maintenance of monitoring wells for EAB monitoring. Assumes well head repairs (replace vault, j-plug, etc.) and well development. Assumes well development fluid will be collected in a mobile tank and decanted at treatment facility. Cost assumes local oversight and no per diem.

Cost Analysis:
Cost for Mobilize/Demobilize

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M70	Mobilization and Demobilization of DPT Rig	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$510.00	$510.00	$510.00	10%	9%	$611	P N/A	
M41	Decontamination Pad Construction/Removal	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$760.38	$760.38	$760.38	10%	9%	$912	P N/A	
												TOTAL UNIT COST:			$1,523		

Cost Analysis:
Cost to Maintain Monitoring Wells

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
S1	Geoprobe rig and crew	3	DY	0.95	$0.00	$0.00	$0.00	$0.00	$0.00	$1,560.00	$1,560.00	$4,680.00	0%	0%	$4,680	P N/A	Overhead and profit included in rate
M74	Locking J-Plug	13	EA	1.00	$0.00	$0.00	$0.00	$0.00	$13.80	$0.00	$13.80	$179.40	10%	9%	$215	P N/A	
M75	8" Vault	13	EA	1.00	$0.00	$0.00	$0.00	$0.00	$60.02	$0.00	$60.02	$780.26	10%	9%	$936	P N/A	
L11	Geologist	26	HR	1.00	$81.29	$81.29	$0.00	$0.00	$0.00	$0.00	$81.29	$2,113.54	0%	9%	$2,304	SE SalaryExpert.com	Overhead included in unit labor rate.
E2	Pickup Truck Rental	3	DY	1.00	$0.00	$0.00	$78.74	$78.74	$0.00	$0.00	$78.74	$236.23	10%	9%	$283	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	3	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$32.22	10%	9%	$39	PE N/A	
												TOTAL UNIT COST:			$8,457		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KGAL	thousand gallons
UNMOD UC	unmodified unit cost	KW-HR	kilowatt-hour
UNMOD LIC	unmodified line item cost	LBS	pounds
UNBUR LIC	unburdened line item cost	LCY	loose cubic yards
PC OH	prime contractor overhead	LF	linear foot
PC PF	prime contractor profit	LS	lump sum
BUR LIC	burdened line item cost	SF	square feet
BCY	bank cubic yard	TN	ton
CLF	hundred linear feet	VLF	vertical linear foot
CY	cubic yards	WK	week

TABLE CW-16-GWU1

Groundwater Monitoring
Periodic Cost Sub-Element
Monitoring Well Maintenance - MNA

Cost Worksheet: CW-16-GWU1

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves maintenance of monitoring wells for MNA monitoring. Assumes well head repairs (replace vault, j-plug, etc.) and well development. Assumes well development fluid will be collected in a mobile tank and decanted at treatment facility. Cost assumes local oversight and no per diem.

Cost Analysis:
Cost for Mobilize/Demobilize

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M70	Mobilization and Demobilization of DPT Rig	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$510.00	$510.00	$510.00	10%	9%	$611	P N/A	
M41	Decontamination Pad Construction/Removal	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$760.38	$760.38	$760.38	10%	9%	$912	P N/A	
												TOTAL UNIT COST:			$1,523		

Cost Analysis:
Cost to Maintain Monitoring Wells

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
S1	Geoprobe rig and crew	3	DY	0.95	$0.00	$0.00	$0.00	$0.00	$0.00	$1,560.00	$1,560.00	$4,680.00	0%	0%	$4,680	P N/A	Overhead and profit included in rate
M74	Locking J-Plug	13	EA	1.00	$0.00	$0.00	$0.00	$0.00	$13.80	$0.00	$13.80	$179.40	10%	9%	$215	P N/A	
M75	8" Vault	13	EA	1.00	$0.00	$0.00	$0.00	$0.00	$60.02	$0.00	$60.02	$780.26	10%	9%	$936	P N/A	
L11	Geologist	26	HR	1.00	$81.29	$81.29	$0.00	$0.00	$0.00	$0.00	$81.29	$2,113.54	0%	9%	$2,304	SE SalaryExpert.com	Overhead included in unit labor rate.
E2	Pickup Truck Rental	3	DY	1.00	$0.00	$0.00	$78.74	$78.74	$0.00	$0.00	$78.74	$236.23	10%	9%	$283	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	3	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$32.22	10%	9%	$39	PE N/A	
												TOTAL UNIT COST:			$8,457		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KGAL	thousand gallons
UNMOD UC	unmodified unit cost	KW-HR	kilowatt-hour
UNMOD LIC	unmodified line item cost	LBS	pounds
UNBUR LIC	unburdened line item cost	LCY	loose cubic yards
PC OH	prime contractor overhead	LF	linear foot
PC PF	prime contractor profit	LS	lump sum
BUR LIC	burdened line item cost	SF	square feet
BCY	bank cubic yard	TN	ton
CLF	hundred linear feet	VLF	vertical linear foot
CY	cubic yards	WK	week

TABLE CW-17-GWU1

Groundwater Monitoring
Capital Cost Sub-Element
Monitoring Well Abandonment - No Action Alternative

Cost Worksheet: CW-17-GWU1

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves abandonment of No Action alternative monitoring wells after site closure. Cost assumes local oversight and no per diem.

Cost Analysis:
Cost for Mobilize/Demobilize

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M70	Mobilization and Demobilization of DPT Rig	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$510.00	$510.00	$510.00	10%	9%	$611	P N/A	
M41	Decontamination Pad Construction/Removal	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$760.38	$760.38	$760.38	10%	9%	$912	P N/A	
												TOTAL UNIT COST:			$1,523		

Cost Analysis:
Cost to Abandon Monitoring Wells

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
S1	Geoprobe rig and crew	3	DY	0.95	$0.00	$0.00	$0.00	$0.00	$0.00	$1,560.00	$1,560.00	$4,680.00	0%	0%	$4,680	P N/A	Overhead and profit included in rate
M100	Grout Continuous Borehole	350	VLF	1.00	$0.00	$0.00	$0.00	$0.00	$7.61	$0.00	$7.61	$2,663.50	10%	9%	$3,194	E 33 23 1820	
L11	Geologist	30	HR	1.00	$81.29	$81.29	$0.00	$0.00	$0.00	$0.00	$81.29	$2,438.70	0%	9%	$2,658	SE SalaryExpert.com	Overhead included in unit labor rate.
E2	Pickup Truck Rental	3	DY	1.00	$0.00	$0.00	$78.74	$78.74	$0.00	$0.00	$78.74	$236.23	10%	9%	$283	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	3	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$32.22	10%	9%	$39	PE N/A	
												TOTAL UNIT COST:			$10,854		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KGAL	thousand gallons
UNMOD UC	unmodified unit cost	KW-HR	kilowatt-hour
UNMOD LIC	unmodified line item cost	LBS	pounds
UNBUR LIC	unburdened line item cost	LCY	loose cubic yards
PC OH	prime contractor overhead	LF	linear foot
PC PF	prime contractor profit	LS	lump sum
BUR LIC	burdened line item cost	SF	square feet
BCY	bank cubic yard	TN	ton
CLF	hundred linear feet	VLF	vertical linear foot
CY	cubic yards	WK	week

TABLE CW-18-GWU1

Groundwater Monitoring
Capital Cost Sub-Element
Monitoring Well Abandonment - EAB

Cost Worksheet: CW-18-GWU1

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves abandonment of EAB monitoring wells after site closure. Cost assumes local oversight and no per diem.

Cost Analysis:
Cost for Mobilize/Demobilize

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M70	Mobilization and Demobilization of DPT Rig	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$510.00	$510.00	$510.00	10%	9%	$611	P N/A	
M41	Decontamination Pad Construction/Removal	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$760.38	$760.38	$760.38	10%	9%	$912	P N/A	
												TOTAL UNIT COST:			$1,523		

Cost Analysis:
Cost to Abandon Monitoring Wells

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
S1	Geoprobe rig and crew	5	DY	0.95	$0.00	$0.00	$0.00	$0.00	$0.00	$1,560.00	$1,560.00	$7,800.00	0%	0%	$7,800	P N/A	Overhead and profit included in rate
M100	Grout Continuous Borehole	700	VLF	1.00	$0.00	$0.00	$0.00	$0.00	$7.61	$0.00	$7.61	$5,327.00	10%	9%	$6,387	E 33 23 1820	
L11	Geologist	50	HR	1.00	$81.29	$81.29	$0.00	$0.00	$0.00	$0.00	$81.29	$4,064.50	0%	9%	$4,430	SE SalaryExpert.com	Overhead included in unit labor rate.
E2	Pickup Truck Rental	5	DY	1.00	$0.00	$0.00	$78.74	$78.74	$0.00	$0.00	$78.74	$393.72	10%	9%	$472	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	5	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$53.70	10%	9%	$64	PE N/A	
												TOTAL UNIT COST:			$19,153		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KGAL	thousand gallons
UNMOD UC	unmodified unit cost	KW-HR	kilowatt-hour
UNMOD LIC	unmodified line item cost	LBS	pounds
UNBUR LIC	unburdened line item cost	LCY	loose cubic yards
PC OH	prime contractor overhead	LF	linear foot
PC PF	prime contractor profit	LS	lump sum
BUR LIC	burdened line item cost	SF	square feet
BCY	bank cubic yard	TN	ton
CLF	hundred linear feet	VLF	vertical linear foot
CY	cubic yards	WK	week

TABLE CW-19-GWU1

Groundwater Monitoring
Capital Cost Sub-Element
Monitoring Well Abandonment - MNA

Cost Worksheet: CW-19-GWU1

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves abandonment of MNA monitoring wells after site closure. Cost assumes local oversight and no per diem.

Cost Analysis:
Cost for Mobilize/Demobilize

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M70	Mobilization and Demobilization of DPT Rig	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$510.00	$510.00	$510.00	10%	9%	$611	P N/A	
M41	Decontamination Pad Construction/Removal	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$760.38	$760.38	$760.38	10%	9%	$912	P N/A	
												TOTAL UNIT COST:			$1,523		

Cost Analysis:
Cost to Abandon Monitoring Wells

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
S1	Geoprobe rig and crew	5	DY	0.95	$0.00	$0.00	$0.00	$0.00	$0.00	$1,560.00	$1,560.00	$7,800.00	0%	0%	$7,800	P N/A	Overhead and profit included in rate
M100	Grout Continuous Borehole	465	VLF	1.00	$0.00	$0.00	$0.00	$0.00	$7.61	$0.00	$7.61	$3,538.65	10%	9%	$4,243	E 33 23 1820	
L11	Geologist	50	HR	1.00	$81.29	$81.29	$0.00	$0.00	$0.00	$0.00	$81.29	$4,064.50	0%	9%	$4,430	SE SalaryExpert.com	Overhead included in unit labor rate.
E2	Pickup Truck Rental	5	DY	1.00	$0.00	$0.00	$78.74	$78.74	$0.00	$0.00	$78.74	$393.72	10%	9%	$472	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	5	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$53.70	10%	9%	$64	PE N/A	
												TOTAL UNIT COST:			$17,009		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KGAL	thousand gallons
UNMOD UC	unmodified unit cost	KW-HR	kilowatt-hour
UNMOD LIC	unmodified line item cost	LBS	pounds
UNBUR LIC	unburdened line item cost	LCY	loose cubic yards
PC OH	prime contractor overhead	LF	linear foot
PC PF	prime contractor profit	LS	lump sum
BUR LIC	burdened line item cost	SF	square feet
BCY	bank cubic yard	TN	ton
CLF	hundred linear feet	VLF	vertical linear foot
CY	cubic yards	WK	week

TABLE CW-20-GWU1

Groundwater Monitoring
Capital Cost Sub-Element
EAB Pilot-Test Injection

Cost Worksheet: CW-20-GWU1

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves injection of bioremediation additives during the pilot test. Assumes local oversight; no per diem included.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M150	EOS	488	GAL	1.00	$0.00	$0.00	$0.00	$0.00	$16.21	$0.00	$16.21	$7,910.48	10%	9%	$9,485	V EOS Remediatior	
M151	Shipping for EOS	488	GAL	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.46	$0.46	$224.48	10%	9%	$269	V EOS Remediatior	
M165	Fuel for Transfer Pump(s)	3	DY	1.00	$0.00	$0.00	$0.00	$0.00	$21.90	$0.00	$21.90	$65.70	10%	9%	$79	P Per Estimator	
M153	Process Water, Supplied by a Water Line	17	KGAL	1.00	$0.00	$0.00	$0.00	$0.00	$4.23	$0.00	$4.23	$71.91	10%	9%	$86	E 33 42 0302	Water for injection solution
M155	Frac tank rental	1	WK	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$1,044.39	$1,044.39	$1,044.39	10%	9%	$1,252	V Rain for Rent	Includes delivery and pickup cost
E3	Pickup Truck Rental for Injection Crew	1	WK	1.00	$0.00	$0.00	$393.72	$393.72	$0.00	$0.00	$393.72	$393.72	10%	9%	$472	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	3	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$32.22	10%	9%	$39	PE N/A	
L23	General Operator/Technician	60	HR	1.00	$50.70	$50.70	$0.00	$0.00	$0.00	$0.00	$50.70	$3,042.00	0%	9%	$3,316	SE SalaryExpert.com	Overhead included in unit labor rate.
L15	Project Manager	5	HR	1.00	$124.22	$124.22	$0.00	$0.00	$0.00	$0.00	$124.22	$621.10	0%	9%	$677	SE SalaryExpert.com	Overhead included in unit labor rate.
L24	Contracting/Procurement Specialist	15	HR	1.00	$46.54	$46.54	$0.00	$0.00	$0.00	$0.00	$46.54	$698.10	0%	9%	$761	SE SalaryExpert.com	Overhead included in unit labor rate.
L11	Geologist	30	HR	1.00	$81.29	$81.29	$0.00	$0.00	$0.00	$0.00	$81.29	$2,438.70	0%	9%	$2,658	SE SalaryExpert.com	Overhead included in unit labor rate.
E1	Pickup Truck Rental	1	WK	1.00	$0.00	$0.00	$393.72	$393.72	$0.00	$0.00	$393.72	$393.72	10%	9%	$472	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	3	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$32.22	10%	9%	$39	PE N/A	
												TOTAL UNIT COST:			$19,605		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KGAL	thousand gallons
UNMOD UC	unmodified unit cost	KW-HR	kilowatt-hour
UNMOD LIC	unmodified line item cost	LBS	pounds
UNBUR LIC	unburdened line item cost	LCY	loose cubic yards
PC OH	prime contractor overhead	LF	linear foot
PC PF	prime contractor profit	LS	lump sum
BUR LIC	burdened line item cost	SF	square feet
BCY	bank cubic yard	TN	ton
CLF	hundred linear feet	VLF	vertical linear foot
CY	cubic yards	WK	week

TABLE CW-21-GWU1

Groundwater Monitoring
Capital Cost Sub-Element
EAB Pilot-Test Monitoring Well Installation

Cost Worksheet: CW-21-GWU1

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves installation of pilot test monitoring wells for evaluating the effectiveness of the pilot test injection program. Assumes local oversight; no per diem included.

Cost Analysis:
Cost for Mobilize/Demobilize

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M70	Mobilization and Demobilization of DPT Rig	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$510.00	$510.00	$510.00	10%	9%	$611	P N/A	
M41	Decontamination Pad Construction/Removal	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$760.38	$760.38	$760.38	10%	9%	$912	P N/A	
												TOTAL UNIT COST:			$1,523		

Cost Analysis:
Cost to Install Monitoring Wells

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
S1	Geoprobe rig and crew	1	DY	0.95	$0.00	$0.00	$0.00	$0.00	$0.00	$1,560.00	$1,560.00	$1,560.00	0%	0%	$1,560	P N/A	Overhead and profit included in rate
M71	Mini-Well Pre-Packed Screen	8	EA	1.00	$0.00	$0.00	$0.00	$0.00	$103.24	$0.00	$103.24	$825.92	10%	9%	$990	P N/A	
M72	PVC Casing	100	LF	1.00	$0.00	$0.00	$0.00	$0.00	$3.70	$0.00	$3.70	$370.00	10%	9%	$444	P N/A	
M73	Well Grout	130	LF	1.00	$0.00	$0.00	$0.00	$0.00	$6.00	$0.00	$6.00	$780.00	10%	9%	$935	P N/A	
M74	Locking J-Plug	4	EA	1.00	$0.00	$0.00	$0.00	$0.00	$13.80	$0.00	$13.80	$55.20	10%	9%	$66	P N/A	
M75	8" Vault	4	EA	1.00	$0.00	$0.00	$0.00	$0.00	$60.02	$0.00	$60.02	$240.08	10%	9%	$288	P N/A	
M44	Monitoring Well Completion	4	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$156.00	$156.00	$624.00	10%	9%	$748	P N/A	
M45	Monitoring Well Development	4	HR	0.95	$0.00	$0.00	$0.00	$0.00	$0.00	$182.40	$182.40	$729.60	10%	9%	$875	P N/A	
M46	IDW Handling	1	HR	0.95	$0.00	$0.00	$0.00	$0.00	$0.00	$192.66	$192.66	$192.66	10%	9%	$231	P N/A	
M47	Decontamination	1	HR	0.95	$0.00	$0.00	$0.00	$0.00	$0.00	$192.66	$192.66	$192.66	10%	9%	$231	P N/A	
M48	Standby Time	4	HR	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$148.20	$148.20	$592.80	10%	9%	$711	P N/A	
M28	55-gallon Open Head Steel Drum	2	EA	1.00	$0.00	$0.00	$0.00	$0.00	$137.43	$0.00	$137.43	$274.86	10%	9%	$330	V Global Indust.	Includes shipping
L11	Geologist	7	HR	1.00	$81.29	$81.29	$0.00	$0.00	$0.00	$0.00	$81.29	$569.03	0%	9%	$620	SE SalaryExpert.com	Overhead included in unit labor rate.
E2	Pickup Truck Rental	1	DY	1.00	$0.00	$0.00	$78.74	$78.74	$0.00	$0.00	$78.74	$78.74	10%	9%	$94	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	1	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$10.74	10%	9%	$13	PE N/A	
												TOTAL UNIT COST:			$8,136		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KGAL	thousand gallons
UNMOD UC	unmodified unit cost	KW-HR	kilowatt-hour
UNMOD LIC	unmodified line item cost	LBS	pounds
UNBUR LIC	unburdened line item cost	LCY	loose cubic yards
PC OH	prime contractor overhead	LF	linear foot
PC PF	prime contractor profit	LS	lump sum
BUR LIC	burdened line item cost	SF	square feet
BCY	bank cubic yard	TN	ton
CLF	hundred linear feet	VLF	vertical linear foot
CY	cubic yards	WK	week

TABLE CW-22-GWU1

MNA Monitoring
Annual Cost Sub-Element
EAB Pilot-Test Sampling Event

Cost Worksheet: CW-22-GWU1

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves implemention of EAB sampling of the pilot test monitoring wells. The following cost includes EAB sample parameters analysis and labor hours for collection of EAB sample parameters. Cost includes rental equipment, project management, and rental vehicle costs. Assumes local sampling crew; no per diem included.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M3	VOCs, EPA Method SW-846 8260	6	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$80.08	$80.08	$480.48	0%	9%	$524	V Teklab	
M4	Filtered	6	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$72.80	$72.80	$436.80	0%	9%	$476	V Teklab	
M9	Nitrate/Nitrite (NO3/NO2)	6	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$17.68	$17.68	$106.08	0%	9%	$116	V Teklab	
M14	Sulfate, EPA MCAWW, 300, Field Filtered	6	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$20.80	$20.80	$124.80	0%	9%	$136	V Teklab	
M15	Sulfide, SM 4500S2 E	6	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$26.00	$26.00	$156.00	0%	9%	$170	V Teklab	
M11	Total Iron (Fe)	6	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$11.44	$11.44	$68.64	0%	9%	$75	V Hach	
M10	Total Manganese (Mn)	6	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$11.44	$11.44	$68.64	0%	9%	$75	V Teklab	
M18	Chloride, EPA MCAWW, 300, Field Filtered	6	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$20.80	$20.80	$124.80	0%	9%	$136	V Teklab	
M16	Alkalinity, EPA MCAWW, 310.1, Field Filtered	6	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$20.80	$20.80	$124.80	0%	9%	$136	V Teklab	
M5	Dissolved Total Organic Carbon (TOC)	6	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$31.20	$31.20	$187.20	0%	9%	$204	V Teklab	
M17	Carbon Dioxide (CO2)	6	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$41.60	$41.60	$249.60	0%	9%	$272	V Teklab	
M6	Volatile Fatty Acids (VFAs)	6	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$166.40	$166.40	$998.40	0%	9%	$1,088	V Teklab	
M12	Methane/Ethane/Ethene	6	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$78.00	$78.00	$468.00	0%	9%	$510	V Hach	One time purchase
M149	Microbiological DNA Analysis	6	EA	1.00	$0.00	$0.00	$0.00	$0.00	$397.53	$0.00	$397.53	$2,385.18	10%	9%	$2,860	P Previous Work	Determination of microbial species
M7	ppm	1	EA	1.00	$0.00	$0.00	$0.00	$0.00	$48.44	$0.00	$48.44	$48.44	0%	9%	$53	V Chemtec	30 tests per kit, Comparator included
M8	ppm	1	EA	1.00	$0.00	$0.00	$0.00	$0.00	$48.44	$0.00	$48.44	$48.44	0%	9%	$53	V Chemtec	30 tests per kit, Comparator included
M13	Field Filter, 0.45 micron filter	6	EA	1.00	$0.00	$0.00	$0.00	$0.00	$23.63	$0.00	$23.63	$141.78	0%	9%	$155	V Teklab	
M19	Water Quality Meter and Flow Through Cell	1	WK	1.00	$0.00	$0.00	$0.00	$0.00	$461.85	$0.00	$461.85	$461.85	0%	9%	$503	V Pine Env	
M20	Photoionization Detector (PID)	1	WK	1.00	$0.00	$0.00	$0.00	$0.00	$214.81	$0.00	$214.81	$214.81	0%	9%	$234	V Pine Env	Includes calibration gas
M21	Water Level Meter	1	WK	1.00	$0.00	$0.00	$0.00	$0.00	$64.44	$0.00	$64.44	$64.44	0%	9%	$70	V Pine Env	
M22	Turbidimeter	1	WK	1.00	$0.00	$0.00	$0.00	$0.00	$80.55	$0.00	$80.55	$80.55	0%	9%	$88	V Pine Env	
M23	Portable Bladder Pump	1	WK	1.00	$0.00	$0.00	$0.00	$0.00	$161.11	$0.00	$161.11	$161.11	0%	9%	$176	V Pine Env	
M24	Replacement Poly Bladders	6	EA	1.00	$0.00	$0.00	$0.00	$0.00	$8.59	$0.00	$8.59	$51.54	0%	9%	$56	V Pine Env	
M25	Bladder Pump Controller and Compressor	1	WK	1.00	$0.00	$0.00	$0.00	$0.00	$322.22	$0.00	$322.22	$322.22	0%	9%	$351	V Pine Env	
M26	Combination Tubing for Bladder Pump	300	LF	1.00	$0.00	$0.00	$0.00	$0.00	$0.54	$0.00	$0.54	$162.00	0%	9%	$177	V Pine Env	
M27	Shipping Rental Equipment	2	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$255.00	$255.00	$510.00	10%	9%	$611	PE N/A	
M28	55-gallon Open Head Steel Drum	1	EA	1.00	$0.00	$0.00	$0.00	$0.00	$137.43	$0.00	$137.43	$137.43	10%	9%	$165	V Global Indust.	Includes shipping
M29	Miscellaneous Sampling Equipment	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$204.00	$204.00	$204.00	10%	9%	$245	PE N/A	Paper towels, gloves, garbage bags, etc.
L15	Project Manager	1	HR	1.00	$124.22	$124.22	$0.00	$0.00	$0.00	$0.00	$124.22	$124.22	0%	9%	$135	SE SalaryExpert.com	Overhead included in unit labor rate.
L23	General Operator/Technician	34	HR	1.00	$50.70	$50.70	$0.00	$0.00	$0.00	$0.00	$50.70	$1,723.80	0%	9%	$1,879	SE SalaryExpert.com	Overhead included in unit labor rate.
L24	Contracting/Procurement Specialist	1	HR	1.00	$46.54	$46.54	$0.00	$0.00	$0.00	$0.00	$46.54	$46.54	0%	9%	$51	SE SalaryExpert.com	Overhead included in unit labor rate.
E1	Pickup Truck Rental	1	WK	1.00	$0.00	$0.00	$393.72	$393.72	$0.00	$0.00	$393.72	$393.72	10%	9%	$472	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	3	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$32.22	10%	9%	$39	PE N/A	
												TOTAL UNIT COST:			$12,291		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KGAL	thousand gallons
UNMOD UC	unmodified unit cost	KW-HR	kilowatt-hour
UNMOD LIC	unmodified line item cost	LBS	pounds
UNBUR LIC	unburdened line item cost	LCY	loose cubic yards
PC OH	prime contractor overhead	LF	linear foot
PC PF	prime contractor profit	LS	lump sum
BUR LIC	burdened line item cost	SF	square feet
BCY	bank cubic yard	TN	ton
CLF	hundred linear feet	VLF	vertical linear foot
CY	cubic yards	WK	week

TABLE CW-23-GWU1

Groundwater Extraction and Treatment
Capital Cost Sub-Element
Mobilization and Demobilization of Drill Rig

Cost Worksheet: CW-23-GWU1

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves installation/abandonment of injection wells. Assumes local oversight; no per diem included.

Cost Analysis:
Cost for Mobilize/Demobilize

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M40	Mobilization and Demobilization of Drill Rig	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$8,088.00	$8,088.00	$8,088.00	10%	9%	$9,698	P N/A	
M41	Decontamination Pad Construction/Removal	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$760.38	$760.38	$760.38	10%	9%	$912	P N/A	
												TOTAL UNIT COST:			$10,610		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KGAL	thousand gallons
UNMOD UC	unmodified unit cost	KW-HR	kilowatt-hour
UNMOD LIC	unmodified line item cost	LBS	pounds
UNBUR LIC	unburdened line item cost	LCY	loose cubic yards
PC OH	prime contractor overhead	LF	linear foot
PC PF	prime contractor profit	LS	lump sum
BUR LIC	burdened line item cost	SF	square feet
BCY	bank cubic yard	TN	ton
CLF	hundred linear feet	VLF	vertical linear foot
CY	cubic yards	WK	week

TABLE CW-24-GWU1

Groundwater Extraction and Treatment
Capital Cost Sub-Element
Injection Well Installation

Cost Worksheet: CW-24-GWU1

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves installation of injection wells. Assumes local oversight; no per diem included.

Cost Analysis:
Cost to Install Injection Well

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M43	Installation of 2-inch ID Monitoring Wells	35	VLF	0.95	$0.00	$0.00	$0.00	$0.00	$0.00	$23.94	$23.94	$837.90	10%	9%	$1,005	P N/A	
M44	Monitoring Well Completion	1	EA	0.95	$0.00	$0.00	$0.00	$0.00	$0.00	$156.00	$156.00	$156.00	10%	9%	$187	P N/A	
M45	Monitoring Well Development	2	HR	0.95	$0.00	$0.00	$0.00	$0.00	$0.00	$182.40	$182.40	$364.80	10%	9%	$437	P N/A	
M46	IDW Handling	1	HR	0.95	$0.00	$0.00	$0.00	$0.00	$0.00	$192.66	$192.66	$96.33	10%	9%	$115	P N/A	
M47	Decontamination	1	HR	0.95	$0.00	$0.00	$0.00	$0.00	$0.00	$192.66	$192.66	$96.33	10%	9%	$115	P N/A	
M48	Standby Time	1	HR	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$148.20	$148.20	$148.20	10%	9%	$178	P N/A	
M28	55-gallon Open Head Steel Drum	1	EA	1.00	$0.00	$0.00	$0.00	$0.00	$137.43	$0.00	$137.43	$137.43	10%	9%	$165	V Global Indust.	Includes shipping
L11	Geologist	4	HR	1.00	$81.29	$81.29	$0.00	$0.00	$0.00	$0.00	$81.29	$325.16	0%	9%	$354	SE SalaryExpert.com	Overhead included in unit labor rate.
E2	Pickup Truck Rental	0.5	DY	1.00	$0.00	$0.00	$78.74	$78.74	$0.00	$0.00	$78.74	$39.37	10%	9%	$47	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	0.5	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$5.37	10%	9%	$6	PE N/A	
												TOTAL UNIT COST:			$2,609		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KGAL	thousand gallons
UNMOD UC	unmodified unit cost	KW-HR	kilowatt-hour
UNMOD LIC	unmodified line item cost	LBS	pounds
UNBUR LIC	unburdened line item cost	LCY	loose cubic yards
PC OH	prime contractor overhead	LF	linear foot
PC PF	prime contractor profit	LS	lump sum
BUR LIC	burdened line item cost	SF	square feet
BCY	bank cubic yard	TN	ton
CLF	hundred linear feet	VLF	vertical linear foot
CY	cubic yards	WK	week

TABLE CW-25-GWU1

MNA Monitoring **Cost Worksheet: CW-25-GWU1**
Annual Cost Sub-Element
Biobarrier Injection Event - Equipment Purchase

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves purchase of equipment for biobarrier injections. Assumes local oversight; no per diem included.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M160	Transfer pump	3	EA	1.00	$0.00	$0.00	$0.00	$0.00	$887.05	$0.00	$887.05	$2,661.15	10%	9%	$3,191	V D B. Supply	Gas driven transfer pump
M162	Flowmeter - Injection Point	2	EA	1.00	$0.00	$0.00	$0.00	$0.00	$149.98	$0.00	$149.98	$299.96	10%	9%	$360	V Assured Auto.	
M163	Flowmeter - Water to Frac Tank	1	EA	1.00	$0.00	$0.00	$0.00	$0.00	$467.56	$0.00	$467.56	$467.56	10%	9%	$561	V Assured Auto.	
M164	General Injection Equipment and Materials	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$2,190.24	$0.00	$2,190.24	$2,190.24	10%	9%	$2,626	P Per Estimator	Hoses, quick disconnects, miscellaneous materials
												TOTAL UNIT COST:			$6,738		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KGAL	thousand gallons
UNMOD UC	unmodified unit cost	KW-HR	kilowatt-hour
UNMOD LIC	unmodified line item cost	LBS	pounds
UNBUR LIC	unburdened line item cost	LCY	loose cubic yards
PC OH	prime contractor overhead	LF	linear foot
PC PF	prime contractor profit	LS	lump sum
BUR LIC	burdened line item cost	SF	square feet
BCY	bank cubic yard	TN	ton
CLF	hundred linear feet	VLF	vertical linear foot
CY	cubic yards	WK	week

TABLE CW-26-GWU1

Remediation
Annual Cost Sub-Element
Biobarrier Injection Event - Line 1A

Cost Worksheet: CW-26-GWU1

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves injection of biobarrier material for Line 1A. Assumes local oversight; no per diem included.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M150	EOS	4,514	GAL	1.00	$0.00	$0.00	$0.00	$0.00	$16.21	$0.00	$16.21	$73,171.94	10%	9%	$87,733	V EOS Remediatior	
M151	Shipping for EOS	4,514	GAL	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.46	$0.46	$2,076.44	10%	9%	$2,490	V EOS Remediatior	
M165	Fuel for Transfer Pump(s)	7	DY	1.00	$0.00	$0.00	$0.00	$0.00	$21.90	$0.00	$21.90	$153.30	10%	9%	$184	P Per Estimator	
M153	Process Water, Supplied by a Water Line	154	KGAL	1.00	$0.00	$0.00	$0.00	$0.00	$4.23	$0.00	$4.23	$651.42	10%	9%	$781	E 33 42 0302	Water for injection solution
M155	Frac tank rental	4	WK	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$1,044.39	$1,044.39	$4,177.56	10%	9%	$5,009	V Rain for Rent	Includes delivery and pickup cost
E3	Pickup Truck Rental for Injection Crew	2	WK	1.00	$0.00	$0.00	$393.72	$393.72	$0.00	$0.00	$393.72	$787.44	10%	9%	$944	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	4	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$42.96	10%	9%	$52	PE N/A	
L23	General Operator/Technician	140	HR	1.00	$50.70	$50.70	$0.00	$0.00	$0.00	$0.00	$50.70	$7,098.00	0%	9%	$7,737	SE SalaryExpert.com	Overhead included in unit labor rate.
L15	Project Manager	4	HR	1.00	$124.22	$124.22	$0.00	$0.00	$0.00	$0.00	$124.22	$496.88	0%	9%	$542	SE SalaryExpert.com	Overhead included in unit labor rate.
L24	Contracting/Procurement Specialist	6	HR	1.00	$46.54	$46.54	$0.00	$0.00	$0.00	$0.00	$46.54	$279.24	0%	9%	$304	SE SalaryExpert.com	Overhead included in unit labor rate.
L11	Geologist	70	HR	1.00	$81.29	$81.29	$0.00	$0.00	$0.00	$0.00	$81.29	$5,690.30	0%	9%	$6,202	SE SalaryExpert.com	Overhead included in unit labor rate.
E1	Pickup Truck Rental	2	WK	1.00	$0.00	$0.00	$393.72	$393.72	$0.00	$0.00	$393.72	$787.44	10%	9%	$944	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	7	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$75.18	10%	9%	$90	PE N/A	
												TOTAL UNIT COST:			$113,012		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KGAL	thousand gallons
UNMOD UC	unmodified unit cost	KW-HR	kilowatt-hour
UNMOD LIC	unmodified line item cost	LBS	pounds
UNBUR LIC	unburdened line item cost	LCY	loose cubic yards
PC OH	prime contractor overhead	LF	linear foot
PC PF	prime contractor profit	LS	lump sum
BUR LIC	burdened line item cost	SF	square feet
BCY	bank cubic yard	TN	ton
CLF	hundred linear feet	VLF	vertical linear foot
CY	cubic yards	WK	week

TABLE CW-27-GWU1

Remediation
Annual Cost Sub-Element
Biobarrier Injection Event - Line 1B

Cost Worksheet: CW-27-GWU1

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves injection of biobarrier material for Line 1B. Assumes local oversight; no per diem included.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M150	EOS	1,098	GAL	1.00	$0.00	$0.00	$0.00	$0.00	$16.21	$0.00	$16.21	$17,798.58	10%	9%	$21,340	V EOS Remediatior	
M151	Shipping for EOS	1,098	GAL	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.46	$0.46	$505.08	10%	9%	$606	V EOS Remediatior	
M165	Fuel for Transfer Pump(s)	2	DY	1.00	$0.00	$0.00	$0.00	$0.00	$21.90	$0.00	$21.90	$43.80	10%	9%	$53	P Per Estimator	
M153	Process Water, Supplied by a Water Line	38	KGAL	1.00	$0.00	$0.00	$0.00	$0.00	$4.23	$0.00	$4.23	$160.74	10%	9%	$193	E 33 42 0302	Water for injection solution
M155	Frac tank rental	2	WK	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$1,044.39	$1,044.39	$2,088.78	10%	9%	$2,504	V Rain for Rent	Includes delivery and pickup cost
E3	Pickup Truck Rental for Injection Crew	1	WK	1.00	$0.00	$0.00	$393.72	$393.72	$0.00	$0.00	$393.72	$393.72	10%	9%	$472	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	2	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$21.48	10%	9%	$26	PE N/A	
L23	General Operator/Technician	40	HR	1.00	$50.70	$50.70	$0.00	$0.00	$0.00	$0.00	$50.70	$2,028.00	0%	9%	$2,211	SE SalaryExpert.com	Overhead included in unit labor rate.
L15	Project Manager	1	HR	1.00	$124.22	$124.22	$0.00	$0.00	$0.00	$0.00	$124.22	$124.22	0%	9%	$135	SE SalaryExpert.com	Overhead included in unit labor rate.
L24	Contracting/Procurement Specialist	2	HR	1.00	$46.54	$46.54	$0.00	$0.00	$0.00	$0.00	$46.54	$93.08	0%	9%	$101	SE SalaryExpert.com	Overhead included in unit labor rate.
L11	Geologist	20	HR	1.00	$81.29	$81.29	$0.00	$0.00	$0.00	$0.00	$81.29	$1,625.80	0%	9%	$1,772	SE SalaryExpert.com	Overhead included in unit labor rate.
E1	Pickup Truck Rental	1	WK	1.00	$0.00	$0.00	$393.72	$393.72	$0.00	$0.00	$393.72	$393.72	10%	9%	$472	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	2	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$21.48	10%	9%	$26	PE N/A	
												TOTAL UNIT COST:			$29,911		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KGAL	thousand gallons
UNMOD UC	unmodified unit cost	KW-HR	kilowatt-hour
UNMOD LIC	unmodified line item cost	LBS	pounds
UNBUR LIC	unburdened line item cost	LCY	loose cubic yards
PC OH	prime contractor overhead	LF	linear foot
PC PF	prime contractor profit	LS	lump sum
BUR LIC	burdened line item cost	SF	square feet
BCY	bank cubic yard	TN	ton
CLF	hundred linear feet	VLF	vertical linear foot
CY	cubic yards	WK	week

TABLE CW-28-GWU1

Remediation
Annual Cost Sub-Element
Biobarrier Injection Event - Line 2

Cost Worksheet: CW-28-GWU1

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves injection of biobarrier material for Line 2. Assumes local oversight; no per diem included.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M150	EOS	7,198	GAL	1.00	$0.00	$0.00	$0.00	$0.00	$16.21	$0.00	$16.21	$116,679.58	10%	9%	$139,899	V EOS Remediatior	
M151	Shipping for EOS	7,198	GAL	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.46	$0.46	$3,311.08	10%	9%	$3,970	V EOS Remediatior	
M165	Fuel for Transfer Pump(s)	11	DY	1.00	$0.00	$0.00	$0.00	$0.00	$21.90	$0.00	$21.90	$240.90	10%	9%	$289	P Per Estimator	
M153	Process Water, Supplied by a Water Line	246	KGAL	1.00	$0.00	$0.00	$0.00	$0.00	$4.23	$0.00	$4.23	$1,040.58	10%	9%	$1,248	E 33 42 0302	Water for injection solution
M155	Frac tank rental	6	WK	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$1,044.39	$1,044.39	$6,266.34	10%	9%	$7,513	V Rain for Rent	Includes delivery and pickup cost
E3	Pickup Truck Rental for Injection Crew	3	WK	1.00	$0.00	$0.00	$393.72	$393.72	$0.00	$0.00	$393.72	$1,181.16	10%	9%	$1,416	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	11	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$118.14	10%	9%	$142	PE N/A	
L23	General Operator/Technician	220	HR	1.00	$50.70	$50.70	$0.00	$0.00	$0.00	$0.00	$50.70	$11,154.00	0%	9%	$12,158	SE SalaryExpert.com	Overhead included in unit labor rate.
L15	Project Manager	6	HR	1.00	$124.22	$124.22	$0.00	$0.00	$0.00	$0.00	$124.22	$745.32	0%	9%	$812	SE SalaryExpert.com	Overhead included in unit labor rate.
L24	Contracting/Procurement Specialist	9	HR	1.00	$46.54	$46.54	$0.00	$0.00	$0.00	$0.00	$46.54	$418.86	0%	9%	$457	SE SalaryExpert.com	Overhead included in unit labor rate.
L11	Geologist	110	HR	1.00	$81.29	$81.29	$0.00	$0.00	$0.00	$0.00	$81.29	$8,941.90	0%	9%	$9,747	SE SalaryExpert.com	Overhead included in unit labor rate.
E1	Pickup Truck Rental	3	WK	1.00	$0.00	$0.00	$393.72	$393.72	$0.00	$0.00	$393.72	$1,181.16	10%	9%	$1,416	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	11	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$118.14	10%	9%	$142	PE N/A	
												TOTAL UNIT COST:			$179,209		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KGAL	thousand gallons
UNMOD UC	unmodified unit cost	KW-HR	kilowatt-hour
UNMOD LIC	unmodified line item cost	LBS	pounds
UNBUR LIC	unburdened line item cost	LCY	loose cubic yards
PC OH	prime contractor overhead	LF	linear foot
PC PF	prime contractor profit	LS	lump sum
BUR LIC	burdened line item cost	SF	square feet
BCY	bank cubic yard	TN	ton
CLF	hundred linear feet	VLF	vertical linear foot
CY	cubic yards	WK	week

TABLE CW-29-GWU1

Remediation
Captial and Periodic Cost Sub-Element
Biobarrier Injection Event - Line 3

Cost Worksheet: CW-29-GWU1

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves injection of biobarrier material for Line 3. Assumes local oversight; no per diem included.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M150	EOS	5,978	GAL	1.00	$0.00	$0.00	$0.00	$0.00	$16.21	$0.00	$16.21	$96,903.38	10%	9%	$116,187	V EOS Remediatior	
M151	Shipping for EOS	5,978	GAL	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.46	$0.46	$2,749.88	10%	9%	$3,297	V EOS Remediatior	
M165	Fuel for Transfer Pump(s)	9	DY	1.00	$0.00	$0.00	$0.00	$0.00	$21.90	$0.00	$21.90	$197.10	10%	9%	$236	P Per Estimator	
M153	Process Water, Supplied by a Water Line	204	KGAL	1.00	$0.00	$0.00	$0.00	$0.00	$4.23	$0.00	$4.23	$862.92	10%	9%	$1,035	E 33 42 0302	Water for injection solution
M155	Frac tank rental	4	WK	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$1,044.39	$1,044.39	$4,177.56	10%	9%	$5,009	V Rain for Rent	Includes delivery and pickup cost
E3	Pickup Truck Rental for Injection Crew	2	WK	1.00	$0.00	$0.00	$393.72	$393.72	$0.00	$0.00	$393.72	$787.44	10%	9%	$944	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	9	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$96.66	10%	9%	$116	PE N/A	
L23	General Operator/Technician	180	HR	1.00	$50.70	$50.70	$0.00	$0.00	$0.00	$0.00	$50.70	$9,126.00	0%	9%	$9,947	SE SalaryExpert.com	Overhead included in unit labor rate.
L15	Project Manager	5	HR	1.00	$124.22	$124.22	$0.00	$0.00	$0.00	$0.00	$124.22	$621.10	0%	9%	$677	SE SalaryExpert.com	Overhead included in unit labor rate.
L24	Contracting/Procurement Specialist	7	HR	1.00	$46.54	$46.54	$0.00	$0.00	$0.00	$0.00	$46.54	$325.78	0%	9%	$355	SE SalaryExpert.com	Overhead included in unit labor rate.
L11	Geologist	90	HR	1.00	$81.29	$81.29	$0.00	$0.00	$0.00	$0.00	$81.29	$7,316.10	0%	9%	$7,975	SE SalaryExpert.com	Overhead included in unit labor rate.
E1	Pickup Truck Rental	2	WK	1.00	$0.00	$0.00	$393.72	$393.72	$0.00	$0.00	$393.72	$787.44	10%	9%	$944	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	9	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$96.66	10%	9%	$116	PE N/A	
												TOTAL UNIT COST:			$146,838		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KGAL	thousand gallons
UNMOD UC	unmodified unit cost	KW-HR	kilowatt-hour
UNMOD LIC	unmodified line item cost	LBS	pounds
UNBUR LIC	unburdened line item cost	LCY	loose cubic yards
PC OH	prime contractor overhead	LF	linear foot
PC PF	prime contractor profit	LS	lump sum
BUR LIC	burdened line item cost	SF	square feet
BCY	bank cubic yard	TN	ton
CLF	hundred linear feet	VLF	vertical linear foot
CY	cubic yards	WK	week

TABLE CW-30-GWU1

Remediation
Captial and Periodic Cost Sub-Element
Biobarrier Injection Event - Line 4

Cost Worksheet: CW-30-GWU1

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves injection of biobarrier material for Line 4. Assumes local oversight; no per diem included.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M150	EOS	3,538	GAL	1.00	$0.00	$0.00	$0.00	$0.00	$16.21	$0.00	$16.21	$57,350.98	10%	9%	$68,764	V EOS Remediatior	
M151	Shipping for EOS	3,538	GAL	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.46	$0.46	$1,627.48	10%	9%	$1,951	V EOS Remediatior	
M165	Fuel for Transfer Pump(s)	6	DY	1.00	$0.00	$0.00	$0.00	$0.00	$21.90	$0.00	$21.90	$131.40	10%	9%	$158	P Per Estimator	
M153	Process Water, Supplied by a Water Line	121	KGAL	1.00	$0.00	$0.00	$0.00	$0.00	$4.23	$0.00	$4.23	$511.83	10%	9%	$614	E 33 42 0302	Water for injection solution
M155	Frac tank rental	4	WK	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$1,044.39	$1,044.39	$4,177.56	10%	9%	$5,009	V Rain for Rent	Includes delivery and pickup cost
E3	Pickup Truck Rental for Injection Crew	2	WK	1.00	$0.00	$0.00	$393.72	$393.72	$0.00	$0.00	$393.72	$787.44	10%	9%	$944	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	6	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$64.44	10%	9%	$77	PE N/A	
L23	General Operator/Technician	110	HR	1.00	$50.70	$50.70	$0.00	$0.00	$0.00	$0.00	$50.70	$5,577.00	0%	9%	$6,079	SE SalaryExpert.com	Overhead included in unit labor rate.
L15	Project Manager	3	HR	1.00	$124.22	$124.22	$0.00	$0.00	$0.00	$0.00	$124.22	$372.66	0%	9%	$406	SE SalaryExpert.com	Overhead included in unit labor rate.
L24	Contracting/Procurement Specialist	5	HR	1.00	$46.54	$46.54	$0.00	$0.00	$0.00	$0.00	$46.54	$232.70	0%	9%	$254	SE SalaryExpert.com	Overhead included in unit labor rate.
L11	Geologist	55	HR	1.00	$81.29	$81.29	$0.00	$0.00	$0.00	$0.00	$81.29	$4,470.95	0%	9%	$4,873	SE SalaryExpert.com	Overhead included in unit labor rate.
E1	Pickup Truck Rental	2	WK	1.00	$0.00	$0.00	$393.72	$393.72	$0.00	$0.00	$393.72	$787.44	10%	9%	$944	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	6	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$64.44	10%	9%	$77	PE N/A	
												TOTAL UNIT COST:			$90,150		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KGAL	thousand gallons
UNMOD UC	unmodified unit cost	KW-HR	kilowatt-hour
UNMOD LIC	unmodified line item cost	LBS	pounds
UNBUR LIC	unburdened line item cost	LCY	loose cubic yards
PC OH	prime contractor overhead	LF	linear foot
PC PF	prime contractor profit	LS	lump sum
BUR LIC	burdened line item cost	SF	square feet
BCY	bank cubic yard	TN	ton
CLF	hundred linear feet	VLF	vertical linear foot
CY	cubic yards	WK	week

TABLE CW-31-GWU1

Remediation
Captial and Periodic Cost Sub-Element
Biobarrier Bioaugmentation

Cost Worksheet: CW-31-GWU1

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves injection of bioaugmentation of half of the injection wells. Assumes existing microbial population is not of sufficient diversity to degrade contaminants. Assumes local oversight; no per diem included.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M152	Bioaugmentation	3,220	Liter	1.00	$0.00	$0.00	$0.00	$0.00	$109.51	$0.00	$109.51	$352,622.20	10%	9%	$422,794	V EOS Remediatior	
M165	Fuel for Transfer Pump(s)	19	DY	1.00	$0.00	$0.00	$0.00	$0.00	$21.90	$0.00	$21.90	$416.10	10%	9%	$499	P Per Estimator	
E3	Pickup Truck Rental for Injection Crew	4	WK	1.00	$0.00	$0.00	$393.72	$393.72	$0.00	$0.00	$393.72	$1,574.88	10%	9%	$1,888	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	19	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$204.06	10%	9%	$245	PE N/A	
L23	General Operator/Technician	380	HR	1.00	$50.70	$50.70	$0.00	$0.00	$0.00	$0.00	$50.70	$19,266.00	0%	9%	$21,000	SE SalaryExpert.com	Overhead included in unit labor rate.
L15	Project Manager	2	HR	1.00	$124.22	$124.22	$0.00	$0.00	$0.00	$0.00	$124.22	$248.44	0%	9%	$271	SE SalaryExpert.com	Overhead included in unit labor rate.
L24	Contracting/Procurement Specialist	4	HR	1.00	$46.54	$46.54	$0.00	$0.00	$0.00	$0.00	$46.54	$186.16	0%	9%	$203	SE SalaryExpert.com	Overhead included in unit labor rate.
L11	Geologist	190	HR	1.00	$81.29	$81.29	$0.00	$0.00	$0.00	$0.00	$81.29	$15,445.10	0%	9%	$16,835	SE SalaryExpert.com	Overhead included in unit labor rate.
E1	Pickup Truck Rental	4	WK	1.00	$0.00	$0.00	$393.72	$393.72	$0.00	$0.00	$393.72	$1,574.88	10%	9%	$1,888	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	19	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$204.06	10%	9%	$245	PE N/A	
												TOTAL UNIT COST:			$465,868		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KGAL	thousand gallons
UNMOD UC	unmodified unit cost	KW-HR	kilowatt-hour
UNMOD LIC	unmodified line item cost	LBS	pounds
UNBUR LIC	unburdened line item cost	LCY	loose cubic yards
PC OH	prime contractor overhead	LF	linear foot
PC PF	prime contractor profit	LS	lump sum
BUR LIC	burdened line item cost	SF	square feet
BCY	bank cubic yard	TN	ton
CLF	hundred linear feet	VLF	vertical linear foot
CY	cubic yards	WK	week

TABLE CW-32-GWU1

Groundwater Monitoring
Capital Cost Sub-Element
Injection Well Abandonment

Cost Worksheet: CW-32-GWU1

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves abandonment of biobarrier injection wells after site closure. Assumes local oversight; no per diem included.

Cost Analysis:
Cost to Abandon Injection Wells

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M95	Well Abandonment, 2" Well	35	VLF	1.00	$5.57	$5.57	$24.56	$24.56	$0.99	$0.00	$31.12	$1,089.20	10%	9%	$1,306	E 33 23 1822	Portland cement grout
L11	Geologist	2	HR	1.00	$81.29	$81.29	$0.00	$0.00	$0.00	$0.00	$81.29	$162.58	0%	9%	$177	SE SalaryExpert.com	Overhead included in unit labor rate.
E1	Pickup Truck Rental	0.3	WK	1.00	$0.00	$0.00	$393.72	$393.72	$0.00	$0.00	$393.72	$98.43	10%	9%	$118	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	0.3	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$2.69	10%	9%	$3	PE N/A	
												TOTAL UNIT COST:			$1,604		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KGAL	thousand gallons
UNMOD UC	unmodified unit cost	KW-HR	kilowatt-hour
UNMOD LIC	unmodified line item cost	LBS	pounds
UNBUR LIC	unburdened line item cost	LCY	loose cubic yards
PC OH	prime contractor overhead	LF	linear foot
PC PF	prime contractor profit	LS	lump sum
BUR LIC	burdened line item cost	SF	square feet
BCY	bank cubic yard	TN	ton
CLF	hundred linear feet	VLF	vertical linear foot
CY	cubic yards	WK	week

TABLE CW-33-GWU1

Groundwater Extraction and Treatment
Capital Cost Sub-Element
Extraction Well Installation

Cost Worksheet: CW-33-GWU1

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves construction of extraction well and setting extraction well pump. Cost assumes local oversight and no per diem.

Cost Analysis:
Cost to Install Extraction Well

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M111	Well, drilled, 18" diameter borehole, reverse circulation	40	LF	0.95	$36.37	$38.28	$160.53	$168.98	$0.00	$0.00	$207.26	$8,290.53	10%	9%	$9,940	P Per Estimator	Based on E 33 23 1123 for 15" diameter borehole
M112	Well, well screen assembly, stainless steel, 10" diameter	30	LF	0.95	$11.29	$11.88	$39.22	$41.28	$116.43	$0.00	$169.60	$5,087.95	10%	9%	$6,100	E 33 23 0228	
M113	Stainless Steel Well Casing, 10"	10	LF	0.95	$11.29	$11.88	$39.22	$41.28	$201.56	$0.00	$254.73	$2,547.28	10%	9%	$3,054	E 33 23 0127	
M114	Well Filter Pack, 10" Screen	32	LF	0.95	$11.29	$11.88	$39.22	$41.28	$5.30	$0.00	$58.47	$1,870.99	10%	9%	$2,243	E 33 23 1405	
M115	Annular Seal, 10" Well, Portland Cement Grout	8	LF	0.95	$11.29	$11.88	$39.22	$41.28	$14.44	$0.00	$67.61	$540.87	10%	9%	$648	E 33 23 1805	
M116	Bentonite Seal, 10" Well	1	EA	0.95	$60.16	$63.33	$265.43	$279.40	$75.06	$0.00	$417.79	$417.79	10%	9%	$501	E 33 23 2106	
M62	Develop Well	4	HR	0.95	$96.39	$101.46	$387.60	$408.00	$259.92	$0.00	$769.38	$3,077.53	10%	9%	$3,690	C 33 21 1310 8500	
M117	Well, pump, 6" submersible, w/controls	1	EA	0.95	$763.20	$803.37	$932.80	$981.89	$8,929.44	$0.00	$10,714.70	$10,714.70	10%	9%	$12,847	E 33 23 0562	
M85	Stainless steel pipe, 4"	30	LF	0.95	$9.57	$10.07	$1.34	$1.41	$97.47	$0.00	$108.95	$3,268.63	10%	9%	$3,919	C 22111 364 1370	
M86	Steel, nipple, 6" x 4"	1	EA	0.95	$42.12	$44.34	$0.00	$0.00	$110.61	$0.00	$154.95	$154.95	10%	9%	$186	C 22111 366 3986	
M87	Steel flange, 4"	1	EA	0.95	$70.20	$73.89	$9.88	$10.40	$26.83	$0.00	$111.12	$111.12	10%	9%	$133	C 22111 347 6140	
M46	IDW Handling	2	HR	0.95	$0.00	$0.00	$0.00	$0.00	$0.00	$192.66	$192.66	$385.32	10%	9%	$462	P N/A	
M47	Decontamination	2	HR	0.95	$0.00	$0.00	$0.00	$0.00	$0.00	$192.66	$192.66	$385.32	10%	9%	$462	P N/A	
M48	Standby Time	1	HR	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$148.20	$148.20	$148.20	10%	9%	$178	P N/A	
M28	55-gallon Open Head Steel Drum	10	EA	1.00	$0.00	$0.00	$0.00	$0.00	$137.43	$0.00	$137.43	$1,374.30	10%	9%	$1,648	V Global Indust.	Includes shipping
L11	Geologist	24	HR	1.00	$81.29	$81.29	$0.00	$0.00	$0.00	$0.00	$81.29	$1,950.96	0%	9%	$2,127	SE SalaryExpert.com	Overhead included in unit labor rate.
E2	Pickup Truck Rental	3	DY	1.00	$0.00	$0.00	$78.74	$78.74	$0.00	$0.00	$78.74	$236.23	10%	9%	$283	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	3	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$32.22	10%	9%	$39	PE N/A	
												TOTAL UNIT COST:			$48,460		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KGAL	thousand gallons
UNMOD UC	unmodified unit cost	KW-HR	kilowatt-hour
UNMOD LIC	unmodified line item cost	LBS	pounds
UNBUR LIC	unburdened line item cost	LCY	loose cubic yards
PC OH	prime contractor overhead	LF	linear foot
PC PF	prime contractor profit	LS	lump sum
BUR LIC	burdened line item cost	SF	square feet
BCY	bank cubic yard	TN	ton
CLF	hundred linear feet	VLF	vertical linear foot
CY	cubic yards	WK	week

TABLE CW-34-GWU1

Groundwater Extraction and Treatment
Capital Cost Sub-Element
Extraction Well Vault

Cost Worksheet: CW-34-GWU1

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves installation of the extraction well vault. Cost assumes local oversight and no per diem.

Cost Analysis:
Cost to Install Extraction Well

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M182	Concrete sawing, up to 12" deep	28	LF	1.00	$2.32	$2.32	$2.78	$2.78	$1.97	$0.00	$7.07	$197.96	10%	9%	$237	C 03811 350 0400	
M183	Selective concrete demolition	2	CY	1.00	$97.76	$97.76	$25.48	$25.48	$0.00	$0.00	$123.24	$246.48	10%	9%	$296	C 03050 510 0070	
M184	Selective demolition, dump charges	4	TN	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$97.76	$97.76	$391.04	10%	9%	$469	C 02411 919 0100	
M200	Excavation, machine excavation, hydraulic backhoe	8	BCY	1.00	$10.24	$10.24	$7.59	$7.59	$0.00	$0.00	$17.83	$142.64	10%	9%	$171	C 31231 616 6030	
M201	Hauling, small load	12	LCY	1.00	$4.33	$4.33	$6.18	$6.18	$0.00	$0.00	$10.51	$126.12	10%	9%	$151	C 31232 320 0416	
M202	Fill, gravel fill, compacted, 12" deep	3	ECY	1.00	$6.86	$6.86	$0.67	$0.67	$19.88	$0.00	$27.41	$82.23	10%	9%	$99	C 31232 317 1300	
M203	Precast concrete vault, 5' x 5', 4' deep	1	EA	1.00	$556.40	$556.40	$222.56	$222.56	$1,533.17	$0.00	$2,312.13	$2,312.13	10%	9%	$2,772	C 33051 613 0510	
M204	Access hatch, aluminum, H-20, 60" x 60"	1	EA	1.00	$0.00	$0.00	$0.00	$0.00	$5,475.60	$0.00	$5,475.60	$5,475.60	10%	9%	$6,565	V Bilco	
M170	Concrete, ready mix, 4000 PSI, delivered	1	CY	1.00	$0.00	$0.00	$0.00	$0.00	$101.30	$0.00	$101.30	$101.30	10%	9%	$121	C 03310 535 0300	
M171	Concrete finishing, floors, manual	24	SF	1.00	$0.38	$0.38	$0.00	$0.00	$0.00	$0.00	$0.38	$9.12	10%	9%	$11	C 03352 930 0200	
M172	Concrete, placing, direct chute, includes vibrating	1	CY	1.00	$8.22	$8.22	$0.50	$0.50	$0.00	$0.00	$8.72	$8.72	10%	9%	$10	C 03310 570 4300	
M329	Elbow, 90 Deg., plastic, PVC, socket joint, 6", schedule 80	4	EA	1.00	$40.80	$40.80	$0.00	$0.00	$33.83	$0.00	$74.63	$298.52	10%	9%	$358	C 22 11 1376 2200	
M347	Tee, plastic, PVC, socket joint, 6", schedule 80	1	EA	1.00	$61.20	$61.20	$0.00	$0.00	$56.93	$0.00	$118.13	$118.13	10%	9%	$142	C 22 11 1376 2490	
M320	Pipe, plastic, PVC, 6" diameter, schedule 80	10	LF	1.00	$10.81	$10.81	$0.00	$0.00	$20.73	$0.00	$31.54	$315.40	10%	9%	$378	C 22 11 1374 2560	
M365	Flange, plastic, PVC, socket joint, 150 lb., 6", schedule 80	8	EA	1.00	$22.44	$22.44	$0.00	$0.00	$25.78	$0.00	$48.22	$385.76	10%	9%	$463	C 22 11 1376 2534	
M312	Valves, iron body, swing check, flanged, 125 lb., 6"	1	EA	1.00	$214.20	$214.20	$0.00	$0.00	$698.14	$0.00	$912.34	$912.34	10%	9%	$1,094	C 23 05 2330 6070	
M302	Venturi flow, measuring device, 6" diameter	1	EA	1.00	$182.58	$182.58	$0.00	$0.00	$993.51	$0.00	$1,176.09	$1,176.09	10%	9%	$1,410	C 23 21 2088 0280	
M307	Valves, iron body, gate, non-rising stem, flanged, 125 lb., 6"	1	EA	1.00	$214.20	$214.20	$0.00	$0.00	$1,235.17	$0.00	$1,449.37	$1,449.37	10%	9%	$1,738	C 23 05 2330 2300	
M260	Pipe stands	3	EA	1.00	$0.00	$0.00	$0.00	$0.00	$164.27	$0.00	$164.27	$492.81	10%	9%	$591	P NA	
M190	Instrumentation allowance for extraction well vault	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$8,601.00	$8,601.00	$8,601.00	10%	9%	$10,313	P NA	Includes RTF transmitter, level and flow transmittters, etc.
M191	Electrical connection allowance for extraction well vault	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$15,600.00	$15,600.00	$15,600.00	10%	9%	$18,704	P NA	Includes transformer, wiring, breaker box, etc.
L8	Field Engineer	32	HR	1.00	$82.93	$82.93	$0.00	$0.00	$0.00	$0.00	$82.93	$2,653.76	0%	9%	$2,893	SE SalaryExpert.com	Overhead included in unit labor rate.
E2	Pickup Truck Rental	4	DY	1.00	$0.00	$0.00	$78.74	$78.74	$0.00	$0.00	$78.74	$314.98	10%	9%	$378	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	4	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$42.96	10%	9%	$52	PE N/A	
												TOTAL UNIT COST:			$49,416		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KGAL	thousand gallons
UNMOD UC	unmodified unit cost	KW-HR	kilowatt-hour
UNMOD LIC	unmodified line item cost	LBS	pounds
UNBUR LIC	unburdened line item cost	LCY	loose cubic yards
PC OH	prime contractor overhead	LF	linear foot
PC PF	prime contractor profit	LS	lump sum
BUR LIC	burdened line item cost	SF	square feet
BCY	bank cubic yard	TN	ton
CLF	hundred linear feet	VLF	vertical linear foot
CY	cubic yards	WK	week

TABLE CW-35-GWU1

Groundwater Extraction and Treatment **Cost Worksheet: CW-35-GWU1**
Capital Cost Sub-Element
Mobilization or Demobilization of Construction Equipment

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves mobilization and demobilization of heavy equipment.

Cost Analysis:
Cost to Install Extraction Well

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M90	Mobilization/demobilization of directional drilling rig	1	EA	1.00	$390.00	$390.00	$811.20	$811.20	$0.00	$0.00	$1,201.20	$1,201.20	10%	9%	$1,440	C 33052 322 0302	
M91	Mobilization or demobilization of dozer, loader, backhoe or excavator	1	EA	1.00	$57.20	$57.20	$276.64	$276.64	$0.00	$0.00	$333.84	$333.84	10%	9%	$400	C 01543 650 0100	
M92	Mobilization/demobilization of small equipment placed in rear of, or towed by pickup	2	EA	1.00	$41.60	$41.60	$60.84	$60.84	$0.00	$0.00	$102.44	$204.88	10%	9%	$246	C 01543 650 1150	
												TOTAL UNIT COST:			$2,086		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KGAL	thousand gallons
UNMOD UC	unmodified unit cost	KW-HR	kilowatt-hour
UNMOD LIC	unmodified line item cost	LBS	pounds
UNBUR LIC	unburdened line item cost	LCY	loose cubic yards
PC OH	prime contractor overhead	LF	linear foot
PC PF	prime contractor profit	LS	lump sum
BUR LIC	burdened line item cost	SF	square feet
BCY	bank cubic yard	TN	ton
CLF	hundred linear feet	VLF	vertical linear foot
CY	cubic yards	WK	week

TABLE CW-36-GWU1

Groundwater Extraction and Treatment
Annual Cost Sub-Element
Operation and Maintenance - Extraction Well

Cost Worksheet: CW-36-GWU1

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves annual operation and maintenance for an extraction well. Cost assume local oversight and no per diem.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M280	Electrical consumption	65,400	kW-HR	0.95	$0.00	$0.00	$0.00	$0.00	$0.11	$0.00	$0.11	$7,194.00	0%	0%	$7,194	P NA	
												TOTAL UNIT COST:			$7,194		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KGAL	thousand gallons
UNMOD UC	unmodified unit cost	KW-HR	kilowatt-hour
UNMOD LIC	unmodified line item cost	LBS	pounds
UNBUR LIC	unburdened line item cost	LCY	loose cubic yards
PC OH	prime contractor overhead	LF	linear foot
PC PF	prime contractor profit	LS	lump sum
BUR LIC	burdened line item cost	SF	square feet
BCY	bank cubic yard	TN	ton
CLF	hundred linear feet	VLF	vertical linear foot
CY	cubic yards	WK	week

TABLE CW-37-GWU1

Groundwater Extraction and Treatment **Cost Worksheet: CW-37-GWU1**
Annual Cost Sub-Element
Operation and Maintenance - Extraction Well Maintenance

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves annual operation and maintenance for an extraction well. Cost assume local oversight and no per diem.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M270	Water Supply Wells, acid cleaning	1	EA	0.95	$478.40	$503.58	$0.00	$0.00	$514.71	$0.00	$1,018.29	$1,018.29	10%	9%	$1,221	C 33211 310 8600	
M271	Water Supply Wells, remove and install well pump	1	EA	0.95	$1,196.00	$1,258.95	$2,938.00	$3,092.63	$0.00	$0.00	$4,351.58	$4,351.58	10%	9%	$5,218	C 33211 310 8590	
M272	Water Supply Wells, well development	4	HR	0.95	$101.40	$106.74	$390.00	$410.53	$277.07	$0.00	$794.33	$3,177.33	10%	9%	$3,810	C 33211 310 8500	
												TOTAL UNIT COST:			$10,249		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KGAL	thousand gallons
UNMOD UC	unmodified unit cost	KW-HR	kilowatt-hour
UNMOD LIC	unmodified line item cost	LBS	pounds
UNBUR LIC	unburdened line item cost	LCY	loose cubic yards
PC OH	prime contractor overhead	LF	linear foot
PC PF	prime contractor profit	LS	lump sum
BUR LIC	burdened line item cost	SF	square feet
BCY	bank cubic yard	TN	ton
CLF	hundred linear feet	VLF	vertical linear foot
CY	cubic yards	WK	week

TABLE CW-38-GWU1

Groundwater Extraction and Treatment **Cost Worksheet: CW-38-GWU1**
Capital Cost Sub-Element
Groundwater Treatment Plant - Equipment and Piping

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
Costs for Groundwater Treatment Plant - equipment and piping.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M321	Pipe, plastic, PVC, 8" diameter, schedule 80	250	LF	1.00	$13.72	$13.72	$0.00	$0.00	$30.61	$0.00	$44.33	$11,082.50	10%	9%	$13,288	C 22 11 1374 2570	
M330	Elbow, 90 Deg., plastic, PVC, socket joint, 8", schedule 80	13	EA	1.00	$68.34	$68.34	$0.00	$0.00	$225.55	$0.00	$293.89	$3,820.57	10%	9%	$4,581	C 22 11 1376 2210	
M348	Tee, plastic, PVC, socket joint, 8", schedule 80	5	EA	1.00	$103.02	$103.02	$0.00	$0.00	$317.92	$0.00	$420.94	$2,104.70	10%	9%	$2,524	C 23 11 1376 2500	
M366	Flange, plastic, PVC, socket joint, 150 lb., 8", schedule 80	20	EA	1.00	$37.23	$37.23	$0.00	$0.00	$111.70	$0.00	$148.93	$2,978.60	10%	9%	$3,571	C 23 11 1376 2538	
M308	Valves, iron body, gate, non-rising stem, flanged, 125 lb., 8"	5	EA	1.00	$0.00	$0.00	$0.00	$0.00	$1,511.20	$0.00	$1,511.20	$7,556.00	10%	9%	$9,060	C Per Estimator	
M313	Valves, iron body, swing check, flanged, 125 lb., 8"	5	EA	1.00	$0.00	$0.00	$0.00	$0.00	$854.95	$0.00	$854.95	$4,274.75	10%	9%	$5,125	C Per Estimator	
M217	Miscellaneaous Piping and Valve Supplies	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$10,200.00	$10,200.00	$10,200.00	10%	9%	$12,230	A NA	
M120	Shallow Tray Air Stripper, 425 gpm max.	1	EA	1.00	$10,400.00	$10,400.00	$0.00	$0.00	$43,958.12	$6,261.84	$60,619.96	$60,619.96	10%	9%	$72,683	V CarbonAir	
M121	4,000 gallon equalization tank, polyethylene	1	EA	1.00	$312.00	$312.00	$0.00	$0.00	$3,175.85	$520.00	$4,007.85	$4,007.85	10%	9%	$4,805	V WaterTanks.com	
M122	Transfer pump, 400 gpm	1	EA	1.00	$457.60	$457.60	$0.00	$0.00	$2,124.53	$260.00	$2,842.13	$2,842.13	10%	9%	$3,408	V Grainger	
M123	Variable frequency drive, enclosed, 5 HP motor size, NEMA 1	1	EA	1.00	$348.40	$348.40	$0.00	$0.00	$1,916.46	$0.00	$2,264.86	$2,264.86	10%	9%	$2,716	C 26292 310 0110	
M246	Utilities Hookup	1	EA	1.00	$0.00	$0.00	$0.00	$0.00	$3,313.16	$0.00	$3,313.16	$3,313.16	10%	9%	$3,972	E 33 02 9928	Single Hookup
M247	Concrete Pads for Treatment Equipment	438	SF	1.00	$2.40	$2.40	$0.22	$0.22	$3.41	$0.00	$6.03	$2,641.14	10%	9%	$3,167	E 18 02 0321	Assume 35% of the building floor area
												TOTAL UNIT COST:			$141,130		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KGAL	thousand gallons
UNMOD UC	unmodified unit cost	KW-HR	kilowatt-hour
UNMOD LIC	unmodified line item cost	LBS	pounds
UNBUR LIC	unburdened line item cost	LCY	loose cubic yards
PC OH	prime contractor overhead	LF	linear foot
PC PF	prime contractor profit	LS	lump sum
BUR LIC	burdened line item cost	SF	square feet
BCY	bank cubic yard	TN	ton
CLF	hundred linear feet	VLF	vertical linear foot
CY	cubic yards	WK	week

TABLE CW-39-GWU1

Groundwater Extraction and Treatment
Capital Cost Sub-Element
Extraction Well Abandonment

Cost Worksheet: CW-39-GWU1

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves extraction well abandonment. Cost assume local oversight and no per diem.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M99	Well Abandonment, 18" Well	40	VLF	1.00	$31.02	$31.02	$136.84	$136.84	$3.33	$0.00	$171.19	$6,847.60	10%	9%	$8,210	P Per Estimator	Based on E 33 23 1825 for 8" diameter borehole
L11	Geologist	10	HR	1.00	$81.29	$81.29	$0.00	$0.00	$0.00	$0.00	$81.29	$812.90	0%	9%	$886	SE SalaryExpert.com	Overhead included in unit labor rate.
E2	Pickup Truck Rental	1	DY	1.00	$0.00	$0.00	$78.74	$78.74	$0.00	$0.00	$78.74	$78.74	10%	9%	$94	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	1	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$10.74	10%	9%	$13	PE N/A	
												TOTAL UNIT COST:			$9,203		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KGAL	thousand gallons
UNMOD UC	unmodified unit cost	KW-HR	kilowatt-hour
UNMOD LIC	unmodified line item cost	LBS	pounds
UNBUR LIC	unburdened line item cost	LCY	loose cubic yards
PC OH	prime contractor overhead	LF	linear foot
PC PF	prime contractor profit	LS	lump sum
BUR LIC	burdened line item cost	SF	square feet
BCY	bank cubic yard	TN	ton
CLF	hundred linear feet	VLF	vertical linear foot
CY	cubic yards	WK	week

TABLE CW-40-GWU1

Groundwater Extraction and Treatment
Periodic Cost Sub-Element
Replace Equipment - Extraction Well Pumps

Cost Worksheet: CW-40-GWU1

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves periodic replacement of extraction well pumps. Assumes no salvage value for pulled pumps.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M271	Water Supply Wells, remove and install well pump	1	EA	1.00	$1,196.00	$1,196.00	$2,938.00	$2,938.00	$0.00	$0.00	$4,134.00	$4,134.00	10%	9%	$4,957	C 33211 310 8590	
M82	Submersible Pump, 5 HP, 4", w/controls	1	EA	1.00	$583.00	$583.00	$731.40	$731.40	$11,161.80	$0.00	$12,476.20	$12,476.20	10%	9%	$14,959	E 33 23 0556	
												TOTAL UNIT COST:			$19,916		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KGAL	thousand gallons
UNMOD UC	unmodified unit cost	KW-HR	kilowatt-hour
UNMOD LIC	unmodified line item cost	LBS	pounds
UNBUR LIC	unburdened line item cost	LCY	loose cubic yards
PC OH	prime contractor overhead	LF	linear foot
PC PF	prime contractor profit	LS	lump sum
BUR LIC	burdened line item cost	SF	square feet
BCY	bank cubic yard	TN	ton
CLF	hundred linear feet	VLF	vertical linear foot
CY	cubic yards	WK	week

TABLE CW-41-GWU1

Groundwater Extraction and Treatment **Cost Worksheet: CW-41-GWU1**
Capital Cost Sub-Element
Groundwater Treatment Plant - Facility Control System

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
Groundwater Treatment (GW) Facility Control System; Assume GWT Includes Laptop, Control System (Computer-based monitoring and control system consisting of Programmable Logic Controller (PLC) for process interface, Variable Frequency Drives (VFD), data acquisition system, and various other control switches), electrical wiring, switches, etc. Allowance for GWTF Control System, Assume 50% of Total Cost for Fabrication and Construction of Pre-Engineered Building, Based on previous work by CDM of similar scope.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M229	Treatment Building Facility Control System	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$64,935.00	$64,935.00	$64,935.00	10%	9%	$77,900	PE NA	
												TOTAL UNIT COST:			$77,900		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KGAL	thousand gallons
UNMOD UC	unmodified unit cost	KW-HR	kilowatt-hour
UNMOD LIC	unmodified line item cost	LBS	pounds
UNBUR LIC	unburdened line item cost	LCY	loose cubic yards
PC OH	prime contractor overhead	LF	linear foot
PC PF	prime contractor profit	LS	lump sum
BUR LIC	burdened line item cost	SF	square feet
BCY	bank cubic yard	TN	ton
CLF	hundred linear feet	VLF	vertical linear foot
CY	cubic yards	WK	week

TABLE CW-42-GWU1

Groundwater Extraction and Treatment **Cost Worksheet: CW-42-GWU1**
Capital Cost Sub-Element
Influent Piping - NIC#1-1 to New Treatment Plant

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves installation of influent piping for NIC#1-1 to the New Treatment Plant. Cost assume local oversight and no per diem.

Cost Analysis:
Cost to Install Influent Piping

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M182	Concrete sawing, up to 12" deep	24	LF	1.00	$2.32	$2.32	$2.78	$2.78	$1.97	$0.00	$7.07	$169.68	10%	9%	$203	C 03811 350 0400	
M183	Selective concrete demolition	2	CY	1.00	$97.76	$97.76	$25.48	$25.48	$0.00	$0.00	$123.24	$246.48	10%	9%	$296	C 03050 510 0070	
M184	Selective demolition, dump charges	4	TN	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$97.76	$97.76	$391.04	10%	9%	$469	C 02411 919 0100	
M200	Excavation, machine excavation, hydraulic backhoe	8	BCY	1.00	$10.24	$10.24	$7.59	$7.59	$0.00	$0.00	$17.83	$142.64	10%	9%	$171	C 31231 616 6030	
M201	Hauling, small load	4	LCY	1.00	$4.33	$4.33	$6.18	$6.18	$0.00	$0.00	$10.51	$42.04	10%	9%	$50	C 31232 320 0416	
M216	Backfilling for Piping	6	LCY	1.00	$4.34	$4.34	$2.54	$2.54	$0.00	$0.00	$6.88	$41.28	10%	9%	$49	C 31231 613 3060	
M221	Compaction Fill, Walk behind vibrating Plate	5	ECY	1.00	$3.43	$3.43	$0.48	$0.48	$0.00	$0.00	$3.91	$19.55	10%	9%	$23	C 31232 323 7040	
M202	Fill, gravel fill, compacted, 12" deep	2	ECY	1.00	$6.86	$6.86	$0.67	$0.67	$19.88	$0.00	$27.41	$54.82	10%	9%	$66	C 31232 317 1300	
M173	Reinforcing steel, dowels, 2' long, #6, A615, grade	48	EA	1.00	$1.60	$1.60	$0.00	$0.00	$2.77	$0.00	$4.37	$209.76	10%	9%	$252	C 03211 060 2430	
M170	Concrete, ready mix, 4000 PSI, delivered	2	CY	1.00	$0.00	$0.00	$0.00	$0.00	$101.30	$0.00	$101.30	$202.60	10%	9%	$243	C 03310 535 0300	
M172	Concrete, placing, direct chute, includes vibrating	2	CY	1.00	$8.22	$8.22	$0.50	$0.50	$0.00	$0.00	$8.72	$17.44	10%	9%	$21	C 03310 570 4300	
M171	Concrete finishing, floors, manual	36	SF	1.00	$0.38	$0.38	$0.00	$0.00	$0.00	$0.00	$0.38	$13.68	10%	9%	$16	C 03352 930 0200	
M210	Directional drilling, up to 12" dia	250	LF	1.00	$2.22	$2.22	$4.62	$4.62	$0.09	$0.00	$6.93	$1,732.50	10%	9%	$2,077	C 33052 322 0320	
M389	Pipe, HDPE, 6" diam., DR 11	250	LF	1.00	$0.00	$0.00	$0.00	$0.00	$5.37	$0.00	$5.37	$1,342.50	10%	9%	$1,610	C 22 11 1378 0082	
M395	Elbow, 90 Deg., HDPE, 6" diam., DR 11	2	EA	1.00	$0.00	$0.00	$0.00	$0.00	$37.59	$0.00	$37.59	$75.18	10%	9%	$90	C 22 11 1378 0332	
M424	Welding, HDPE, labor per joint, 6" pipe size	16	EA	1.00	$22.87	$22.87	$0.00	$0.00	$0.00	$0.00	$22.87	$365.92	10%	9%	$439	C 22 11 1378 4080	Includes cost for weld setup
M430	Welding, HDPE, machine, 6" thru 8" diameter	1	DY	1.00	$0.00	$0.00	$108.12	$108.12	$0.00	$0.00	$108.12	$108.12	10%	9%	$130	C 22 11 1378 4370	
M211	Tracer wire	3	CLF	1.00	$140.40	$140.40	$0.00	$0.00	$122.65	$0.00	$263.05	$657.63	10%	9%	$788	C 26052 680 0260	
M212	Manhole for tracer wire connections, precast concre	1	EA	1.00	$184.08	$184.08	$0.00	$0.00	$394.24	$0.00	$578.32	$578.32	10%	9%	$693	C 33051 613 0510	
L8	Field Engineer	8	HR	1.00	$82.93	$82.93	$0.00	$0.00	$0.00	$0.00	$82.93	$663.44	0%	9%	$723	SE SalaryExpert.com	Overhead included in unit labor rate.
E2	Pickup Truck Rental	1	DY	1.00	$0.00	$0.00	$78.74	$78.74	$0.00	$0.00	$78.74	$78.74	10%	9%	$94	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	1	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$10.74	10%	9%	$13	PE N/A	
												TOTAL COST:			$8,516		
												LENGTH OF PIPE RUN:			250		
												TOTAL UNIT COST:			$34.06		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KGAL	thousand gallons
UNMOD UC	unmodified unit cost	KW-HR	kilowatt-hour
UNMOD LIC	unmodified line item cost	LBS	pounds
UNBUR LIC	unburdened line item cost	LCY	loose cubic yards
PC OH	prime contractor overhead	LF	linear foot
PC PF	prime contractor profit	LS	lump sum
BUR LIC	burdened line item cost	SF	square feet
BCY	bank cubic yard	TN	ton
CLF	hundred linear feet	VLF	vertical linear foot
CY	cubic yards	WK	week

TABLE CW-43-GWU1

Groundwater Extraction and Treatment **Cost Worksheet: CW-43-GWU1**
Capital Cost Sub-Element
Effluent Piping - New Treatment Plant to Unnamed Creek

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves installation of effluent piping from New Treatment Plant to Unnamed Creek. Cost assume local oversight and no per diem.

Cost Analysis:
Cost to Install Inffluent Piping

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M182	Concrete sawing, up to 12" deep	24	LF	1.00	$2.32	$2.32	$2.78	$2.78	$1.97	$0.00	$7.07	$169.68	10%	9%	$203	C 03811 350 0400	
M183	Selective concrete demolition	2	CY	1.00	$97.76	$97.76	$25.48	$25.48	$0.00	$0.00	$123.24	$246.48	10%	9%	$296	C 03050 510 0070	
M184	Selective demolition, dump charges	4	TN	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$97.76	$97.76	$391.04	10%	9%	$469	C 02411 919 0100	
M200	Excavation, machine excavation, hydraulic backhoe	8	BCY	1.00	$10.24	$10.24	$7.59	$7.59	$0.00	$0.00	$17.83	$142.64	10%	9%	$171	C 31231 616 6030	
M201	Hauling, small load	4	LCY	1.00	$4.33	$4.33	$6.18	$6.18	$0.00	$0.00	$10.51	$42.04	10%	9%	$50	C 31232 320 0416	
M216	Backfilling for Piping	6	LCY	1.00	$4.34	$4.34	$2.54	$2.54	$0.00	$0.00	$6.88	$41.28	10%	9%	$49	C 31231 613 3060	
M221	Compaction Fill, Walk behind vibrating Plate	5	ECY	1.00	$3.43	$3.43	$0.48	$0.48	$0.00	$0.00	$3.91	$19.55	10%	9%	$23	C 31232 323 7040	
M202	Fill, gravel fill, compacted, 12" deep	2	ECY	1.00	$6.86	$6.86	$0.67	$0.67	$19.88	$0.00	$27.41	$54.82	10%	9%	$66	C 31232 317 1300	
M173	Reinforcing steel, dowels, 2' long, #6, A615, grade	48	EA	1.00	$1.60	$1.60	$0.00	$0.00	$2.77	$0.00	$4.37	$209.76	10%	9%	$252	C 03211 060 2430	
M170	Concrete, ready mix, 4000 PSI, delivered	2	CY	1.00	$0.00	$0.00	$0.00	$0.00	$101.30	$0.00	$101.30	$202.60	10%	9%	$243	C 03310 535 0300	
M172	Concrete, placing, direct chute, includes vibrating	2	CY	1.00	$8.22	$8.22	$0.50	$0.50	$0.00	$0.00	$8.72	$17.44	10%	9%	$21	C 03310 570 4300	
M171	Concrete finishing, floors, manual	36	SF	1.00	$0.38	$0.38	$0.00	$0.00	$0.00	$0.00	$0.38	$13.68	10%	9%	$16	C 03352 930 0200	
M210	Directional drilling, up to 12" dia	250	LF	1.00	$2.22	$2.22	$4.62	$4.62	$0.09	$0.00	$6.93	$1,732.50	10%	9%	$2,077	C 33052 322 0320	
M389	Pipe, HDPE, 6" diam., DR 11	250	LF	1.00	$0.00	$0.00	$0.00	$0.00	$5.37	$0.00	$5.37	$1,342.50	10%	9%	$1,610	C 22 11 1378 0082	
M395	Elbow, 90 Deg., HDPE, 6" diam., DR 11	0	EA	1.00	$0.00	$0.00	$0.00	$0.00	$37.59	$0.00	$37.59	$0.00	10%	9%	$0	C 22 11 1378 0332	
M413	Tee, HDPE, 6" diam., DR 11	0	EA	1.00	$0.00	$0.00	$0.00	$0.00	$49.41	$0.00	$49.41	$0.00	10%	9%	$0	C 22 11 1378 0732	
M424	Welding, HDPE, labor per joint, 6" pipe size	14	EA	1.00	$22.87	$22.87	$0.00	$0.00	$0.00	$0.00	$22.87	$320.18	10%	9%	$384	C 22 11 1378 4080	Includes cost for weld setup
M430	Welding, HDPE, machine, 6" thru 8" diameter	1	DY	1.00	$0.00	$0.00	$108.12	$108.12	$0.00	$0.00	$108.12	$108.12	10%	9%	$130	C 22 11 1378 4370	
M211	Tracer wire	3	CLF	1.00	$140.40	$140.40	$0.00	$0.00	$122.65	$0.00	$263.05	$657.63	10%	9%	$788	C 26052 680 0260	
M212	Manhole for tracer wire connections, precast concre	1	EA	1.00	$184.08	$184.08	$0.00	$0.00	$394.24	$0.00	$578.32	$578.32	10%	9%	$693	C 33051 613 0510	
L8	Field Engineer	8	HR	1.00	$82.93	$82.93	$0.00	$0.00	$0.00	$0.00	$82.93	$663.44	0%	9%	$723	SE SalaryExpert.com	Overhead included in unit labor rate.
E2	Pickup Truck Rental	1	DY	1.00	$0.00	$0.00	$78.74	$78.74	$0.00	$0.00	$78.74	$78.74	10%	9%	$94	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	1	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$10.74	10%	9%	$13	PE N/A	
												TOTAL COST:			$8,371		

LENGTH OF PIPE RUN:	250
TOTAL UNIT COST:	$33.48

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KGAL	thousand gallons
UNMOD UC	unmodified unit cost	KW-HR	kilowatt-hour
UNMOD LIC	unmodified line item cost	LBS	pounds
UNBUR LIC	unburdened line item cost	LCY	loose cubic yards
PC OH	prime contractor overhead	LF	linear foot
PC PF	prime contractor profit	LS	lump sum
BUR LIC	burdened line item cost	SF	square feet
BCY	bank cubic yard	TN	ton
CLF	hundred linear feet	VLF	vertical linear foot
CY	cubic yards	WK	week

TABLE CW-44-GWU1

Groundwater Extraction and Treatment **Cost Worksheet: CW-44-GWU1**
Capital Cost Sub-Element
Geotechnical Investigation for Treatment Building

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
Based on previous work of similar scope by CDM. Geotechnical Investigation includes various soil analysis and testing and also includes investigation report.

Cost Analysis:
Geotechnical Investigation

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M227	Geotechnical Investigation	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$7,650.00	$7,650.00	$7,650.00	10%	9%	$9,172	PE NA	
M228	Investigation and Analysis Report	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$5,100.00	$5,100.00	$5,100.00	10%	9%	$6,115	PE NA	
												TOTAL UNIT COST:			$15,287		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KGAL	thousand gallons
UNMOD UC	unmodified unit cost	KW-HR	kilowatt-hour
UNMOD LIC	unmodified line item cost	LBS	pounds
UNBUR LIC	unburdened line item cost	LCY	loose cubic yards
PC OH	prime contractor overhead	LF	linear foot
PC PF	prime contractor profit	LS	lump sum
BUR LIC	burdened line item cost	SF	square feet
BCY	bank cubic yard	TN	ton
CLF	hundred linear feet	VLF	vertical linear foot
CY	cubic yards	WK	week

TABLE CW-45-GWU1

Groundwater Extraction and Treatment
Capital Cost Sub-Element
Groundwater Treatment Plant - Building

Cost Worksheet: CW-45-GWU1

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
Includes foundation, building structure, including interior and exterior finishing for the GWTF. Based on previous work of similar scope by CDM. Pre-Engineered Building includes earthwork for foundation & concrete slab, fabrication, delivery, erection, HVAC, plumbing, interior & exterior finishing, of the building housing the Groundwater Treatment System.

Cost Analysis:
Pre-Engineered Building

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M225	Earthwork and Foundation for Pre-Engineered Building	1,250	SF	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$18.47	$18.47	$23,087.50	10%	9%	$27,682	P NA	
M226	Fabrication and Construction of Pre-Engineered Building	1,250	SF	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$102.60	$102.60	$128,250.00	10%	9%	$153,772	P NA	
M248	Heat for Equipment Building	1,250	SF	1.00	$0.00	$0.00	$0.00	$0.00	$6.95	$0.00	$6.95	$8,687.50	10%	9%	$10,416	P NA	Prevent equipment from freezing during winter
												TOTAL UNIT COST:			$191,870		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KGAL	thousand gallons
UNMOD UC	unmodified unit cost	KW-HR	kilowatt-hour
UNMOD LIC	unmodified line item cost	LBS	pounds
UNBUR LIC	unburdened line item cost	LCY	loose cubic yards
PC OH	prime contractor overhead	LF	linear foot
PC PF	prime contractor profit	LS	lump sum
BUR LIC	burdened line item cost	SF	square feet
BCY	bank cubic yard	TN	ton
CLF	hundred linear feet	VLF	vertical linear foot
CY	cubic yards	WK	week

TABLE CW-46-GWU1

Groundwater Extraction and Treatment
Capital Cost Sub-Element
Groundwater Treatment Plant - Startup

Cost Worksheet: CW-46-GWU1

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
The sub-element involves a 14-day startup phase for the groundwater treatment plant with one extraction well. Includes sampling three points (influent, mid-plant, and effluent) one per day during the 14-day startup period. Includes operator time and engineer time during the initial startup process.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M3	VOCs, EPA Method SW-846 8260	50	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$80.08	$80.08	$4,004.00	0%	9%	$4,364	V Teklab	
M4	Filtered	0	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$72.80	$72.80	$0.00	0%	9%	$0	V Teklab	
M19	Water Quality Meter and Flow Through Cell	2	WK	1.00	$0.00	$0.00	$0.00	$0.00	$461.85	$0.00	$461.85	$923.70	0%	9%	$1,007	V Pine Env	
M20	Photoionization Detector (PID)	2	WK	1.00	$0.00	$0.00	$0.00	$0.00	$214.81	$0.00	$214.81	$429.62	0%	9%	$468	V Pine Env	Includes calibration gas
M21	Water Level Meter	2	WK	1.00	$0.00	$0.00	$0.00	$0.00	$64.44	$0.00	$64.44	$128.88	0%	9%	$140	V Pine Env	
M22	Turbidimeter	2	WK	1.00	$0.00	$0.00	$0.00	$0.00	$80.55	$0.00	$80.55	$161.10	0%	9%	$176	V Pine Env	
M27	Shipping Rental Equipment	2	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$255.00	$255.00	$510.00	10%	9%	$611	PE N/A	
M29	Miscellaneous Sampling Equipment	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$204.00	$204.00	$204.00	10%	9%	$245	PE N/A	Paper towels, gloves, garbage bags, etc.
L15	Project Manager	5	HR	1.00	$124.22	$124.22	$0.00	$0.00	$0.00	$0.00	$124.22	$621.10	0%	9%	$677	SE SalaryExpert.com	Overhead included in unit labor rate.
L24	Contracting/Procurement Specialist	9	HR	1.00	$46.54	$46.54	$0.00	$0.00	$0.00	$0.00	$46.54	$418.86	0%	9%	$457	SE SalaryExpert.com	Overhead included in unit labor rate.
L23	General Operator/Technician	140	HR	1.00	$50.70	$50.70	$0.00	$0.00	$0.00	$0.00	$50.70	$7,098.00	0%	9%	$7,737	SE SalaryExpert.com	Overhead included in unit labor rate.
L5	Environmental Engineer	40	HR	1.00	$86.14	$86.14	$0.00	$0.00	$0.00	$0.00	$86.14	$3,445.60	0%	9%	$3,756	SE SalaryExpert.com	Overhead included in unit labor rate.
E2	Pickup Truck Rental	16	DY	1.00	$0.00	$0.00	$78.74	$78.74	$0.00	$0.00	$78.74	$1,259.90	10%	9%	$1,511	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	16	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$171.84	10%	9%	$206	PE N/A	
												TOTAL UNIT COST:			$21,355		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-47-GWU1

Groundwater Extraction and Treatment
Capital Cost Sub-Element
Decommissioning Treatment System

Cost Worksheet: CW-47-GWU1

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves decommission of the Treatment Plant.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M235	Removal of treatment system equipment	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$20,800.00	$20,800.00	$20,800.00	10%	9%	$24,939	P Per Estimator	
												TOTAL UNIT COST:			$24,939		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-48-GWU1

Groundwater Extraction and Treatment
Annual Cost Sub-Element
Operation and Maintenance - Treatment Plant

Cost Worksheet: CW-48-GWU1

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves annual operation and maintenance for the new groundwater treatment system. Assumes quarterly acid washing/cleaning of the tray air stripper, and a weekly visit by an operation and maintenance technician. Cost assume local oversight and no per diem.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M280	Electrical consumption	154,700	kW-HR	1.00	$0.00	$0.00	$0.00	$0.00	$0.11	$0.00	$0.11	$17,017.00	0%	0%	$17,017	P NA	
M281	Acid wash of air stripper system	4	EA	1.00	$416.00	$416.00	$312.00	$312.00	$547.56	$0.00	$1,275.56	$5,102.24	10%	9%	$6,118	P NA	
L23	General Operator/Technician	416	HR	1.00	$50.70	$50.70	$0.00	$0.00	$0.00	$0.00	$50.70	$21,091.20	0%	9%	$22,989	SE SalaryExpert.com	Overhead included in unit labor rate.
												TOTAL UNIT COST:			$46,124		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-49-GWU1

Groundwater Extraction and Treatment **Cost Worksheet: CW-49-GWU1**
Periodic Cost Sub-Element
Minor Equipment Replacement - Treatment Plant

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element assumes treatment system equipment will require periodic replacement.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M308	Valves, iron body, gate, non-rising stem, flanged, 125 lb., 8"	5	EA	1.00	$0.00	$0.00	$0.00	$0.00	$1,511.20	$0.00	$1,511.20	$7,556.00	10%	9%	$9,060	C Per Estimator	
M313	Valves, iron body, swing check, flanged, 125 lb., 8"	5	EA	1.00	$0.00	$0.00	$0.00	$0.00	$854.95	$0.00	$854.95	$4,274.75	10%	9%	$5,125	C Per Estimator	
M303	Venturi flow, measuring device, 8" diameter	3	EA	1.00	$0.00	$0.00	$0.00	$0.00	$1,215.84	$0.00	$1,215.84	$3,647.52	10%	9%	$4,373	P Per Estimator	
												TOTAL UNIT COST:			$18,558		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-50-GWU1

Groundwater Extraction and Treatment **Cost Worksheet: CW-50-GWU1**
Periodic Cost Sub-Element
Major Equipment Replacement - Treatment Plant

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element assumes treatment system equipment will require periodic replacement.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M120	Shallow Tray Air Stripper, 425 gpm max.	1	EA	1.00	$10,400.00	$10,400.00	$0.00	$0.00	$43,958.12	$6,261.84	$60,619.96	$60,619.96	10%	9%	$72,683	V CarbonAir	
M121	4,000 gallon equalization tank, polyethylene	1	EA	1.00	$312.00	$312.00	$0.00	$0.00	$3,175.85	$520.00	$4,007.85	$4,007.85	10%	9%	$4,805	V WaterTanks.com	
M122	Transfer pump, 400 gpm	1	EA	1.00	$457.60	$457.60	$0.00	$0.00	$2,124.53	$260.00	$2,842.13	$2,842.13	10%	9%	$3,408	V Grainger	
M123	Variable frequency drive, enclosed, 5 HP motor size, NEMA 1	2	EA	1.00	$348.40	$348.40	$0.00	$0.00	$1,916.46	$0.00	$2,264.86	$4,529.72	10%	9%	$5,431	C 26292 310 0110	
												TOTAL UNIT COST:			$86,327		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-51-GWU1

Groundwater Extraction and Treatment
Periodic Cost Sub-Element
General Maintenance - New Treatment Plant

Cost Worksheet: CW-51-GWU1

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU1
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/15/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element assumes treatment system equipment will require periodic maintenance like painting and rehabilitation of building systems.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M230	Painting building, siding, exterior, alkyd (oil base), paint 2 coats, spray	2,250	SF	1.00	$0.11	$0.11	$0.00	$0.00	$0.18	$0.00	$0.29	$652.50	10%	9%	$782	C 09 91 1360 1000	
M231	Building Electrical System Rehabilitation	1,250	SF	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$17.86	$17.86	$22,325.00	10%	9%	$26,768	P Previous Work	
												TOTAL UNIT COST:			$27,550		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

CALCULATION WORKSHEET INDEX

Wrksht No.	Description
C-01	Calculations for determination of quantities for preparing groundwater monitoring reports
C-02	Calculations for determination of quantities for groundwater monitoring per sampling event - No Action
C-03	Calculations for determination of quantities for groundwater monitoring per sampling event - MNA Sampling
C-04	Calculations for determination of quantities for groundwater monitoring per sampling event - EAB Sampling
C-05	Calculations for determination of quantities for groundwater monitoring per sampling event - Post-EAB Sampling
C-06	Calculations for determination of quantities for installation of monitoring wells.
C-07	Calculations for determination of quantities for maintenance of monitoring wells - No Action
C-08	Calculations for determination of quantities for maintenance of monitoring wells- EAB
C-09	Calculations for determination of quantities for maintenance of monitoring wells - MNA
C-10	Calculations for determination of quantities for abandonment of monitoring wells - No Action
C-11	Calculations for determination of quantities for abandonment of monitoring wells - EAB
C-12	Calculations for determination of quantities for abandonment of monitoring wells - MNA
C-13	Calculations for determination of quantities for EAB pilot-test monitoring event
C-14	Calculations for determination of quantities for EAB pilot-test monitoring well installation
C-15	Calculations for determination of quantities for biobarrier injection well installation
C-16	Calculations for determination of quantities for biobarrier pilot-test
C-17	Calculations for determination of quantities for biobarrier injections - Line 1A, Line 1B, and Line 2
C-18	Calculations for determination of quantities for biobarrier injections - Line 3 and Line 4
C-19	Calculations for determination of quantities for bioaugmentation
C-20	Calculations for determination of quantities for injection well abandonment
C-21	Calculations for determination of quantities for installation of extraction wells
C-22	Calculations for determination of quantities for installation of extraction well vaults
C-23	Calculations for determination of quantities for extraction well abandonment
C-24	Calculations for determination of quantities for installation of influent piping from NIC#1-1 to new treatment plant
C-25	Calculations for determination of quantities for installation of effluent piping from new treatment plant to unnamed creek
C-26	Calculations for determination of quantities for pre-engineered building, equipment, & startup - single well treatment system
C-27	Calculations for determination of quantities for electrical consumption by extraction well
C-28	Calculations for determination of quantities for treatment plant operation and maintenance
C-29	Calculations for determination of quantities for groundwater treatment plant - equipment replacement

CDM					
PROJECT:	North Industrial Corridor-GWU1	COMPUTED BY :	MW	CHECKED BY:	MS
JOB NO.:	2395-54800	DATE :	3/15/2011	DATE CHECKED:	3/29/2011
CLIENT:	City of Wichita			WRKSHT NO. :	C-01

Description: Calculations for determination of quantities for preparing groundwater monitoring reports.

No Action Groundwater Monitoring Report Generation		
Assumed CAD hours per well, HR:	2	
Assumed Geologist hours per well, HR:	10	*Includes data review and tabulation, report, figures, etc.*
Number of wells:	10	
Project Manager, HR:	8	
CAD Drafter, HR:	20	
Geologist, HR:	100	
Quality Assurance Director, HR:	4	
Clerks, Typist, Bookkeeper & Receptionist, HR:	8	
Reproduction, LS:	1	
MNA Monitoring Report Generation		
Assumed CAD hours per well, HR:	3	
Assumed Geologist hours per well, HR:	12	*Includes data review and tabulation, report, figures, etc.*
Number of wells:	28	
Project Manager, HR:	8	
CAD Drafter, HR:	84	
Geologist, HR:	336	
Quality Assurance Director, HR:	4	
Clerks, Typist, Bookkeeper & Receptionist, HR:	12	
Reproduction, LS:	1	
EAB Monitoring Report Generation		
Assumed CAD hours per well, HR:	3	
Assumed Geologist hours per well, HR:	12	*Includes data review and tabulation, report, figures, etc.*
Number of wells:	33	
Project Manager, HR:	8	
CAD Drafter, HR:	99	
Geologist, HR:	396	
Quality Assurance Director, HR:	4	
Clerks, Typist, Bookkeeper & Receptionist, HR:	10	
Reproduction, LS:	1	
Post-EAB Monitoring Report Generation		
Assumed CAD hours per well, HR:	2	
Assumed Geologist hours per well, HR:	10	*Includes data review and tabulation, report, figures, etc.*
Number of wells:	13	
Project Manager, HR:	8	
CAD Drafter, HR:	26	
Geologist, HR:	130	
Quality Assurance Director, HR:	4	
Clerks, Typist, Bookkeeper & Receptionist, HR:	10	
Reproduction, LS:	1	

Description: Calculations for determination of quantities for groundwater monitoring per sampling event.

Groundwater Monitoring - No Action Alternative		
No. of monitoring wells to be sampled for general analysis:	**10**	
Analytical Requirements for General Analysis		
Samples, EA:	12	*Includes QC samples*
Sampling Equipment		
Water Quality Meter and Flow Through Cell, WK:	1	*Rounded up to nearest week*
Photoionization Detector (PID), WK:	1	*Rounded up to nearest week*
Water Level Meter, WK:	1	*Rounded up to nearest week*
Turbidimeter, WK:	1	*Rounded up to nearest week*
Portable Bladder Pump, WK:	1	*Rounded up to nearest week*
Replacement Poly Bladders, EA:	12	*Assumes 2 extra bladders*
Bladder Pump Controller and Compressor, WK:	1	*Rounded up to nearest week*
Combination Tubing, LF:	600	*Assume 60 feet per well. Rounded up to nearest 100.*
Shipping Rental Equipment, EA:	**2**	
55-gallon Open Head Steel Drum, EA:	**2**	*Assume 500 mL per minute for 60 minutes per well*
Miscellaneous Sampling Equipment, LS:	**1**	
Labor Requirements for General Analysis		
Assumed length of time per day, HR:	**8**	
Time assumed to sample a well, HR:	**2**	*Includes setup, purging, and sample collection*
Number of sampling team members:	**2**	
Prepartory time, HR:	**8**	
Time to collect water level measurements, HR:	3	*Assume 15 minutes per well. Rounded up to nearest hour*
Time to sample all wells for general analysis, HR:	4	*Rounded up to nearest hour*
Time to collect MNA samples, HR:	4	*Assume 20 minutes per well. Rounded up to nearest hour*
Time for decon, HR:	4	*Assume 20 minutes per well. Rounded up to nearest hour*
Time for sample management, HR:	5	*Assume 15 minutes per well. Rounded up to nearest hour*
Total, HR:	**28**	
Time to sample all wells for general analysis, DY:	**4**	*Rounded up to nearest day*
Project Manager, HR:	1	*5 minutes per sample, rounded up to nearest hour*
General Operator/Technician, HR:	56	*Two member team*
Contracting/Procurement Specialist, HR:	2	*10 minutes per sample, rounded up to nearest hour*
Pickup Truck Rental, WK:	1	*Rounded up to nearest week*
Fuel for Pickup Truck, DY:	4	

CDM	PROJECT: North Industrial Corridor-GWU1	COMPUTED BY : MW	CHECKED BY: MS
	JOB NO.: 2395-54800	DATE : 3/15/2011	DATE CHECKED: 3/29/2011
	CLIENT: City of Wichita		WRKSHT NO. : C-03

Description: Calculations for determination of quantities for MNA monitoring per sampling event.

MNA Monitoring		
No. of monitoring wells to be sampled for MNA&VOCs analysis:	**18**	
No. of monitoring wells to be sampled for only VOCs analysis:	**10**	
No. of surface water samples for VOCs analysis:	**4**	
Analytical Requirements		
Samples, including VOCs, EA:	38	*Includes QC samples*
Metals, Dissolved, EPA Method 6010, Field Filtered, EA:	21	
Nitrate/Nitrite (NO3/NO2), EA:	21	
Sulfate, EPA MCAWW, 300, Field Filtered, EA:	21	
Sulfide, SM 4500S2 E, EA:	21	*30 per kit, rounded up to nearest kit*
Total Iron (Fe), EA:	21	*30 per kit, rounded up to nearest kit*
Total Manganese (Mn), EA:	21	
Chloride, EPA MCAWW, 300, Field Filtered, EA:	21	
Alkalinity, EPA MCAWW, 310.1, Field Filtered, EA:	21	
Dissolved Total Organic Carbon (TOC), EA:	21	
Carbon Dioxide (CO2), EA:	21	
Volatile Fatty Acids (VFAs), EA:	21	
Methane/Ethane/Ethene, EA:	21	
Dissolved Oxygen, Colormetic Test Kits, 0 to 1 ppm, EA:	1	*30 per kit, rounded up to nearest kit*
Dissolved Oxygen, Colormetic Test Kits, 1 to 12 ppm, EA:	1	*30 per kit, rounded up to nearest kit*
Field Filter, 0.45 micron filter, EA:	18	
Sampling Equipment		
Water Quality Meter and Flow Through Cell, WK:	1	*Rounded up to nearest week*
Photoionization Detector (PID), WK:	1	*Rounded up to nearest week*
Water Level Meter, WK:	1	*Rounded up to nearest week*
Turbidimeter, WK:	1	*Rounded up to nearest week*
Portable Bladder Pump, WK:	1	*Rounded up to nearest week*
Replacement Poly Bladders, EA:	20	*Assumes 2 extra bladders*
Bladder Pump Controller and Compressor, WK:	1	*Rounded up to nearest week*
Combination Tubing, LF:	1100	*Assume 60 feet per well. Rounded up to nearest 100.*
Shipping Rental Equipment, EA:	**2**	
55-gallon Open Head Steel Drum, EA:	**3**	*Assume 500 mL per minute for 60 minutes per well*
Miscellaneous Sampling Equipment, LS:	**1**	
Labor Requirements		
Assumed length of time per day, HR:	**8**	
Time assumed to sample a well, HR:	**2**	*Includes setup, purging, and sample collection*
Number of sampling team members:	**2**	
Prepartory time, HR:	**8**	*Procuring equipment, etc.*
Time to collect water level measurements, HR:	5	*Assume 15 minutes per well. Rounded up to nearest hour*
Time to sample all wells for general analysis, HR:	6	*Rounded up to nearest hour*
Time to collect MNA samples, HR:	6	*Assume 20 minutes per well. Rounded up to nearest hour*
Time for decon, HR:	6	*Assume 20 minutes per well. Rounded up to nearest hour*
Time for sample management, HR:	9	*Assume 30 minutes per well. Rounded up to nearest hour*
Total, HR:	**40**	
Time to sample all wells for general analysis, DY:	**5**	*Rounded up to nearest day*
Project Manager, HR:	2	*5 minutes per sample, rounded up to nearest hour*
General Operator/Technician, HR:	80	*Two member team*
Contracting/Procurement Specialist, HR:	3	*10 minutes per sample, rounded up to nearest hour*
Pickup Truck Rental, WK:	1	*Rounded up to nearest week*
Fuel for Pickup Truck, DY:	5	

Description: Calculations for determination of quantities for EAB monitoring per sampling event.

EAB Groundwater Monitoring		
No. of monitoring wells to be sampled for general analysis:	**33**	
No. of surface water samples for VOCs analysis:	**4**	
Analytical Requirements		
Samples, including VOCs, EA:	43	*Includes QC samples*
Metals, Dissolved, EPA Method 6010, Field Filtered, EA:	39	
Nitrate/Nitrite (NO3/NO2), EA:	39	
Sulfate, EPA MCAWW, 300, Field Filtered, EA:	39	
Sulfide, SM 4500S2 E, EA:	39	*30 per kit, rounded up to nearest kit*
Total Iron (Fe), EA:	39	*30 per kit, rounded up to nearest kit*
Total Manganese (Mn), EA:	39	
Chloride, EPA MCAWW, 300, Field Filtered, EA:	39	
Alkalinity, EPA MCAWW, 310.1, Field Filtered, EA:	39	
Dissolved Total Organic Carbon (TOC), EA:	39	
Carbon Dioxide (CO2), EA:	39	
Volatile Fatty Acids (VFAs), EA:	39	
Methane/Ethane/Ethene, EA:	39	
Dissolved Oxygen, Colormetic Test Kits, 0 to 1 ppm, EA:	2	*30 per kit, rounded up to nearest kit*
Dissolved Oxygen, Colormetic Test Kits, 1 to 12 ppm, EA:	2	*30 per kit, rounded up to nearest kit*
Field Filter, 0.45 micron filter, EA:	33	
Sampling Equipment		
Water Quality Meter and Flow Through Cell, WK:	2	*Rounded up to nearest week*
Photoionization Detector (PID), WK:	2	*Rounded up to nearest week*
Water Level Meter, WK:	2	*Rounded up to nearest week*
Turbidimeter, WK:	2	*Rounded up to nearest week*
Portable Bladder Pump, WK:	2	*Rounded up to nearest week*
Replacement Poly Bladders, EA:	35	*Assumes 2 extra bladders*
Bladder Pump Controller and Compressor, WK:	2	*Rounded up to nearest week*
Combination Tubing, LF:	2000	*Assume 60 feet per well. Rounded up to nearest 100.*
Shipping Rental Equipment, EA:	**2**	
55-gallon Open Head Steel Drum, EA:	**5**	*Assume 500 mL per minute for 60 minutes per well*
Miscellaneous Sampling Equipment, LS:	**1**	
Labor Requirements		
Assumed length of time per day, HR:	**8**	
Time assumed to sample a well, HR:	**2**	*Includes setup, purging, and sample collection*
Number of sampling team members:	**2**	
Prepartory time, HR:	8	
Time to collect water level measurements, HR:	9	*Assume 15 minutes per well. Rounded up to nearest hour*
Time to sample all wells for general analysis, HR:	34	*Rounded up to nearest hour*
Time for decon, HR:	11	*Assume 20 minutes per well. Rounded up to nearest hour*
Time for sample management, HR:	9	*Assume 15 minutes per well. Rounded up to nearest hour*
Total, HR:	**71**	
Time to sample all wells for general analysis, DY:	**9**	*Rounded up to nearest day*
Project Manager, HR:	3	*5 minutes per sample, rounded up to nearest hour*
General Operator/Technician, HR:	142	*Two member team*
Contracting/Procurement Specialist, HR:	6	*10 minutes per sample, rounded up to nearest hour*
Pickup Truck Rental, WK:	2	*Rounded up to nearest week*
Fuel for Pickup Truck, DY:	9	

Description: Calculations for determination of quantities for post-EAB monitoring per sampling event.

Post-EAB Monitoring		
No. of monitoring wells to be sampled for MNA analysis:	**13**	
No. of surface water samples for VOCs analysis:	**4**	
Analytical Requirements		
Samples, including VOCs, EA:	20	*Includes QC samples*
Sampling Equipment		
Water Quality Meter and Flow Through Cell, WK:	1	*Rounded up to nearest week*
Photoionization Detector (PID), WK:	1	*Rounded up to nearest week*
Water Level Meter, WK:	1	*Rounded up to nearest week*
Turbidimeter, WK:	1	*Rounded up to nearest week*
Portable Bladder Pump, WK:	1	*Rounded up to nearest week*
Replacement Poly Bladders, EA:	15	*Assumes 2 extra bladders*
Bladder Pump Controller and Compressor, WK:	1	*Rounded up to nearest week*
Combination Tubing, LF:	800	*Assume 60 feet per well. Rounded up to nearest 100.*
Shipping Rental Equipment, EA:	**2**	
55-gallon Open Head Steel Drum, EA:	**2**	*Assume 500 mL per minute for 60 minutes per well*
Miscellaneous Sampling Equipment, LS:	**1**	
Labor Requirements		
Assumed length of time per day, HR:	**8**	
Time assumed to sample a well, HR:	**2**	*Includes setup, purging, and sample collection*
Number of sampling team members:	**2**	
Prepartory time, HR:	**8**	*Procuring equipment, etc.*
Time to collect water level measurements, HR:	4	*Assume 15 minutes per well. Rounded up to nearest hour*
Time to sample all wells for general analysis, HR:	4	*Rounded up to nearest hour*
Time to collect EAB samples, HR:	5	*Assume 20 minutes per well. Rounded up to nearest hour*
Time for decon, HR:	5	*Assume 20 minutes per well. Rounded up to nearest hour*
Time for sample management, HR:	7	*Assume 30 minutes per well. Rounded up to nearest hour*
Total, HR:	**33**	
Time to sample all wells for general analysis, DY:	**5**	*Rounded up to nearest day*
Project Manager, HR:	2	*5 minutes per sample, rounded up to nearest hour*
General Operator/Technician, HR:	66	*Two member team*
Contracting/Procurement Specialist, HR:	3	*10 minutes per sample, rounded up to nearest hour*
Pickup Truck Rental, WK:	1	*Rounded up to nearest week*
Fuel for Pickup Truck, DY:	5	

Description: Quantities for installation of monitoring wells.

Monitoring Well Installation

Number of Shallow Monitoring Wells:	1		
Shallow Monitoring Well Depth, VLF:	25	Top	Bottom
Screened Interval, FT:	10	13	23
Estimated time to install shallow monitoring well, HR:	0.5		
Number of Deep Monitoring Wells:	1		
Deep Monitoring Well Depth, VLF:	45	Top	Bottom
Screened Interval, FT:	10	32	42
Estimated time to install deep monitoring well, HR:	1		

Shallow Monitoring Well Quantities		**Deep Monitoring Well Quantities**	
Geoprobe rig and crew, DY:	0.25	Geoprobe rig and crew, DY:	0.25
5' Mini-Well Pre-Packed Screen, EA:	2	5' Mini-Well Pre-Packed Screen, EA:	2
PVC Casing, LF:	15	PVC Casing, LF:	35
Well Grout, LF:	15	Well Grout, LF:	35
Locking J-Plug, EA:	1	Locking J-Plug, EA:	1
8" Vault, EA:	1	8" Vault, EA:	1
Monitoring Well Completion, EA:	1	Monitoring Well Completion, EA:	1
Well Development, HR:	1	Well Development, HR:	1
IDW Handling, HR:	0.5	IDW Handling, HR:	0.5
Decontamination, HR:	0.5	Decontamination, HR:	0.5
Standby Time, HR:	1	Standby Time, HR:	1
55-gallon drum, EA:	0.5	55-gallon drum, EA:	0.5
Geologist, HR:	1.5	Geologist, HR:	2
Pickup Truck Rental, DY:	0.25	Pickup Truck Rental, DY:	0.25
Fuel for Rental Truck, DY:	0.25	Fuel for Rental Truck, DY:	0.25

Total

Mobilization and Demobilization of DPT Rig, LS:	1
Decontamination Pad Construction/Removal, LS:	1
Geoprobe rig and crew, DY:	1
Mini-Well Pre-Packed Screen, EA:	4
PVC Casing, LF:	50
Well Grout, LF:	50
Locking J-Plug, EA:	2
8" Vault, EA:	2
Monitoring Well Completion, EA:	2
Monitoring Well Development, HR:	2
IDW Handling, HR:	1
Decontamination, HR:	1
Standby Time, HR:	2
55-gallon Open Head Steel Drum, EA:	1
Geologist, HR:	3.5
Pickup Truck Rental, DY:	1
Fuel for Rental Truck, DY:	1

CDM

PROJECT:	North Industrial Corridor-GWU1	COMPUTED BY :	MW	CHECKED BY:	MS
JOB NO.:	2395-54800	DATE :	3/15/2011	DATE CHECKED:	3/29/2011
CLIENT:	City of Wichita			WRKSHT NO. :	C-07

Description: Quantities for maintenance of monitoring wells. Assumes all monitoring wells will require replacement of vault and development.

Monitoring Well Maintenance - No Action Monitoring Wells

Number of wells requiring maintenance, EA:	10
Estimated time to complete well head repairs per well, HR:	1
Estimated time to develop well, HR:	1
Total time per well, HR:	2
Total time for all wells, HR:	20
Estimated length of work day, HR:	10
Mobilization and Demobilization of DPT Rig, LS:	1
Decontamination Pad Construction/Removal, LS:	1
Geoprobe rig and crew, DY:	2
Locking J-Plug, EA:	10
8" Vault, EA:	10
Geologist, HR:	20
Pickup Truck Rental, DY:	2
Fuel for Rental Truck, DY:	2

CDM					
PROJECT:	North Industrial Corridor-GWU1	COMPUTED BY :	MW	CHECKED BY:	MS
JOB NO.:	2395-54800	DATE :	3/15/2011	DATE CHECKED:	3/29/2011
CLIENT:	City of Wichita			WRKSHT NO. :	C-08

Description: Quantities for maintenance of monitoring wells. Assumes all monitoring wells will require replacement of vault and development.

Monitoring Well Maintenance - EAB Monitoring

Number of wells requiring maintenance, EA:	13	*13 "original" & long-term wells; the 20 wells installed for upgradient & downgradient monitoring at the biobarriers are expected to be decommissioned in Year 10 along with the injection wells. Since well maintenance proposed for every 10 years, no maintenance of 20 wells is required.*
Estimated time to complete well head repairs per well, HR:	1	
Estimated time to develop well, HR:	1	
Total time per well, HR:	2	
Total time for all wells, HR:	26	
Estimated length of work day, HR:	10	
Mobilization and Demobilization of DPT Rig, LS:	1	
Decontamination Pad Construction/Removal, LS:	1	
Geoprobe rig and crew, DY:	3	
Locking J-Plug, EA:	13	
8" Vault, EA:	13	
Geologist, HR:	26	
Pickup Truck Rental, DY:	3	
Fuel for Rental Truck, DY:	3	

CDM

PROJECT:	North Industrial Corridor-GWU1	COMPUTED BY :	MW	CHECKED BY:	MS
JOB NO.:	2395-54800	DATE :	3/15/2011	DATE CHECKED:	3/29/2011
CLIENT:	City of Wichita			WRKSHT NO. :	C-09

Description: Quantities for maintenance of monitoring wells. Assumes all monitoring wells will require replacement of vault and development.

Monitoring Well Maintenance - MNA Monitoring

Number of wells requiring maintenance, EA:	13
Estimated time to complete well head repairs per well, HR:	1
Estimated time to develop well, HR:	1
Total time per well, HR:	2
Total time for all wells, HR:	26
Estimated length of work day, HR:	10
Mobilization and Demobilization of DPT Rig, LS:	1
Decontamination Pad Construction/Removal, LS:	1
Geoprobe rig and crew, DY:	3
Locking J-Plug, EA:	13
8" Vault, EA:	13
Geologist, HR:	26
Pickup Truck Rental, DY:	3
Fuel for Rental Truck, DY:	3

CDM					
PROJECT:	North Industrial Corridor-GWU1	COMPUTED BY :	MW	CHECKED BY:	MS
JOB NO.:	2395-54800	DATE :	3/15/2011	DATE CHECKED:	3/29/2011
CLIENT:	City of Wichita			WRKSHT NO. :	C-10

Description: Quantities for abandonment of monitoring wells. Assumes all monitoring wells will be abandoned when site is closed.

Monitoring Well Abandonment - No Action Alternative Monitoring Wells

Number of Shallow Monitoring Wells:	5		
Shallow Monitoring Well Depth, VLF:	25	Top	Bottom
Screened Interval, FT:	10	13	23
Estimated time to abandon shallow monitoring well, HR:	2		
Number of Deep Monitoring Wells:	5		
Deep Monitoring Well Depth, VLF:	45	Top	Bottom
Screened Interval, FT:	10	32	42
Estimated time to abandon deep monitoring well, HR:	3		
Estimated length of work day, HR:	10		

Shallow Monitoring Well Quantities		**Deep Monitoring Well Quantities**	
Geoprobe rig and crew, HR:	10	Geoprobe rig and crew, HR:	15
Geoprobe rig and crew, DY:	1	Geoprobe rig and crew, DY:	2
Grout well, VLF:	125	Grout well, VLF:	225

Total

Mobilization and Demobilization of DPT Rig, LS:	1
Decontamination Pad Construction/Removal, LS:	1
Geoprobe rig and crew, DY:	3
Grout well, VLF:	350
Geologist, HR:	30
Pickup Truck Rental, DY:	3
Fuel for Rental Truck, DY:	3

CDM	PROJECT:	North Industrial Corridor-GWU1	COMPUTED BY :	MW	CHECKED BY: MS
	JOB NO.:	2395-54800	DATE :	3/15/2011	DATE CHECKED: 3/29/2011
	CLIENT:	City of Wichita			WRKSHT NO. : C-11

Description: Quantities for abandonment of monitoring wells. Assumes all monitoring wells will be abandoned when site is closed.

Monitoring Well Abandonment - EAB Monitoring Alternative Monitoring Wells

Number of Shallow Monitoring Wells:	10		
Shallow Monitoring Well Depth, VLF:	25	Top	Bottom
Screened Interval, FT:	10	13	23
Estimated time to abandon shallow monitoring well, HR:	2		
Number of Deep Monitoring Wells:	10		
Deep Monitoring Well Depth, VLF:	45	Top	Bottom
Screened Interval, FT:	10	32	42
Estimated time to abandon deep monitoring well, HR:	3		
Estimated length of work day, HR:	10		

Shallow Monitoring Well Quantities		Deep Monitoring Well Quantities	
Geoprobe rig and crew, HR:	20	Geoprobe rig and crew, HR:	30
Geoprobe rig and crew, DY:	2	Geoprobe rig and crew, DY:	3
Grout well, VLF:	250	Grout well, VLF:	450

Total

Mobilization and Demobilization of DPT Rig, LS:	1
Decontamination Pad Construction/Removal, LS:	1
Geoprobe rig and crew, DY:	5
Grout well, VLF:	700
Geologist, HR:	50
Pickup Truck Rental, DY:	5
Fuel for Rental Truck, DY:	5

CDM					
PROJECT:	North Industrial Corridor-GWU1	COMPUTED BY :	MW	CHECKED BY:	MS
JOB NO.:	2395-54800	DATE :	3/15/2011	DATE CHECKED:	3/29/2011
CLIENT:	City of Wichita			WRKSHT NO. :	C-12

Description: Quantities for abandonment of monitoring wells. Assumes all monitoring wells will be abandoned when site is closed.

Monitoring Well Abandonment - MNA Monitoring Alternative Monitoring Wells

Number of Shallow Monitoring Wells:	6		
Shallow Monitoring Well Depth, VLF:	25	Top	Bottom
Screened Interval, FT:	10	13	23
Estimated time to abandon shallow monitoring well, HR:	2		
Number of Deep Monitoring Wells:	7		
Deep Monitoring Well Depth, VLF:	45	Top	Bottom
Screened Interval, FT:	10	32	42
Estimated time to abandon deep monitoring well, HR:	3		
Estimated length of work day, HR:	10		

Shallow Monitoring Well Quantities		Deep Monitoring Well Quantities	
Geoprobe rig and crew, HR:	12	Geoprobe rig and crew, HR:	21
Geoprobe rig and crew, DY:	2	Geoprobe rig and crew, DY:	3
Grout well, VLF:	150	Grout well, VLF:	315

Total

Mobilization and Demobilization of DPT Rig, LS:	1
Decontamination Pad Construction/Removal, LS:	1
Geoprobe rig and crew, DY:	5
Grout well, VLF:	465
Geologist, HR:	50
Pickup Truck Rental, DY:	5
Fuel for Rental Truck, DY:	5

Description: Calculations for determination of quantities for monitoring per sampling event.

EAB Pilot Test Monitoring Event		
No. of monitoring wells to be sampled for MNA analysis:	**4**	
Analytical Requirements		
VOCs, EPA Method SW-846 8260, EA:	6	*Includes QC samples*
Metals, Dissolved, EPA Method 6010, Field Filtered, EA:	6	
Nitrate/Nitrite (NO3/NO2), EA:	6	
Sulfate, EPA MCAWW, 300, Field Filtered, EA:	6	
Sulfide, SM 4500S2 E, EA:	6	*30 per kit, rounded up to nearest kit*
Total Iron (Fe), EA:	6	*30 per kit, rounded up to nearest kit*
Total Manganese (Mn), EA:	6	
Chloride, EPA MCAWW, 300, Field Filtered, EA:	6	
Alkalinity, EPA MCAWW, 310.1, Field Filtered, EA:	6	
Dissolved Total Organic Carbon (TOC), EA:	6	
Carbon Dioxide (CO2), EA:	6	
Volatile Fatty Acids (VFAs), EA:	6	
Methane/Ethane/Ethene, EA:	6	
Microbiological DNA Analysis, EA:	6	
Dissolved Oxygen, Colormetic Test Kits, 0 to 1 ppm, EA:	1	*30 per kit, rounded up to nearest kit*
Dissolved Oxygen, Colormetic Test Kits, 1 to 12 ppm, EA:	1	*30 per kit, rounded up to nearest kit*
Field Filter, 0.45 micron filter, EA:	6	
Sampling Equipment		
Water Quality Meter and Flow Through Cell, WK:	1	*Rounded up to nearest week*
Photoionization Detector (PID), WK:	1	*Rounded up to nearest week*
Water Level Meter, WK:	1	*Rounded up to nearest week*
Turbidimeter, WK:	1	*Rounded up to nearest week*
Portable Bladder Pump, WK:	1	*Rounded up to nearest week*
Replacement Poly Bladders, EA:	6	*Assumes 2 extra bladders*
Bladder Pump Controller and Compressor, WK:	1	*Rounded up to nearest week*
Combination Tubing, LF:	300	*Assume 60 feet per well. Rounded up to nearest 100.*
Shipping Rental Equipment, EA:	**2**	
55-gallon Open Head Steel Drum, EA:	**1**	*Assume 500 mL per minute for 60 minutes per well*
Miscellaneous Sampling Equipment, LS:	**1**	
Labor Requirements		
Assumed length of time per day, HR:	**8**	
Time assumed to sample a well, HR:	**2**	*Includes setup, purging, and sample collection*
Number of sampling team members:	**2**	
Prepartory time, HR:	**8**	*Procuring equipment, etc.*
Time to collect water level measurements, HR:	1	*Assume 15 minutes per well. Rounded up to nearest hour*
Time to sample all wells for general analysis, HR:	2	*Rounded up to nearest hour*
Time to collect MNA samples, HR:	2	*Assume 20 minutes per well. Rounded up to nearest hour*
Time for decon, HR:	2	*Assume 20 minutes per well. Rounded up to nearest hour*
Time for sample management, HR:	2	*Assume 30 minutes per well. Rounded up to nearest hour*
Total, HR:	**17**	
Time to sample all wells for general analysis, DY:	**3**	*Rounded up to nearest day*
Project Manager, HR:	1	*5 minutes per sample, rounded up to nearest hour*
General Operator/Technician, HR:	34	*Two member team*
Contracting/Procurement Specialist, HR:	1	*10 minutes per sample, rounded up to nearest hour*
Pickup Truck Rental, WK:	1	*Rounded up to nearest week*
Fuel for Pickup Truck, DY:	3	

Description: Quantities for installation of monitoring wells.

EAB Pilot-Test Monitoring Well Installation

Number of Shallow Monitoring Wells:	2		
Shallow Monitoring Well Depth, VLF:	25	Top	Bottom
Screened Interval, FT:	10	32	42
Estimated time to install shallow monitoring well, HR:	0.5		
Number of Deep Monitoring Wells:	2		
Deep Monitoring Well Depth, VLF:	45	Top	Bottom
Screened Interval, FT:	10	32	42
Estimated time to install deep monitoring well, HR:	1		

Shallow Monitoring Well Quantities		**Deep Monitoring Well Quantities**	
Geoprobe rig and crew, DY:	1	Geoprobe rig and crew, DY:	1
5' Mini-Well Pre-Packed Screen, EA:	4	5' Mini-Well Pre-Packed Screen, EA:	4
PVC Casing, LF:	30	PVC Casing, LF:	70
Well Grout, LF:	60	Well Grout, LF:	70
Locking J-Plug, EA:	2	Locking J-Plug, EA:	2
8" Vault, EA:	2	8" Vault, EA:	2
Monitoring Well Completion, EA:	2	Monitoring Well Completion, EA:	2
Well Development, HR:	2	Well Development, HR:	2
IDW Handling, HR:	0.5	IDW Handling, HR:	0.5
Decontamination, HR:	0.5	Decontamination, HR:	0.5
Standby Time, HR:	2	Standby Time, HR:	2
55-gallon drum, EA:	1	55-gallon drum, EA:	1
Geologist, HR:	3	Geologist, HR:	4
Pickup Truck Rental, DY:	1	Pickup Truck Rental, DY:	1
Fuel for Rental Truck, DY:	1	Fuel for Rental Truck, DY:	1

Total

Mobilization and Demobilization of DPT Rig, LS:	1
Decontamination Pad Construction/Removal, LS:	1
Geoprobe rig and crew, DY:	1
Mini-Well Pre-Packed Screen, EA:	8
PVC Casing, LF:	100
Well Grout, LF:	130
Locking J-Plug, EA:	4
8" Vault, EA:	4
Monitoring Well Completion, EA:	4
Monitoring Well Development, HR:	4
IDW Handling, HR:	1
Decontamination, HR:	1
Standby Time, HR:	4
55-gallon Open Head Steel Drum, EA:	2
Geologist, HR:	7
Pickup Truck Rental, DY:	1
Fuel for Rental Truck, DY:	1

Description: Quantities for installation of injection wells.

Biobarrier Injection Well

Borehole diameter, IN:	6	
Well casing inner diameter, IN:	2	
Well casing outer diameter, IN:	2.375	
Drilling – 6-inch nominal borehole, VLF:	35	
Screen - 2", VLF:	20	
Steel Casing, VLF:	15	
Steel Unit Weight. LBS/FT:	3.66	
Steel Casing, LBS:	55	*Rounded up to nearest whole number*
Estimated time to install monitoring well, HR:	4	
Monitoring Well Completion, EA:	1	
Well Development, HR:	2	
IDW Handling, HR:	0.5	
Decontamination, HR:	0.5	
Standby Time, HR:	1	
55-gallon drum, EA:	1	
Geologist, HR:	4	
Pickup Truck Rental, DY:	0.5	
Fuel for Rental Truck, DY:	0.5	
Filter Pack, 2" Screen, VLF:	22	*Assumes 2 feet more than screen*
Annular Seal, 6" Well, Portland Cement Grout, VLF:	13	
Bentonite Seal, 6" Well, EA:	1	

Number of Biobarrier Injection Wells

Spacing of injection points, FT:	40
Number of rows, EA:	2
Length of Line 1A, FT:	750
Number of injection points for Line 1A, EA:	37
Length of Line 1B, FT:	200
Number of injection points for Line 1B, EA:	9
Length of Line 2, FT:	1200
Number of injection points for Line 2, EA:	59
Length of Line 3, FT:	1000
Number of injection points for Line 3, EA:	49
Length of Line 4, FT:	600
Number of injection points for Line 4, EA:	29
Total number of wells, EA:	154

Description: Quantities for biobarrier injection.

Biobarrier Pilot-Test Injection		
Gallons of EOS injected per biobarrier well, GAL:	122	
Gallons of solution injected per biobarrier well, GAL:	4275	
Estimated number of frac tanks needed, EA:	1	
Estimated injection flow rate, GPM:	10	
Assumed number of wells manifolded, EA:	1	
Estimated workday length, HR/DY:	10	
Estimated workweek length, DY/WK:	5	
Number of technicians per event, EA:	2	
Estimated project management time per hour, HR/HR:	0.15	
Estimated Contracting/Procurement time, HR/HR:	0.5	
Number of biobarrier wells for pilot-test, EA:	4	
Estimated volume of EOS for pilot-test, GAL:	488	
Estimated volume of solution for pilot-test, GAL:	17100	
Estimated volume of water for pilot-test, KGAL:	17	*Rounded up to the nearest whole number*
Estimated injection time for pilot-test, HR:	30	*Rounded up to the nearest 5 hour interval*
Estimated injection time for pilot-test, DY:	3	*Rounded up to the nearest whole number*
Estimated frac tank rental time for pilot-test, WK:	1	*Rounded up to the nearest whole number*
General Operator/Technician, HR:	60	
Project Manager, HR:	5	*Rounded up to the nearest whole number*
Contracting/Procurement Specialist, HR:	15	*Rounded up to the nearest whole number*
Geologist, HR:	30	
Pickup Truck Rental, WK:	1	*Rounded up to the nearest whole number*
Fuel for Rental Truck, DY:	3	

Description: Quantities for biobarrier injection.

Biobarrier Injection		
Gallons of EOS injected per biobarrier well, GAL:	122	
Gallons of solution injected per biobarrier well, GAL:	4275	
Estimated number of frac tanks needed, EA:	2	
Estimated injection flow rate, GPM:	20	
Assumed number of wells manifolded, EA:	2	
Estimated workday length, HR/DY:	10	
Estimated workweek length, DY/WK:	5	
Number of technicians per event, EA:	2	
Estimated project management time per hour, HR/HR:	0.05	
Estimated Contracting/Procurement time, HR/HR:	0.075	
Number of biobarrier wells for Line 1A, EA:	37	
Estimated volume of EOS for Line 1A, GAL:	4514	
Estimated volume of solution for Line 1A, GAL:	158175	
Estimated volume of water for Line 1A, KGAL:	154	*Rounded up to the nearest whole number*
Estimated injection time for Line 1A, HR:	70	*Rounded up to the nearest 5 hour interval*
Estimated injection time for Line 1A, DY:	7	*Rounded up to the nearest whole number*
Estimated frac tank rental time for Line 1A, WK:	4	*Rounded up to the nearest whole number*
General Operator/Technician, HR:	140	
Project Manager, HR:	4	*Rounded up to the nearest whole number*
Contracting/Procurement Specialist, HR:	6	*Rounded up to the nearest whole number*
Geologist, HR:	70	
Pickup Truck Rental, WK:	2	*Rounded up to the nearest whole number*
Fuel for Rental Truck, DY:	7	
Number of biobarrier wells for Line 1B, EA:	9	
Estimated volume of EOS for Line 1B, GAL:	1098	
Estimated volume of solution for Line 1B, GAL:	38475	
Estimated volume of water for Line 1B, KGAL:	38	*Rounded up to the nearest whole number*
Estimated injection time for Line 1B, HR:	20	*Rounded up to the nearest 5 hour interval*
Estimated injection time for Line 1B, DY:	2	*Rounded up to the nearest whole number*
Estimated frac tank rental time for Line 1B, WK:	2	*Rounded up to the nearest whole number*
General Operator/Technician, HR:	40	
Project Manager, HR:	1	*Rounded up to the nearest whole number*
Contracting/Procurement Specialist, HR:	2	*Rounded up to the nearest whole number*
Geologist, HR:	20	
Pickup Truck Rental, WK:	1	*Rounded up to the nearest whole number*
Fuel for Rental Truck, DY:	2	
Number of biobarrier wells for Line 2, EA:	59	
Estimated volume of EOS for Line 2, GAL:	7198	
Estimated volume of solution for Line 2, GAL:	252225	
Estimated volume of water for Line 2, KGAL:	246	*Rounded up to the nearest whole number*
Estimated injection time for Line 2, HR:	110	*Rounded up to the nearest 5 hour interval*
Estimated injection time for Line 2, DY:	11	*Rounded up to the nearest whole number*
Estimated frac tank rental time for Line 2, WK:	6	*Rounded up to the nearest whole number*
General Operator/Technician, HR:	220	
Project Manager, HR:	6	*Rounded up to the nearest whole number*
Contracting/Procurement Specialist, HR:	9	*Rounded up to the nearest whole number*
Geologist, HR:	110	
Pickup Truck Rental, WK:	3	*Rounded up to the nearest whole number*
Fuel for Rental Truck, DY:	11	

Description: Quantities for biobarrier injection.

Biobarrier Injection (continued)

Number of biobarrier wells for Line 3, EA:	49	
Estimated volume of EOS for Line 3, GAL:	5978	
Estimated volume of solution for Line 3, GAL:	209475	
Estimated volume of water for Line 3, KGAL:	204	*Rounded up to the nearest whole number*
Estimated injection time for Line 3, HR:	90	*Rounded up to the nearest 5 hour interval*
Estimated injection time for Line 3, DY:	9	*Rounded up to the nearest whole number*
Estimated frac tank rental time for Line 3, WK:	4	*Rounded up to the nearest whole number*
General Operator/Technician, HR:	180	
Project Manager, HR:	5	*Rounded up to the nearest whole number*
Contracting/Procurement Specialist, HR:	7	*Rounded up to the nearest whole number*
Geologist, HR:	90	
Pickup Truck Rental, WK:	2	*Rounded up to the nearest whole number*
Fuel for Rental Truck, DY:	9	
Number of biobarrier wells for Line 4, EA:	29	
Estimated volume of EOS for Line 4, GAL:	3538	
Estimated volume of solution for Line 4, GAL:	123975	
Estimated volume of water for Line 4, KGAL:	121	*Rounded up to the nearest whole number*
Estimated injection time for Line 4, HR:	55	*Rounded up to the nearest 5 hour interval*
Estimated injection time for Line 4, DY:	6	*Rounded up to the nearest whole number*
Estimated frac tank rental time for Line 4, WK:	4	*Rounded up to the nearest whole number*
General Operator/Technician, HR:	110	
Project Manager, HR:	3	*Rounded up to the nearest whole number*
Contracting/Procurement Specialist, HR:	5	*Rounded up to the nearest whole number*
Geologist, HR:	55	
Pickup Truck Rental, WK:	2	*Rounded up to the nearest whole number*
Fuel for Rental Truck, DY:	6	

Description: Quantities for biobarrier bioaugmentation.

Biobarrier Bioaugmentation

Number of biobarrier wells for bioaugmentation, EA:	92	*half of injection wells*
Liters of bioaugmentation solution per well, L:	35	
Estimated number of wells per well, EA/DY:	5	
Estimated workday length, HR/DY:	10	
Estimated workweek length, DY/WK:	5	
Number of technicians per event, EA:	2	
Total bioaugmentation solution, L:	3220	
Number of days for bioaugmentation, DY:	19	*Rounded up to the nearest whole number*
Number of technician hours for bioaugmentation, HR:	380	
Number of weeks for bioaugmentation, WK:	4	*Rounded up to the nearest whole number*
Project Manager, HR:	2	*Rounded up to the nearest whole number*
Contracting/Procurement Specialist, HR:	4	*Rounded up to the nearest whole number*
Number of hours for geologist oversight, HR:	190	
Pickup Truck Rental, WK:	4	*Rounded up to the nearest whole number*
Fuel for Rental Truck, DY:	19	

Description: Quantities for biobarrier injection well abandonment.

Biobarrier Injection Well Abandonment

Average depth of injection well, VLF:	35
Borehole diameter, IN:	6
Well casing inner diameter, IN:	2
Well casing outer diameter, IN:	2.375
Drilling – 6-inch nominal borehole, VLF:	35
Estimated time to abandon well, HR:	2
55-gallon drum, EA:	1
Geologist, HR:	2
Pickup Truck Rental, DY:	0.25
Fuel for Rental Truck, DY:	0.25

Description: Quantities for installation of extraction wells. Well vaults are assumed to be below grade vaults. All well vault pipe materials are assumed to be Schedule 80 PVC.

Extraction Well Installation		
Extraction Well Depth, VLF:	40	
Estimated time to install extraction well, HR:	24	
Extraction Well Quantities		
Borehole diameter, IN:	18	
Well casing inner diameter, IN:	10	
Well casing outer diameter, IN:	10.625	
Drilling – 18-inch nominal borehole, VLF:	40	
Stainless Steel Screen - 10", VLF:	30	
Steel Casing, VLF:	10	
Steel Casing, LBS:	290	*Assumes 29 lbs/foot*
Monitoring Well Completion, EA:	1	
Well Development, HR:	4	
IDW Handling, HR:	2	
Decontamination, HR:	2	
Standby Time, HR:	1	
55-gallon drum, EA:	10	
Geologist, HR:	24	
Pickup Truck Rental, DY:	3	
Fuel for Rental Truck, DY:	3	
Filter Pack, 6" Screen, VLF:	32	*Assumes 2 feet more than screen*
Annular Seal, 6" Well, Portland Cement Grout, VLF:	8	
Bentonite Seal, 6" Well, EA:	1	

Description: Quantities for installation of extraction wells. Well vaults are assumed to be below grade vaults. All well vault pipe materials are assumed to be Schedule 80 PVC.

Extraction Well Vault

Depth of excavation for vault, FT:	6	
Width of excavation for vault, FT:	6	
Length of excavation for vault, FT:	6	
Existing concrete thickness, IN:	12	
Concrete demolition, CY:	2	
Concrete demolition, TN:	4	*Assumes 2 tons per CY*
Saw cut, LF:	28	
Total volume, CF:	216	
Total volume, BCY:	8	*Rounded up to nearest whole number*
Total volume, LCY:	10	*Rounded up to nearest whole number*
Depth of Bedding Material, FT:	1	
Total Volume of Bedding Material Required, BCY:	2	*Rounded up to nearest whole number*
Total Volume of Bedding Material Required, ECY:	3	*Rounded up to nearest whole number*
Well vault, 6'x6'x4', EA:	1	
Well vault door, EA:	1	
Number of Elbow, 90 Deg Required, EA:	4	
Number of Elbow, Tees Required, EA:	1	
Length of 6" PVC piping, LF:	10	
Number of flanged fittings, EA:	8	
Number of check valves, EA:	1	
Number of flow meters, EA:	1	
Number of butterfly valves, EA:	1	
Pipe stands needed, EA:	3	
Concrete to grade, CY:	1	
Finishing, SF:	24	
Field Engineer, HR:	32	
Pickup Truck Rental, DY:	4	
Fuel for Rental Truck, DY:	4	

Description: Quantities for abandonment of extraction wells. Assumes all extraction wells will be abandoned when site is closed.

Extraction Well Abandonment

Extraction Well Depth, VLF:	40
Grout well, VLF:	40
Estimated productivity, VLF/HR:	4
Total time to abandon well, HR:	10
Estimated length of work day, HR:	10
Geologist, HR:	10
Pickup Truck Rental, DY:	1
Fuel for Rental Truck, DY:	1

Description: Quantities for installing influent piping. Assumes all pipe will be directional bored. No open trench installation. All pipe from well vault to treatment plant is assumed to be HDPE. Assumes all connections made in street and would require concrete pavement repair.

Installation of Influent Piping from NIC#1-1 to New Treatment Plant

Estimated distance, LF:	250	
Assumed length per unit of pipe, LF:	20	
Estimated size of pipe for pipe run, IN:	6	
Number of Elbow, 90 Deg Required, EA:	1	
Number of HDPE flange fittings, EA:	1	
Estimated length per directional bore, LF:	500	
Number of boring locations, EA:	**1**	*Rounded up to nearest whole number.*
Assumed depth of boring location, FT:	6	
Assumed width and length of boring location, FT:	6	
Volume for excavation, CF:	**216**	
Volume for excavation, BCY:	**8**	*Rounded up to nearest whole number.*
Volume for excavation, LCY:	**10**	*Rounded up to nearest whole number.*
Volume for backfill, ECY:	**9**	*Rounded up to nearest whole number.*
Concrete pavement, SF:	**36**	
Existing concrete thickness, IN:	12	
Concrete demolition, CY:	2	
Concrete demolition, TN:	4	*Assumes 2 tons per CY*
Saw cut, LF:	24	
Gravel base for pavement repair, IN:	9	
Gravel base for pavement repair, BCY:	1	*Rounded up to nearest whole number.*
Gravel base, LCY:	**2**	*Rounded up to nearest whole number.*
Gravel base, ECY:	**2**	*Rounded up to nearest whole number.*
Concrete replacement, CY:	2	
Reinforcement dowels, EA:	48	*Assumes 6" spacing along perimeter of cut*
Finishing, SF:	36	
Volume of spoils to haul away, LCY:	4	
Volume for backfilling, LCY:	6	
Volume for backfilling, ECY:	5	*Rounded up to nearest whole number.*
Directional boring, LF:	250	
Assumed productivity of directional drilling, LF/DAY:	350	
Number of days for directional drilling, DY:	1	
Length of HDPE pipe needed, LF:	250	
Number of 90 Deg, El, EA:	2	
Number of flange fittings, EA:	1	
Number of HDPE pipe welds, EA:	16	*Assume 20 FT long pipe sections*
Assumed Productivity of Welding Joints, EA/DAY:	30	
Number of Days Required for Welding, DY:	1	
Tracer wire, CLF:	2.5	
Manholes for tracer wire connection, EA:	1	
Field Engineer, HR:	8	
Pickup Truck Rental, DY:	1	
Fuel for Rental Truck, DY:	1	

Description: Quantities for installing effluent piping. Assumes all pipe will be directional bored. No open trench installation. All pipe from treatment plant to discharge location is assumed to be HDPE. Assumes all connections made in street and would require concrete pavement repair.

Installation of Effluent Piping from New Treatment Plant to Storm Sewer

Estimated distance, LF:	250	
Assumed length per unit of pipe, LF:	20	
Estimated size of pipe for pipe run, IN:	6	
Number of Elbow, 90 Deg Required, EA:	1	
Number of HDPE flange fittings, EA:	1	
Estimated length per directional bore, LF:	500	
Number of boring locations, EA:	**1**	*Rounded up to nearest whole number.*
Assumed depth of boring location, FT:	6	
Assumed width and length of boring location, FT:	6	
Volume for excavation, CF:	**216**	
Volume for excavation, BCY:	**8**	*Rounded up to nearest whole number.*
Volume for excavation, LCY:	**10**	*Rounded up to nearest whole number.*
Volume for backfill, ECY:	**9**	*Rounded up to nearest whole number.*
Concrete pavement, SF:	**36**	
Existing concrete thickness, IN:	12	
Concrete demolition, CY:	2	
Concrete demolition, TN:	4	*Assumes 2 tons per CY*
Saw cut, LF:	24	
Gravel base for pavement repair, IN:	9	
Gravel base for pavement repair, BCY:	1	*Rounded up to nearest whole number.*
Gravel base, LCY:	**2**	*Rounded up to nearest whole number.*
Gravel base, ECY:	**2**	*Rounded up to nearest whole number.*
Concrete replacement, CY:	2	
Reinforcement dowels, EA:	48	*Assumes 6" spacing along perimeter of cut*
Finishing, SF:	36	
Volume of spoils to haul away, LCY:	4	
Volume for backfilling, LCY:	6	
Volume for backfilling, ECY:	5	*Rounded up to nearest whole number.*
Directional boring, LF:	250	
Assumed productivity of directional drilling, LF/DAY:	350	
Number of days for directional drilling, DY:	1	
Length of HDPE pipe needed, LF:	250	
Number of 90 Deg, El, EA:	0	
Number of tees, EA:	0	
Number of flange fittings, EA:	1	
Number of HDPE pipe welds, EA:	14	*Assume 20 FT long pipe sections*
Assumed Productivity of Welding Joints, EA/DAY:	30	
Number of Days Required for Welding, DY:	1	
Tracer wire, CLF:	2.5	
Manholes for tracer wire connection, EA:	1	
Field Engineer, HR:	8	
Pickup Truck Rental, DY:	1	
Fuel for Rental Truck, DY:	1	

Description: Quantities for Pre-Engineered Building

Pre-Engineered Building, Equipment, & Startup - Single Well Treatment System

Pre-Engineered Building		
Dimension of Pre-Engineered Building, FT:	50	*Length of the building*
Dimension of Pre-Engineered Building, FT:	25	*Width of the building*
Heigh of Pre-Engineered Building, FT:	15	
Total Area of the Proposed Pre-Engineered Building, SF:	1250	
Exterior wall square footage, SF:	2250	
Facility Control System		
Total Cost for Fabrication and Const. of Pre-Eng Buld., $:	8,688	*='CW-45'!R19C13*
50% of Fabrication Cost, $:	4,344	
Groundwater Treatment Plant - Equipment		
Shallow tray air stripper, EA:	1	*Assume max flow rate of 400 gpm*
Equalization tank, EA:	1	*Assume min 10 min. detention - 4000 gallons*
Transfer pump, EA:	1	*Assume 400 gpm with VFD*
Pipe, plastic, PVC, 8" diameter, SCH 80, LF:	250	
El, 90 Deg., plastic, PVC, socket joint, 8", SCH 80, EA:	13	*Assume every 20 LF*
Tee, plastic, PVC, socket joint, 8", SCH 80, EA:	5	*Assume every 50 LF*
Flange, plastic, PVC, socket joint, 8", SCH 80, EA:	20	
Valves, iron body, gate, flanged, 125 lb., 8", EA:	5	*Assume every 50 LF*
Valves, iron body, swing check, flanged, 125 lb., 8", EA:	5	
Venturi flow, measuring device, 8", EA:	3	
Concrete Pads for Treatment Equipment, SF:	438	*Assume 35% of building floor area*
Heat for Equipment Building, SF:	1250	
Groundwater Treatment Plant Startup		
Labor Cost for Startup Technician, HR:	140	*10 hour days*
Labor Cost for Engineer, HR:	40	*2 days, 8 hour days*
Truck Rental, DY:	16	
Fuel for Rental Truck, DY:	16	
Number of days for startup testing, DY:	14	
Number of weeks for startup testing, WK:	2	
Number of sample points, EA:	3	*Each extraction well, influent and effluent of plant*
Sample frequency, EA/DY:	1	
VOCs, EPA Method SW-846 8260, EA:	50	*Includes QC samples*
Metals, EPA Method 6010, Field Filtered, EA:	0	*Includes QC samples*
Water Quality Meter and Flow Through Cell, WK:	2	*Rounded up to nearest week*
Photoionization Detector (PID), WK:	2	*Rounded up to nearest week*
Water Level Meter, WK:	2	*Rounded up to nearest week*
Turbidimeter, WK:	2	*Rounded up to nearest week*
Shipping Rental Equipment, EA:	**2**	
Miscellaneous Sampling Equipment, LS:	**1**	
Project Manager, HR:	5	*5 minutes per sample, rounded up to nearest hour*
Contracting/Procurement Specialist, HR:	9	*10 minutes per sample, rounded up to nearest hour*

Description: Determination of electrical consumption for an extraction well.

Electrical Consumption by Well

Energy equivalent, HP-HR to kW-HR:	0.746	
Assumed pump efficiency, %:	50%	
Assumed HP of extraction well pump, HP:	5	
Number of hours per year, HR:	8760	
Number of HP-HR:	43800	
Equivalent electrical consumption, kW-HR:	65400	*Assumes motor efficiency, rounded up to nearest hundred*

Description: Determination of items related to operation and maintenance of the new groundwater treatment plant. Includes a an estimate of electrical consumption, and O&M technician time.

Treatment Plant Operation and Maintenance

Energy equivalent, HP-HR to kW-HR:	0.746	
Assumed pump efficiency, %:	50%	
Assumed HP of transfer pump, HP:	5	
Assumed HP of air stripper blower, HP:	5	
Number of hours per year, HR:	8760	
Number of HP-HR:	87600	
Equivalent electrical consumption, kW-HR:	130700	*Assumes motor efficiency, rounded up to nearest hundred*
Est. mo. electrical consumption for lights, etc., kW-HR:	2000	
Annual electrical consumption, kW-HR:	24000	
Est. annual total electrical consumption, kW-HR:	154700	
Assumed time per week of O&M tech, HR/WK:	8	
Number of weeks per year, WK/YR:	52	
Annual O&M tech hours, HR:	416	

Description: Quantities for minor and major replacement of equipment for treatment system.

Groundwater Treatment Plant - Equipment Replacement

Minor Equipment Replacement

Valves, iron body, gate, flanged, 125 lb., 8", EA:	5	
Valves, iron body, swing check, flanged, 125 lb., 8", EA:	5	
Venturi flow, measuring device, 8", EA:	3	

Major Equipment Replacement

Shallow tray air stripper, EA:	1	*Assume max flow rate of 400 gpm*
Equalization tank, EA:	1	*Assume min 10 min. detention - 4000 gallons*
Transfer pump, EA:	1	*Assume 400 gpm with VFD*
VFD, enclosed, 5 HP motor size, NEMA 1, EA:	2	
GAC adsorption, offgas vessels, EA:	0	

Appendix E2
Detailed Cost Analysis of Retained Alternatives for GWU3

COST SUMMARY INDEX

Sheet Name	Title	Description
CS-S-GWU3	Alternative Cost Summary	Summary of GWU3 Alternative Costs
CS-GWU3-1	Cost Estimate Summary	Alternative GWU3-1 No Action
PV-GWU3-1	Present Value Analysis	Alternative GWU3-1 No Action
CS-GWU3-2	Cost Estimate Summary	Alternative GWU3-2 Groundwater Extraction (Containment Only), Discharge to Gilbert-Mosley Treatment
PV-GWU3-2	Present Value Analysis	Alternative GWU3-2 Groundwater Extraction (Containment Only), Discharge to Gilbert-Mosley Treatment
CS-GWU3-3	Cost Estimate Summary	Alternative GWU3-3 Groundwater Extraction (Containment Only), Treatment and Discharge to Chisholm
PV-GWU3-3	Present Value Analysis	Alternative GWU3-3 Groundwater Extraction (Containment Only), Treatment and Discharge to Chisholm
CS-GWU3-4	Cost Estimate Summary	Alternative GWU3-4 Groundwater Extraction (Containment and Interior Extraction)
PV-GWU3-4	Present Value Analysis	Alternative GWU3-4 Groundwater Extraction (Containment and Interior Extraction)
CS-GWU3-4	Cost Estimate Summary	Alternative GWU3-5 Groundwater Extraction (Containment and Interior Extraction)
PV-GWU3-4	Present Value Analysis	Alternative GWU3-5 Groundwater Extraction (Containment and Interior Extraction)
PV-AERFT	Annual Escalation Rate	Summary of Annual Escalation Rate Factors Table
PV-ADRFT	Annual Discount Rate Factors	Summary of Annual Discount Rate Factors Table

TABLE CS-S-GWU3

ALTERNATIVE COST SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Alternative	Total Capital Cost	Total Annual O&M Cost	Total Periodic Cost	Present Value Cost
GWU3-1	$122,000	$2,674,000	$889,000	$2,192,000
GWU3-2	$1,557,000	$14,620,000	$2,216,000	$11,304,000
GWU3-3	$1,872,000	$16,776,000	$2,422,000	$12,784,000
GWU3-4	$2,631,000	$21,074,000	$3,364,000	$16,422,000
GWU3-5	$3,218,000	$21,585,000	$3,606,000	$25,776,000

Notes:

1 - Capital costs, annual costs, and periodic costs are presented on tables CS-GWU3-1 through CS-GWU3-5
2 - Estimated remedial timeframes and associated present value analysis for each remedial alternative are provided on tables PV-GWU3-1 through PV-GWU3-5.
3 - Costs presented have an expected accuracy range for feasibility study estimates (-30% to +50% of the actual cost of the alternative).

TABLE CS-GWU3-1

ALTERNATIVE GWU3-1
NO ACTION

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: The No Action alternative (Alternative GWU3-1) would include ongoing monitoring to determine the extent of the groundwater plume. There would be no change in groundwater contaminant concentrations because no treatment, containment or removal of contaminated groundwater is included in this alternative. The No Action alternative is carried through the FS process as required by the NCP to provide a baseline set of conditions can be established against which other remedial actions may be compared.

CAPITAL COSTS: (Assumed to be Incurred During Year 1)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Institutional Controls	CW-1-GWU3	1	LS	$20,014	$20,014	
Miscellaneous Requirements for Sampling	CW-7-GWU3	1	LS	$50,143	$50,143	
				SUBTOTAL	$70,157	
Contingency (Scope and Bid)		20%			$14,031	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$84,188	
Project Management		10%			$8,419	Percentage from Exhibit 5-8 was used.
Remedial Design		0%			$0	No remedial design required under this alternative.
Construction Management		0%			$0	No construction management required under this alternative.
Technical Support		15%			$12,628	Middle value of the recommended range was used.
				TOTAL	$105,235	
				TOTAL CAPITAL COST	**$105,000**	Total capital cost is rounded to the nearest $1,000.

FUTURE CAPITAL COSTS: (Assumed to be Incurred During Year 70)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Monitoring Well Abandonment - No Action Alternative	CW-42-GWU3	1	LS	$9,824	$9,824	
				SUBTOTAL	$9,824	
Contingency (Scope and Bid)		20%			$1,965	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$11,789	
Project Management		10%			$1,179	Percentage from Exhibit 5-8 was used.
Construction Management		15%			$1,768	No construction management required under this alternative.
Technical Support		15%			$1,768	Middle value of the recommended range was used.
				TOTAL	$16,504	
				TOTAL CAPITAL COST	**$17,000**	Total future capital cost is rounded to the nearest $1,000.

TABLE CS-GWU3-1

ALTERNATIVE GWU3-1

NO ACTION

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: The No Action alternative (Alternative GWU3-1) would include ongoing monitoring to determine the extent of the groundwater plume. There would be no change in groundwater contaminant concentrations because no treatment, containment or removal of contaminated groundwater is included in this alternative. The No Action alternative is carried through the FS process as required by the NCP to provide a baseline set of conditions can be established against which other remedial actions may be compared.

QUARTERLY MONITORING ANNUAL COSTS: (Assumed to be Incurred During Year 1 through 2

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Groundwater Sampling Event - No Action Alternative	CW-5-GWU3	4	EA	$7,975	$31,900	
Groundwater Monitoring Event Report Preparation - No Action Alternative	CW-3-GWU3	4	EA	$13,165	$52,660	
				SUBTOTAL	$84,560	
Contingency (Scope and Bid)		20%			$16,912	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$101,472	
Project Management		8%			$8,118	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$15,221	Middle value of the recommended range was used.
				TOTAL	$124,811	
	TOTAL QUARTERLY MONITORING COSTS (Years 1 through 2)				**$125,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

SEMIANNUAL MONITORING ANNUAL COSTS: (Assumed to be Incurred During Year 3 through 10

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Groundwater Sampling Event - No Action Alternative	CW-5-GWU3	2	EA	$7,975	$15,950	
Groundwater Monitoring Event Report Preparation - No Action Alternative	CW-3-GWU3	2	EA	$13,165	$26,330	
				SUBTOTAL	$42,280	
Contingency (Scope and Bid)		20%			$8,456	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$50,736	
Project Management		10%			$5,074	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$7,610	Middle value of the recommended range was used.
				TOTAL	$63,420	
	TOTAL SEMIANNUAL MONITORING COST (Year 3 through 10)				**$63,000**	Total semiannual monitoring cost is rounded to the nearest $1,000.

ANNUAL MONITORING ANNUAL COSTS: (Assumed to be Incurred During Year 11 through 70

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Groundwater Sampling Event - No Action Alternative	CW-5-GWU3	1	EA	$7,975	$7,975	
Groundwater Monitoring Event Report Preparation - No Action Alternative	CW-3-GWU3	1	EA	$13,165	$13,165	
				SUBTOTAL	$21,140	
Contingency (Scope and Bid)		20%			$4,228	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$25,368	
Project Management		10%			$2,537	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$3,805	Middle value of the recommended range was used.
				TOTAL	$31,710	
	TOTAL ANNUAL MONITORING COST (Year 11 through70)				**$32,000**	Total annual monitoring cost is rounded to the nearest $1,000.

TABLE CS-GWU3-1

ALTERNATIVE GWU3-1

NO ACTION

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: The No Action alternative (Alternative GWU3-1) would include ongoing monitoring to determine the extent of the groundwater plume. There would be no change in groundwater contaminant concentrations because no treatment, containment or removal of contaminated groundwater is included in this alternative. The No Action alternative is carried through the FS process as required by the NCP to provide a baseline set of conditions can be established against which other remedial actions may be compared.

MONITORING WELL MAINTENANCE PERIODIC COSTS (Years 10, 20, 30, 40, 50, and 60)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Monitoring Well Maintenance - No Action Alternative	CW-40-GWU3	1	LS	$7,515	$7,515	Assumes well head repairs and development required.
				SUBTOTAL	$7,515	
Contingency (Scope and Bid)		20%			$1,503	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$9,018	
Project Management		10%			$902	The high end of the recommended range was used.
Technical Support		15%			$1,353	Middle value of the recommended range was used.
				TOTAL	$11,273	
	TOTAL MONITORING WELL MAINTENANCE PERIODIC COST				**$11,000**	Total periodic monitoring well maintenance cost is rounded to the nearest $1,000.

FIVE-YEAR SITE REVIEW PERIODIC COSTS (Years 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, and 70)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Five-Year Site Review	CW-2-GWU3	1	LS	$38,547	$38,547	
				SUBTOTAL	$38,547	
Contingency (Scope and Bid)		20%			$7,709	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$46,256	
Project Management		10%			$4,626	The high end of the recommended range was used.
Technical Support		15%			$6,938	Middle value of the recommended range was used.
				TOTAL	$57,820	
	TOTAL FIVE-YEAR SITE REVIEW PERIODIC COST				**$58,000**	Total Five-Year Review periodic cost is rounded to the nearest $1,000.

Notes:
Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.

Abbreviations:

EA	Each
QTY	Quantity
LS	Lump Sum

TABLE PV-GWU3-1

ALTERNATIVE GWU3-1
NO ACTION

PRESENT VALUE ANALYSIS

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Escalation Rate:	3%
Discount Rate:	5%

		O&M COSTS		PERIODIC COSTS								
Year[1]	Capital Costs[2]	O&M Costs[2]	Monitoring Costs[2]	Monitoring Well Maintenance[2,3]	Minor Equipment Replacement Costs[2,4]	Major Equipment Replacement Costs[2,5]	Five-year Review Costs[2]	Total Annual Expenditure[6]	Escalation Factor (3%)	Escalated Cost[7]	Discount Factor (5%)	Present Value[8,9]
0	$105,000	$0	$0	$0	$0	$0	$0	$105,000	1.0000	$105,000	1.0000	$105,000
1	$0	$0	$125,000	$0	$0	$0	$0	$125,000	1.0300	$128,750	0.9524	$122,622
2	$0	$0	$125,000	$0	$0	$0	$0	$125,000	1.0609	$132,613	0.9070	$120,280
3	$0	$0	$63,000	$0	$0	$0	$0	$63,000	1.0927	$68,840	0.8638	$59,464
4	$0	$0	$63,000	$0	$0	$0	$0	$63,000	1.1255	$70,907	0.8227	$58,335
5	$0	$0	$63,000	$0	$0	$0	$58,000	$121,000	1.1593	$140,275	0.7835	$109,906
6	$0	$0	$63,000	$0	$0	$0	$0	$63,000	1.1941	$75,228	0.7462	$56,135
7	$0	$0	$63,000	$0	$0	$0	$0	$63,000	1.2299	$77,484	0.7107	$55,068
8	$0	$0	$63,000	$0	$0	$0	$0	$63,000	1.2668	$79,808	0.6768	$54,014
9	$0	$0	$63,000	$0	$0	$0	$0	$63,000	1.3048	$82,202	0.6446	$52,988
10	$0	$0	$63,000	$11,000	$0	$0	$58,000	$132,000	1.3439	$177,395	0.6139	$108,903
11	$0	$0	$32,000	$0	$0	$0	$0	$32,000	1.3842	$44,294	0.5847	$25,899
12	$0	$0	$32,000	$0	$0	$0	$0	$32,000	1.4258	$45,626	0.5568	$25,404
13	$0	$0	$32,000	$0	$0	$0	$0	$32,000	1.4685	$46,992	0.5303	$24,920
14	$0	$0	$32,000	$0	$0	$0	$0	$32,000	1.5126	$48,403	0.5051	$24,448
15	$0	$0	$32,000	$0	$0	$0	$58,000	$90,000	1.5580	$140,220	0.4810	$67,446
16	$0	$0	$32,000	$0	$0	$0	$0	$32,000	1.6047	$51,350	0.4581	$23,524
17	$0	$0	$32,000	$0	$0	$0	$0	$32,000	1.6528	$52,890	0.4363	$23,076
18	$0	$0	$32,000	$0	$0	$0	$0	$32,000	1.7024	$54,477	0.4155	$22,635
19	$0	$0	$32,000	$0	$0	$0	$0	$32,000	1.7535	$56,112	0.3957	$22,204
20	$0	$0	$32,000	$11,000	$0	$0	$58,000	$101,000	1.8061	$182,416	0.3769	$68,753
21	$0	$0	$32,000	$0	$0	$0	$0	$32,000	1.8603	$59,530	0.3589	$21,365
22	$0	$0	$32,000	$0	$0	$0	$0	$32,000	1.9161	$61,315	0.3418	$20,958
23	$0	$0	$32,000	$0	$0	$0	$0	$32,000	1.9736	$63,155	0.3256	$20,563
24	$0	$0	$32,000	$0	$0	$0	$0	$32,000	2.0328	$65,050	0.3101	$20,172
25	$0	$0	$32,000	$0	$0	$0	$58,000	$90,000	2.0938	$188,442	0.2953	$55,647
26	$0	$0	$32,000	$0	$0	$0	$0	$32,000	2.1566	$69,011	0.2812	$19,406
27	$0	$0	$32,000	$0	$0	$0	$0	$32,000	2.2213	$71,082	0.2678	$19,036
28	$0	$0	$32,000	$0	$0	$0	$0	$32,000	2.2879	$73,213	0.2551	$18,677
29	$0	$0	$32,000	$0	$0	$0	$0	$32,000	2.3566	$75,411	0.2429	$18,317
30	$0	$0	$32,000	$11,000	$0	$0	$58,000	$101,000	2.4273	$245,157	0.2314	$56,729
31	$0	$0	$32,000	$0	$0	$0	$0	$32,000	2.5001	$80,003	0.2204	$17,633
32	$0	$0	$32,000	$0	$0	$0	$0	$32,000	2.5751	$82,403	0.2099	$17,296
33	$0	$0	$32,000	$0	$0	$0	$0	$32,000	2.6523	$84,874	0.1999	$16,966
34	$0	$0	$32,000	$0	$0	$0	$0	$32,000	2.7319	$87,421	0.1904	$16,645
35	$0	$0	$32,000	$0	$0	$0	$58,000	$90,000	2.8139	$253,251	0.1813	$45,914
36	$0	$0	$32,000	$0	$0	$0	$0	$32,000	2.8983	$92,746	0.1727	$16,017
37	$0	$0	$32,000	$0	$0	$0	$0	$32,000	2.9852	$95,526	0.1644	$15,705
38	$0	$0	$32,000	$0	$0	$0	$0	$32,000	3.0748	$98,394	0.1566	$15,408
39	$0	$0	$32,000	$0	$0	$0	$0	$32,000	3.1670	$101,344	0.1491	$15,110
40	$0	$0	$32,000	$11,000	$0	$0	$58,000	$101,000	3.2620	$329,462	0.1420	$46,784

TABLE PV-GWU3-1

ALTERNATIVE GWU3-1
NO ACTION

PRESENT VALUE ANALYSIS

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Escalation Rate: 3%
Discount Rate: 5%

		O&M COSTS		PERIODIC COSTS								
Year[1]	Capital Costs[2]	O&M Costs[2]	Monitoring Costs[2]	Monitoring Well Maintenance[2,3]	Minor Equipment Replacement Costs[2,4]	Major Equipment Replacement Costs[2,5]	Five-year Review Costs[2]	Total Annual Expenditure[6]	Escalation Factor (3%)	Escalated Cost[7]	Discount Factor (5%)	Present Value[8,9]
41	$0	$0	$32,000	$0	$0	$0	$0	$32,000	3.3599	$107,517	0.1353	$14,547
42	$0	$0	$32,000	$0	$0	$0	$0	$32,000	3.4607	$110,742	0.1288	$14,264
43	$0	$0	$32,000	$0	$0	$0	$0	$32,000	3.5645	$114,064	0.1227	$13,996
44	$0	$0	$32,000	$0	$0	$0	$0	$32,000	3.6715	$117,488	0.1169	$13,734
45	$0	$0	$32,000	$0	$0	$0	$58,000	$90,000	3.7816	$340,344	0.1113	$37,880
46	$0	$0	$32,000	$0	$0	$0	$0	$32,000	3.8950	$124,640	0.1060	$13,212
47	$0	$0	$32,000	$0	$0	$0	$0	$32,000	4.0119	$128,381	0.1009	$12,954
48	$0	$0	$32,000	$0	$0	$0	$0	$32,000	4.1323	$132,234	0.0961	$12,708
49	$0	$0	$32,000	$0	$0	$0	$0	$32,000	4.2562	$136,198	0.0916	$12,476
50	$0	$0	$32,000	$11,000	$0	$0	$58,000	$101,000	4.3839	$442,774	0.0872	$38,610
51	$0	$0	$32,000	$0	$0	$0	$0	$32,000	4.5154	$144,493	0.0831	$12,007
52	$0	$0	$32,000	$0	$0	$0	$0	$32,000	4.6509	$148,829	0.0791	$11,772
53	$0	$0	$32,000	$0	$0	$0	$0	$32,000	4.7904	$153,293	0.0753	$11,543
54	$0	$0	$32,000	$0	$0	$0	$0	$32,000	4.9341	$157,891	0.0717	$11,321
55	$0	$0	$32,000	$0	$0	$0	$58,000	$90,000	5.0821	$457,389	0.0683	$31,240
56	$0	$0	$32,000	$0	$0	$0	$0	$32,000	5.2346	$167,507	0.0651	$10,905
57	$0	$0	$32,000	$0	$0	$0	$0	$32,000	5.3917	$172,534	0.0620	$10,697
58	$0	$0	$32,000	$0	$0	$0	$0	$32,000	5.5534	$177,709	0.0590	$10,485
59	$0	$0	$32,000	$0	$0	$0	$0	$32,000	5.7200	$183,040	0.0562	$10,287
60	$0	$0	$32,000	$11,000	$0	$0	$58,000	$101,000	5.8916	$595,052	0.0535	$31,835
61	$0	$0	$32,000	$0	$0	$0	$0	$32,000	6.0684	$194,189	0.0510	$9,904
62	$0	$0	$32,000	$0	$0	$0	$0	$32,000	6.2504	$200,013	0.0486	$9,721
63	$0	$0	$32,000	$0	$0	$0	$0	$32,000	6.4379	$206,013	0.0462	$9,518
64	$0	$0	$32,000	$0	$0	$0	$0	$32,000	6.6311	$212,195	0.0440	$9,337
65	$0	$0	$32,000	$0	$0	$0	$58,000	$90,000	6.8300	$614,700	0.0419	$25,756
66	$0	$0	$32,000	$0	$0	$0	$0	$32,000	7.0349	$225,117	0.0399	$8,982
67	$0	$0	$32,000	$0	$0	$0	$0	$32,000	7.2459	$231,869	0.0380	$8,811
68	$0	$0	$32,000	$0	$0	$0	$0	$32,000	7.4633	$238,826	0.0362	$8,645
69	$0	$0	$32,000	$0	$0	$0	$0	$32,000	7.6872	$245,990	0.0345	$8,487
70	$17,000	$0	$32,000	$11,000	$0	$0	$58,000	$118,000	7.9178	$934,300	0.0329	$30,738
TOTALS:	**$122,000**	**$0**	**$2,674,000**	**$77,000**	**$0**	**$0**	**$812,000**	**$3,685,000**		**$11,553,401**		$2,191,744
TOTAL PRESENT VALUE OF ALTERNATIVE GWU3-1												**$2,192,000**

Notes:
1 - Duration is assumed to be 70 years for present value analysis. Estimated remedial timeframes are discussed within the FS report.
2 - Capital costs, for purposes of this analysis, are assumed to be distributed as indicated on Table CS-GWU3-1.
3 - Includes replacement of monitoring well vault and development.
4 - Includes replacement of extraction well pumps, some valves and system controls.
5 - Includes major building maintenance (painting, etc.), replacement of building HVAC system, replacement of building electrical system, and replacement treatment system components.
6 - Total annual expenditure is the total cost per year with no escalation or discounting.
7 - Escalation cost is the total cost per year including an escalation rate for that year. See Table PV-AERFT for details
8 - Present value is the total cost per year including a discount factor for that year. See Table PV-ADRFT for details.
9 - Total present value is rounded to the nearest $1,000. Depreciation is excluded from the present value cost.

TABLE CS-GWU3-2

ALTERNATIVE GWU3-2

GROUNDWATER EXTRACTION (CONTAINMENT ONLY), DISCHARGE TO GILBERT-MOSLEY TREATMENT PLANT

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Under Alternative GWU3-2, extraction wells would be installed on the leading edge of the groundwater plume. Extracted groundwater would be discharged to the Gilbert-Mosley treatment plant, connecting to the existing 8" pipe. Groundwater monitoring, both upgradient and downgradient of the extraction wells, would be performed as part of this alternative to demonstrate the effectiveness of the containment system. Gilbert-Mosley treatment plant operation and maintenance costs proportional to the expected flow rate from GWU3 are included under this alternative.

CAPITAL COSTS: (Assumed to be Incurred During Year 1)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Institutional Controls	CW-1-GWU3	1	LS	$20,014	$20,014	
Miscellaneous Requirements for Sampling	CW-7-GWU3	1	LS	$50,143	$50,143	
Monitoring Well Installation	CW-9-GWU3	1	LS	$7,627	$7,627	Additional monitoring well clusters to increase monitoring coverage.
Miscellaneous Requirements for Construction	CW-8-GWU3	1	LS	$91,725	$91,725	
Mobilization and Demobilization of Drill Rig	CW-10-GWU3	1	LS	$10,610	$10,610	
Extraction Well Installation	CW-11-GWU3	2	EA	$48,460	$96,920	
Extraction Well Vault	CW-12-GWU3	2	EA	$49,416	$98,832	
Mobilization or Demobilization of Construction Equipment	CW-13-GWU3	2	EA	$2,086	$4,172	
Influent Piping - NIC#3-1 to Santa Fe	CW-14-GWU3	1,900	LF	$27.41	$52,079	
Influent Piping - NIC#3-2 to Santa Fe	CW-15-GWU3	2,100	LF	$27.74	$58,254	
Influent Piping - NIC#3-1/NIC#3-2 to Gilbert-Mosley GWTP	CW-17-GWU3	9,350	LF	$26.67	$249,365	
Pipe Jacking under Railroad Tracks	CW-24-GWU3	2	EA	$53,675	$107,350	
				SUBTOTAL	$847,091	
Contingency (Scope and Bid)		20%			$169,418	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$1,016,509	
Project Management		6%			$60,991	Percentage from Exhibit 5-8 was used.
Remedial Design		12%			$121,981	Percentage from Exhibit 5-8 was used.
Construction Management		8%			$81,321	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$152,476	Middle value of the recommended range was used.
				TOTAL	$1,433,278	
				TOTAL CAPITAL COST	**$1,433,000**	Total capital cost is rounded to the nearest $1,000.

TABLE CS-GWU3-2

ALTERNATIVE GWU3-2

GROUNDWATER EXTRACTION (CONTAINMENT ONLY), DISCHARGE TO GILBERT-MOSLEY TREATMENT PLANT

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Under Alternative GWU3-2, extraction wells would be installed on the leading edge of the groundwater plume. Extracted groundwater would be discharged to the Gilbert-Mosley treatment plant, connecting to the existing 8" pipe. Groundwater monitoring, both upgradient and downgradient of the extraction wells, would be performed as part of this alternative to demonstrate the effectiveness of the containment system. Gilbert-Mosley treatment plant operation and maintenance costs proportional to the expected flow rate from GWU3 are included under this alternative.

FUTURE CAPITAL COSTS: (Assumed to be Incurred During Year 50)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Mobilization and Demobilization of Drill Rig	CW-10-GWU3	1	LS	$10,610	$10,610	Decommissioning of NIC#3-1
Extraction Well Abandonment	CW-44-GWU3	1	EA	$9,203	$9,203	NIC#3-1
				SUBTOTAL	$19,813	
Contingency (Scope and Bid)		20%			$3,963	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$23,776	
Project Management		10%			$2,378	Percentage from Exhibit 5-8 was used.
Construction Management		15%			$3,566	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$3,566	Middle value of the recommended range was used.
				TOTAL	$33,286	
				TOTAL FUTURE CAPITAL COST	**$33,000**	Total future capital cost is rounded to the nearest $1,000.

FUTURE CAPITAL COSTS: (Assumed to be Incurred During Year70)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Mobilization and Demobilization of Drill Rig	CW-10-GWU3	1	LS	$10,610	$10,610	Decommissioning of NIC#3-2
Extraction Well Abandonment	CW-44-GWU3	1	EA	$9,203	$9,203	NIC#3-2
Monitoring Well Abandonment	CW-43-GWU3	1	LS	$34,450	$34,450	
				SUBTOTAL	$54,263	
Contingency (Scope and Bid)		20%			$10,853	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$65,116	
Project Management		10%			$6,512	Percentage from Exhibit 5-8 was used.
Construction Management		15%			$9,767	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$9,767	Middle value of the recommended range was used.
				TOTAL	$91,162	
				TOTAL FUTURE CAPITAL COST	**$91,000**	Total future capital cost is rounded to the nearest $1,000.

TABLE CS-GWU3-2

ALTERNATIVE GWU3-2

GROUNDWATER EXTRACTION (CONTAINMENT ONLY), DISCHARGE TO GILBERT-MOSLEY TREATMENT PLANT

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Under Alternative GWU3-2, extraction wells would be installed on the leading edge of the groundwater plume. Extracted groundwater would be discharged to the Gilbert-Mosley treatment plant, connecting to the existing 8" pipe. Groundwater monitoring, both upgradient and downgradient of the extraction wells, would be performed as part of this alternative to demonstrate the effectiveness of the containment system. Gilbert-Mosley treatment plant operation and maintenance costs proportional to the expected flow rate from GWU3 are included under this alternative.

QUARTERLY MONITORING ANNUAL COSTS: (Assumed to be Incurred During Year 1 through 2

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Groundwater Sampling Event	CW-6-GWU3	4	EA	$21,593	$86,372	Includes 2 surface water sampling points for VOCs only
Groundwater Monitoring Event Report Preparation	CW-4-GWU3	4	EA	$47,032	$188,128	
				SUBTOTAL	$274,500	
Contingency (Scope and Bid)		20%			$54,900	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$329,400	
Project Management		8%			$26,352	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$49,410	Middle value of the recommended range was used.
				TOTAL	$405,162	
	TOTAL QUARTERLY MONITORING COSTS (Years 1 through 2)				**$405,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

SEMIANNUAL MONITORING ANNUAL COSTS: (Assumed to be Incurred During Year 3 through 10

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Groundwater Sampling Event	CW-6-GWU3	2	EA	$21,593	$43,186	Includes 2 surface water sampling points for VOCs only
Groundwater Monitoring Event Report Preparation	CW-4-GWU3	2	EA	$47,032	$94,064	
				SUBTOTAL	$137,250	
Contingency (Scope and Bid)		20%			$27,450	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$164,700	
Project Management		8%			$13,176	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$24,705	Middle value of the recommended range was used.
				TOTAL	$202,581	
	TOTAL SEMIANNUAL MONITORING COST (Year 3 through 10)				**$203,000**	Total semiannual monitoring cost is rounded to the nearest $1,000.

ANNUAL MONITORING ANNUAL COSTS: (Assumed to be Incurred During Year 11 through70)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Groundwater Sampling Event	CW-6-GWU3	1	EA	$21,593	$21,593	Includes 2 surface water sampling points for VOCs only
Groundwater Monitoring Event Report Preparation	CW-4-GWU3	1	EA	$47,032	$47,032	
				SUBTOTAL	$68,625	
Contingency (Scope and Bid)		20%			$13,725	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$82,350	
Project Management		10%			$8,235	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$12,353	Middle value of the recommended range was used.
				TOTAL	$102,938	
	TOTAL ANNUAL MONITORING COST (Year 11 through70)				**$103,000**	Total annual monitoring cost is rounded to the nearest $1,000.

TABLE CS-GWU3-2

ALTERNATIVE GWU3-2

GROUNDWATER EXTRACTION (CONTAINMENT ONLY), DISCHARGE TO GILBERT-MOSLEY TREATMENT PLANT

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Under Alternative GWU3-2, extraction wells would be installed on the leading edge of the groundwater plume. Extracted groundwater would be discharged to the Gilbert-Mosley treatment plant, connecting to the existing 8" pipe. Groundwater monitoring, both upgradient and downgradient of the extraction wells, would be performed as part of this alternative to demonstrate the effectiveness of the containment system. Gilbert-Mosley treatment plant operation and maintenance costs proportional to the expected flow rate from GWU3 are included under this alternative.

ANNUAL OPERATING AND MAINTENANCE COSTS: (Assumed to be Incurred During Year 1 through 56

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Operation and Maintenance - Extraction Well	CW-30-GWU3	2	EA	$7,194	$14,388	NIC#3-1 and NIC#3-2
Operation and Maintenance - Extraction Well Maintenance	CW-31-GWU3	2	EA	$10,249	$20,498	Assume annual maintenance for NIC#3-1 and NIC#3-2.
Operation and Maintenance - Gilbert-Mosley Treatment Plant (2 wells)	CW-32-GWU3	1	LS	$29,482	$29,482	Portion of overall costs based on estimated contribution from GWU3.
				SUBTOTAL	$64,368	
Contingency (Scope and Bid)		20%			$12,874	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$77,242	
Project Management		10%			$7,724	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$11,586	Middle value of the recommended range was used.
				TOTAL	$96,552	
TOTAL ANNUAL OPERATING AND MAINTENANCE COST (Year 1 through 56					**$97,000**	Total annual O&M cost is rounded to the nearest $1,000.

ANNUAL OPERATING AND MAINTENANCE COSTS: (Assumed to be Incurred During Year 57 through 70

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Operation and Maintenance - Extraction Well	CW-30-GWU3	1	EA	$7,194	$7,194	NIC#3-2
Operation and Maintenance - Extraction Well Maintenance	CW-31-GWU3	1	EA	$10,249	$10,249	Assume annual maintenance for NIC#3-2.
Operation and Maintenance - Gilbert-Mosley Treatment Plant (1 well)	CW-33-GWU3	1	LS	$9,754	$9,754	Portion of overall costs based on estimated contribution from GWU3.
				SUBTOTAL	$27,197	
Contingency (Scope and Bid)		20%			$5,439	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$32,636	
Project Management		10%			$3,264	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$4,895	Middle value of the recommended range was used.
				TOTAL	$40,795	
TOTAL ANNUAL OPERATING AND MAINTENANCE COST (Year 57 through70)					**$41,000**	Total annual O&M cost is rounded to the nearest $1,000.

PERIODIC MINOR EQUIPMENT REPLACEMENT COSTS: (Years 5, 10, 15, 20, 25, 30, and 35)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Replace Equipment - Extraction Well Pumps	CW-39-GWU3	1	EA	$19,916	$19,916	Assume pump replacement every 5 years (NIC#3-1).
				SUBTOTAL	$19,916	
Contingency (Scope and Bid)		20%			$3,983	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$23,899	
Project Management		10%			$2,390	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$3,585	Middle value of the recommended range was used.
				TOTAL	$29,874	
TOTAL PERIODIC MINOR EQUIPMENT REPLACEMENT COST					**$30,000**	Total periodic minor equipment replacement cost is rounded to the nearest $1,000.

TABLE CS-GWU3-2

ALTERNATIVE GWU3-2

GROUNDWATER EXTRACTION (CONTAINMENT ONLY), DISCHARGE TO GILBERT-MOSLEY TREATMENT PLANT

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Under Alternative GWU3-2, extraction wells would be installed on the leading edge of the groundwater plume. Extracted groundwater would be discharged to the Gilbert-Mosley treatment plant, connecting to the existing 8" pipe. Groundwater monitoring, both upgradient and downgradient of the extraction wells, would be performed as part of this alternative to demonstrate the effectiveness of the containment system. Gilbert-Mosley treatment plant operation and maintenance costs proportional to the expected flow rate from GWU3 are included under this alternative.

PERIODIC MINOR EQUIPMENT REPLACEMENT COSTS: (Years 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, and 65)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Replace Equipment - Extraction Well Pumps	CW-39-GWU3	1	EA	$19,916	$19,916	Assume pump replacement every 5 years (NIC#3-2).
				SUBTOTAL	$19,916	
Contingency (Scope and Bid)		20%			$3,983	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$23,899	
Project Management		10%			$2,390	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$3,585	Middle value of the recommended range was used.
				TOTAL	$29,874	
	TOTAL PERIODIC MINOR EQUIPMENT REPLACEMENT COST				**$30,000**	Total periodic minor equipment replacement cost is rounded to the nearest $1,000.

PERIODIC MAJOR EQUIPMENT REPLACEMENT COSTS: (Years 30 and 60)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Replace Equipment - Gilbert-Mosley Treatment Plant	CW-35-GWU3	1	LS	$176,541	$176,541	Portion of overall costs based on estimated contribution from GWU3.
				SUBTOTAL	$176,541	
Contingency (Scope and Bid)		20%			$35,308	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$211,849	
Project Management		8%			$16,948	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$31,777	Middle value of the recommended range was used.
				TOTAL	$260,574	
	TOTAL PERIODIC MAJOR EQUIPMENT REPLACEMENT COST				**$261,000**	Total periodic major equipment replacement cost is rounded to the nearest $1,000.

MONITORING WELL MAINTENANCE PERIODIC COSTS (Years 10, 20, 30, 40, 50, and 60)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Monitoring Well Maintenance	CW-41-GWU3	1	LS	$27,689	$27,689	Assumes well head repairs and development required.
				SUBTOTAL	$27,689	
Contingency (Scope and Bid)		20%			$5,538	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$33,227	
Project Management		10%			$3,323	The high end of the recommended range was used.
Technical Support		15%			$4,984	Middle value of the recommended range was used.
				TOTAL	$41,534	
	TOTAL MONITORING WELL MAINTENANCE PERIODIC COST				**$42,000**	Total periodic monitoring well maintenance cost is rounded to the nearest $1,000.

TABLE CS-GWU3-2

ALTERNATIVE GWU3-2

GROUNDWATER EXTRACTION (CONTAINMENT ONLY), DISCHARGE TO GILBERT-MOSLEY TREATMENT PLANT

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Under Alternative GWU3-2, extraction wells would be installed on the leading edge of the groundwater plume. Extracted groundwater would be discharged to the Gilbert-Mosley treatment plant, connecting to the existing 8" pipe. Groundwater monitoring, both upgradient and downgradient of the extraction wells, would be performed as part of this alternative to demonstrate the effectiveness of the containment system. Gilbert-Mosley treatment plant operation and maintenance costs proportional to the expected flow rate from GWU3 are included under this alternative.

FIVE-YEAR SITE REVIEW PERIODIC COSTS (Years 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, and 70)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Five-Year Site Review	CW-2-GWU3	1	LS	$38,547	$38,547	
				SUBTOTAL	$38,547	
Contingency (Scope and Bid)		20%			$7,709	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$46,256	
Project Management		10%			$4,626	The high end of the recommended range was used.
Technical Support		15%			$6,938	Middle value of the recommended range was used.
				TOTAL	$57,820	
				TOTAL FIVE-YEAR SITE REVIEW PERIODIC COST	**$58,000**	Total Five-Year Review periodic cost is rounded to the nearest $1,000.

Notes:
Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.

Abbreviations:

EA	Each
QTY	Quantity
LS	Lump Sum

TABLE PV-GWU3-2

ALTERNATIVE GWU3-2

GROUNDWATER EXTRACTION (CONTAINMENT ONLY), DISCHARGE TO GILBERT-MOSLEY TREATMENT PLANT

PRESENT VALUE ANALYSIS

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Escalation Rate:	**3%**
Discount Rate:	**5%**

		O&M COSTS		PERIODIC COSTS								
Year[1]	**Capital Costs[2]**	**O&M Costs[2]**	**Monitoring Costs[2]**	**Monitoring Well Maintenance[2,3]**	**Minor Equipment Replacement Costs[2,4]**	**Major Equipment Replacement Costs[2,5]**	**Five-year Review Costs[2]**	**Total Annual Expenditure[6]**	**Escalation Factor (3%)**	**Escalated Cost[7]**	**Discount Factor (5%)**	**Present Value[8,9]**
0	$1,433,000	$0	$0	$0	$0	$0	$0	$1,433,000	1.0000	$1,433,000	1.0000	$1,433,000
1	$0	$97,000	$405,000	$0	$0	$0	$0	$502,000	1.0300	$517,060	0.9524	$492,448
2	$0	$97,000	$405,000	$0	$0	$0	$0	$502,000	1.0609	$532,572	0.9070	$483,043
3	$0	$97,000	$203,000	$0	$0	$0	$0	$300,000	1.0927	$327,810	0.8638	$283,162
4	$0	$97,000	$203,000	$0	$0	$0	$0	$300,000	1.1255	$337,650	0.8227	$277,785
5	$0	$97,000	$203,000	$0	$60,000	$0	$58,000	$418,000	1.1593	$484,587	0.7835	$379,674
6	$0	$97,000	$203,000	$0	$0	$0	$0	$300,000	1.1941	$358,230	0.7462	$267,311
7	$0	$97,000	$203,000	$0	$0	$0	$0	$300,000	1.2299	$368,970	0.7107	$262,227
8	$0	$97,000	$203,000	$0	$0	$0	$0	$300,000	1.2668	$380,040	0.6768	$257,211
9	$0	$97,000	$203,000	$0	$0	$0	$0	$300,000	1.3048	$391,440	0.6446	$252,322
10	$0	$97,000	$203,000	$42,000	$60,000	$0	$58,000	$460,000	1.3439	$618,194	0.6139	$379,509
11	$0	$97,000	$103,000	$0	$0	$0	$0	$200,000	1.3842	$276,840	0.5847	$161,868
12	$0	$97,000	$103,000	$0	$0	$0	$0	$200,000	1.4258	$285,160	0.5568	$158,777
13	$0	$97,000	$103,000	$0	$0	$0	$0	$200,000	1.4685	$293,700	0.5303	$155,749
14	$0	$97,000	$103,000	$0	$0	$0	$0	$200,000	1.5126	$302,520	0.5051	$152,803
15	$0	$97,000	$103,000	$0	$60,000	$0	$58,000	$318,000	1.5580	$495,444	0.4810	$238,309
16	$0	$97,000	$103,000	$0	$0	$0	$0	$200,000	1.6047	$320,940	0.4581	$147,023
17	$0	$97,000	$103,000	$0	$0	$0	$0	$200,000	1.6528	$330,560	0.4363	$144,223
18	$0	$97,000	$103,000	$0	$0	$0	$0	$200,000	1.7024	$340,480	0.4155	$141,469
19	$0	$97,000	$103,000	$0	$0	$0	$0	$200,000	1.7535	$350,700	0.3957	$138,772
20	$0	$97,000	$103,000	$42,000	$60,000	$0	$58,000	$360,000	1.8061	$650,196	0.3769	$245,059
21	$0	$97,000	$103,000	$0	$0	$0	$0	$200,000	1.8603	$372,060	0.3589	$133,532
22	$0	$97,000	$103,000	$0	$0	$0	$0	$200,000	1.9161	$383,220	0.3418	$130,985
23	$0	$97,000	$103,000	$0	$0	$0	$0	$200,000	1.9736	$394,720	0.3256	$128,521
24	$0	$97,000	$103,000	$0	$0	$0	$0	$200,000	2.0328	$406,560	0.3101	$126,074
25	$0	$97,000	$103,000	$0	$60,000	$0	$58,000	$318,000	2.0938	$665,828	0.2953	$196,619
26	$0	$97,000	$103,000	$0	$0	$0	$0	$200,000	2.1566	$431,320	0.2812	$121,287
27	$0	$97,000	$103,000	$0	$0	$0	$0	$200,000	2.2213	$444,260	0.2678	$118,973
28	$0	$97,000	$103,000	$0	$0	$0	$0	$200,000	2.2879	$457,580	0.2551	$116,729
29	$0	$97,000	$103,000	$0	$0	$0	$0	$200,000	2.3566	$471,320	0.2429	$114,484
30	$0	$97,000	$103,000	$42,000	$60,000	$261,000	$58,000	$621,000	2.4273	$1,507,353	0.2314	$348,802
31	$0	$97,000	$103,000	$0	$0	$0	$0	$200,000	2.5001	$500,020	0.2204	$110,204
32	$0	$97,000	$103,000	$0	$0	$0	$0	$200,000	2.5751	$515,020	0.2099	$108,103
33	$0	$97,000	$103,000	$0	$0	$0	$0	$200,000	2.6523	$530,460	0.1999	$106,039
34	$0	$97,000	$103,000	$0	$0	$0	$0	$200,000	2.7319	$546,380	0.1904	$104,031
35	$0	$97,000	$103,000	$0	$60,000	$0	$58,000	$318,000	2.8139	$894,820	0.1813	$162,231
36	$0	$97,000	$103,000	$0	$0	$0	$0	$200,000	2.8983	$579,660	0.1727	$100,107
37	$0	$97,000	$103,000	$0	$0	$0	$0	$200,000	2.9852	$597,040	0.1644	$98,153
38	$0	$97,000	$103,000	$0	$0	$0	$0	$200,000	3.0748	$614,960	0.1566	$96,303
39	$0	$97,000	$103,000	$0	$0	$0	$0	$200,000	3.1670	$633,400	0.1491	$94,440
40	$0	$97,000	$103,000	$42,000	$30,000	$0	$58,000	$330,000	3.2620	$1,076,460	0.1420	$152,857

TABLE PV-GWU3-2

ALTERNATIVE GWU3-2

GROUNDWATER EXTRACTION (CONTAINMENT ONLY), DISCHARGE TO GILBERT-MOSLEY TREATMENT PLANT

PRESENT VALUE ANALYSIS

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Escalation Rate:	**3%**
Discount Rate:	**5%**

		O&M COSTS		PERIODIC COSTS								
Year[1]	**Capital Costs[2]**	**O&M Costs[2]**	**Monitoring Costs[2]**	**Monitoring Well Maintenance[2,3]**	**Minor Equipment Replacement Costs[2,4]**	**Major Equipment Replacement Costs[2,5]**	**Five-year Review Costs[2]**	**Total Annual Expenditure[6]**	**Escalation Factor (3%)**	**Escalated Cost[7]**	**Discount Factor (5%)**	**Present Value[8,9]**
41	$0	$97,000	$103,000	$0	$0	$0	$0	$200,000	3.3599	$671,980	0.1353	$90,919
42	$0	$97,000	$103,000	$0	$0	$0	$0	$200,000	3.4607	$692,140	0.1288	$89,148
43	$0	$97,000	$103,000	$0	$0	$0	$0	$200,000	3.5645	$712,900	0.1227	$87,473
44	$0	$97,000	$103,000	$0	$0	$0	$0	$200,000	3.6715	$734,300	0.1169	$85,840
45	$0	$97,000	$103,000	$0	$30,000	$0	$58,000	$288,000	3.7816	$1,089,101	0.1113	$121,217
46	$0	$97,000	$103,000	$0	$0	$0	$0	$200,000	3.8950	$779,000	0.1060	$82,574
47	$0	$97,000	$103,000	$0	$0	$0	$0	$200,000	4.0119	$802,380	0.1009	$80,960
48	$0	$97,000	$103,000	$0	$0	$0	$0	$200,000	4.1323	$826,460	0.0961	$79,423
49	$0	$97,000	$103,000	$0	$0	$0	$0	$200,000	4.2562	$851,240	0.0916	$77,974
50	$0	$97,000	$103,000	$42,000	$30,000	$0	$58,000	$330,000	4.3839	$1,446,687	0.0872	$126,151
51	$0	$97,000	$103,000	$0	$0	$0	$0	$200,000	4.5154	$903,080	0.0831	$75,046
52	$0	$97,000	$103,000	$0	$0	$0	$0	$200,000	4.6509	$930,180	0.0791	$73,577
53	$0	$97,000	$103,000	$0	$0	$0	$0	$200,000	4.7904	$958,080	0.0753	$72,143
54	$0	$97,000	$103,000	$0	$0	$0	$0	$200,000	4.9341	$986,820	0.0717	$70,755
55	$0	$97,000	$103,000	$0	$30,000	$0	$58,000	$288,000	5.0821	$1,463,645	0.0683	$99,967
56	$33,000	$97,000	$103,000	$0	$0	$0	$0	$233,000	5.2346	$1,219,662	0.0651	$79,400
57	$0	$41,000	$103,000	$0	$0	$0	$0	$144,000	5.3917	$776,405	0.0620	$48,137
58	$0	$41,000	$103,000	$0	$0	$0	$0	$144,000	5.5534	$799,690	0.0590	$47,182
59	$0	$41,000	$103,000	$0	$0	$0	$0	$144,000	5.7200	$823,680	0.0562	$46,291
60	$0	$41,000	$103,000	$42,000	$30,000	$261,000	$58,000	$535,000	5.8916	$3,152,006	0.0535	$168,632
61	$0	$41,000	$103,000	$0	$0	$0	$0	$144,000	6.0684	$873,850	0.0510	$44,566
62	$0	$41,000	$103,000	$0	$0	$0	$0	$144,000	6.2504	$900,058	0.0486	$43,743
63	$0	$41,000	$103,000	$0	$0	$0	$0	$144,000	6.4379	$927,058	0.0462	$42,830
64	$0	$41,000	$103,000	$0	$0	$0	$0	$144,000	6.6311	$954,878	0.0440	$42,015
65	$0	$41,000	$103,000	$0	$30,000	$0	$58,000	$232,000	6.8300	$1,584,560	0.0419	$66,393
66	$0	$41,000	$103,000	$0	$0	$0	$0	$144,000	7.0349	$1,013,026	0.0399	$40,420
67	$0	$41,000	$103,000	$0	$0	$0	$0	$144,000	7.2459	$1,043,410	0.0380	$39,650
68	$0	$41,000	$103,000	$0	$0	$0	$0	$144,000	7.4633	$1,074,715	0.0362	$38,905
69	$0	$41,000	$103,000	$0	$0	$0	$0	$144,000	7.6872	$1,106,957	0.0345	$38,190
70	$91,000	$41,000	$103,000	$0	$30,000	$0	$58,000	$323,000	7.9178	$2,557,449	0.0329	$84,140
TOTALS:	**$1,557,000**	**$6,006,000**	**$8,614,000**	**$252,000**	**$630,000**	**$522,000**	**$812,000**	**$18,393,000**		**$54,073,930**		$11,303,879
TOTAL PRESENT VALUE OF ALTERNATIVE GWU3-2												**$11,304,000**

Notes:

1 - Duration is assumed to be 70 years for present value analysis. Estimated remedial timeframes are discussed within the FS report.

2 - Capital costs, for purposes of this analysis, are assumed to be distributed as indicated on Table CS-GWU3-2.

3 - Includes replacement of monitoring well vault and development.

4 - Includes replacement of extraction well pumps, some valves and system controls.

5 - Includes major building maintenance (painting, etc.), replacement of building HVAC system, replacement of building electrical system, and replacement treatment system components.

6 - Total annual expenditure is the total cost per year with no escalation or discounting.

7 - Escalation cost is the total cost per year including an escalation rate for that year. See Table PV-AERFT for details

8 - Present value is the total cost per year including a discount factor for that year. See Table PV-ADRFT for details.

9 - Total present value is rounded to the nearest $1,000. Depreciation is excluded from the present value cost.

TABLE CS-GWU3-3

ALTERNATIVE GWU3-3

GROUNDWATER EXTRACTION (CONTAINMENT ONLY), TREATMENT AND DISCHARGE TO CHISHOLM CREEK

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Under Alternative GWU3-3, extraction wells would be installed on the leading edge of the groundwater plume. Extracted groundwater would be treated through an air stripper system and discharged into Chisholm Creek via a surface water pipeline. The off gas from the stripper would discharge into the atmosphere. Groundwater monitoring, both upgradient and downgradient of the extraction wells, would be performed as part of this alternative to demonstrate the effectiveness of the containment system.

CAPITAL COSTS: (Assumed to be Incurred During Year 1)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Institutional Controls	CW-1-GWU3	1	LS	$20,014	$20,014	
Miscellaneous Requirements for Sampling	CW-7-GWU3	1	LS	$50,143	$50,143	
Monitoring Well Installation	CW-9-GWU3	1	LS	$7,627	$7,627	Additional monitoring well clusters to increase monitoring coverage.
Miscellaneous Requirements for Construction	CW-8-GWU3	1	LS	$91,725	$91,725	
Mobilization and Demobilization of Drill Rig	CW-10-GWU3	1	LS	$10,610	$10,610	
Extraction Well Installation	CW-11-GWU3	2	EA	$48,460	$96,920	
Extraction Well Vault	CW-12-GWU3	2	EA	$49,416	$98,832	
Mobilization or Demobilization of Construction Equipment	CW-13-GWU3	2	EA	$2,086	$4,172	
Influent Piping - NIC#3-1 to New Treatment Plant	CW-18-GWU3	3,950	LF	$26.98	$106,571	
Influent Piping - NIC#3-2 to New Treatment Plant	CW-20-GWU3	1,900	LF	$27.37	$52,003	
Effluent Piping - New Treatment Plant to Chisholm Creek	CW-19-GWU3	100	LF	$54.67	$5,467	
Geotechnical Investigation for Treatment Building	CW-25-GWU3	1	LS	$15,287	$15,287	
Groundwater Treatment Plant - Building	CW-26-GWU3	1	LS	$191,870	$191,870	Includes earthwork, foundation, HVAC, lighting, insulation, etc.
Groundwater Treatment Plant - Equipment and Piping	CW-27-GWU3	1	LS	$145,503	$145,503	
Groundwater Treatment Plant - Facility Control System	CW-28-GWU3	1	LS	$77,900	$77,900	
Groundwater Treatment Plant - Startup	CW-29-GWU3	1	LS	$33,897	$33,897	
				SUBTOTAL	$1,008,541	
Contingency (Scope and Bid)		20%			$201,708	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$1,210,249	
Project Management		6%			$72,615	Percentage from Exhibit 5-8 was used.
Remedial Design		12%			$145,230	Percentage from Exhibit 5-8 was used.
Construction Management		8%			$96,820	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$181,537	Middle value of the recommended range was used.
				TOTAL	$1,706,451	
				TOTAL CAPITAL COST	**$1,706,000**	Total capital cost is rounded to the nearest $1,000.

TABLE CS-GWU3-3

ALTERNATIVE GWU3-3

GROUNDWATER EXTRACTION (CONTAINMENT ONLY), TREATMENT AND DISCHARGE TO CHISHOLM CREEK

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Under Alternative GWU3-3, extraction wells would be installed on the leading edge of the groundwater plume. Extracted groundwater would be treated through an air stripper system and discharged into Chisholm Creek via a surface water pipeline. The off gas from the stripper would discharge into the atmosphere. Groundwater monitoring, both upgradient and downgradient of the extraction wells, would be performed as part of this alternative to demonstrate the effectiveness of the containment system.

FUTURE CAPITAL COSTS: (Assumed to be Incurred During Year 56)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Mobilization and Demobilization of Drill Rig	CW-10-GWU3	1	LS	$10,610	$10,610	Decommissioning of NIC#3-1
Extraction Well Abandonment	CW-44-GWU3	1	EA	$9,203	$9,203	NIC#3-1
				SUBTOTAL	$19,813	
Contingency (Scope and Bid)		20%			$3,963	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$23,776	
Project Management		10%			$2,378	Percentage from Exhibit 5-8 was used.
Construction Management		15%			$3,566	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$3,566	Middle value of the recommended range was used.
				TOTAL	$33,286	
				TOTAL FUTURE CAPITAL COST	**$33,000**	Total future capital cost is rounded to the nearest $1,000.

FUTURE CAPITAL COSTS: (Assumed to be Incurred During Year 70)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Decommissioning Treatment System	CW-45-GWU3	1	LS	$24,939	$24,939	
Mobilization and Demobilization of Drill Rig	CW-10-GWU3	1	LS	$10,610	$10,610	Decommissioning of NIC#3-2
Extraction Well Abandonment	CW-44-GWU3	1	EA	$9,203	$9,203	NIC#3-2
Monitoring Well Abandonment	CW-43-GWU3	1	LS	$34,450	$34,450	
				SUBTOTAL	$79,202	
Contingency (Scope and Bid)		20%			$15,840	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$95,042	
Project Management		10%			$9,504	Percentage from Exhibit 5-8 was used.
Construction Management		15%			$14,256	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$14,256	Middle value of the recommended range was used.
				TOTAL	$133,058	
				TOTAL FUTURE CAPITAL COST	**$133,000**	Total future capital cost is rounded to the nearest $1,000.

TABLE CS-GWU3-3

ALTERNATIVE GWU3-3

GROUNDWATER EXTRACTION (CONTAINMENT ONLY), TREATMENT AND DISCHARGE TO CHISHOLM CREEK

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Under Alternative GWU3-3, extraction wells would be installed on the leading edge of the groundwater plume. Extracted groundwater would be treated through an air stripper system and discharged into Chisholm Creek via a surface water pipeline. The off gas from the stripper would discharge into the atmosphere. Groundwater monitoring, both upgradient and downgradient of the extraction wells, would be performed as part of this alternative to demonstrate the effectiveness of the containment system.

QUARTERLY MONITORING ANNUAL COSTS: (Assumed to be Incurred During Year 1 through 2

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Groundwater Sampling Event	CW-6-GWU3	4	EA	$21,593	$86,372	Includes 2 surface water sampling points for VOCs only
Groundwater Monitoring Event Report Preparation	CW-4-GWU3	4	EA	$47,032	$188,128	
				SUBTOTAL	$274,500	
Contingency (Scope and Bid)		20%			$54,900	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$329,400	
Project Management		8%			$26,352	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$49,410	Middle value of the recommended range was used.
				TOTAL	$405,162	
	TOTAL QUARTERLY MONITORING COSTS (Years 1 through 2)				**$405,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

SEMIANNUAL MONITORING ANNUAL COSTS: (Assumed to be Incurred During Year 3 through 10

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Groundwater Sampling Event	CW-6-GWU3	2	EA	$21,593	$43,186	Includes 2 surface water sampling points for VOCs only
Groundwater Monitoring Event Report Preparation	CW-4-GWU3	2	EA	$47,032	$94,064	
				SUBTOTAL	$137,250	
Contingency (Scope and Bid)		20%			$27,450	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$164,700	
Project Management		8%			$13,176	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$24,705	Middle value of the recommended range was used.
				TOTAL	$202,581	
	TOTAL SEMIANNUAL MONITORING COST (Year 3 through 10)				**$203,000**	Total semiannual monitoring cost is rounded to the nearest $1,000.

ANNUAL MONITORING ANNUAL COSTS: (Assumed to be Incurred During Year 11 through 70

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Groundwater Sampling Event	CW-6-GWU3	1	EA	$21,593	$21,593	Includes 2 surface water sampling points for VOCs only
Groundwater Monitoring Event Report Preparation	CW-4-GWU3	1	EA	$47,032	$47,032	
				SUBTOTAL	$68,625	
Contingency (Scope and Bid)		20%			$13,725	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$82,350	
Project Management		10%			$8,235	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$12,353	Middle value of the recommended range was used.
				TOTAL	$102,938	
	TOTAL ANNUAL MONITORING COST (Year 11 through 70)				**$103,000**	Total annual monitoring cost is rounded to the nearest $1,000.

TABLE CS-GWU3-3

ALTERNATIVE GWU3-3

GROUNDWATER EXTRACTION (CONTAINMENT ONLY), TREATMENT AND DISCHARGE TO CHISHOLM CREEK

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Under Alternative GWU3-3, extraction wells would be installed on the leading edge of the groundwater plume. Extracted groundwater would be treated through an air stripper system and discharged into Chisholm Creek via a surface water pipeline. The off gas from the stripper would discharge into the atmosphere. Groundwater monitoring, both upgradient and downgradient of the extraction wells, would be performed as part of this alternative to demonstrate the effectiveness of the containment system.

ANNUAL OPERATING AND MAINTENANCE COSTS: (Assumed to be Incurred During Year 1 through 56

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Operation and Maintenance - Extraction Well	CW-30-GWU3	2	EA	$7,194	$14,388	NIC#3-1 and NIC#3-2
Operation and Maintenance - Extraction Well Maintenance	CW-31-GWU3	2	EA	$10,249	$20,498	Assume annual maintenance for NIC#3-1 and NIC#3-2.
Operation and Maintenance - New Treatment Plant	CW-34-GWU3	1	LS	$46,124	$46,124	
				SUBTOTAL	$81,010	
Contingency (Scope and Bid)		20%			$16,202	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$97,212	
Project Management		10%			$9,721	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$14,582	Middle value of the recommended range was used.
				TOTAL	$121,515	
TOTAL ANNUAL OPERATING AND MAINTENANCE COST (Year 1 through 56					**$122,000**	Total annual O&M cost is rounded to the nearest $1,000.

ANNUAL OPERATING AND MAINTENANCE COSTS: (Assumed to be Incurred During Year 57 through 70

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Operation and Maintenance - Extraction Well	CW-30-GWU3	1	EA	$7,194	$7,194	NIC#3-2
Operation and Maintenance - Extraction Well Maintenance	CW-31-GWU3	1	EA	$10,249	$10,249	Assume annual maintenance for NIC#3-2.
Operation and Maintenance - New Treatment Plant	CW-34-GWU3	1	LS	$46,124	$46,124	
				SUBTOTAL	$63,567	
Contingency (Scope and Bid)		20%			$12,713	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$76,280	
Project Management		10%			$7,628	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$11,442	Middle value of the recommended range was used.
				TOTAL	$95,350	
TOTAL ANNUAL OPERATING AND MAINTENANCE COST (Year 57 through 70					**$95,000**	Total annual O&M cost is rounded to the nearest $1,000.

PERIODIC MINOR EQUIPMENT REPLACEMENT COSTS: (Years 5, 10, 15, 20, 25, 30, and 35)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Replace Equipment - Extraction Well Pumps	CW-39-GWU3	1	EA	$19,916	$19,916	Assume pump replacement every 5 years (NIC#3-1).
				SUBTOTAL	$19,916	
Contingency (Scope and Bid)		20%			$3,983	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$23,899	
Project Management		10%			$2,390	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$3,585	Middle value of the recommended range was used.
				TOTAL	$29,874	
TOTAL PERIODIC MINOR EQUIPMENT REPLACEMENT COST					**$30,000**	Total periodic minor equipment replacement cost is rounded to the nearest $1,000.

TABLE CS-GWU3-3

ALTERNATIVE GWU3-3

GROUNDWATER EXTRACTION (CONTAINMENT ONLY), TREATMENT AND DISCHARGE TO CHISHOLM CREEK

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Under Alternative GWU3-3, extraction wells would be installed on the leading edge of the groundwater plume. Extracted groundwater would be treated through an air stripper system and discharged into Chisholm Creek via a surface water pipeline. The off gas from the stripper would discharge into the atmosphere. Groundwater monitoring, both upgradient and downgradient of the extraction wells, would be performed as part of this alternative to demonstrate the effectiveness of the containment system.

PERIODIC MINOR EQUIPMENT REPLACEMENT COSTS: (Years 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, and 65)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Minor Equipment Replacement - New Treatment Plant	CW-36-GWU3	1	LS	$18,558	$18,558	
Replace Equipment - Extraction Well Pumps	CW-39-GWU3	1	EA	$19,916	$19,916	Assume extraction well pump replaced every 5 years (NIC#3-2)
				SUBTOTAL	$38,474	
Contingency (Scope and Bid)		20%			$7,695	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$46,169	
Project Management		10%			$4,617	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$6,925	Middle value of the recommended range was used.
				TOTAL	$57,711	
	TOTAL PERIODIC MINOR EQUIPMENT REPLACEMENT COST				**$58,000**	Total periodic minor equipment replacement cost is rounded to the nearest $1,000.

PERIODIC MAJOR EQUIPMENT REPLACEMENT COSTS: (Years 30 and 60)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Major Equipment Replacement - New Treatment Plant	CW-37-GWU3	1	LS	$86,327	$86,327	
General Maintenance - New Treatment Plant	CW-38-GWU3	1	LS	$27,550	$27,550	
				SUBTOTAL	$113,877	
Contingency (Scope and Bid)		20%			$22,775	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$136,652	
Project Management		8%			$10,932	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$20,498	Middle value of the recommended range was used.
				TOTAL	$168,082	
	TOTAL PERIODIC MAJOR EQUIPMENT REPLACEMENT COST				**$168,000**	Total periodic major equipment replacement cost is rounded to the nearest $1,000.

MONITORING WELL MAINTENANCE PERIODIC COSTS (Years 10, 20, 30, 40, 50, and 60)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Monitoring Well Maintenance	CW-41-GWU3	1	LS	$27,689	$27,689	Assumes well head repairs and development required.
				SUBTOTAL	$27,689	
Contingency (Scope and Bid)		20%			$5,538	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$33,227	
Project Management		10%			$3,323	The high end of the recommended range was used.
Technical Support		15%			$4,984	Middle value of the recommended range was used.
				TOTAL	$41,534	
	TOTAL MONITORING WELL MAINTENANCE PERIODIC COST				**$42,000**	Total periodic monitoring well maintenance cost is rounded to the nearest $1,000.

TABLE CS-GWU3-3

ALTERNATIVE GWU3-3

GROUNDWATER EXTRACTION (CONTAINMENT ONLY), TREATMENT AND DISCHARGE TO CHISHOLM CREEK

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Under Alternative GWU3-3, extraction wells would be installed on the leading edge of the groundwater plume. Extracted groundwater would be treated through an air stripper system and discharged into Chisholm Creek via a surface water pipeline. The off gas from the stripper would discharge into the atmosphere. Groundwater monitoring, both upgradient and downgradient of the extraction wells, would be performed as part of this alternative to demonstrate the effectiveness of the containment system.

FIVE-YEAR SITE REVIEW PERIODIC COSTS (Years 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, and 70)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Five-Year Site Review	CW-2-GWU3	1	LS	$38,547	$38,547	
				SUBTOTAL	$38,547	
Contingency (Scope and Bid)		20%			$7,709	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$46,256	
Project Management		10%			$4,626	The high end of the recommended range was used.
Technical Support		15%			$6,938	Middle value of the recommended range was used.
				TOTAL	$57,820	
				TOTAL FIVE-YEAR SITE REVIEW PERIODIC COST	**$58,000**	Total Five-Year Review periodic cost is rounded to the nearest $1,000.

Notes:
Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.

Abbreviations:

EA	Each
QTY	Quantity
LS	Lump Sum

TABLE PV-GWU3-3

ALTERNATIVE GWU3-3

GROUNDWATER EXTRACTION (CONTAINMENT ONLY), TREATMENT AND DISCHARGE TO CHISHOLM CREEK

PRESENT VALUE ANALYSIS

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Escalation Rate:	**3%**
Discount Rate:	**5%**

		O&M COSTS		PERIODIC COSTS								
Year[1]	**Capital Costs[2]**	**O&M Costs[2]**	**Monitoring Costs[2]**	**Monitoring Well Maintenance[2,3]**	**Minor Equipment Replacement Costs[2,4]**	**Major Equipment Replacement Costs[2,5]**	**Five-year Review Costs[2]**	**Total Annual Expenditure[6]**	**Escalation Factor (5%)**	**Escalated Cost[7]**	**Discount Factor (0%)**	**Present Value[8,9]**
0	$1,706,000	$0	$0	$0	$0	$0	$0	$1,706,000	1.0000	$1,706,000	1.0000	$1,706,000
1	$0	$122,000	$405,000	$0	$0	$0	$0	$527,000	1.0300	$542,810	0.9524	$516,972
2	$0	$122,000	$405,000	$0	$0	$0	$0	$527,000	1.0609	$559,094	0.9070	$507,099
3	$0	$122,000	$203,000	$0	$0	$0	$0	$325,000	1.0927	$355,128	0.8638	$306,759
4	$0	$122,000	$203,000	$0	$0	$0	$0	$325,000	1.1255	$365,788	0.8227	$300,933
5	$0	$122,000	$203,000	$0	$88,000	$0	$58,000	$471,000	1.1593	$546,030	0.7835	$427,815
6	$0	$122,000	$203,000	$0	$0	$0	$0	$325,000	1.1941	$388,083	0.7462	$289,587
7	$0	$122,000	$203,000	$0	$0	$0	$0	$325,000	1.2299	$399,718	0.7107	$284,079
8	$0	$122,000	$203,000	$0	$0	$0	$0	$325,000	1.2668	$411,710	0.6768	$278,645
9	$0	$122,000	$203,000	$0	$0	$0	$0	$325,000	1.3048	$424,060	0.6446	$273,349
10	$0	$122,000	$203,000	$42,000	$88,000	$0	$58,000	$513,000	1.3439	$689,421	0.6139	$423,235
11	$0	$122,000	$103,000	$0	$0	$0	$0	$225,000	1.3842	$311,445	0.5847	$182,102
12	$0	$122,000	$103,000	$0	$0	$0	$0	$225,000	1.4258	$320,805	0.5568	$178,624
13	$0	$122,000	$103,000	$0	$0	$0	$0	$225,000	1.4685	$330,413	0.5303	$175,218
14	$0	$122,000	$103,000	$0	$0	$0	$0	$225,000	1.5126	$340,335	0.5051	$171,903
15	$0	$122,000	$103,000	$0	$88,000	$0	$58,000	$371,000	1.5580	$578,018	0.4810	$278,027
16	$0	$122,000	$103,000	$0	$0	$0	$0	$225,000	1.6047	$361,058	0.4581	$165,400
17	$0	$122,000	$103,000	$0	$0	$0	$0	$225,000	1.6528	$371,880	0.4363	$162,251
18	$0	$122,000	$103,000	$0	$0	$0	$0	$225,000	1.7024	$383,040	0.4155	$159,153
19	$0	$122,000	$103,000	$0	$0	$0	$0	$225,000	1.7535	$394,538	0.3957	$156,118
20	$0	$122,000	$103,000	$42,000	$88,000	$0	$58,000	$413,000	1.8061	$745,919	0.3769	$281,137
21	$0	$122,000	$103,000	$0	$0	$0	$0	$225,000	1.8603	$418,568	0.3589	$150,224
22	$0	$122,000	$103,000	$0	$0	$0	$0	$225,000	1.9161	$431,123	0.3418	$147,358
23	$0	$122,000	$103,000	$0	$0	$0	$0	$225,000	1.9736	$444,060	0.3256	$144,586
24	$0	$122,000	$103,000	$0	$0	$0	$0	$225,000	2.0328	$457,380	0.3101	$141,834
25	$0	$122,000	$103,000	$0	$88,000	$0	$58,000	$371,000	2.0938	$776,800	0.2953	$229,389
26	$0	$122,000	$103,000	$0	$0	$0	$0	$225,000	2.1566	$485,235	0.2812	$136,448
27	$0	$122,000	$103,000	$0	$0	$0	$0	$225,000	2.2213	$499,793	0.2678	$133,844
28	$0	$122,000	$103,000	$0	$0	$0	$0	$225,000	2.2879	$514,778	0.2551	$131,320
29	$0	$122,000	$103,000	$0	$0	$0	$0	$225,000	2.3566	$530,235	0.2429	$128,794
30	$0	$122,000	$103,000	$42,000	$88,000	$168,000	$58,000	$581,000	2.4273	$1,410,261	0.2314	$326,334
31	$0	$122,000	$103,000	$0	$0	$0	$0	$225,000	2.5001	$562,523	0.2204	$123,980
32	$0	$122,000	$103,000	$0	$0	$0	$0	$225,000	2.5751	$579,398	0.2099	$121,616
33	$0	$122,000	$103,000	$0	$0	$0	$0	$225,000	2.6523	$596,768	0.1999	$119,294
34	$0	$122,000	$103,000	$0	$0	$0	$0	$225,000	2.7319	$614,678	0.1904	$117,035
35	$0	$122,000	$103,000	$0	$88,000	$0	$58,000	$371,000	2.8139	$1,043,957	0.1813	$189,269
36	$0	$122,000	$103,000	$0	$0	$0	$0	$225,000	2.8983	$652,118	0.1727	$112,621
37	$0	$122,000	$103,000	$0	$0	$0	$0	$225,000	2.9852	$671,670	0.1644	$110,423
38	$0	$122,000	$103,000	$0	$0	$0	$0	$225,000	3.0748	$691,830	0.1566	$108,341
39	$0	$122,000	$103,000	$0	$0	$0	$0	$225,000	3.1670	$712,575	0.1491	$106,245
40	$0	$122,000	$103,000	$42,000	$58,000	$0	$58,000	$383,000	3.2620	$1,249,346	0.1420	$177,407

TABLE PV-GWU3-3

ALTERNATIVE GWU3-3

GROUNDWATER EXTRACTION (CONTAINMENT ONLY), TREATMENT AND DISCHARGE TO CHISHOLM CREEK

PRESENT VALUE ANALYSIS

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Escalation Rate:	**3%**
Discount Rate:	**5%**

		O&M COSTS		PERIODIC COSTS								
Year[1]	**Capital Costs[2]**	**O&M Costs[2]**	**Monitoring Costs[2]**	**Monitoring Well Maintenance[2,3]**	**Minor Equipment Replacement Costs[2,4]**	**Major Equipment Replacement Costs[2,5]**	**Five-year Review Costs[2]**	**Total Annual Expenditure[6]**	**Escalation Factor (5%)**	**Escalated Cost[7]**	**Discount Factor (0%)**	**Present Value[8,9]**
41	$0	$122,000	$103,000	$0	$0	$0	$0	$225,000	3.3599	$755,978	0.1353	$102,284
42	$0	$122,000	$103,000	$0	$0	$0	$0	$225,000	3.4607	$778,658	0.1288	$100,291
43	$0	$122,000	$103,000	$0	$0	$0	$0	$225,000	3.5645	$802,013	0.1227	$98,407
44	$0	$122,000	$103,000	$0	$0	$0	$0	$225,000	3.6715	$826,088	0.1169	$96,570
45	$0	$122,000	$103,000	$0	$58,000	$0	$58,000	$341,000	3.7816	$1,289,526	0.1113	$143,524
46	$0	$122,000	$103,000	$0	$0	$0	$0	$225,000	3.8950	$876,375	0.1060	$92,896
47	$0	$122,000	$103,000	$0	$0	$0	$0	$225,000	4.0119	$902,678	0.1009	$91,080
48	$0	$122,000	$103,000	$0	$0	$0	$0	$225,000	4.1323	$929,768	0.0961	$89,351
49	$0	$122,000	$103,000	$0	$0	$0	$0	$225,000	4.2562	$957,645	0.0916	$87,720
50	$0	$122,000	$103,000	$42,000	$58,000	$0	$58,000	$383,000	4.3839	$1,679,034	0.0872	$146,412
51	$0	$122,000	$103,000	$0	$0	$0	$0	$225,000	4.5154	$1,015,965	0.0831	$84,427
52	$0	$122,000	$103,000	$0	$0	$0	$0	$225,000	4.6509	$1,046,453	0.0791	$82,774
53	$0	$122,000	$103,000	$0	$0	$0	$0	$225,000	4.7904	$1,077,840	0.0753	$81,161
54	$0	$122,000	$103,000	$0	$0	$0	$0	$225,000	4.9341	$1,110,173	0.0717	$79,599
55	$0	$122,000	$103,000	$0	$58,000	$0	$58,000	$341,000	5.0821	$1,732,996	0.0683	$118,364
56	$33,000	$122,000	$103,000	$0	$0	$0	$0	$258,000	5.2346	$1,350,527	0.0651	$87,919
57	$0	$95,000	$103,000	$0	$0	$0	$0	$198,000	5.3917	$1,067,557	0.0620	$66,189
58	$0	$95,000	$103,000	$0	$0	$0	$0	$198,000	5.5534	$1,099,573	0.0590	$64,875
59	$0	$95,000	$103,000	$0	$0	$0	$0	$198,000	5.7200	$1,132,560	0.0562	$63,650
60	$0	$95,000	$103,000	$42,000	$58,000	$168,000	$58,000	$524,000	5.8916	$3,087,198	0.0535	$165,165
61	$0	$95,000	$103,000	$0	$0	$0	$0	$198,000	6.0684	$1,201,543	0.0510	$61,279
62	$0	$95,000	$103,000	$0	$0	$0	$0	$198,000	6.2504	$1,237,579	0.0486	$60,146
63	$0	$95,000	$103,000	$0	$0	$0	$0	$198,000	6.4379	$1,274,704	0.0462	$58,891
64	$0	$95,000	$103,000	$0	$0	$0	$0	$198,000	6.6311	$1,312,958	0.0440	$57,770
65	$0	$95,000	$103,000	$0	$58,000	$0	$58,000	$314,000	6.8300	$2,144,620	0.0419	$89,860
66	$0	$95,000	$103,000	$0	$0	$0	$0	$198,000	7.0349	$1,392,910	0.0399	$55,577
67	$0	$95,000	$103,000	$0	$0	$0	$0	$198,000	7.2459	$1,434,688	0.0380	$54,518
68	$0	$95,000	$103,000	$0	$0	$0	$0	$198,000	7.4633	$1,477,733	0.0362	$53,494
69	$0	$95,000	$103,000	$0	$0	$0	$0	$198,000	7.6872	$1,522,066	0.0345	$52,511
70	$133,000	$95,000	$103,000	$0	$58,000	$0	$58,000	$447,000	7.9178	$3,539,257	0.0329	$116,442
TOTALS:	**$1,872,000**	**$8,162,000**	**$8,614,000**	**$252,000**	**$1,022,000**	**$336,000**	**$812,000**	**$21,070,000**		**$63,925,040**		$12,783,914
TOTAL PRESENT VALUE OF ALTERNATIVE GWU3-3												**$12,784,000**

Notes:

1 - Duration is assumed to be 70 years for present value analysis. Estimated remedial timeframes are discussed within the FS report.

2 - Capital costs, for purposes of this analysis, are assumed to be distributed as indicated on Table CS-GWU3-3.

3 - Includes replacement of monitoring well vault and development.

4 - Includes replacement of extraction well pumps, some valves and system controls.

5 - Includes major building maintenance (painting, etc.), replacement of building HVAC system, replacement of building electrical system, and replacement treatment system components.

6 - Total annual expenditure is the total cost per year with no escalation or discounting.

7 - Escalation cost is the total cost per year including an escalation rate for that year. See Table PV-AERFT for details

8 - Present value is the total cost per year including a discount factor for that year. See Table PV-ADRFT for details.

9 - Total present value is rounded to the nearest $1,000. Depreciation is excluded from the present value cost.

TABLE CS-GWU3-4

ALTERNATIVE GWU3-4

GROUNDWATER EXTRACTION (CONTAINMENT AND INTERIOR EXTRACTION)

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Under Alternative GWU3-4, extraction wells would be installed on the leading edge and in the interior of the groundwater plume. Groundwater from extraction wells at the leading edge of the groundwater plume would be discharged to the Gilbert-Mosley treatment plant, connecting to the 8" pipe. Groundwater from the interior of the groundwater plume would be extracted and treated through an air stripper system and discharged into Chisholm Creek via a surface water pipeline. The gas from the air stripper would be discharged into the atmosphere. Groundwater monitoring, upgradient and downgradient of the extraction wells, would be performed as part of this alternative to demonstrate the effectiveness of the containment system. Gilbert-Mosley treatment plant operation and maintenance costs are proportional to the expected flow rate from GWU3 under this alternative.

CAPITAL COSTS: (Assumed to be Incurred During Year 1)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Institutional Controls	CW-1-GWU3	1	LS	$20,014	$20,014	
Miscellaneous Requirements for Sampling	CW-7-GWU3	1	LS	$50,143	$50,143	
Monitoring Well Installation	CW-9-GWU3	1	LS	$7,627	$7,627	Additional monitoring well clusters to increase monitoring coverage.
Miscellaneous Requirements for Construction	CW-8-GWU3	1	LS	$91,725	$91,725	
Mobilization and Demobilization of Drill Rig	CW-10-GWU3	1	LS	$10,610	$10,610	
Extraction Well Installation	CW-11-GWU3	3	EA	$48,460	$145,380	
Extraction Well Vault	CW-12-GWU3	3	EA	$49,416	$148,248	
Mobilization or Demobilization of Construction Equipment	CW-13-GWU3	3	EA	$2,086	$6,258	
Influent Piping - NIC#3-1 to Santa Fe	CW-14-GWU3	1,900	LF	$27.41	$52,079	
Influent Piping - NIC#3-2 to Santa Fe	CW-15-GWU3	2,100	LF	$27.74	$58,254	
Influent Piping - NIC#3-1/NIC#3-2 to Gilbert-Mosley GWTP	CW-17-GWU3	9,350	LF	$26.67	$249,365	
Influent Piping - NIC#3-3A to New Treatment Plant	CW-16-GWU3	1,300	LF	$27.14	$35,282	
Pipe Jacking under Railroad Tracks	CW-24-GWU3	2	EA	$53,675	$107,350	
Effluent Piping - New Treatment Plant to Chisholm Creek	CW-19-GWU3	100	LF	$54.67	$5,467	
Geotechnical Investigation for Treatment Building	CW-25-GWU3	1	LS	$15,287	$15,287	
Groundwater Treatment Plant - Building	CW-26-GWU3	1	LS	$191,870	$191,870	Includes earthwork, foundation, HVAC, lighting, insulation, etc.
Groundwater Treatment Plant - Equipment and Piping	CW-27-GWU3	1	LS	$145,503	$145,503	
Groundwater Treatment Plant - Facility Control System	CW-28-GWU3	1	LS	$77,900	$77,900	
Groundwater Treatment Plant - Startup	CW-29-GWU3	1	LS	$33,897	$33,897	
				SUBTOTAL	$1,452,259	
Contingency (Scope and Bid)		20%			$290,452	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$1,742,711	
Project Management		6%			$104,563	Percentage from Exhibit 5-8 was used.
Remedial Design		12%			$209,125	Percentage from Exhibit 5-8 was used.
Construction Management		8%			$139,417	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$261,407	Middle value of the recommended range was used.
				TOTAL	$2,457,223	
				TOTAL CAPITAL COST	**$2,457,000**	Total capital cost is rounded to the nearest $1,000.

TABLE CS-GWU3-4

ALTERNATIVE GWU3-4

GROUNDWATER EXTRACTION (CONTAINMENT AND INTERIOR EXTRACTION)

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Under Alternative GWU3-4, extraction wells would be installed on the leading edge and in the interior of the groundwater plume. Groundwater from extraction wells at the leading edge of the groundwater plume would be discharged to the Gilbert-Mosley treatment plant, connecting to the 8" pipe. Groundwater from the interior of the groundwater plume would be extracted and treated through an air stripper system and discharged into Chisholm Creek via a surface water pipeline. The gas from the air stripper would be discharged into the atmosphere. Groundwater monitoring, upgradient and downgradient of the extraction wells, would be performed as part of this alternative to demonstrate the effectiveness of the containment system. Gilbert-Mosley treatment plant operation and maintenance costs are proportional to the expected flow rate from GWU3 under this alternative.

FUTURE CAPITAL COSTS: (Assumed to be Incurred During Year 56)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Mobilization and Demobilization of Drill Rig	CW-10-GWU3	1	LS	$10,610	$10,610	Decommissioning of NIC#3-1
Extraction Well Abandonment	CW-44-GWU3	1	EA	$9,203	$9,203	NIC#3-1
				SUBTOTAL	$19,813	
Contingency (Scope and Bid)		20%			$3,963	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$23,776	
Project Management		10%			$2,378	Percentage from Exhibit 5-8 was used.
Construction Management		15%			$3,566	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$3,566	Middle value of the recommended range was used.
				TOTAL	$33,286	
				TOTAL FUTURE CAPITAL COST	**$33,000**	Total future capital cost is rounded to the nearest $1,000.

FUTURE CAPITAL COSTS: (Assumed to be Incurred During Year 70)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Decommissioning Treatment System	CW-45-GWU3	1	LS	$24,939	$24,939	
Mobilization and Demobilization of Drill Rig	CW-10-GWU3	1	LS	$10,610	$10,610	Decommissioning of NIC#3-2 and NIC#3-3A
Extraction Well Abandonment	CW-44-GWU3	2	EA	$9,203	$18,406	NIC#3-2 and NIC#3-3A
Monitoring Well Abandonment	CW-43-GWU3	1	LS	$34,450	$34,450	
				SUBTOTAL	$88,405	
Contingency (Scope and Bid)		20%			$17,681	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$106,086	
Project Management		8%			$8,487	Percentage from Exhibit 5-8 was used.
Construction Management		10%			$10,609	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$15,913	Middle value of the recommended range was used.
				TOTAL	$141,095	
				TOTAL FUTURE CAPITAL COST	**$141,000**	Total future capital cost is rounded to the nearest $1,000.

TABLE CS-GWU3-4

ALTERNATIVE GWU3-4

GROUNDWATER EXTRACTION (CONTAINMENT AND INTERIOR EXTRACTION)

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Under Alternative GWU3-4, extraction wells would be installed on the leading edge and in the interior of the groundwater plume. Groundwater from extraction wells at the leading edge of the groundwater plume would be discharged to the Gilbert-Mosley treatment plant, connecting to the 8" pipe. Groundwater from the interior of the groundwater plume would be extracted and treated through an air stripper system and discharged into Chisholm Creek via a surface water pipeline. The gas from the air stripper would be discharged into the atmosphere. Groundwater monitoring, upgradient and downgradient of the extraction wells, would be performed as part of this alternative to demonstrate the effectiveness of the containment system. Gilbert-Mosley treatment plant operation and maintenance costs are proportional to the expected flow rate from GWU3 under this alternative.

QUARTERLY MONITORING ANNUAL COSTS: (Assumed to be Incurred During Year 1 through 2

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Groundwater Sampling Event	CW-6-GWU3	4	EA	$21,593	$86,372	Includes 2 surface water sampling points for VOCs only
Groundwater Monitoring Event Report Preparation	CW-4-GWU3	4	EA	$47,032	$188,128	
				SUBTOTAL	$274,500	
Contingency (Scope and Bid)		20%			$54,900	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$329,400	
Project Management		8%			$26,352	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$49,410	Middle value of the recommended range was used.
				TOTAL	$405,162	
	TOTAL QUARTERLY MONITORING COSTS (Years 1 through 2				**$405,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

SEMIANNUAL MONITORING ANNUAL COSTS: (Assumed to be Incurred During Year 3 through 10

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Groundwater Sampling Event	CW-6-GWU3	2	EA	$21,593	$43,186	Includes 2 surface water sampling points for VOCs only
Groundwater Monitoring Event Report Preparation	CW-4-GWU3	2	EA	$47,032	$94,064	
				SUBTOTAL	$137,250	
Contingency (Scope and Bid)		20%			$27,450	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$164,700	
Project Management		8%			$13,176	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$24,705	Middle value of the recommended range was used.
				TOTAL	$202,581	
	TOTAL SEMIANNUAL MONITORING COST (Year 3 through 10				**$203,000**	Total semiannual monitoring cost is rounded to the nearest $1,000.

ANNUAL MONITORING ANNUAL COSTS: (Assumed to be Incurred During Year 11 through 70

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Groundwater Sampling Event	CW-6-GWU3	1	EA	$21,593	$21,593	Includes 2 surface water sampling points for VOCs only
Groundwater Monitoring Event Report Preparation	CW-4-GWU3	1	EA	$47,032	$47,032	
				SUBTOTAL	$68,625	
Contingency (Scope and Bid)		20%			$13,725	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$82,350	
Project Management		10%			$8,235	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$12,353	Middle value of the recommended range was used.
				TOTAL	$102,938	
	TOTAL ANNUAL MONITORING COST (Year 11 through 70				**$103,000**	Total annual monitoring cost is rounded to the nearest $1,000.

TABLE CS-GWU3-4

ALTERNATIVE GWU3-4

GROUNDWATER EXTRACTION (CONTAINMENT AND INTERIOR EXTRACTION)

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Under Alternative GWU3-4, extraction wells would be installed on the leading edge and in the interior of the groundwater plume. Groundwater from extraction wells at the leading edge of the groundwater plume would be discharged to the Gilbert-Mosley treatment plant, connecting to the 8" pipe. Groundwater from the interior of the groundwater plume would be extracted and treated through an air stripper system and discharged into Chisholm Creek via a surface water pipeline. The gas from the air stripper would be discharged into the atmosphere. Groundwater monitoring, upgradient and downgradient of the extraction wells, would be performed as part of this alternative to demonstrate the effectiveness of the containment system. Gilbert-Mosley treatment plant operation and maintenance costs are proportional to the expected flow rate from GWU3 under this alternative.

ANNUAL OPERATING AND MAINTENANCE COSTS: (Assumed to be Incurred During Year 1 through 56

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Operation and Maintenance - Extraction Well	CW-30-GWU3	3	EA	$7,194	$21,582	NIC#3-1, NIC#3-2, and NIC#3-3A
Operation and Maintenance - Extraction Well Maintenance	CW-31-GWU3	3	EA	$10,249	$30,747	Assume annual maintenance for NIC#3-1, NIC#3-2, and NIC#3-3A
Operation and Maintenance - Gilbert-Mosley Treatment Plant (2 wells)	CW-32-GWU3	1	LS	$29,482	$29,482	Portion of overall costs based on estimated contribution from GWU3 (NIC#3-1/2).
Operation and Maintenance - New Treatment Plant	CW-34-GWU3	1	LS	$46,124	$46,124	NIC#3-3A
				SUBTOTAL	$127,935	
Contingency (Scope and Bid)		20%			$25,587	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$153,522	
Project Management		8%			$12,282	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$23,028	Middle value of the recommended range was used.
				TOTAL	$188,832	
TOTAL ANNUAL OPERATING AND MAINTENANCE COST (Year 1 through 56					**$189,000**	Total annual O&M cost is rounded to the nearest $1,000.

ANNUAL OPERATING AND MAINTENANCE COSTS: (Assumed to be Incurred During Year 57 through 70

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Operation and Maintenance - Extraction Well	CW-30-GWU3	2	EA	$7,194	$14,388	NIC#3-2 and NIC#3-3A
Operation and Maintenance - Extraction Well Maintenance	CW-31-GWU3	2	EA	$10,249	$20,498	Assume annual maintenance for NIC#3-2 and NIC#3-3A
Operation and Maintenance - Gilbert-Mosley Treatment Plant (1 well)	CW-33-GWU3	1	LS	$9,754	$9,754	Portion of overall costs based on estimated contribution from GWU3 (NIC#3-2).
Operation and Maintenance - New Treatment Plant	CW-34-GWU3	1	LS	$46,124	$46,124	NIC#3-3A
				SUBTOTAL	$90,764	
Contingency (Scope and Bid)		20%			$18,153	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$108,917	
Project Management		8%			$8,713	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$16,338	Middle value of the recommended range was used.
				TOTAL	$133,968	
TOTAL ANNUAL OPERATING AND MAINTENANCE COST (Year 57 through 70					**$134,000**	Total annual O&M cost is rounded to the nearest $1,000.

TABLE CS-GWU3-4

ALTERNATIVE GWU3-4

GROUNDWATER EXTRACTION (CONTAINMENT AND INTERIOR EXTRACTION)

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Under Alternative GWU3-4, extraction wells would be installed on the leading edge and in the interior of the groundwater plume. Groundwater from extraction wells at the leading edge of the groundwater plume would be discharged to the Gilbert-Mosley treatment plant, connecting to the 8" pipe. Groundwater from the interior of the groundwater plume would be extracted and treated through an air stripper system and discharged into Chisholm Creek via a surface water pipeline. The gas from the air stripper would be discharged into the atmosphere. Groundwater monitoring, upgradient and downgradient of the extraction wells, would be performed as part of this alternative to demonstrate the effectiveness of the containment system. Gilbert-Mosley treatment plant operation and maintenance costs are proportional to the expected flow rate from GWU3 under this alternative.

PERIODIC MINOR EQUIPMENT REPLACEMENT COSTS: (Years 5, 10, 15, 20, 25, 30, and 35)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Replace Equipment - Extraction Well Pumps	CW-39-GWU3	1	EA	$19,916	$19,916	Assume pump replacement every 5 years (NIC#3-1).
				SUBTOTAL	$19,916	
Contingency (Scope and Bid)		20%			$3,983	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$23,899	
Project Management		10%			$2,390	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$3,585	Middle value of the recommended range was used.
				TOTAL	$29,874	
	TOTAL PERIODIC MINOR EQUIPMENT REPLACEMENT COST				**$30,000**	Total periodic minor equipment replacement cost is rounded to the nearest $1,000.

PERIODIC MINOR EQUIPMENT REPLACEMENT COSTS: (Years 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, and 65)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Minor Equipment Replacement - New Treatment Plant	CW-36-GWU3	1	LS	$18,558	$18,558	NIC#3-3A
Replace Equipment - Extraction Well Pumps	CW-39-GWU3	2	EA	$19,916	$39,832	Assume pump replacement every 5 years (NIC#3-2 and NIC#3-3A).
				SUBTOTAL	$58,390	
Contingency (Scope and Bid)		20%			$11,678	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$70,068	
Project Management		10%			$7,007	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$10,510	Middle value of the recommended range was used.
				TOTAL	$87,585	
	TOTAL PERIODIC MINOR EQUIPMENT REPLACEMENT COST				**$88,000**	Total periodic minor equipment replacement cost is rounded to the nearest $1,000.

PERIODIC MAJOR EQUIPMENT REPLACEMENT COSTS: (Years 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, and 65)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Replace Equipment - Gilbert-Mosley Treatment Plant	CW-35-GWU3	1	LS	$176,541	$176,541	Portion of overall costs based on estimated contribution from GWU3.
Major Equipment Replacement - New Treatment Plant	CW-37-GWU3	1	LS	$86,327	$86,327	
General Maintenance - New Treatment Plant	CW-38-GWU3	1	LS	$27,550	$27,550	
				SUBTOTAL	$290,418	
Contingency (Scope and Bid)		20%			$58,084	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$348,502	
Project Management		8%			$27,880	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$52,275	Middle value of the recommended range was used.
				TOTAL	$428,657	
	TOTAL PERIODIC MAJOR EQUIPMENT REPLACEMENT COST				**$429,000**	Total periodic major equipment replacement cost is rounded to the nearest $1,000.

TABLE CS-GWU3-4

ALTERNATIVE GWU3-4

GROUNDWATER EXTRACTION (CONTAINMENT AND INTERIOR EXTRACTION)

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Under Alternative GWU3-4, extraction wells would be installed on the leading edge and in the interior of the groundwater plume. Groundwater from extraction wells at the leading edge of the groundwater plume would be discharged to the Gilbert-Mosley treatment plant, connecting to the 8" pipe. Groundwater from the interior of the groundwater plume would be extracted and treated through an air stripper system and discharged into Chisholm Creek via a surface water pipeline. The gas from the air stripper would be discharged into the atmosphere. Groundwater monitoring, upgradient and downgradient of the extraction wells, would be performed as part of this alternative to demonstrate the effectiveness of the containment system. Gilbert-Mosley treatment plant operation and maintenance costs are proportional to the expected flow rate from GWU3 under this alternative.

MONITORING WELL MAINTENANCE PERIODIC COSTS (Years 10, 20, 30, 40, 50, and 60)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Monitoring Well Maintenance	CW-41-GWU3	1	LS	$27,689	$27,689	Assumes well head repairs and development required.
				SUBTOTAL	$27,689	
Contingency (Scope and Bid)		20%			$5,538	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$33,227	
Project Management		10%			$3,323	The high end of the recommended range was used.
Technical Support		15%			$4,984	Middle value of the recommended range was used.
				TOTAL	$41,534	
	TOTAL MONITORING WELL MAINTENANCE PERIODIC COST				**$42,000**	Total periodic monitoring well maintenance cost is rounded to the nearest $1,000.

FIVE-YEAR SITE REVIEW PERIODIC COSTS (Years 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, and 70)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Five-Year Site Review	CW-2-GWU3	1	LS	$38,547	$38,547	
				SUBTOTAL	$38,547	
Contingency (Scope and Bid)		20%			$7,709	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$46,256	
Project Management		10%			$4,626	The high end of the recommended range was used.
Technical Support		15%			$6,938	Middle value of the recommended range was used.
				TOTAL	$57,820	
	TOTAL FIVE-YEAR SITE REVIEW PERIODIC COST				**$58,000**	Total Five-Year Review periodic cost is rounded to the nearest $1,000.

Notes:
Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.

Abbreviations:

EA	Each
QTY	Quantity
LS	Lump Sum

TABLE PV-GWU3-4

ALTERNATIVE GWU3-4
GROUNDWATER EXTRACTION (CONTAINMENT AND INTERIOR EXTRACTION)

PRESENT VALUE ANALYSIS

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Escalation Rate:	**3%**
Discount Rate:	**5%**

		O&M COSTS		PERIODIC COSTS								
Year[1]	**Capital Costs[2]**	**O&M Costs[2]**	**Monitoring Costs[2]**	**Monitoring Well Maintenance[2,3]**	**Minor Equipment Replacement Costs[2,4]**	**Major Equipment Replacement Costs[2,5]**	**Five-year Review Costs[2]**	**Total Annual Expenditure[6]**	**Escalation Factor (3%)**	**Escalated Cost[7]**	**Discount Factor (5%)**	**Present Value[8,9]**
0	$2,457,000	$0	$0	$0	$0	$0	$0	$2,457,000	1.0000	$2,457,000	1.0000	$2,457,000
1	$0	$189,000	$405,000	$0	$0	$0	$0	$594,000	1.0300	$611,820	0.9524	$582,697
2	$0	$189,000	$405,000	$0	$0	$0	$0	$594,000	1.0609	$630,175	0.9070	$571,568
3	$0	$189,000	$203,000	$0	$0	$0	$0	$392,000	1.0927	$428,338	0.8638	$369,999
4	$0	$189,000	$203,000	$0	$0	$0	$0	$392,000	1.1255	$441,196	0.8227	$362,972
5	$0	$189,000	$203,000	$0	$118,000	$0	$58,000	$568,000	1.1593	$658,482	0.7835	$515,921
6	$0	$189,000	$203,000	$0	$0	$0	$0	$392,000	1.1941	$468,087	0.7462	$349,287
7	$0	$189,000	$203,000	$0	$0	$0	$0	$392,000	1.2299	$482,121	0.7107	$342,643
8	$0	$189,000	$203,000	$0	$0	$0	$0	$392,000	1.2668	$496,586	0.6768	$336,089
9	$0	$189,000	$203,000	$0	$0	$0	$0	$392,000	1.3048	$511,482	0.6446	$329,701
10	$0	$189,000	$203,000	$42,000	$118,000	$0	$58,000	$610,000	1.3439	$819,779	0.6139	$503,262
11	$0	$189,000	$103,000	$0	$0	$0	$0	$292,000	1.3842	$404,186	0.5847	$236,328
12	$0	$189,000	$103,000	$0	$0	$0	$0	$292,000	1.4258	$416,334	0.5568	$231,815
13	$0	$189,000	$103,000	$0	$0	$0	$0	$292,000	1.4685	$428,802	0.5303	$227,394
14	$0	$189,000	$103,000	$0	$0	$0	$0	$292,000	1.5126	$441,679	0.5051	$223,092
15	$0	$189,000	$103,000	$0	$118,000	$0	$58,000	$468,000	1.5580	$729,144	0.4810	$350,718
16	$0	$189,000	$103,000	$0	$0	$0	$0	$292,000	1.6047	$468,572	0.4581	$214,653
17	$0	$189,000	$103,000	$0	$0	$0	$0	$292,000	1.6528	$482,618	0.4363	$210,566
18	$0	$189,000	$103,000	$0	$0	$0	$0	$292,000	1.7024	$497,101	0.4155	$206,545
19	$0	$189,000	$103,000	$0	$0	$0	$0	$292,000	1.7535	$512,022	0.3957	$202,607
20	$0	$189,000	$103,000	$42,000	$118,000	$0	$58,000	$510,000	1.8061	$921,111	0.3769	$347,167
21	$0	$189,000	$103,000	$0	$0	$0	$0	$292,000	1.8603	$543,208	0.3589	$194,957
22	$0	$189,000	$103,000	$0	$0	$0	$0	$292,000	1.9161	$559,501	0.3418	$191,238
23	$0	$189,000	$103,000	$0	$0	$0	$0	$292,000	1.9736	$576,291	0.3256	$187,640
24	$0	$189,000	$103,000	$0	$0	$0	$0	$292,000	2.0328	$593,578	0.3101	$184,068
25	$0	$189,000	$103,000	$0	$118,000	$0	$58,000	$468,000	2.0938	$979,898	0.2953	$289,364
26	$0	$189,000	$103,000	$0	$0	$0	$0	$292,000	2.1566	$629,727	0.2812	$177,079
27	$0	$189,000	$103,000	$0	$0	$0	$0	$292,000	2.2213	$648,620	0.2678	$173,700
28	$0	$189,000	$103,000	$0	$0	$0	$0	$292,000	2.2879	$668,067	0.2551	$170,424
29	$0	$189,000	$103,000	$0	$0	$0	$0	$292,000	2.3566	$688,127	0.2429	$167,146
30	$0	$189,000	$103,000	$42,000	$118,000	$429,000	$58,000	$939,000	2.4273	$2,279,235	0.2314	$527,415
31	$0	$189,000	$103,000	$0	$0	$0	$0	$292,000	2.5001	$730,029	0.2204	$160,898
32	$0	$189,000	$103,000	$0	$0	$0	$0	$292,000	2.5751	$751,929	0.2099	$157,830
33	$0	$189,000	$103,000	$0	$0	$0	$0	$292,000	2.6523	$774,472	0.1999	$154,817
34	$0	$189,000	$103,000	$0	$0	$0	$0	$292,000	2.7319	$797,715	0.1904	$151,885
35	$0	$189,000	$103,000	$0	$118,000	$0	$58,000	$468,000	2.8139	$1,316,905	0.1813	$238,755
36	$0	$189,000	$103,000	$0	$0	$0	$0	$292,000	2.8983	$846,304	0.1727	$146,157
37	$0	$189,000	$103,000	$0	$0	$0	$0	$292,000	2.9852	$871,678	0.1644	$143,304
38	$0	$189,000	$103,000	$0	$0	$0	$0	$292,000	3.0748	$897,842	0.1566	$140,602
39	$0	$189,000	$103,000	$0	$0	$0	$0	$292,000	3.1670	$924,764	0.1491	$137,882
40	$0	$189,000	$103,000	$42,000	$88,000	$0	$58,000	$480,000	3.2620	$1,565,760	0.1420	$222,338

TABLE PV-GWU3-4

ALTERNATIVE GWU3-4
GROUNDWATER EXTRACTION (CONTAINMENT AND INTERIOR EXTRACTION)

PRESENT VALUE ANALYSIS

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Escalation Rate:	**3%**
Discount Rate:	**5%**

		O&M COSTS		PERIODIC COSTS								
Year[1]	**Capital Costs[2]**	**O&M Costs[2]**	**Monitoring Costs[2]**	**Monitoring Well Maintenance[2,3]**	**Minor Equipment Replacement Costs[2,4]**	**Major Equipment Replacement Costs[2,5]**	**Five-year Review Costs[2]**	**Total Annual Expenditure[6]**	**Escalation Factor (3%)**	**Escalated Cost[7]**	**Discount Factor (5%)**	**Present Value[8,9]**
41	$0	$189,000	$103,000	$0	$0	$0	$0	$292,000	3.3599	$981,091	0.1353	$132,742
42	$0	$189,000	$103,000	$0	$0	$0	$0	$292,000	3.4607	$1,010,524	0.1288	$130,156
43	$0	$189,000	$103,000	$0	$0	$0	$0	$292,000	3.5645	$1,040,834	0.1227	$127,710
44	$0	$189,000	$103,000	$0	$0	$0	$0	$292,000	3.6715	$1,072,078	0.1169	$125,326
45	$0	$189,000	$103,000	$0	$88,000	$0	$58,000	$438,000	3.7816	$1,656,341	0.1113	$184,351
46	$0	$189,000	$103,000	$0	$0	$0	$0	$292,000	3.8950	$1,137,340	0.1060	$120,558
47	$0	$189,000	$103,000	$0	$0	$0	$0	$292,000	4.0119	$1,171,475	0.1009	$118,202
48	$0	$189,000	$103,000	$0	$0	$0	$0	$292,000	4.1323	$1,206,632	0.0961	$115,957
49	$0	$189,000	$103,000	$0	$0	$0	$0	$292,000	4.2562	$1,242,810	0.0916	$113,841
50	$0	$189,000	$103,000	$42,000	$88,000	$0	$58,000	$480,000	4.3839	$2,104,272	0.0872	$183,493
51	$0	$189,000	$103,000	$0	$0	$0	$0	$292,000	4.5154	$1,318,497	0.0831	$109,567
52	$0	$189,000	$103,000	$0	$0	$0	$0	$292,000	4.6509	$1,358,063	0.0791	$107,423
53	$0	$189,000	$103,000	$0	$0	$0	$0	$292,000	4.7904	$1,398,797	0.0753	$105,329
54	$0	$189,000	$103,000	$0	$0	$0	$0	$292,000	4.9341	$1,440,757	0.0717	$103,302
55	$0	$189,000	$103,000	$0	$88,000	$0	$58,000	$438,000	5.0821	$2,225,960	0.0683	$152,033
56	$33,000	$189,000	$103,000	$0	$0	$0	$0	$325,000	5.2346	$1,701,245	0.0651	$110,751
57	$0	$134,000	$103,000	$0	$0	$0	$0	$237,000	5.3917	$1,277,833	0.0620	$79,226
58	$0	$134,000	$103,000	$0	$0	$0	$0	$237,000	5.5534	$1,316,156	0.0590	$77,653
59	$0	$134,000	$103,000	$0	$0	$0	$0	$237,000	5.7200	$1,355,640	0.0562	$76,187
60	$0	$134,000	$103,000	$42,000	$88,000	$429,000	$58,000	$854,000	5.8916	$5,031,426	0.0535	$269,181
61	$0	$134,000	$103,000	$0	$0	$0	$0	$237,000	6.0684	$1,438,211	0.0510	$73,349
62	$0	$134,000	$103,000	$0	$0	$0	$0	$237,000	6.2504	$1,481,345	0.0486	$71,993
63	$0	$134,000	$103,000	$0	$0	$0	$0	$237,000	6.4379	$1,525,782	0.0462	$70,491
64	$0	$134,000	$103,000	$0	$0	$0	$0	$237,000	6.6311	$1,571,571	0.0440	$69,149
65	$0	$134,000	$103,000	$0	$88,000	$0	$58,000	$383,000	6.8300	$2,615,890	0.0419	$109,606
66	$0	$134,000	$103,000	$0	$0	$0	$0	$237,000	7.0349	$1,667,271	0.0399	$66,524
67	$0	$134,000	$103,000	$0	$0	$0	$0	$237,000	7.2459	$1,717,278	0.0380	$65,257
68	$0	$134,000	$103,000	$0	$0	$0	$0	$237,000	7.4633	$1,768,802	0.0362	$64,031
69	$0	$134,000	$103,000	$0	$0	$0	$0	$237,000	7.6872	$1,821,866	0.0345	$62,854
70	$141,000	$134,000	$103,000	$0	$88,000	$0	$58,000	$524,000	7.9178	$4,148,927	0.0329	$136,500
TOTALS:	**$2,631,000**	**$12,460,000**	**$8,614,000**	**$252,000**	**$1,442,000**	**$858,000**	**$812,000**	**$27,069,000**		**$81,754,998**		$16,422,265
TOTAL PRESENT VALUE OF ALTERNATIVE GWU3-4												**$16,422,000**

Notes:
1 - Duration is assumed to be 70 years for present value analysis. Estimated remedial timeframes are discussed within the FS report.
2 - Capital costs, for purposes of this analysis, are assumed to be distributed as indicated on Table CS-GWU3-4.
3 - Includes replacement of monitoring well vault and development.
4 - Includes replacement of extraction well pumps, some valves and system controls.
5 - Includes major building maintenance (painting, etc.), replacement of building HVAC system, replacement of building electrical system, and replacement treatment system components.
6 - Total annual expenditure is the total cost per year with no escalation or discounting.
7 - Escalation cost is the total cost per year including an escalation rate for that year. See Table PV-AERFT for details
8 - Present value is the total cost per year including a discount factor for that year. See Table PV-ADRFT for details.
9 - Total present value is rounded to the nearest $1,000. Depreciation is excluded from the present value cost.

TABLE CS-GWU3-5

ALTERNATIVE GWU3-5

GROUNDWATER EXTRACTION (CONTAINMENT AND INTERIOR EXTRACTION)

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Under Alternative GWU3-5, extraction wells would be installed on the leading edge and in the interior of the groundwater plume. Groundwater from extraction wells at the leading edge of the groundwater plume would be discharged to the Gilbert-Mosley treatment plant, connecting to the 8" pipe. Groundwater from the interior of the groundwater plume would be extracted and treated through an air stripper system and discharged into Chisholm Creek via a surface water pipeline. The gas from the air stripper would be discharged into the atmosphere. Groundwater monitoring, upgradient and downgradient of the extraction wells, would be performed as part of this alternative to demonstrate the effectiveness of the containment system. Gilbert-Mosley treatment plant operation and maintenance costs are proportional to the expected flow rate from GWU3 under this alternative.

CAPITAL COSTS: (Assumed to be Incurred During Year 1)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Institutional Controls	CW-1-GWU3	1	LS	$20,014	$20,014	
Miscellaneous Requirements for Sampling	CW-7-GWU3	1	LS	$50,143	$50,143	
Monitoring Well Installation	CW-9-GWU3	1	LS	$7,627	$7,627	Additional monitoring well clusters to increase monitoring coverage.
Miscellaneous Requirements for Construction	CW-8-GWU3	1	LS	$91,725	$91,725	
Mobilization and Demobilization of Drill Rig	CW-10-GWU3	1	LS	$10,610	$10,610	
Extraction Well Installation	CW-11-GWU3	5	EA	$48,460	$242,300	
Extraction Well Vault	CW-12-GWU3	5	EA	$49,416	$247,080	
Mobilization or Demobilization of Construction Equipment	CW-13-GWU3	5	EA	$2,086	$10,430	
Influent Piping - NIC#3-1 to Santa Fe	CW-14-GWU3	1,900	LF	$27.41	$52,079	
Influent Piping - NIC#3-2 to Santa Fe	CW-15-GWU3	2,100	LF	$27.74	$58,254	
Influent Piping - NIC#3-1/NIC#3-2 to Gilbert-Mosley GWTP	CW-17-GWU3	9,350	LF	$26.67	$249,365	
Pipe Jacking under Railroad Tracks	CW-24-GWU3	2	EA	$53,675	$107,350	
Influent Piping - NIC#3-3B to New Treatment Plant	CW-23-GWU3	5,300	LF	$25.84	$136,952	
Influent Piping - NIC#3-4 to New Treatment Plant	CW-21-GWU3	2,300	LF	$26.36	$60,628	
Influent Piping - NIC#3-5 to New Treatment Plant	CW-22-GWU3	750	LF	$29.43	$22,073	
Effluent Piping - New Treatment Plant to Chisholm Creek	CW-19-GWU3	100	LF	$54.67	$5,467	
Geotechnical Investigation for Treatment Building	CW-25-GWU3	1	LS	$15,287	$15,287	
Groundwater Treatment Plant - Building	CW-26-GWU3	1	LS	$191,870	$191,870	Includes earthwork, foundation, HVAC, lighting, insulation, etc.
Groundwater Treatment Plant - Equipment and Piping	CW-27-GWU3	1	LS	$145,503	$145,503	
Groundwater Treatment Plant - Facility Control System	CW-28-GWU3	1	LS	$77,900	$77,900	
Groundwater Treatment Plant - Startup	CW-29-GWU3	1	LS	$33,897	$33,897	
				SUBTOTAL	$1,836,554	
Contingency (Scope and Bid)		20%			$367,311	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$2,203,865	
Project Management		5%			$110,193	Percentage from Exhibit 5-8 was used.
Remedial Design		8%			$176,309	Percentage from Exhibit 5-8 was used.
Construction Management		6%			$132,232	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$330,580	Middle value of the recommended range was used.
				TOTAL	$2,953,179	
				TOTAL CAPITAL COST	**$2,953,000**	Total capital cost is rounded to the nearest $1,000.

TABLE CS-GWU3-5

ALTERNATIVE GWU3-5

GROUNDWATER EXTRACTION (CONTAINMENT AND INTERIOR EXTRACTION)

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Under Alternative GWU3-5, extraction wells would be installed on the leading edge and in the interior of the groundwater plume. Groundwater from extraction wells at the leading edge of the groundwater plume would be discharged to the Gilbert-Mosley treatment plant, connecting to the 8" pipe. Groundwater from the interior of the groundwater plume would be extracted and treated through an air stripper system and discharged into Chisholm Creek via a surface water pipeline. The gas from the air stripper would be discharged into the atmosphere. Groundwater monitoring, upgradient and downgradient of the extraction wells, would be performed as part of this alternative to demonstrate the effectiveness of the containment system. Gilbert-Mosley treatment plant operation and maintenance costs are proportional to the expected flow rate from GWU3 under this alternative.

FUTURE CAPITAL COSTS: (Assumed to be Incurred During Year 35)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Mobilization and Demobilization of Drill Rig	CW-10-GWU3	1	LS	$10,610	$10,610	Decommissioning of NIC#3-1
Extraction Well Abandonment	CW-44-GWU3	1	EA	$9,203	$9,203	NIC#3-1
				SUBTOTAL	$19,813	
Contingency (Scope and Bid)		20%			$3,963	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$23,776	
Project Management		10%			$2,378	Percentage from Exhibit 5-8 was used.
Construction Management		15%			$3,566	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$3,566	Middle value of the recommended range was used.
				TOTAL	$33,286	
				TOTAL FUTURE CAPITAL COST	**$33,000**	Total future capital cost is rounded to the nearest $1,000.

FUTURE CAPITAL COSTS: (Assumed to be Incurred During Year 63)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Mobilization and Demobilization of Drill Rig	CW-10-GWU3	1	LS	$10,610	$10,610	Decommissioning of NIC#3-2
Extraction Well Abandonment	CW-44-GWU3	1	EA	$9,203	$9,203	NIC#3-2
				SUBTOTAL	$19,813	
Contingency (Scope and Bid)		20%			$3,963	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$23,776	
Project Management		10%			$2,378	Percentage from Exhibit 5-8 was used.
Construction Management		15%			$3,566	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$3,566	Middle value of the recommended range was used.
				TOTAL	$33,286	
				TOTAL FUTURE CAPITAL COST	**$33,000**	Total future capital cost is rounded to the nearest $1,000.

TABLE CS-GWU3-5

ALTERNATIVE GWU3-5

GROUNDWATER EXTRACTION (CONTAINMENT AND INTERIOR EXTRACTION)

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Under Alternative GWU3-5, extraction wells would be installed on the leading edge and in the interior of the groundwater plume. Groundwater from extraction wells at the leading edge of the groundwater plume would be discharged to the Gilbert-Mosley treatment plant, connecting to the 8" pipe. Groundwater from the interior of the groundwater plume would be extracted and treated through an air stripper system and discharged into Chisholm Creek via a surface water pipeline. The gas from the air stripper would be discharged into the atmosphere. Groundwater monitoring, upgradient and downgradient of the extraction wells, would be performed as part of this alternative to demonstrate the effectiveness of the containment system. Gilbert-Mosley treatment plant operation and maintenance costs are proportional to the expected flow rate from GWU3 under this alternative.

FUTURE CAPITAL COSTS: (Assumed to be Incurred During Year 28)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Mobilization and Demobilization of Drill Rig	CW-10-GWU3	1	LS	$10,610	$10,610	Decommissioning of NIC#3-3B
Extraction Well Abandonment	CW-44-GWU3	1	EA	$9,203	$9,203	NIC#3-3B
				SUBTOTAL	$19,813	
Contingency (Scope and Bid)		20%			$3,963	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$23,776	
Project Management		10%			$2,378	Percentage from Exhibit 5-8 was used.
Construction Management		15%			$3,566	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$3,566	Middle value of the recommended range was used.
				TOTAL	$33,286	
				TOTAL FUTURE CAPITAL COST	**$33,000**	Total future capital cost is rounded to the nearest $1,000.

FUTURE CAPITAL COSTS: (Assumed to be Incurred During Year 70)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Decommissioning Treatment System	CW-45-GWU3	1	LS	$24,939	$24,939	
Mobilization and Demobilization of Drill Rig	CW-10-GWU3	1	LS	$10,610	$10,610	Decommissioning of NIC#3-4
Extraction Well Abandonment	CW-44-GWU3	1	EA	$9,203	$9,203	NIC#3-4
Monitoring Well Abandonment	CW-43-GWU3	1	LS	$34,450	$34,450	
				SUBTOTAL	$79,202	
Contingency (Scope and Bid)		20%			$15,840	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$95,042	
Project Management		10%			$9,504	Percentage from Exhibit 5-8 was used.
Construction Management		15%			$14,256	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$14,256	Middle value of the recommended range was used.
				TOTAL	$133,058	
				TOTAL FUTURE CAPITAL COST	**$133,000**	Total future capital cost is rounded to the nearest $1,000.

TABLE CS-GWU3-5

ALTERNATIVE GWU3-5

GROUNDWATER EXTRACTION (CONTAINMENT AND INTERIOR EXTRACTION)

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Under Alternative GWU3-5, extraction wells would be installed on the leading edge and in the interior of the groundwater plume. Groundwater from extraction wells at the leading edge of the groundwater plume would be discharged to the Gilbert-Mosley treatment plant, connecting to the 8" pipe. Groundwater from the interior of the groundwater plume would be extracted and treated through an air stripper system and discharged into Chisholm Creek via a surface water pipeline. The gas from the air stripper would be discharged into the atmosphere. Groundwater monitoring, upgradient and downgradient of the extraction wells, would be performed as part of this alternative to demonstrate the effectiveness of the containment system. Gilbert-Mosley treatment plant operation and maintenance costs are proportional to the expected flow rate from GWU3 under this alternative.

FUTURE CAPITAL COSTS: (Assumed to be Incurred During Year 42)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Mobilization and Demobilization of Drill Rig	CW-10-GWU3	1	LS	$10,610	$10,610	Decommissioning of NIC#3-5
Extraction Well Abandonment	CW-44-GWU3	1	EA	$9,203	$9,203	NIC#3-5
				SUBTOTAL	$19,813	
Contingency (Scope and Bid)		20%			$3,963	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$23,776	
Project Management		10%			$2,378	Percentage from Exhibit 5-8 was used.
Construction Management		15%			$3,566	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$3,566	Middle value of the recommended range was used.
				TOTAL	$33,286	
				TOTAL FUTURE CAPITAL COST	**$33,000**	Total future capital cost is rounded to the nearest $1,000.

QUARTERLY MONITORING ANNUAL COSTS: (Assumed to be Incurred During Year 1 through 2

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Groundwater Sampling Event	CW-6-GWU3	4	EA	$21,593	$86,372	Includes 2 surface water sampling points for VOCs only
Groundwater Monitoring Event Report Preparation	CW-4-GWU3	4	EA	$47,032	$188,128	
				SUBTOTAL	$274,500	
Contingency (Scope and Bid)		20%			$54,900	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$329,400	
Project Management		8%			$26,352	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$49,410	Middle value of the recommended range was used.
				TOTAL	$405,162	
	TOTAL QUARTERLY MONITORING COSTS (Years 1 through 2)				**$405,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

SEMIANNUAL MONITORING ANNUAL COSTS: (Assumed to be Incurred During Year 3 through 10

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Groundwater Sampling Event	CW-6-GWU3	2	EA	$21,593	$43,186	Includes 2 surface water sampling points for VOCs only
Groundwater Monitoring Event Report Preparation	CW-4-GWU3	2	EA	$47,032	$94,064	
				SUBTOTAL	$137,250	
Contingency (Scope and Bid)		20%			$27,450	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$164,700	
Project Management		8%			$13,176	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$24,705	Middle value of the recommended range was used.
				TOTAL	$202,581	
	TOTAL SEMIANNUAL MONITORING COST (Year 3 through 10)				**$203,000**	Total semiannual monitoring cost is rounded to the nearest $1,000.

TABLE CS-GWU3-5

ALTERNATIVE GWU3-5

GROUNDWATER EXTRACTION (CONTAINMENT AND INTERIOR EXTRACTION)

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Under Alternative GWU3-5, extraction wells would be installed on the leading edge and in the interior of the groundwater plume. Groundwater from extraction wells at the leading edge of the groundwater plume would be discharged to the Gilbert-Mosley treatment plant, connecting to the 8" pipe. Groundwater from the interior of the groundwater plume would be extracted and treated through an air stripper system and discharged into Chisholm Creek via a surface water pipeline. The gas from the air stripper would be discharged into the atmosphere. Groundwater monitoring, upgradient and downgradient of the extraction wells, would be performed as part of this alternative to demonstrate the effectiveness of the containment system. Gilbert-Mosley treatment plant operation and maintenance costs are proportional to the expected flow rate from GWU3 under this alternative.

ANNUAL MONITORING ANNUAL COSTS: (Assumed to be Incurred During Year 11 through 70

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Groundwater Sampling Event	CW-6-GWU3	1	EA	$21,593	$21,593	Includes 2 surface water sampling points for VOCs only
Groundwater Monitoring Event Report Preparation	CW-4-GWU3	1	EA	$47,032	$47,032	
				SUBTOTAL	$68,625	
Contingency (Scope and Bid)		20%			$13,725	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$82,350	
Project Management		10%			$8,235	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$12,353	Middle value of the recommended range was used.
				TOTAL	$102,938	
TOTAL ANNUAL MONITORING COST (Year 11 through 70					**$103,000**	Total annual monitoring cost is rounded to the nearest $1,000.

ANNUAL OPERATING AND MAINTENANCE COSTS: (Assumed to be Incurred During Year 1 through 35

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Operation and Maintenance - Extraction Well	CW-30-GWU3	2	EA	$7,194	$14,388	NIC#3-1 and NIC#3-2
Operation and Maintenance - Extraction Well Maintenance	CW-31-GWU3	2	EA	$10,249	$20,498	Assume annual maintenance for NIC#3-1 and NIC#3-2.
Operation and Maintenance - Gilbert-Mosley Treatment Plant (2 wells)	CW-32-GWU3	1	LS	$29,482	$29,482	Portion of overall costs based on estimated contribution from GWU3.
				SUBTOTAL	$64,368	
Contingency (Scope and Bid)		20%			$12,874	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$77,242	
Project Management		10%			$7,724	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$11,586	Middle value of the recommended range was used.
				TOTAL	$96,552	
TOTAL ANNUAL OPERATING AND MAINTENANCE COST (Year 1 through 35					**$97,000**	Total annual O&M cost is rounded to the nearest $1,000.

ANNUAL OPERATING AND MAINTENANCE COSTS: (Assumed to be Incurred During Year 36 through 63

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Operation and Maintenance - Extraction Well	CW-30-GWU3	1	EA	$7,194	$7,194	NIC#3-2
Operation and Maintenance - Extraction Well Maintenance	CW-31-GWU3	1	EA	$10,249	$10,249	Assume annual maintenance for NIC#3-2.
Operation and Maintenance - Gilbert-Mosley Treatment Plant (1 well)	CW-33-GWU3	1	LS	$9,754	$9,754	Portion of overall costs based on estimated contribution from GWU3.
				SUBTOTAL	$27,197	
Contingency (Scope and Bid)		20%			$5,439	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$32,636	
Project Management		10%			$3,264	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$4,895	Middle value of the recommended range was used.
				TOTAL	$40,795	
TOTAL ANNUAL OPERATING AND MAINTENANCE COST (Year 36 through 63					**$41,000**	Total annual O&M cost is rounded to the nearest $1,000.

TABLE CS-GWU3-5

ALTERNATIVE GWU3-5

GROUNDWATER EXTRACTION (CONTAINMENT AND INTERIOR EXTRACTION)

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Under Alternative GWU3-5, extraction wells would be installed on the leading edge and in the interior of the groundwater plume. Groundwater from extraction wells at the leading edge of the groundwater plume would be discharged to the Gilbert-Mosley treatment plant, connecting to the 8" pipe. Groundwater from the interior of the groundwater plume would be extracted and treated through an air stripper system and discharged into Chisholm Creek via a surface water pipeline. The gas from the air stripper would be discharged into the atmosphere. Groundwater monitoring, upgradient and downgradient of the extraction wells, would be performed as part of this alternative to demonstrate the effectiveness of the containment system. Gilbert-Mosley treatment plant operation and maintenance costs are proportional to the expected flow rate from GWU3 under this alternative.

ANNUAL OPERATING AND MAINTENANCE COSTS: (Assumed to be Incurred During Year 1 through 28

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Operation and Maintenance - Extraction Well	CW-30-GWU3	3	EA	$7,194	$21,582	NIC#3-3B, NIC#3-4, and NIC#3-5
Operation and Maintenance - Extraction Well Maintenance	CW-31-GWU3	3	EA	$10,249	$30,747	Assume annual maintenance for NIC#3-3B, NIC#3-4, and NIC#3-5
Operation and Maintenance - New Treatment Plant	CW-34-GWU3	1	LS	$46,124	$46,124	
				SUBTOTAL	$98,453	
Contingency (Scope and Bid)		20%			$19,691	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$118,144	
Project Management		8%			$9,452	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$17,722	Middle value of the recommended range was used.
				TOTAL	$145,318	
TOTAL ANNUAL OPERATING AND MAINTENANCE COST (Year 1 through 28					**$145,000**	Total annual O&M cost is rounded to the nearest $1,000.

ANNUAL OPERATING AND MAINTENANCE COSTS: (Assumed to be Incurred During Year 29 through 42

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Operation and Maintenance - Extraction Well	CW-30-GWU3	2	EA	$7,194	$14,388	NIC#3-4 and NIC#3-5
Operation and Maintenance - Extraction Well Maintenance	CW-31-GWU3	2	EA	$10,249	$20,498	Assume annual maintenance for NIC#3-4 and NIC#3-5
Operation and Maintenance - New Treatment Plant	CW-34-GWU3	1	LS	$46,124	$46,124	
				SUBTOTAL	$81,010	
Contingency (Scope and Bid)		20%			$16,202	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$97,212	
Project Management		10%			$9,721	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$14,582	Middle value of the recommended range was used.
				TOTAL	$121,515	
TOTAL ANNUAL OPERATING AND MAINTENANCE COST (Year 29 through 42					**$122,000**	Total annual O&M cost is rounded to the nearest $1,000.

ANNUAL OPERATING AND MAINTENANCE COSTS: (Assumed to be Incurred During Year 43 through 70

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Operation and Maintenance - Extraction Well	CW-30-GWU3	1	EA	$7,194	$7,194	NIC#3-4
Operation and Maintenance - Extraction Well Maintenance	CW-31-GWU3	1	EA	$10,249	$10,249	Assume annual maintenance for NIC#3-4
Operation and Maintenance - New Treatment Plant	CW-34-GWU3	1	LS	$46,124	$46,124	
				SUBTOTAL	$63,567	
Contingency (Scope and Bid)		20%			$12,713	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$76,280	
Project Management		10%			$7,628	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$11,442	Middle value of the recommended range was used.
				TOTAL	$95,350	
TOTAL ANNUAL OPERATING AND MAINTENANCE COST (Year 43 through 70					**$95,000**	Total annual O&M cost is rounded to the nearest $1,000.

TABLE CS-GWU3-5

ALTERNATIVE GWU3-5

GROUNDWATER EXTRACTION (CONTAINMENT AND INTERIOR EXTRACTION)

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Under Alternative GWU3-5, extraction wells would be installed on the leading edge and in the interior of the groundwater plume. Groundwater from extraction wells at the leading edge of the groundwater plume would be discharged to the Gilbert-Mosley treatment plant, connecting to the 8" pipe. Groundwater from the interior of the groundwater plume would be extracted and treated through an air stripper system and discharged into Chisholm Creek via a surface water pipeline. The gas from the air stripper would be discharged into the atmosphere. Groundwater monitoring, upgradient and downgradient of the extraction wells, would be performed as part of this alternative to demonstrate the effectiveness of the containment system. Gilbert-Mosley treatment plant operation and maintenance costs are proportional to the expected flow rate from GWU3 under this alternative.

PERIODIC MINOR EQUIPMENT REPLACEMENT COSTS: (Years 5, 10, 15, 20, 25, and 30)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Replace Equipment - Extraction Well Pumps	CW-39-GWU3	1	EA	$19,916	$19,916	Assume pump replacement every 5 years (NIC#3-1).
				SUBTOTAL	$19,916	
Contingency (Scope and Bid)		20%			$3,983	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$23,899	
Project Management		10%			$2,390	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$3,585	Middle value of the recommended range was used.
				TOTAL	$29,874	
	TOTAL PERIODIC MINOR EQUIPMENT REPLACEMENT COST				**$30,000**	Total periodic minor equipment replacement cost is rounded to the nearest $1,000.

PERIODIC MINOR EQUIPMENT REPLACEMENT COSTS: (Years 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, and 60)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Replace Equipment - Extraction Well Pumps	CW-39-GWU3	1	EA	$19,916	$19,916	Assume pump replacement every 5 years (NIC#3-2).
				SUBTOTAL	$19,916	
Contingency (Scope and Bid)		20%			$3,983	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$23,899	
Project Management		10%			$2,390	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$3,585	Middle value of the recommended range was used.
				TOTAL	$29,874	
	TOTAL PERIODIC MINOR EQUIPMENT REPLACEMENT COST				**$30,000**	Total periodic minor equipment replacement cost is rounded to the nearest $1,000.

PERIODIC MINOR EQUIPMENT REPLACEMENT COSTS: (Years 5, 10, 15, 20, and 25)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Replace Equipment - Extraction Well Pumps	CW-39-GWU3	1	EA	$19,916	$19,916	Assume pump replacement every 5 years (NIC#3-3B).
				SUBTOTAL	$19,916	
Contingency (Scope and Bid)		20%			$3,983	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$23,899	
Project Management		10%			$2,390	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$3,585	Middle value of the recommended range was used.
				TOTAL	$29,874	
	TOTAL PERIODIC MINOR EQUIPMENT REPLACEMENT COST				**$30,000**	Total periodic minor equipment replacement cost is rounded to the nearest $1,000.

TABLE CS-GWU3-5

ALTERNATIVE GWU3-5

GROUNDWATER EXTRACTION (CONTAINMENT AND INTERIOR EXTRACTION)

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Under Alternative GWU3-5, extraction wells would be installed on the leading edge and in the interior of the groundwater plume. Groundwater from extraction wells at the leading edge of the groundwater plume would be discharged to the Gilbert-Mosley treatment plant, connecting to the 8" pipe. Groundwater from the interior of the groundwater plume would be extracted and treated through an air stripper system and discharged into Chisholm Creek via a surface water pipeline. The gas from the air stripper would be discharged into the atmosphere. Groundwater monitoring, upgradient and downgradient of the extraction wells, would be performed as part of this alternative to demonstrate the effectiveness of the containment system. Gilbert-Mosley treatment plant operation and maintenance costs are proportional to the expected flow rate from GWU3 under this alternative.

PERIODIC MINOR EQUIPMENT REPLACEMENT COSTS: (Years 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, and 65)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Minor Equipment Replacement - New Treatment Plant	CW-36-GWU3	1	LS	$18,558	$18,558	
Replace Equipment - Extraction Well Pumps	CW-39-GWU3	1	EA	$19,916	$19,916	Assume pump replacement every 5 years (NIC#3-4).
				SUBTOTAL	$38,474	
Contingency (Scope and Bid)		20%			$7,695	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$46,169	
Project Management		10%			$4,617	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$6,925	Middle value of the recommended range was used.
				TOTAL	$57,711	
	TOTAL PERIODIC MINOR EQUIPMENT REPLACEMENT COST				**$58,000**	Total periodic minor equipment replacement cost is rounded to the nearest $1,000.

PERIODIC MINOR EQUIPMENT REPLACEMENT COSTS: (Years 5, 10, 15, 20, 25, 30, 35, and 40)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Replace Equipment - Extraction Well Pumps	CW-39-GWU3	1	EA	$19,916	$19,916	Assume pump replacement every 5 years (NIC#3-5).
				SUBTOTAL	$19,916	
Contingency (Scope and Bid)		20%			$3,983	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$23,899	
Project Management		10%			$2,390	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$3,585	Middle value of the recommended range was used.
				TOTAL	$29,874	
	TOTAL PERIODIC MINOR EQUIPMENT REPLACEMENT COST				**$30,000**	Total periodic minor equipment replacement cost is rounded to the nearest $1,000.

PERIODIC MAJOR EQUIPMENT REPLACEMENT COSTS: (Years 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, and 65)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Replace Equipment - Gilbert-Mosley Treatment Plant	CW-35-GWU3	1	LS	$176,541	$176,541	Portion of overall costs based on estimated contribution from GWU3.
Major Equipment Replacement - New Treatment Plant	CW-37-GWU3	1	LS	$86,327	$86,327	
General Maintenance - New Treatment Plant	CW-38-GWU3	1	LS	$27,550	$27,550	
				SUBTOTAL	$290,418	
Contingency (Scope and Bid)		20%			$58,084	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$348,502	
Project Management		8%			$27,880	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$52,275	Middle value of the recommended range was used.
				TOTAL	$428,657	
	TOTAL PERIODIC MAJOR EQUIPMENT REPLACEMENT COST				**$429,000**	Total periodic major equipment replacement cost is rounded to the nearest $1,000.

TABLE CS-GWU3-5

ALTERNATIVE GWU3-5

GROUNDWATER EXTRACTION (CONTAINMENT AND INTERIOR EXTRACTION)

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Under Alternative GWU3-5, extraction wells would be installed on the leading edge and in the interior of the groundwater plume. Groundwater from extraction wells at the leading edge of the groundwater plume would be discharged to the Gilbert-Mosley treatment plant, connecting to the 8" pipe. Groundwater from the interior of the groundwater plume would be extracted and treated through an air stripper system and discharged into Chisholm Creek via a surface water pipeline. The gas from the air stripper would be discharged into the atmosphere. Groundwater monitoring, upgradient and downgradient of the extraction wells, would be performed as part of this alternative to demonstrate the effectiveness of the containment system. Gilbert-Mosley treatment plant operation and maintenance costs are proportional to the expected flow rate from GWU3 under this alternative.

MONITORING WELL MAINTENANCE PERIODIC COSTS (Years 10, 20, 30, 40, 50, and 60)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Monitoring Well Maintenance	CW-41-GWU3	1	LS	$27,689	$27,689	Assumes well head repairs and development required.
				SUBTOTAL	$27,689	
Contingency (Scope and Bid)		20%			$5,538	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$33,227	
Project Management		10%			$3,323	The high end of the recommended range was used.
Technical Support		15%			$4,984	Middle value of the recommended range was used.
				TOTAL	$41,534	
	TOTAL MONITORING WELL MAINTENANCE PERIODIC COST				**$42,000**	Total periodic monitoring well maintenance cost is rounded to the nearest $1,000.

FIVE-YEAR SITE REVIEW PERIODIC COSTS (Years 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, and 70)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Five-Year Site Review	CW-2-GWU3	1	LS	$38,547	$38,547	
				SUBTOTAL	$38,547	
Contingency (Scope and Bid)		20%			$7,709	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$46,256	
Project Management		10%			$4,626	The high end of the recommended range was used.
Technical Support		15%			$6,938	Middle value of the recommended range was used.
				TOTAL	$57,820	
	TOTAL FIVE-YEAR SITE REVIEW PERIODIC COST				**$58,000**	Total Five-Year Review periodic cost is rounded to the nearest $1,000.

Notes:
Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.

Abbreviations:

EA	Each
QTY	Quantity
LS	Lump Sum

TABLE PV-GWU3-5

ALTERNATIVE GWU3-5
GROUNDWATER EXTRACTION (CONTAINMENT AND INTERIOR EXTRACTION)

PRESENT VALUE ANALYSIS

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Escalation Rate:	**3%**
Discount Rate:	**5%**

		O&M COSTS		PERIODIC COSTS								
Year[1]	**Capital Costs[2]**	**O&M Costs[2]**	**Monitoring Costs[2]**	**Monitoring Well Maintenance[2,3]**	**Minor Equipment Replacement Costs[2,4]**	**Major Equipment Replacement Costs[2,5]**	**Five-year Review Costs[2]**	**Total Annual Expenditure[6]**	**Escalation Factor (3%)**	**Escalated Cost[7]**	**Discount Factor (5%)**	**Present Value[8,9]**
0	$2,953,000	$0	$0	$0	$0	$0	$0	$2,953,000	1.0000	$2,953,000	1.0000	$2,953,000
1	$0	$242,000	$405,000	$0	$0	$0	$0	$889,000	1.0300	$915,670	0.9524	$872,084
2	$0	$242,000	$405,000	$0	$0	$0	$0	$889,000	1.0609	$943,140	0.9070	$855,428
3	$0	$242,000	$203,000	$0	$0	$0	$0	$687,000	1.0927	$750,685	0.8638	$648,442
4	$0	$242,000	$203,000	$0	$0	$0	$0	$687,000	1.1255	$773,219	0.8227	$636,127
5	$0	$242,000	$203,000	$0	$178,000	$0	$58,000	$923,000	1.1593	$1,070,034	0.7835	$838,372
6	$0	$242,000	$203,000	$0	$0	$0	$0	$687,000	1.1941	$820,347	0.7462	$612,143
7	$0	$242,000	$203,000	$0	$0	$0	$0	$687,000	1.2299	$844,941	0.7107	$600,500
8	$0	$242,000	$203,000	$0	$0	$0	$0	$687,000	1.2668	$870,292	0.6768	$589,013
9	$0	$242,000	$203,000	$0	$0	$0	$0	$687,000	1.3048	$896,398	0.6446	$577,818
10	$0	$242,000	$203,000	$42,000	$178,000	$0	$58,000	$965,000	1.3439	$1,296,864	0.6139	$796,145
11	$0	$242,000	$103,000	$0	$0	$0	$0	$587,000	1.3842	$812,525	0.5847	$475,084
12	$0	$242,000	$103,000	$0	$0	$0	$0	$587,000	1.4258	$836,945	0.5568	$466,011
13	$0	$242,000	$103,000	$0	$0	$0	$0	$587,000	1.4685	$862,010	0.5303	$457,124
14	$0	$242,000	$103,000	$0	$0	$0	$0	$587,000	1.5126	$887,896	0.5051	$448,476
15	$0	$242,000	$103,000	$0	$178,000	$0	$58,000	$823,000	1.5580	$1,282,234	0.4810	$616,755
16	$0	$242,000	$103,000	$0	$0	$0	$0	$587,000	1.6047	$941,959	0.4581	$431,511
17	$0	$242,000	$103,000	$0	$0	$0	$0	$587,000	1.6528	$970,194	0.4363	$423,295
18	$0	$242,000	$103,000	$0	$0	$0	$0	$587,000	1.7024	$999,309	0.4155	$415,213
19	$0	$242,000	$103,000	$0	$0	$0	$0	$587,000	1.7535	$1,029,305	0.3957	$407,296
20	$0	$242,000	$103,000	$42,000	$178,000	$0	$58,000	$865,000	1.8061	$1,562,277	0.3769	$588,822
21	$0	$242,000	$103,000	$0	$0	$0	$0	$587,000	1.8603	$1,091,996	0.3589	$391,917
22	$0	$242,000	$103,000	$0	$0	$0	$0	$587,000	1.9161	$1,124,751	0.3418	$384,440
23	$0	$242,000	$103,000	$0	$0	$0	$0	$587,000	1.9736	$1,158,503	0.3256	$377,209
24	$0	$242,000	$103,000	$0	$0	$0	$0	$587,000	2.0328	$1,193,254	0.3101	$370,028
25	$0	$242,000	$103,000	$0	$178,000	$0	$58,000	$823,000	2.0938	$1,723,197	0.2953	$508,860
26	$0	$242,000	$103,000	$0	$0	$0	$0	$587,000	2.1566	$1,265,924	0.2812	$355,978
27	$0	$242,000	$103,000	$0	$0	$0	$0	$587,000	2.2213	$1,303,903	0.2678	$349,185
28	$33,000	$242,000	$103,000	$0	$0	$0	$0	$620,000	2.2879	$1,418,498	0.2551	$361,859
29	$0	$219,000	$103,000	$0	$0	$0	$0	$541,000	2.3566	$1,274,921	0.2429	$309,678
30	$0	$219,000	$103,000	$42,000	$148,000	$429,000	$58,000	$1,218,000	2.4273	$2,956,451	0.2314	$684,123
31	$0	$219,000	$103,000	$0	$0	$0	$0	$541,000	2.5001	$1,352,554	0.2204	$298,103
32	$0	$219,000	$103,000	$0	$0	$0	$0	$541,000	2.5751	$1,393,129	0.2099	$292,418
33	$0	$219,000	$103,000	$0	$0	$0	$0	$541,000	2.6523	$1,434,894	0.1999	$286,835
34	$0	$219,000	$103,000	$0	$0	$0	$0	$541,000	2.7319	$1,477,958	0.1904	$281,403
35	$33,000	$219,000	$103,000	$0	$118,000	$0	$58,000	$750,000	2.8139	$2,110,425	0.1813	$382,620
36	$0	$163,000	$103,000	$0	$0	$0	$0	$429,000	2.8983	$1,243,371	0.1727	$214,730
37	$0	$163,000	$103,000	$0	$0	$0	$0	$429,000	2.9852	$1,280,651	0.1644	$210,539
38	$0	$163,000	$103,000	$0	$0	$0	$0	$429,000	3.0748	$1,319,089	0.1566	$206,569
39	$0	$163,000	$103,000	$0	$0	$0	$0	$429,000	3.1670	$1,358,643	0.1491	$202,574
40	$0	$163,000	$103,000	$42,000	$118,000	$0	$58,000	$647,000	3.2620	$2,110,514	0.1420	$299,693

TABLE PV-GWU3-5

ALTERNATIVE GWU3-5
GROUNDWATER EXTRACTION (CONTAINMENT AND INTERIOR EXTRACTION)

PRESENT VALUE ANALYSIS

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Escalation Rate: 3%
Discount Rate: 5%

		O&M COSTS		PERIODIC COSTS								
Year[1]	Capital Costs[2]	O&M Costs[2]	Monitoring Costs[2]	Monitoring Well Maintenance[2,3]	Minor Equipment Replacement Costs[2,4]	Major Equipment Replacement Costs[2,5]	Five-year Review Costs[2]	Total Annual Expenditure[6]	Escalation Factor (3%)	Escalated Cost[7]	Discount Factor (5%)	Present Value[8,9]
41	$0	$163,000	$103,000	$0	$0	$0	$0	$429,000	3.3599	$1,441,397	0.1353	$195,021
42	$33,000	$163,000	$103,000	$0	$0	$0	$0	$462,000	3.4607	$1,598,843	0.1288	$205,931
43	$0	$136,000	$103,000	$0	$0	$0	$0	$375,000	3.5645	$1,336,688	0.1227	$164,012
44	$0	$136,000	$103,000	$0	$0	$0	$0	$375,000	3.6715	$1,376,813	0.1169	$160,949
45	$0	$136,000	$103,000	$0	$88,000	$0	$58,000	$521,000	3.7816	$1,970,214	0.1113	$219,285
46	$0	$136,000	$103,000	$0	$0	$0	$0	$375,000	3.8950	$1,460,625	0.1060	$154,826
47	$0	$136,000	$103,000	$0	$0	$0	$0	$375,000	4.0119	$1,504,463	0.1009	$151,800
48	$0	$136,000	$103,000	$0	$0	$0	$0	$375,000	4.1323	$1,549,613	0.0961	$148,918
49	$0	$136,000	$103,000	$0	$0	$0	$0	$375,000	4.2562	$1,596,075	0.0916	$146,200
50	$0	$136,000	$103,000	$42,000	$88,000	$0	$58,000	$563,000	4.3839	$2,468,136	0.0872	$215,221
51	$0	$136,000	$103,000	$0	$0	$0	$0	$375,000	4.5154	$1,693,275	0.0831	$140,711
52	$0	$136,000	$103,000	$0	$0	$0	$0	$375,000	4.6509	$1,744,088	0.0791	$137,957
53	$0	$136,000	$103,000	$0	$0	$0	$0	$375,000	4.7904	$1,796,400	0.0753	$135,269
54	$0	$136,000	$103,000	$0	$0	$0	$0	$375,000	4.9341	$1,850,288	0.0717	$132,666
55	$0	$136,000	$103,000	$0	$88,000	$0	$58,000	$521,000	5.0821	$2,647,774	0.0683	$180,843
56	$0	$136,000	$103,000	$0	$0	$0	$0	$375,000	5.2346	$1,962,975	0.0651	$127,790
57	$0	$136,000	$103,000	$0	$0	$0	$0	$375,000	5.3917	$2,021,888	0.0620	$125,357
58	$0	$136,000	$103,000	$0	$0	$0	$0	$375,000	5.5534	$2,082,525	0.0590	$122,869
59	$0	$136,000	$103,000	$0	$0	$0	$0	$375,000	5.7200	$2,145,000	0.0562	$120,549
60	$0	$136,000	$103,000	$42,000	$88,000	$429,000	$58,000	$992,000	5.8916	$5,844,467	0.0535	$312,679
61	$0	$136,000	$103,000	$0	$0	$0	$0	$375,000	6.0684	$2,275,650	0.0510	$116,058
62	$0	$136,000	$103,000	$0	$0	$0	$0	$375,000	6.2504	$2,343,900	0.0486	$113,914
63	$33,000	$136,000	$103,000	$0	$0	$0	$0	$408,000	6.4379	$2,626,663	0.0462	$121,352
64	$0	$95,000	$103,000	$0	$0	$0	$0	$293,000	6.6311	$1,942,912	0.0440	$85,488
65	$0	$95,000	$103,000	$0	$58,000	$0	$58,000	$409,000	6.8300	$2,793,470	0.0419	$117,046
66	$0	$95,000	$103,000	$0	$0	$0	$0	$293,000	7.0349	$2,061,226	0.0399	$82,243
67	$0	$95,000	$103,000	$0	$0	$0	$0	$293,000	7.2459	$2,123,049	0.0380	$80,676
68	$0	$95,000	$103,000	$0	$0	$0	$0	$293,000	7.4633	$2,186,747	0.0362	$79,160
69	$0	$95,000	$103,000	$0	$0	$0	$0	$293,000	7.6872	$2,252,350	0.0345	$77,706
70	$133,000	$95,000	$103,000	$0	$0	$0	$58,000	$484,000	7.9178	$3,832,215	0.0329	$126,080
TOTALS:	**$3,218,000**	**$12,971,000**	**$8,614,000**	**$252,000**	**$1,684,000**	**$858,000**	**$812,000**	**$41,380,000**		**$116,441,592**		$25,775,996
TOTAL PRESENT VALUE OF ALTERNATIVE GWU3-5												**$25,776,000**

Notes:
1 - Duration is assumed to be 70 years for present value analysis. Estimated remedial timeframes are discussed within the FS report.
2 - Capital costs, for purposes of this analysis, are assumed to be distributed as indicated on Table CS-GWU3-5.
3 - Includes replacement of monitoring well vault and development.
4 - Includes replacement of extraction well pumps, some valves and system controls.
5 - Includes major building maintenance (painting, etc.), replacement of building HVAC system, replacement of building electrical system, and replacement treatment system components.
6 - Total annual expenditure is the total cost per year with no escalation or discounting.
7 - Escalation cost is the total cost per year including an escalation rate for that year. See Table PV-AERFT for details
8 - Present value is the total cost per year including a discount factor for that year. See Table PV-ADRFT for details.
9 - Total present value is rounded to the nearest $1,000. Depreciation is excluded from the present value cost.

TABLE PV-AERFT

ANNUAL ESCALATION RATE FACTORS TABLE

Site: North Industrial Corridor
Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Escalation Rate (Percent): 3%

Year	Escalation Factor	Year	Escalation Factor	Year	Escalation Factor
0	1.0000	30	2.4273	60	5.8916
1	1.0300	31	2.5001	61	6.0684
2	1.0609	32	2.5751	62	6.2504
3	1.0927	33	2.6523	63	6.4379
4	1.1255	34	2.7319	64	6.6311
5	1.1593	35	2.8139	65	6.8300
6	1.1941	36	2.8983	66	7.0349
7	1.2299	37	2.9852	67	7.2459
8	1.2668	38	3.0748	68	7.4633
9	1.3048	39	3.1670	69	7.6872
10	1.3439	40	3.2620	70	7.9178
11	1.3842	41	3.3599	71	8.1554
12	1.4258	42	3.4607	72	8.4000
13	1.4685	43	3.5645	73	8.6520
14	1.5126	44	3.6715	74	8.9116
15	1.5580	45	3.7816	75	9.1789
16	1.6047	46	3.8950	76	9.4543
17	1.6528	47	4.0119	77	9.7379
18	1.7024	48	4.1323	78	10.0301
19	1.7535	49	4.2562	79	10.3310
20	1.8061	50	4.3839	80	10.6409
21	1.8603	51	4.5154		
22	1.9161	52	4.6509		
23	1.9736	53	4.7904		
24	2.0328	54	4.9341		
25	2.0938	55	5.0821		
26	2.1566	56	5.2346		
27	2.2213	57	5.3917		
28	2.2879	58	5.5534		
29	2.3566	59	5.7200		

Notes:

The net present value will not be calculated with the real discount rate as recommended by EPA's *A Guide to Developing and Documenting Cost Estimates during the Feasibility Study* ; rather an inflation rate of 3 percent and a nominal discount (interest) rate of 5 percent (typical of city bonds) was applied separately in the determination of net present value.

TABLE PV-ADRFT

ANNUAL DISCOUNT RATE FACTORS TABLE

Site: North Industrial Corridor
Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Discount Rate (Percent): 5%

Year	Discount Factor[1,2]	Year	Discount Factor[1,2]	Year	Discount Factor[1,2]
0	1.0000	30	0.2314	60	0.0535
1	0.9524	31	0.2204	61	0.0510
2	0.9070	32	0.2099	62	0.0486
3	0.8638	33	0.1999	63	0.0462
4	0.8227	34	0.1904	64	0.0440
5	0.7835	35	0.1813	65	0.0419
6	0.7462	36	0.1727	66	0.0399
7	0.7107	37	0.1644	67	0.0380
8	0.6768	38	0.1566	68	0.0362
9	0.6446	39	0.1491	69	0.0345
10	0.6139	40	0.1420	70	0.0329
11	0.5847	41	0.1353	71	0.0313
12	0.5568	42	0.1288	72	0.0298
13	0.5303	43	0.1227	73	0.0284
14	0.5051	44	0.1169	74	0.0270
15	0.4810	45	0.1113	75	0.0258
16	0.4581	46	0.1060	76	0.0245
17	0.4363	47	0.1009	77	0.0234
18	0.4155	48	0.0961	78	0.0222
19	0.3957	49	0.0916	79	0.0212
20	0.3769	50	0.0872	80	0.0202
21	0.3589	51	0.0831		
22	0.3418	52	0.0791		
23	0.3256	53	0.0753		
24	0.3101	54	0.0717		
25	0.2953	55	0.0683		
26	0.2812	56	0.0651		
27	0.2678	57	0.0620		
28	0.2551	58	0.0590		
29	0.2429	59	0.0562		

Notes:

[1] Annual discount factors were calculated using the formulas and guidance presented in Section 4.0 of *A Guide to Developing and Documenting Cost Estimates During the Feasibility Study* , EPA 2000.

[2] The net present value will not be calculated with the real discount rate as recommended by EPA's *A Guide to Developing and Documenting Cost Estimates during the Feasibility Study* ; rather an inflation rate of 3 percent and a nominal discount (interest) rate of 5 percent (typical of city bonds) was applied separately in the determination of net present value.

COST WORKSHEET INDEX

Wrksht No.	Description
CW-1-GWU3	Institutional Controls
CW-2-GWU3	Five-Year Site Review
CW-3-GWU3	Groundwater Monitoring Event Report Preparation - No Action Alternative
CW-4-GWU3	Groundwater Monitoring Event Report Preparation
CW-5-GWU3	Groundwater Sampling Event - No Action Alternative
CW-6-GWU3	Groundwater Sampling Event
CW-7-GWU3	Miscellaneous Requirements for Sampling
CW-8-GWU3	Miscellaneous Requirements for Construction
CW-9-GWU3	Monitoring Well Installation
CW-10-GWU3	Mobilization and Demobilization of Drill Rig
CW-11-GWU3	Extraction Well Installation
CW-12-GWU3	Extraction Well Vault
CW-13-GWU3	Mobilization or Demobilization of Construction Equipment
CW-14-GWU3	Influent Piping - NIC#3-1 to Santa Fe
CW-15-GWU3	Influent Piping - NIC#3-2 to Santa Fe
CW-16-GWU3	Influent Piping - NIC#3-3A to New Treatment Plant
CW-17-GWU3	Influent Piping - NIC#3-1/NIC#3-2 to Gilbert-Mosley GWTP
CW-18-GWU3	Influent Piping - NIC#3-1 to New Treatment Plant
CW-19-GWU3	Effluent Piping - New Treatment Plant to Chisholm Creek
CW-20-GWU3	Influent Piping - NIC#3-2 to New Treatment Plant
CW-21-GWU3	Influent Piping - NIC#3-4 to New Treatment Plant
CW-22-GWU3	Influent Piping - NIC#3-5 to New Treatment Plant
CW-23-GWU3	Influent Piping - NIC#3-3B to New Treatment Plant
CW-24-GWU3	Pipe Jacking under Railroad Tracks
CW-25-GWU3	Geotechnical Investigation for Treatment Building
CW-26-GWU3	Groundwater Treatment Plant - Building
CW-27-GWU3	Groundwater Treatment Plant - Equipment and Piping
CW-28-GWU3	Groundwater Treatment Plant - Facility Control System
CW-29-GWU3	Groundwater Treatment Plant - Startup
CW-30-GWU3	Operation and Maintenance - Extraction Well
CW-31-GWU3	Operation and Maintenance - Extraction Well Maintenance
CW-32-GWU3	Operation and Maintenance - Gilbert-Mosley Treatment Plant (2 wells)
CW-33-GWU3	Operation and Maintenance - Gilbert-Mosley Treatment Plant (1 well)
CW-34-GWU3	Operation and Maintenance - New Treatment Plant
CW-35-GWU3	Replace Equipment - Gilbert-Mosley Treatment Plant
CW-36-GWU3	Minor Equipment Replacement - New Treatment Plant
CW-37-GWU3	Major Equipment Replacement - New Treatment Plant
CW-38-GWU3	General Maintenance - New Treatment Plant
CW-39-GWU3	Replace Equipment - Extraction Well Pumps
CW-40-GWU3	Monitoring Well Maintenance - No Action Alternative
CW-41-GWU3	Monitoring Well Maintenance
CW-42-GWU3	Monitoring Well Abandonment - No Action Alternative
CW-43-GWU3	Monitoring Well Abandonment
CW-44-GWU3	Extraction Well Abandonment
CW-45-GWU3	Decommissioning Treatment System

TABLE CW-1-GWU3

Institutional Controls
Capital Cost Sub-Element

Cost Worksheet: CW-1-GWU3

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/17/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves implemention of institutional control for the site. The following cost includes hours for a legal procedures and cost for document submission.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
L6	Environmental Lawyer	120	HR	1.00	$114.32	$114.32	$0.00	$0.00	$0.00	$0.00	$114.32	$13,718.40	0%	9%	$14,953	SE SalaryExpert.com	Overhead included in unit labor rate.
L18	Paralegal	60	HR	1.00	$47.27	$47.27	$0.00	$0.00	$0.00	$0.00	$47.27	$2,836.20	0%	9%	$3,091	SE SalaryExpert.com	Overhead included in unit labor rate.
L3	Clerks, Typist, Bookkeeper & Receptionist	40	HR	1.00	$30.90	$30.90	$0.00	$0.00	$0.00	$0.00	$30.90	$1,236.00	0%	9%	$1,347	SE SalaryExpert.com	Overhead included in unit labor rate.
M1	Reproduction Costs for Institutional Controls	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$520.00	$520.00	$520.00	10%	9%	$623	PE N/A	Includes copying and shipping
												TOTAL UNIT COST:			$20,014		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-2-GWU3

Five-Year Site Review
Periodic Cost Sub-Element

Cost Worksheet: CW-2-GWU3

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/17/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves preparation of Five-Year site review report.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
E1	Pickup Truck Rental	1	WK	1.00	$0.00	$0.00	$393.72	$393.72	$0.00	$0.00	$393.72	$393.72	10%	9%	$472	V Enterprise	Includes applicable taxes.
L23	General Operator/Technician	40	HR	1.00	$50.70	$50.70	$0.00	$0.00	$0.00	$0.00	$50.70	$2,028.00	0%	9%	$2,211	SE SalaryExpert.com	Overhead included in unit labor rate.
L15	Project Manager	40	HR	1.00	$124.22	$124.22	$0.00	$0.00	$0.00	$0.00	$124.22	$4,968.80	0%	9%	$5,416	SE SalaryExpert.com	Overhead included in unit labor rate.
L5	Environmental Engineer	120	HR	1.00	$86.14	$86.14	$0.00	$0.00	$0.00	$0.00	$86.14	$10,336.80	0%	9%	$11,267	SE SalaryExpert.com	Overhead included in unit labor rate.
L7	Environmental Scientist	160	HR	1.00	$64.56	$64.56	$0.00	$0.00	$0.00	$0.00	$64.56	$10,329.60	0%	9%	$11,259	SE SalaryExpert.com	Overhead included in unit labor rate.
L16	Quality Control Engineer	24	HR	1.00	$73.57	$73.57	$0.00	$0.00	$0.00	$0.00	$73.57	$1,765.68	0%	9%	$1,925	SE SalaryExpert.com	Overhead included in unit labor rate.
L1	CAD Drafter	40	HR	1.00	$78.06	$78.06	$0.00	$0.00	$0.00	$0.00	$78.06	$3,122.40	0%	9%	$3,403	SE SalaryExpert.com	Overhead included in unit labor rate.
L3	Clerks, Typist, Bookkeeper & Receptionist	40	HR	1.00	$30.90	$30.90	$0.00	$0.00	$0.00	$0.00	$30.90	$1,236.00	0%	9%	$1,347	SE SalaryExpert.com	Overhead included in unit labor rate.
M2	Reports	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$1,040.00	$1,040.00	$1,040.00	10%	9%	$1,247	PE N/A	Includes copying and shipping
												TOTAL UNIT COST:			$38,547		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-3-GWU3

Groundwater Monitoring **Cost Worksheet: CW-3-GWU3**
Annual Cost Sub-Element
Groundwater Monitoring Event Report Preparation - No Action Alternative

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/17/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves preparation of a report summarizing groundwater sample results under the No Action alternative. The following cost includes hours for preparation of document with contaminant plume and potentiometric surface maps, analysis of groundwater sample results, review, reproduction and shipping.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
L15	Project Manager	8	HR	1.00	$124.22	$124.22	$0.00	$0.00	$0.00	$0.00	$124.22	$993.76	0%	9%	$1,083	SE SalaryExpert.com	Overhead included in unit labor rate.
L1	CAD Drafter	20	HR	1.00	$78.06	$78.06	$0.00	$0.00	$0.00	$0.00	$78.06	$1,561.20	0%	9%	$1,702	SE SalaryExpert.com	Overhead included in unit labor rate.
L11	Geologist	100	HR	1.00	$81.29	$81.29	$0.00	$0.00	$0.00	$0.00	$81.29	$8,129.00	0%	9%	$8,861	SE SalaryExpert.com	Overhead included in unit labor rate.
L17	Quality Assurance Director	4	HR	1.00	$146.55	$146.55	$0.00	$0.00	$0.00	$0.00	$146.55	$586.20	0%	9%	$639	SE SalaryExpert.com	Overhead included in unit labor rate.
L3	Clerks, Typist, Bookkeeper & Receptionist	8	HR	1.00	$30.90	$30.90	$0.00	$0.00	$0.00	$0.00	$30.90	$247.20	0%	9%	$269	SE SalaryExpert.com	Overhead included in unit labor rate.
M30	Reproduction Costs for Groundwater Sampling Event Reports	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$510.00	$510.00	$510.00	10%	9%	$611	PE N/A	Includes copying and shipping
												TOTAL UNIT COST:			$13,165		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-4-GWU3

Groundwater Monitoring
Annual Cost Sub-Element
Groundwater Monitoring Event Report Preparation

Cost Worksheet: CW-4-GWU3

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/17/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves preparation of amonitoring report summarizing groundwater sample results. The following cost includes hours for preparation of document with contaminant plume and potentiometric surface maps, analysis of groundwater sample results, review, reproduction and shipping. Assumes local sampling crew; no per diem included.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
L15	Project Manager	8	HR	1.00	$124.22	$124.22	$0.00	$0.00	$0.00	$0.00	$124.22	$993.76	0%	9%	$1,083	SE SalaryExpert.com	Overhead included in unit labor rate.
L1	CAD Drafter	84	HR	1.00	$78.06	$78.06	$0.00	$0.00	$0.00	$0.00	$78.06	$6,557.04	0%	9%	$7,147	SE SalaryExpert.com	Overhead included in unit labor rate.
L11	Geologist	420	HR	1.00	$81.29	$81.29	$0.00	$0.00	$0.00	$0.00	$81.29	$34,141.80	0%	9%	$37,215	SE SalaryExpert.com	Overhead included in unit labor rate.
L17	Quality Assurance Director	4	HR	1.00	$146.55	$146.55	$0.00	$0.00	$0.00	$0.00	$146.55	$586.20	0%	9%	$639	SE SalaryExpert.com	Overhead included in unit labor rate.
L3	Clerks, Typist, Bookkeeper & Receptionist	10	HR	1.00	$30.90	$30.90	$0.00	$0.00	$0.00	$0.00	$30.90	$309.00	0%	9%	$337	SE SalaryExpert.com	Overhead included in unit labor rate.
M30	Reproduction Costs for Groundwater Sampling Event Reports	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$510.00	$510.00	$510.00	10%	9%	$611	PE N/A	Includes copying and shipping
												TOTAL UNIT COST:			$47,032		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-5-GWU3

Groundwater Monitoring **Cost Worksheet: CW-5-GWU3**
Annual Cost Sub-Element
Groundwater Sampling Event - No Action Alternative

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/17/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves groundwater sampling at the site under the No Action alternative. The following cost includes hours for sample collection and management and costs for sample analysis, sampling equipment, and vehicle rental. Assumes local sampling crew; no per diem included.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M3	VOCs, EPA Method SW-846 8260	12	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$80.08	$80.08	$960.96	0%	9%	$1,047	V Teklab	
M4	Filtered	0	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$72.80	$72.80	$0.00	0%	9%	$0	V Teklab	
M19	Water Quality Meter and Flow Through Cell	1	WK	1.00	$0.00	$0.00	$0.00	$0.00	$461.85	$0.00	$461.85	$461.85	0%	9%	$503	V Pine Env	
M20	Photoionization Detector (PID)	1	WK	1.00	$0.00	$0.00	$0.00	$0.00	$214.81	$0.00	$214.81	$214.81	0%	9%	$234	V Pine Env	Includes calibration gas
M21	Water Level Meter	1	WK	1.00	$0.00	$0.00	$0.00	$0.00	$64.44	$0.00	$64.44	$64.44	0%	9%	$70	V Pine Env	
M22	Turbidimeter	1	WK	1.00	$0.00	$0.00	$0.00	$0.00	$80.55	$0.00	$80.55	$80.55	0%	9%	$88	V Pine Env	
M23	Portable Bladder Pump	1	WK	1.00	$0.00	$0.00	$0.00	$0.00	$161.11	$0.00	$161.11	$161.11	0%	9%	$176	V Pine Env	
M24	Replacement Poly Bladders	12	EA	1.00	$0.00	$0.00	$0.00	$0.00	$8.59	$0.00	$8.59	$103.08	0%	9%	$112	V Pine Env	
M25	Bladder Pump Controller and Compressor	1	WK	1.00	$0.00	$0.00	$0.00	$0.00	$322.22	$0.00	$322.22	$322.22	0%	9%	$351	V Pine Env	
M26	Combination Tubing for Bladder Pump	600	LF	1.00	$0.00	$0.00	$0.00	$0.00	$0.54	$0.00	$0.54	$324.00	0%	9%	$353	V Pine Env	
M27	Shipping Rental Equipment	2	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$255.00	$255.00	$510.00	10%	9%	$611	PE N/A	
M28	55-gallon Open Head Steel Drum	2	EA	1.00	$0.00	$0.00	$0.00	$0.00	$137.43	$0.00	$137.43	$274.86	10%	9%	$330	V Global Indust.	Includes shipping
M29	Miscellaneous Sampling Equipment	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$204.00	$204.00	$204.00	10%	9%	$245	PE N/A	Paper towels, gloves, garbage bags, etc.
L15	Project Manager	1	HR	1.00	$124.22	$124.22	$0.00	$0.00	$0.00	$0.00	$124.22	$124.22	0%	9%	$135	SE SalaryExpert.com	Overhead included in unit labor rate.
L23	General Operator/Technician	56	HR	1.00	$50.70	$50.70	$0.00	$0.00	$0.00	$0.00	$50.70	$2,839.20	0%	9%	$3,095	SE SalaryExpert.com	Overhead included in unit labor rate.
L24	Contracting/Procurement Specialist	2	HR	1.00	$46.54	$46.54	$0.00	$0.00	$0.00	$0.00	$46.54	$93.08	0%	9%	$101	SE SalaryExpert.com	Overhead included in unit labor rate.
E1	Pickup Truck Rental	1	WK	1.00	$0.00	$0.00	$393.72	$393.72	$0.00	$0.00	$393.72	$393.72	10%	9%	$472	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	4	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$42.96	10%	9%	$52	PE N/A	
												TOTAL UNIT COST:			$7,975		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-6-GWU3

Groundwater Monitoring
Annual Cost Sub-Element
Groundwater Sampling Event

Cost Worksheet: CW-6-GWU3

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/17/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves groundwater sampling at the site. Cost also includes sampling at two surface water locations. The following cost includes hours for sample collection and management and costs for sample analysis, sampling equipment, and vehicle rental. Assumes local sampling crew; no per diem included.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M3	VOCs, EPA Method SW-846 8260	52	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$80.08	$80.08	$4,164.16	0%	9%	$4,539	V Teklab	
M4	Filtered	0	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$72.80	$72.80	$0.00	0%	9%	$0	V Teklab	
M19	Water Quality Meter and Flow Through Cell	2	WK	1.00	$0.00	$0.00	$0.00	$0.00	$461.85	$0.00	$461.85	$923.70	0%	9%	$1,007	V Pine Env	
M20	Photoionization Detector (PID)	2	WK	1.00	$0.00	$0.00	$0.00	$0.00	$214.81	$0.00	$214.81	$429.62	0%	9%	$468	V Pine Env	Includes calibration gas
M21	Water Level Meter	2	WK	1.00	$0.00	$0.00	$0.00	$0.00	$64.44	$0.00	$64.44	$128.88	0%	9%	$140	V Pine Env	
M22	Turbidimeter	2	WK	1.00	$0.00	$0.00	$0.00	$0.00	$80.55	$0.00	$80.55	$161.10	0%	9%	$176	V Pine Env	
M23	Portable Bladder Pump	2	WK	1.00	$0.00	$0.00	$0.00	$0.00	$161.11	$0.00	$161.11	$322.22	0%	9%	$351	V Pine Env	
M24	Replacement Poly Bladders	44	EA	1.00	$0.00	$0.00	$0.00	$0.00	$8.59	$0.00	$8.59	$377.96	0%	9%	$412	V Pine Env	
M25	Bladder Pump Controller and Compressor	2	WK	1.00	$0.00	$0.00	$0.00	$0.00	$322.22	$0.00	$322.22	$644.44	0%	9%	$702	V Pine Env	
M26	Combination Tubing for Bladder Pump	2,600	LF	1.00	$0.00	$0.00	$0.00	$0.00	$0.54	$0.00	$0.54	$1,404.00	0%	9%	$1,530	V Pine Env	
M27	Shipping Rental Equipment	2	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$255.00	$255.00	$510.00	10%	9%	$611	PE N/A	
M28	55-gallon Open Head Steel Drum	7	EA	1.00	$0.00	$0.00	$0.00	$0.00	$137.43	$0.00	$137.43	$962.01	10%	9%	$1,153	V Global Indust.	Includes shipping
M29	Miscellaneous Sampling Equipment	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$204.00	$204.00	$204.00	10%	9%	$245	PE N/A	Paper towels, gloves, garbage bags, etc.
L15	Project Manager	4	HR	1.00	$124.22	$124.22	$0.00	$0.00	$0.00	$0.00	$124.22	$496.88	0%	9%	$542	SE SalaryExpert.com	Overhead included in unit labor rate.
L23	General Operator/Technician	150	HR	1.00	$50.70	$50.70	$0.00	$0.00	$0.00	$0.00	$50.70	$7,605.00	0%	9%	$8,289	SE SalaryExpert.com	Overhead included in unit labor rate.
L24	Contracting/Procurement Specialist	7	HR	1.00	$46.54	$46.54	$0.00	$0.00	$0.00	$0.00	$46.54	$325.78	0%	9%	$355	SE SalaryExpert.com	Overhead included in unit labor rate.
E1	Pickup Truck Rental	2	WK	1.00	$0.00	$0.00	$393.72	$393.72	$0.00	$0.00	$393.72	$787.44	10%	9%	$944	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	10	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$107.40	10%	9%	$129	PE N/A	
												TOTAL UNIT COST:			$21,593		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-7-GWU3

Miscellaneous Requirements **Cost Worksheet: CW-7-GWU3**
Capital Cost Sub-Element
Miscellaneous Requirements for Sampling

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/17/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element includes all miscellaneous tasks and items that are required for preparing plans for the quality assurance plan and sampling and analysis plan for general sampling at the site, and are not included under other cost worksheet tasks or professional/technical services.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M31	Contractor Quality Assurance Plan	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$15,300.00	$15,300.00	$15,300.00	10%	9%	$18,345	PE N/A	
M34	Sampling and Analysis Plan	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$20,400.00	$20,400.00	$20,400.00	10%	9%	$24,460	PE N/A	
M35	Site Safety and Health Plan	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$6,120.00	$6,120.00	$6,120.00	10%	9%	$7,338	PE N/A	
												TOTAL UNIT COST:			$50,143		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-8-GWU3

Miscellaneous Requirements **Cost Worksheet: CW-8-GWU3**
Capital Cost Sub-Element
Miscellaneous Requirements for Construction

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/17/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element includes all miscellaneous tasks and items that are required for completion of the alternative, and are not included under other cost worksheet tasks or professional/technical services. Items included in this sub-element include contratctor work plans.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M31	Contractor Quality Assurance Plan	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$15,300.00	$15,300.00	$15,300.00	10%	9%	$18,345	PE N/A	
M32	Construction Schedule	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$4,080.00	$4,080.00	$4,080.00	10%	9%	$4,892	PE N/A	
M33	Environmental Protection Plan	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$8,160.00	$8,160.00	$8,160.00	10%	9%	$9,784	PE N/A	
M34	Sampling and Analysis Plan	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$20,400.00	$20,400.00	$20,400.00	10%	9%	$24,460	PE N/A	
M35	Site Safety and Health Plan	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$6,120.00	$6,120.00	$6,120.00	10%	9%	$7,338	PE N/A	
M36	Site Work Plan	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$10,200.00	$10,200.00	$10,200.00	10%	9%	$12,230	PE N/A	
M37	Miscellaneous Submittals	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$12,240.00	$12,240.00	$12,240.00	10%	9%	$14,676	PE N/A	
												TOTAL UNIT COST:			$91,725		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-9-GWU3

Groundwater Monitoring
Capital Cost Sub-Element
Monitoring Well Installation

Cost Worksheet: CW-9-GWU3

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/17/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves construction of additional monitoring wells. Cost assumes local oversight and no per diem.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M70	Mobilization and Demobilization of DPT Rig	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$510.00	$510.00	$510.00	10%	9%	$611	P N/A	
M41	Decontamination Pad Construction/Removal	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$760.38	$760.38	$760.38	10%	9%	$912	P N/A	
												TOTAL UNIT COST:			$1,523		

Cost Analysis:
Cost to Install Monitoring Wells

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
S1	Geoprobe rig and crew	1	DY	0.95	$0.00	$0.00	$0.00	$0.00	$0.00	$1,560.00	$1,560.00	$1,560.00	0%	0%	$1,560	P N/A	Overhead and profit included in rate
M71	Mini-Well Pre-Packed Screen	4	EA	1.00	$0.00	$0.00	$0.00	$0.00	$103.24	$0.00	$103.24	$412.96	10%	9%	$495	P N/A	
M72	PVC Casing	50	LF	1.00	$0.00	$0.00	$0.00	$0.00	$3.70	$0.00	$3.70	$185.00	10%	9%	$222	P N/A	
M73	Well Grout	50	LF	1.00	$0.00	$0.00	$0.00	$0.00	$6.00	$0.00	$6.00	$300.00	10%	9%	$360	P N/A	
M74	Locking J-Plug	2	EA	1.00	$0.00	$0.00	$0.00	$0.00	$13.80	$0.00	$13.80	$27.60	10%	9%	$33	P N/A	
M75	8" Vault	2	EA	1.00	$0.00	$0.00	$0.00	$0.00	$60.02	$0.00	$60.02	$120.04	10%	9%	$144	P N/A	
M44	Monitoring Well Completion	2	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$156.00	$156.00	$312.00	10%	9%	$374	P N/A	
M45	Monitoring Well Development	3	HR	0.95	$0.00	$0.00	$0.00	$0.00	$0.00	$182.40	$182.40	$547.20	10%	9%	$656	P N/A	
M46	IDW Handling	2	HR	0.95	$0.00	$0.00	$0.00	$0.00	$0.00	$192.66	$192.66	$385.32	10%	9%	$462	P N/A	
M47	Decontamination	2	HR	0.95	$0.00	$0.00	$0.00	$0.00	$0.00	$192.66	$192.66	$385.32	10%	9%	$462	P N/A	
M48	Standby Time	2	HR	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$148.20	$148.20	$296.40	10%	9%	$355	P N/A	
M28	55-gallon Open Head Steel Drum	1	EA	1.00	$0.00	$0.00	$0.00	$0.00	$137.43	$0.00	$137.43	$137.43	10%	9%	$165	V Global Indust.	Includes shipping
L11	Geologist	8	HR	1.00	$81.29	$81.29	$0.00	$0.00	$0.00	$0.00	$81.29	$650.32	0%	9%	$709	SE SalaryExpert.com	Overhead included in unit labor rate.
E2	Pickup Truck Rental	1	DY	1.00	$0.00	$0.00	$78.74	$78.74	$0.00	$0.00	$78.74	$78.74	10%	9%	$94	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	1	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$10.74	10%	9%	$13	PE N/A	
												TOTAL UNIT COST:			$6,104		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-10-GWU3

Groundwater Extraction and Treatment
Capital Cost Sub-Element
Mobilization and Demobilization of Drill Rig

Cost Worksheet: CW-10-GWU3

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/17/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves construction of extraction well. Cost assume local oversight and no per diem.

Cost Analysis:
Cost for Mobilize/Demobilize

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M40	Mobilization and Demobilization of Drill Rig	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$8,088.00	$8,088.00	$8,088.00	10%	9%	$9,698	P N/A	
M41	Decontamination Pad Construction/Removal	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$760.38	$760.38	$760.38	10%	9%	$912	P N/A	
												TOTAL UNIT COST:			$10,610		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-11-GWU3

Groundwater Extraction and Treatment
Capital Cost Sub-Element
Extraction Well Installation

Cost Worksheet: CW-11-GWU3

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/17/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves construction of extraction well and setting extraction well pump. Cost assumes local oversight and no per diem.

Cost Analysis:
Cost to Install Extraction Well

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M111	Well, drilled, 18" diameter borehole, reverse circulation	40	LF	0.95	$36.37	$38.28	$160.53	$168.98	$0.00	$0.00	$207.26	$8,290.53	10%	9%	$9,940	P Per Estimator	Based on E 33 23 1123 for 15" diameter borehole
M112	Well, well screen assembly, stainless steel, 10" diameter	30	LF	0.95	$11.29	$11.88	$39.22	$41.28	$116.43	$0.00	$169.60	$5,087.95	10%	9%	$6,100	E 33 23 0228	
M113	Stainless Steel Well Casing, 10"	10	LF	0.95	$11.29	$11.88	$39.22	$41.28	$201.56	$0.00	$254.73	$2,547.28	10%	9%	$3,054	E 33 23 0127	
M114	Well Filter Pack, 10" Screen	32	LF	0.95	$11.29	$11.88	$39.22	$41.28	$5.30	$0.00	$58.47	$1,870.99	10%	9%	$2,243	E 33 23 1405	
M115	Annular Seal, 10" Well, Portland Cement Grout	8	LF	0.95	$11.29	$11.88	$39.22	$41.28	$14.44	$0.00	$67.61	$540.87	10%	9%	$648	E 33 23 1805	
M116	Bentonite Seal, 10" Well	1	EA	0.95	$60.16	$63.33	$265.43	$279.40	$75.06	$0.00	$417.79	$417.79	10%	9%	$501	E 33 23 2106	
M62	Develop Well	4	HR	0.95	$96.39	$101.46	$387.60	$408.00	$259.92	$0.00	$769.38	$3,077.53	10%	9%	$3,690	C 33 21 1310 8500	
M117	Well, pump, 6" submersible, w/controls	1	EA	0.95	$763.20	$803.37	$932.80	$981.89	$8,929.44	$0.00	$10,714.70	$10,714.70	10%	9%	$12,847	E 33 23 0562	
M85	Stainless steel pipe, 4"	30	LF	0.95	$9.57	$10.07	$1.34	$1.41	$97.47	$0.00	$108.95	$3,268.63	10%	9%	$3,919	C 22111 364 1370	
M86	Steel, nipple, 6" x 4"	1	EA	0.95	$42.12	$44.34	$0.00	$0.00	$110.61	$0.00	$154.95	$154.95	10%	9%	$186	C 22111 366 3986	
M87	Steel flange, 4"	1	EA	0.95	$70.20	$73.89	$9.88	$10.40	$26.83	$0.00	$111.12	$111.12	10%	9%	$133	C 22111 347 6140	
M46	IDW Handling	2	HR	0.95	$0.00	$0.00	$0.00	$0.00	$0.00	$192.66	$192.66	$385.32	10%	9%	$462	P N/A	
M47	Decontamination	2	HR	0.95	$0.00	$0.00	$0.00	$0.00	$0.00	$192.66	$192.66	$385.32	10%	9%	$462	P N/A	
M48	Standby Time	1	HR	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$148.20	$148.20	$148.20	10%	9%	$178	P N/A	
M28	55-gallon Open Head Steel Drum	10	EA	1.00	$0.00	$0.00	$0.00	$0.00	$137.43	$0.00	$137.43	$1,374.30	10%	9%	$1,648	V Global Indust.	Includes shipping
L11	Geologist	24	HR	1.00	$81.29	$81.29	$0.00	$0.00	$0.00	$0.00	$81.29	$1,950.96	0%	9%	$2,127	SE SalaryExpert.com	Overhead included in unit labor rate.
E2	Pickup Truck Rental	3	DY	1.00	$0.00	$0.00	$78.74	$78.74	$0.00	$0.00	$78.74	$236.23	10%	9%	$283	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	3	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$32.22	10%	9%	$39	PE N/A	
												TOTAL UNIT COST:			$48,460		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-12-GWU3

Groundwater Extraction and Treatment
Capital Cost Sub-Element
Extraction Well Vault

Cost Worksheet: CW-12-GWU3

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/17/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves installation of the extraction well vault. Cost assumes local oversight and no per diem.

Cost Analysis:
Cost to Install Extraction Well

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M182	Concrete sawing, up to 12" deep	28	LF	1.00	$2.32	$2.32	$2.78	$2.78	$1.97	$0.00	$7.07	$197.96	10%	9%	$237	C 03811 350 0400	
M183	Selective concrete demolition	2	CY	1.00	$97.76	$97.76	$25.48	$25.48	$0.00	$0.00	$123.24	$246.48	10%	9%	$296	C 03050 510 0070	
M184	Selective demolition, dump charges	4	TN	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$97.76	$97.76	$391.04	10%	9%	$469	C 02411 919 0100	
M200	Excavation, machine excavation, hydraulic backhoe	8	BCY	1.00	$10.24	$10.24	$7.59	$7.59	$0.00	$0.00	$17.83	$142.64	10%	9%	$171	C 31231 616 6030	
M201	Hauling, small load	12	LCY	1.00	$4.33	$4.33	$6.18	$6.18	$0.00	$0.00	$10.51	$126.12	10%	9%	$151	C 31232 320 0416	
M202	Fill, gravel fill, compacted, 12" deep	3	ECY	1.00	$6.86	$6.86	$0.67	$0.67	$19.88	$0.00	$27.41	$82.23	10%	9%	$99	C 31232 317 1300	
M203	Precast concrete vault, 5' x 5', 4' deep	1	EA	1.00	$556.40	$556.40	$222.56	$222.56	$1,533.17	$0.00	$2,312.13	$2,312.13	10%	9%	$2,772	C 33051 613 0510	
M204	Access hatch, aluminum, H-20, 60" x 60"	1	EA	1.00	$0.00	$0.00	$0.00	$0.00	$5,475.60	$0.00	$5,475.60	$5,475.60	10%	9%	$6,565	V Bilco	
M170	Concrete, ready mix, 4000 PSI, delivered	1	CY	1.00	$0.00	$0.00	$0.00	$0.00	$101.30	$0.00	$101.30	$101.30	10%	9%	$121	C 03310 535 0300	
M171	Concrete finishing, floors, manual	24	SF	1.00	$0.38	$0.38	$0.00	$0.00	$0.00	$0.00	$0.38	$9.12	10%	9%	$11	C 03352 930 0200	
M172	Concrete, placing, direct chute, includes vibrating	1	CY	1.00	$8.22	$8.22	$0.50	$0.50	$0.00	$0.00	$8.72	$8.72	10%	9%	$10	C 03310 570 4300	
M329	Elbow, 90 Deg., plastic, PVC, socket joint, 6", schedule 80	4	EA	1.00	$40.80	$40.80	$0.00	$0.00	$33.83	$0.00	$74.63	$298.52	10%	9%	$358	C 22 11 1376 2200	
M347	Tee, plastic, PVC, socket joint, 6", schedule 80	1	EA	1.00	$61.20	$61.20	$0.00	$0.00	$56.93	$0.00	$118.13	$118.13	10%	9%	$142	C 22 11 1376 2490	
M320	Pipe, plastic, PVC, 6" diameter, schedule 80	10	LF	1.00	$10.81	$10.81	$0.00	$0.00	$20.73	$0.00	$31.54	$315.40	10%	9%	$378	C 22 11 1374 2560	
M365	Flange, plastic, PVC, socket joint, 150 lb., 6", schedule 80	8	EA	1.00	$22.44	$22.44	$0.00	$0.00	$25.78	$0.00	$48.22	$385.76	10%	9%	$463	C 22 11 1376 2534	
M312	Valves, iron body, swing check, flanged, 125 lb., 6"	1	EA	1.00	$214.20	$214.20	$0.00	$0.00	$698.14	$0.00	$912.34	$912.34	10%	9%	$1,094	C 23 05 2330 6070	
M302	Venturi flow, measuring device, 6" diameter	1	EA	1.00	$182.58	$182.58	$0.00	$0.00	$993.51	$0.00	$1,176.09	$1,176.09	10%	9%	$1,410	C 23 21 2088 0280	
M307	Valves, iron body, gate, non-rising stem, flanged, 125 lb., 6"	1	EA	1.00	$214.20	$214.20	$0.00	$0.00	$1,235.17	$0.00	$1,449.37	$1,449.37	10%	9%	$1,738	C 23 05 2330 2300	
M260	Pipe stands	3	EA	1.00	$0.00	$0.00	$0.00	$0.00	$164.27	$0.00	$164.27	$492.81	10%	9%	$591	P NA	
M190	Instrumentation allowance for extraction well vault	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$8,601.00	$8,601.00	$8,601.00	10%	9%	$10,313	P NA	Includes RTF transmitter, level and flow transmittters, etc.
M191	Electrical connection allowance for extraction well vault	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$15,600.00	$15,600.00	$15,600.00	10%	9%	$18,704	P NA	Includes transformer, wiring, breaker box, etc.
L8	Field Engineer	32	HR	1.00	$82.93	$82.93	$0.00	$0.00	$0.00	$0.00	$82.93	$2,653.76	0%	9%	$2,893	SE SalaryExpert.com	Overhead included in unit labor rate.
E2	Pickup Truck Rental	4	DY	1.00	$0.00	$0.00	$78.74	$78.74	$0.00	$0.00	$78.74	$314.98	10%	9%	$378	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	4	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$42.96	10%	9%	$52	PE N/A	
												TOTAL UNIT COST:			$49,416		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-13-GWU3

Groundwater Extraction and Treatment **Cost Worksheet: CW-13-GWU3**
Capital Cost Sub-Element
Mobilization or Demobilization of Construction Equipment

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/17/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves mobilization and demobilization of heavy equipment.

Cost Analysis:
Cost to Install Extraction Well

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M90	Mobilization/demobilization of directional drilling rig	1	EA	1.00	$390.00	$390.00	$811.20	$811.20	$0.00	$0.00	$1,201.20	$1,201.20	10%	9%	$1,440	C 33052 322 0302	
M91	Mobilization or demobilization of dozer, loader, backhoe or excavator	1	EA	1.00	$57.20	$57.20	$276.64	$276.64	$0.00	$0.00	$333.84	$333.84	10%	9%	$400	C 01543 650 0100	
M92	Mobilization/demobilization of small equipment placed in rear of, or towed by pickup	2	EA	1.00	$41.60	$41.60	$60.84	$60.84	$0.00	$0.00	$102.44	$204.88	10%	9%	$246	C 01543 650 1150	
												TOTAL UNIT COST:			$2,086		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-14-GWU3

Groundwater Extraction and Treatment
Capital Cost Sub-Element
Influent Piping - NIC#3-1 to Santa Fe

Cost Worksheet: CW-14-GWU3

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/17/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves installation of influent piping for NIC#3-1 to the tie-in point with NIC#3-2 on Santa Fe. Cost assumes local oversight and no per diem.

Cost Analysis:
Cost to Install Influent Piping

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M182	Concrete sawing, up to 12" deep	60	LF	1.00	$2.32	$2.32	$2.78	$2.78	$1.97	$0.00	$7.07	$424.20	10%	9%	$509	C 03811 350 0400	
M183	Selective concrete demolition	8	CY	1.00	$97.76	$97.76	$25.48	$25.48	$0.00	$0.00	$123.24	$985.92	10%	9%	$1,182	C 03050 510 0070	
M184	Selective demolition, dump charges	16	TN	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$97.76	$97.76	$1,564.16	10%	9%	$1,875	C 02411 919 0100	
M200	Excavation, machine excavation, hydraulic backhoe	32	BCY	1.00	$10.24	$10.24	$7.59	$7.59	$0.00	$0.00	$17.83	$570.56	10%	9%	$684	C 31231 616 6030	
M201	Hauling, small load	13	LCY	1.00	$4.33	$4.33	$6.18	$6.18	$0.00	$0.00	$10.51	$136.63	10%	9%	$164	C 31232 320 0416	
M216	Backfilling for Piping	26	LCY	1.00	$4.34	$4.34	$2.54	$2.54	$0.00	$0.00	$6.88	$178.88	10%	9%	$214	C 31231 613 3060	
M221	Compaction Fill, Walk behind vibrating Plate	20	ECY	1.00	$3.43	$3.43	$0.48	$0.48	$0.00	$0.00	$3.91	$78.20	10%	9%	$94	C 31232 323 7040	
M202	Fill, gravel fill, compacted, 12" deep	5	ECY	1.00	$6.86	$6.86	$0.67	$0.67	$19.88	$0.00	$27.41	$137.05	10%	9%	$164	C 31232 317 1300	
M173	Reinforcing steel, dowels, 2' long, #6, A615, grade	192	EA	1.00	$1.60	$1.60	$0.00	$0.00	$2.77	$0.00	$4.37	$839.04	10%	9%	$1,006	C 03211 060 2430	
M170	Concrete, ready mix, 4000 PSI, delivered	8	CY	1.00	$0.00	$0.00	$0.00	$0.00	$101.30	$0.00	$101.30	$810.40	10%	9%	$972	C 03310 535 0300	
M172	Concrete, placing, direct chute, includes vibrating	8	CY	1.00	$8.22	$8.22	$0.50	$0.50	$0.00	$0.00	$8.72	$69.76	10%	9%	$84	C 03310 570 4300	
M171	Concrete finishing, floors, manual	144	SF	1.00	$0.38	$0.38	$0.00	$0.00	$0.00	$0.00	$0.38	$54.72	10%	9%	$66	C 03352 930 0200	
M210	Directional drilling, up to 12" dia	1,900	LF	1.00	$2.22	$2.22	$4.62	$4.62	$0.09	$0.00	$6.93	$13,167.00	10%	9%	$15,787	C 33052 322 0320	
M389	Pipe, HDPE, 6" diam., DR 11	1,900	LF	1.00	$0.00	$0.00	$0.00	$0.00	$5.37	$0.00	$5.37	$10,203.00	10%	9%	$12,233	C 22 11 1378 0082	
M395	Elbow, 90 Deg., HDPE, 6" diam., DR 11	2	EA	1.00	$0.00	$0.00	$0.00	$0.00	$37.59	$0.00	$37.59	$75.18	10%	9%	$90	C 22 11 1378 0332	
M424	Welding, HDPE, labor per joint, 6" pipe size	98	EA	1.00	$22.87	$22.87	$0.00	$0.00	$0.00	$0.00	$22.87	$2,241.26	10%	9%	$2,687	C 22 11 1378 4080	Includes cost for weld setup
M430	Welding, HDPE, machine, 6" thru 8" diameter	4	DY	1.00	$0.00	$0.00	$108.12	$108.12	$0.00	$0.00	$108.12	$432.48	10%	9%	$519	C 22 11 1378 4370	
M211	Tracer wire	19	CLF	1.00	$140.40	$140.40	$0.00	$0.00	$122.65	$0.00	$263.05	$4,997.95	10%	9%	$5,993	C 26052 680 0260	
M212	Manhole for tracer wire connections, precast concre	4	EA	1.00	$184.08	$184.08	$0.00	$0.00	$394.24	$0.00	$578.32	$2,313.28	10%	9%	$2,774	C 33051 613 0510	
L8	Field Engineer	48	HR	1.00	$82.93	$82.93	$0.00	$0.00	$0.00	$0.00	$82.93	$3,980.64	0%	9%	$4,339	SE SalaryExpert.com	Overhead included in unit labor rate.
E2	Pickup Truck Rental	6	DY	1.00	$0.00	$0.00	$78.74	$78.74	$0.00	$0.00	$78.74	$472.46	10%	9%	$566	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	6	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$64.44	10%	9%	$77	PE N/A	
												TOTAL COST:			$52,079		

LENGTH OF PIPE RUN:	1,900
TOTAL UNIT COST:	$27.41

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-15-GWU3

Groundwater Extraction and Treatment
Capital Cost Sub-Element
Influent Piping - NIC#3-2 to Santa Fe

Cost Worksheet: CW-15-GWU3

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/17/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves installation of influent piping for NIC#3-2 to the tie-in point with NIC#3-1 on Santa Fe. Cost assumes local oversight and no per diem.

Cost Analysis:
Cost to Install Influent Piping

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M182	Concrete sawing, up to 12" deep	72	LF	1.00	$2.32	$2.32	$2.78	$2.78	$1.97	$0.00	$7.07	$509.04	10%	9%	$610	C 03811 350 0400	
M183	Selective concrete demolition	10	CY	1.00	$97.76	$97.76	$25.48	$25.48	$0.00	$0.00	$123.24	$1,232.40	10%	9%	$1,478	C 03050 510 0070	
M184	Selective demolition, dump charges	20	TN	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$97.76	$97.76	$1,955.20	10%	9%	$2,344	C 02411 919 0100	
M200	Excavation, machine excavation, hydraulic backhoe	40	BCY	1.00	$10.24	$10.24	$7.59	$7.59	$0.00	$0.00	$17.83	$713.20	10%	9%	$855	C 31231 616 6030	
M201	Hauling, small load	16	LCY	1.00	$4.33	$4.33	$6.18	$6.18	$0.00	$0.00	$10.51	$168.16	10%	9%	$202	C 31232 320 0416	
M216	Backfilling for Piping	32	LCY	1.00	$4.34	$4.34	$2.54	$2.54	$0.00	$0.00	$6.88	$220.16	10%	9%	$264	C 31231 613 3060	
M221	Compaction Fill, Walk behind vibrating Plate	24	ECY	1.00	$3.43	$3.43	$0.48	$0.48	$0.00	$0.00	$3.91	$93.84	10%	9%	$113	C 31232 323 7040	
M202	Fill, gravel fill, compacted, 12" deep	6	ECY	1.00	$6.86	$6.86	$0.67	$0.67	$19.88	$0.00	$27.41	$164.46	10%	9%	$197	C 31232 317 1300	
M173	Reinforcing steel, dowels, 2' long, #6, A615, grade	240	EA	1.00	$1.60	$1.60	$0.00	$0.00	$2.77	$0.00	$4.37	$1,048.80	10%	9%	$1,258	C 03211 060 2430	
M170	Concrete, ready mix, 4000 PSI, delivered	10	CY	1.00	$0.00	$0.00	$0.00	$0.00	$101.30	$0.00	$101.30	$1,013.00	10%	9%	$1,215	C 03310 535 0300	
M172	Concrete, placing, direct chute, includes vibrating	10	CY	1.00	$8.22	$8.22	$0.50	$0.50	$0.00	$0.00	$8.72	$87.20	10%	9%	$105	C 03310 570 4300	
M171	Concrete finishing, floors, manual	180	SF	1.00	$0.38	$0.38	$0.00	$0.00	$0.00	$0.00	$0.38	$68.40	10%	9%	$82	C 03352 930 0200	
M210	Directional drilling, up to 12" dia	2,100	LF	1.00	$2.22	$2.22	$4.62	$4.62	$0.09	$0.00	$6.93	$14,553.00	10%	9%	$17,449	C 33052 322 0320	
M389	Pipe, HDPE, 6" diam., DR 11	2,100	LF	1.00	$0.00	$0.00	$0.00	$0.00	$5.37	$0.00	$5.37	$11,277.00	10%	9%	$13,521	C 22 11 1378 0082	
M395	Elbow, 90 Deg., HDPE, 6" diam., DR 11	1	EA	1.00	$0.00	$0.00	$0.00	$0.00	$37.59	$0.00	$37.59	$37.59	10%	9%	$45	C 22 11 1378 0332	
M424	Welding, HDPE, labor per joint, 6" pipe size	107	EA	1.00	$22.87	$22.87	$0.00	$0.00	$0.00	$0.00	$22.87	$2,447.09	10%	9%	$2,934	C 22 11 1378 4080	Includes cost for weld setup
M430	Welding, HDPE, machine, 6" thru 8" diameter	4	DY	1.00	$0.00	$0.00	$108.12	$108.12	$0.00	$0.00	$108.12	$432.48	10%	9%	$519	C 22 11 1378 4370	
M211	Tracer wire	21	CLF	1.00	$140.40	$140.40	$0.00	$0.00	$122.65	$0.00	$263.05	$5,524.05	10%	9%	$6,623	C 26052 680 0260	
M212	Manhole for tracer wire connections, precast concre	5	EA	1.00	$184.08	$184.08	$0.00	$0.00	$394.24	$0.00	$578.32	$2,891.60	10%	9%	$3,467	C 33051 613 0510	
L8	Field Engineer	48	HR	1.00	$82.93	$82.93	$0.00	$0.00	$0.00	$0.00	$82.93	$3,980.64	0%	9%	$4,339	SE SalaryExpert.com	Overhead included in unit labor rate.
E2	Pickup Truck Rental	6	DY	1.00	$0.00	$0.00	$78.74	$78.74	$0.00	$0.00	$78.74	$472.46	10%	9%	$566	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	6	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$64.44	10%	9%	$77	PE N/A	
												TOTAL COST:			$58,263		

LENGTH OF PIPE RUN:	2,100
TOTAL UNIT COST:	$27.74

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-16-GWU3

Groundwater Extraction and Treatment **Cost Worksheet: CW-16-GWU3**
Capital Cost Sub-Element
Influent Piping - NIC#3-3A to New Treatment Plant

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/17/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves installation of influent piping from NIC#3-3A to the New Treatment Plant. Cost assumes local oversight and no per diem.

Cost Analysis:
Cost to Install Influent Piping

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M182	Concrete sawing, up to 12" deep	48	LF	1.00	$2.32	$2.32	$2.78	$2.78	$1.97	$0.00	$7.07	$339.36	10%	9%	$407	C 03811 350 0400	
M183	Selective concrete demolition	6	CY	1.00	$97.76	$97.76	$25.48	$25.48	$0.00	$0.00	$123.24	$739.44	10%	9%	$887	C 03050 510 0070	
M184	Selective demolition, dump charges	12	TN	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$97.76	$97.76	$1,173.12	10%	9%	$1,407	C 02411 919 0100	
M200	Excavation, machine excavation, hydraulic backhoe	24	BCY	1.00	$10.24	$10.24	$7.59	$7.59	$0.00	$0.00	$17.83	$427.92	10%	9%	$513	C 31231 616 6030	
M201	Hauling, small load	10	LCY	1.00	$4.33	$4.33	$6.18	$6.18	$0.00	$0.00	$10.51	$105.10	10%	9%	$126	C 31232 320 0416	
M216	Backfilling for Piping	19	LCY	1.00	$4.34	$4.34	$2.54	$2.54	$0.00	$0.00	$6.88	$130.72	10%	9%	$157	C 31231 613 3060	
M221	Compaction Fill, Walk behind vibrating Plate	15	ECY	1.00	$3.43	$3.43	$0.48	$0.48	$0.00	$0.00	$3.91	$58.65	10%	9%	$70	C 31232 323 7040	
M202	Fill, gravel fill, compacted, 12" deep	4	ECY	1.00	$6.86	$6.86	$0.67	$0.67	$19.88	$0.00	$27.41	$109.64	10%	9%	$131	C 31232 317 1300	
M173	Reinforcing steel, dowels, 2' long, #6, A615, grade	144	EA	1.00	$1.60	$1.60	$0.00	$0.00	$2.77	$0.00	$4.37	$629.28	10%	9%	$755	C 03211 060 2430	
M170	Concrete, ready mix, 4000 PSI, delivered	6	CY	1.00	$0.00	$0.00	$0.00	$0.00	$101.30	$0.00	$101.30	$607.80	10%	9%	$729	C 03310 535 0300	
M172	Concrete, placing, direct chute, includes vibrating	6	CY	1.00	$8.22	$8.22	$0.50	$0.50	$0.00	$0.00	$8.72	$52.32	10%	9%	$63	C 03310 570 4300	
M171	Concrete finishing, floors, manual	108	SF	1.00	$0.38	$0.38	$0.00	$0.00	$0.00	$0.00	$0.38	$41.04	10%	9%	$49	C 03352 930 0200	
M210	Directional drilling, up to 12" dia	1,300	LF	1.00	$2.22	$2.22	$4.62	$4.62	$0.09	$0.00	$6.93	$9,009.00	10%	9%	$10,802	C 33052 322 0320	
M389	Pipe, HDPE, 6" diam., DR 11	1,300	LF	1.00	$0.00	$0.00	$0.00	$0.00	$5.37	$0.00	$5.37	$6,981.00	10%	9%	$8,370	C 22 11 1378 0082	
M395	Elbow, 90 Deg., HDPE, 6" diam., DR 11	1	EA	1.00	$0.00	$0.00	$0.00	$0.00	$37.59	$0.00	$37.59	$37.59	10%	9%	$45	C 22 11 1378 0332	
M413	Tee, HDPE, 6" diam., DR 11	1	EA	1.00	$0.00	$0.00	$0.00	$0.00	$49.41	$0.00	$49.41	$49.41	10%	9%	$59	C 22 11 1378 0732	
M424	Welding, HDPE, labor per joint, 6" pipe size	30	EA	1.00	$22.87	$22.87	$0.00	$0.00	$0.00	$0.00	$22.87	$686.10	10%	9%	$823	C 22 11 1378 4080	Includes cost for weld setup
M430	Welding, HDPE, machine, 6" thru 8" diameter	3	DY	1.00	$0.00	$0.00	$108.12	$108.12	$0.00	$0.00	$108.12	$324.36	10%	9%	$389	C 22 11 1378 4370	
M211	Tracer wire	13	CLF	1.00	$140.40	$140.40	$0.00	$0.00	$122.65	$0.00	$263.05	$3,419.65	10%	9%	$4,100	C 26052 680 0260	
M212	Manhole for tracer wire connections, precast concre	3	EA	1.00	$184.08	$184.08	$0.00	$0.00	$394.24	$0.00	$578.32	$1,734.96	10%	9%	$2,080	C 33051 613 0510	
L8	Field Engineer	32	HR	1.00	$82.93	$82.93	$0.00	$0.00	$0.00	$0.00	$82.93	$2,653.76	0%	9%	$2,893	SE SalaryExpert.com	Overhead included in unit labor rate.
E2	Pickup Truck Rental	4	DY	1.00	$0.00	$0.00	$78.74	$78.74	$0.00	$0.00	$78.74	$314.98	10%	9%	$378	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	4	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$42.96	10%	9%	$52	PE N/A	
												TOTAL COST:			$35,285		

LENGTH OF PIPE RUN:	1,300
TOTAL UNIT COST:	$27.14

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-17-GWU3

Groundwater Extraction and Treatment **Cost Worksheet: CW-17-GWU3**
Capital Cost Sub-Element
Influent Piping - NIC#3-1/NIC#3-2 to Gilbert-Mosley GWTP

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/17/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves installation of influent piping from the tie in points for NIC#3-1 and NIC#3-2 to the Gilbert-Mosley Treatment Plant. Cost assumes local oversight and no per diem.

Cost Analysis:
Cost to Install Influent Piping

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M182	Concrete sawing, up to 12" deep	240	LF	1.00	$2.32	$2.32	$2.78	$2.78	$1.97	$0.00	$7.07	$1,696.80	10%	9%	$2,034	C 03811 350 0400	
M183	Selective concrete demolition	38	CY	1.00	$97.76	$97.76	$25.48	$25.48	$0.00	$0.00	$123.24	$4,683.12	10%	9%	$5,615	C 03050 510 0070	
M184	Selective demolition, dump charges	76	TN	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$97.76	$97.76	$7,429.76	10%	9%	$8,908	C 02411 919 0100	
M200	Excavation, machine excavation, hydraulic backhoe	152	BCY	1.00	$10.24	$10.24	$7.59	$7.59	$0.00	$0.00	$17.83	$2,710.16	10%	9%	$3,249	C 31231 616 6030	
M201	Hauling, small load	61	LCY	1.00	$4.33	$4.33	$6.18	$6.18	$0.00	$0.00	$10.51	$641.11	10%	9%	$769	C 31232 320 0416	
M216	Backfilling for Piping	122	LCY	1.00	$4.34	$4.34	$2.54	$2.54	$0.00	$0.00	$6.88	$839.36	10%	9%	$1,006	C 31231 613 3060	
M221	Compaction Fill, Walk behind vibrating Plate	92	ECY	1.00	$3.43	$3.43	$0.48	$0.48	$0.00	$0.00	$3.91	$359.72	10%	9%	$431	C 31232 323 7040	
M202	Fill, gravel fill, compacted, 12" deep	22	ECY	1.00	$6.86	$6.86	$0.67	$0.67	$19.88	$0.00	$27.41	$603.02	10%	9%	$723	C 31232 317 1300	
M173	Reinforcing steel, dowels, 2' long, #6, A615, grade	912	EA	1.00	$1.60	$1.60	$0.00	$0.00	$2.77	$0.00	$4.37	$3,985.44	10%	9%	$4,779	C 03211 060 2430	
M170	Concrete, ready mix, 4000 PSI, delivered	38	CY	1.00	$0.00	$0.00	$0.00	$0.00	$101.30	$0.00	$101.30	$3,849.40	10%	9%	$4,615	C 03310 535 0300	
M172	Concrete, placing, direct chute, includes vibrating	38	CY	1.00	$8.22	$8.22	$0.50	$0.50	$0.00	$0.00	$8.72	$331.36	10%	9%	$397	C 03310 570 4300	
M171	Concrete finishing, floors, manual	684	SF	1.00	$0.38	$0.38	$0.00	$0.00	$0.00	$0.00	$0.38	$259.92	10%	9%	$312	C 03352 930 0200	
M210	Directional drilling, up to 12" dia	9,150	LF	1.00	$2.22	$2.22	$4.62	$4.62	$0.09	$0.00	$6.93	$63,409.50	10%	9%	$76,028	C 33052 322 0320	
M389	Pipe, HDPE, 6" diam., DR 11	9,350	LF	1.00	$0.00	$0.00	$0.00	$0.00	$5.37	$0.00	$5.37	$50,209.50	10%	9%	$60,201	C 22 11 1378 0082	
M395	Elbow, 90 Deg., HDPE, 6" diam., DR 11	0	EA	1.00	$0.00	$0.00	$0.00	$0.00	$37.59	$0.00	$37.59	$0.00	10%	9%	$0	C 22 11 1378 0332	
M413	Tee, HDPE, 6" diam., DR 11	3	EA	1.00	$0.00	$0.00	$0.00	$0.00	$49.41	$0.00	$49.41	$148.23	10%	9%	$178	C 22 11 1378 0732	
M424	Welding, HDPE, labor per joint, 6" pipe size	471	EA	1.00	$22.87	$22.87	$0.00	$0.00	$0.00	$0.00	$22.87	$10,771.77	10%	9%	$12,915	C 22 11 1378 4080	Includes cost for weld setup
M430	Welding, HDPE, machine, 6" thru 8" diameter	16	DY	1.00	$0.00	$0.00	$108.12	$108.12	$0.00	$0.00	$108.12	$1,729.92	10%	9%	$2,074	C 22 11 1378 4370	
M211	Tracer wire	94	CLF	1.00	$140.40	$140.40	$0.00	$0.00	$122.65	$0.00	$263.05	$24,595.18	10%	9%	$29,490	C 26052 680 0260	
M212	Manhole for tracer wire connections, precast concre	19	EA	1.00	$184.08	$184.08	$0.00	$0.00	$394.24	$0.00	$578.32	$10,988.08	10%	9%	$13,175	C 33051 613 0510	
L8	Field Engineer	216	HR	1.00	$82.93	$82.93	$0.00	$0.00	$0.00	$0.00	$82.93	$17,912.88	0%	9%	$19,525	SE SalaryExpert.com	Overhead included in unit labor rate.
E2	Pickup Truck Rental	27	DY	1.00	$0.00	$0.00	$78.74	$78.74	$0.00	$0.00	$78.74	$2,126.09	10%	9%	$2,549	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	27	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$289.98	10%	9%	$348	PE N/A	
												TOTAL COST:			$249,321		

LENGTH OF PIPE RUN:	9,350
TOTAL UNIT COST:	$26.67

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-18-GWU3

Groundwater Extraction and Treatment **Cost Worksheet: CW-18-GWU3**
Capital Cost Sub-Element
Influent Piping - NIC#3-1 to New Treatment Plant

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/17/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves installation of influent piping from NIC#3-1 to a new treatment plant anticipated to be installed at Central and Chisholm Creek. Cost assumes local oversight and no per diem.

Cost Analysis:
Cost to Install Influent Piping

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M182	Concrete sawing, up to 12" deep	108	LF	1.00	$2.32	$2.32	$2.78	$2.78	$1.97	$0.00	$7.07	$763.56	10%	9%	$916	C 03811 350 0400	
M183	Selective concrete demolition	16	CY	1.00	$97.76	$97.76	$25.48	$25.48	$0.00	$0.00	$123.24	$1,971.84	10%	9%	$2,364	C 03050 510 0070	
M184	Selective demolition, dump charges	32	TN	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$97.76	$97.76	$3,128.32	10%	9%	$3,751	C 02411 919 0100	
M200	Excavation, machine excavation, hydraulic backhoe	64	BCY	1.00	$10.24	$10.24	$7.59	$7.59	$0.00	$0.00	$17.83	$1,141.12	10%	9%	$1,368	C 31231 616 6030	
M201	Hauling, small load	26	LCY	1.00	$4.33	$4.33	$6.18	$6.18	$0.00	$0.00	$10.51	$273.26	10%	9%	$328	C 31232 320 0416	
M216	Backfilling for Piping	51	LCY	1.00	$4.34	$4.34	$2.54	$2.54	$0.00	$0.00	$6.88	$350.88	10%	9%	$421	C 31231 613 3060	
M221	Compaction Fill, Walk behind vibrating Plate	39	ECY	1.00	$3.43	$3.43	$0.48	$0.48	$0.00	$0.00	$3.91	$152.49	10%	9%	$183	C 31232 323 7040	
M202	Fill, gravel fill, compacted, 12" deep	9	ECY	1.00	$6.86	$6.86	$0.67	$0.67	$19.88	$0.00	$27.41	$246.69	10%	9%	$296	C 31232 317 1300	
M173	Reinforcing steel, dowels, 2' long, #6, A615, grade	384	EA	1.00	$1.60	$1.60	$0.00	$0.00	$2.77	$0.00	$4.37	$1,678.08	10%	9%	$2,012	C 03211 060 2430	
M170	Concrete, ready mix, 4000 PSI, delivered	16	CY	1.00	$0.00	$0.00	$0.00	$0.00	$101.30	$0.00	$101.30	$1,620.80	10%	9%	$1,943	C 03310 535 0300	
M172	Concrete, placing, direct chute, includes vibrating	16	CY	1.00	$8.22	$8.22	$0.50	$0.50	$0.00	$0.00	$8.72	$139.52	10%	9%	$167	C 03310 570 4300	
M171	Concrete finishing, floors, manual	288	SF	1.00	$0.38	$0.38	$0.00	$0.00	$0.00	$0.00	$0.38	$109.44	10%	9%	$131	C 03352 930 0200	
M210	Directional drilling, up to 12" dia	3,950	LF	1.00	$2.22	$2.22	$4.62	$4.62	$0.09	$0.00	$6.93	$27,373.50	10%	9%	$32,821	C 33052 322 0320	
M389	Pipe, HDPE, 6" diam., DR 11	3,950	LF	1.00	$0.00	$0.00	$0.00	$0.00	$5.37	$0.00	$5.37	$21,211.50	10%	9%	$25,433	C 22 11 1378 0082	
M395	Elbow, 90 Deg., HDPE, 6" diam., DR 11	0	EA	1.00	$0.00	$0.00	$0.00	$0.00	$37.59	$0.00	$37.59	$0.00	10%	9%	$0	C 22 11 1378 0332	
M413	Tee, HDPE, 6" diam., DR 11	1	EA	1.00	$0.00	$0.00	$0.00	$0.00	$49.41	$0.00	$49.41	$49.41	10%	9%	$59	C 22 11 1378 0732	
M424	Welding, HDPE, labor per joint, 6" pipe size	200	EA	1.00	$22.87	$22.87	$0.00	$0.00	$0.00	$0.00	$22.87	$4,574.00	10%	9%	$5,484	C 22 11 1378 4080	Includes cost for weld setup
M430	Welding, HDPE, machine, 6" thru 8" diameter	7	DY	1.00	$0.00	$0.00	$108.12	$108.12	$0.00	$0.00	$108.12	$756.84	10%	9%	$907	C 22 11 1378 4370	
M211	Tracer wire	40	CLF	1.00	$140.40	$140.40	$0.00	$0.00	$122.65	$0.00	$263.05	$10,390.48	10%	9%	$12,458	C 26052 680 0260	
M212	Manhole for tracer wire connections, precast concre	8	EA	1.00	$184.08	$184.08	$0.00	$0.00	$394.24	$0.00	$578.32	$4,626.56	10%	9%	$5,547	C 33051 613 0510	
L8	Field Engineer	96	HR	1.00	$82.93	$82.93	$0.00	$0.00	$0.00	$0.00	$82.93	$7,961.28	0%	9%	$8,678	SE SalaryExpert.com	Overhead included in unit labor rate.
E2	Pickup Truck Rental	12	DY	1.00	$0.00	$0.00	$78.74	$78.74	$0.00	$0.00	$78.74	$944.93	10%	9%	$1,133	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	12	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$128.88	10%	9%	$155	PE N/A	
												TOTAL COST:			$106,555		

LENGTH OF PIPE RUN:	3,950
TOTAL UNIT COST:	$26.98

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-19-GWU3

Groundwater Extraction and Treatment **Cost Worksheet: CW-19-GWU3**
Capital Cost Sub-Element
Effluent Piping - New Treatment Plant to Chisholm Creek

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/17/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves installation of effluent piping from the treatment plant to Chisholm Creek. Treatment Plant projected to be located at Central and Chisholm Creek. Cost assumes local oversight and no per diem.

Cost Analysis:
Cost to Install Effluent Piping

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M182	Concrete sawing, up to 12" deep	24	LF	1.00	$2.32	$2.32	$2.78	$2.78	$1.97	$0.00	$7.07	$169.68	10%	9%	$203	C 03811 350 0400	
M183	Selective concrete demolition	2	CY	1.00	$97.76	$97.76	$25.48	$25.48	$0.00	$0.00	$123.24	$246.48	10%	9%	$296	C 03050 510 0070	
M184	Selective demolition, dump charges	4	TN	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$97.76	$97.76	$391.04	10%	9%	$469	C 02411 919 0100	
M200	Excavation, machine excavation, hydraulic backhoe	8	BCY	1.00	$10.24	$10.24	$7.59	$7.59	$0.00	$0.00	$17.83	$142.64	10%	9%	$171	C 31231 616 6030	
M201	Hauling, small load	4	LCY	1.00	$4.33	$4.33	$6.18	$6.18	$0.00	$0.00	$10.51	$42.04	10%	9%	$50	C 31232 320 0416	
M216	Backfilling for Piping	6	LCY	1.00	$4.34	$4.34	$2.54	$2.54	$0.00	$0.00	$6.88	$41.28	10%	9%	$49	C 31231 613 3060	
M221	Compaction Fill, Walk behind vibrating Plate	5	ECY	1.00	$3.43	$3.43	$0.48	$0.48	$0.00	$0.00	$3.91	$19.55	10%	9%	$23	C 31232 323 7040	
M202	Fill, gravel fill, compacted, 12" deep	2	ECY	1.00	$6.86	$6.86	$0.67	$0.67	$19.88	$0.00	$27.41	$54.82	10%	9%	$66	C 31232 317 1300	
M173	Reinforcing steel, dowels, 2' long, #6, A615, grade	48	EA	1.00	$1.60	$1.60	$0.00	$0.00	$2.77	$0.00	$4.37	$209.76	10%	9%	$252	C 03211 060 2430	
M170	Concrete, ready mix, 4000 PSI, delivered	2	CY	1.00	$0.00	$0.00	$0.00	$0.00	$101.30	$0.00	$101.30	$202.60	10%	9%	$243	C 03310 535 0300	
M172	Concrete, placing, direct chute, includes vibrating	2	CY	1.00	$8.22	$8.22	$0.50	$0.50	$0.00	$0.00	$8.72	$17.44	10%	9%	$21	C 03310 570 4300	
M171	Concrete finishing, floors, manual	36	SF	1.00	$0.38	$0.38	$0.00	$0.00	$0.00	$0.00	$0.38	$13.68	10%	9%	$16	C 03352 930 0200	
M210	Directional drilling, up to 12" dia	100	LF	1.00	$2.22	$2.22	$4.62	$4.62	$0.09	$0.00	$6.93	$693.00	10%	9%	$831	C 33052 322 0320	
M389	Pipe, HDPE, 6" diam., DR 11	100	LF	1.00	$0.00	$0.00	$0.00	$0.00	$5.37	$0.00	$5.37	$537.00	10%	9%	$644	C 22 11 1378 0082	
M395	Elbow, 90 Deg., HDPE, 6" diam., DR 11	0	EA	1.00	$0.00	$0.00	$0.00	$0.00	$37.59	$0.00	$37.59	$0.00	10%	9%	$0	C 22 11 1378 0332	
M413	Tee, HDPE, 6" diam., DR 11	0	EA	1.00	$0.00	$0.00	$0.00	$0.00	$49.41	$0.00	$49.41	$0.00	10%	9%	$0	C 22 11 1378 0732	
M424	Welding, HDPE, labor per joint, 6" pipe size	6	EA	1.00	$22.87	$22.87	$0.00	$0.00	$0.00	$0.00	$22.87	$137.22	10%	9%	$165	C 22 11 1378 4080	Includes cost for weld setup
M430	Welding, HDPE, machine, 6" thru 8" diameter	1	DY	1.00	$0.00	$0.00	$108.12	$108.12	$0.00	$0.00	$108.12	$108.12	10%	9%	$130	C 22 11 1378 4370	
M211	Tracer wire	1	CLF	1.00	$140.40	$140.40	$0.00	$0.00	$122.65	$0.00	$263.05	$263.05	10%	9%	$315	C 26052 680 0260	
M212	Manhole for tracer wire connections, precast concre	1	EA	1.00	$184.08	$184.08	$0.00	$0.00	$394.24	$0.00	$578.32	$578.32	10%	9%	$693	C 33051 613 0510	
L8	Field Engineer	8	HR	1.00	$82.93	$82.93	$0.00	$0.00	$0.00	$0.00	$82.93	$663.44	0%	9%	$723	SE SalaryExpert.com	Overhead included in unit labor rate.
E2	Pickup Truck Rental	1	DY	1.00	$0.00	$0.00	$78.74	$78.74	$0.00	$0.00	$78.74	$78.74	10%	9%	$94	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	1	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$10.74	10%	9%	$13	PE N/A	
												TOTAL COST:			$5,467		

LENGTH OF PIPE RUN:	100
TOTAL UNIT COST:	$54.67

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-20-GWU3

Groundwater Extraction and Treatment **Cost Worksheet: CW-20-GWU3**
Capital Cost Sub-Element
Influent Piping - NIC#3-2 to New Treatment Plant

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/17/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves installation of influent piping from NIC#3-2 to the New Treatment Plant aanticipated to be installed at Central and Chisholm Creek. Cost assumes local oversight and no per diem.

Cost Analysis:
Cost to Install Influent Piping

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M182	Concrete sawing, up to 12" deep	60	LF	1.00	$2.32	$2.32	$2.78	$2.78	$1.97	$0.00	$7.07	$424.20	10%	9%	$509	C 03811 350 0400	
M183	Selective concrete demolition	8	CY	1.00	$97.76	$97.76	$25.48	$25.48	$0.00	$0.00	$123.24	$985.92	10%	9%	$1,182	C 03050 510 0070	
M184	Selective demolition, dump charges	16	TN	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$97.76	$97.76	$1,564.16	10%	9%	$1,875	C 02411 919 0100	
M200	Excavation, machine excavation, hydraulic backhoe	32	BCY	1.00	$10.24	$10.24	$7.59	$7.59	$0.00	$0.00	$17.83	$570.56	10%	9%	$684	C 31231 616 6030	
M201	Hauling, small load	13	LCY	1.00	$4.33	$4.33	$6.18	$6.18	$0.00	$0.00	$10.51	$136.63	10%	9%	$164	C 31232 320 0416	
M216	Backfilling for Piping	26	LCY	1.00	$4.34	$4.34	$2.54	$2.54	$0.00	$0.00	$6.88	$178.88	10%	9%	$214	C 31231 613 3060	
M221	Compaction Fill, Walk behind vibrating Plate	20	ECY	1.00	$3.43	$3.43	$0.48	$0.48	$0.00	$0.00	$3.91	$78.20	10%	9%	$94	C 31232 323 7040	
M202	Fill, gravel fill, compacted, 12" deep	5	ECY	1.00	$6.86	$6.86	$0.67	$0.67	$19.88	$0.00	$27.41	$137.05	10%	9%	$164	C 31232 317 1300	
M173	Reinforcing steel, dowels, 2' long, #6, A615, grade	192	EA	1.00	$1.60	$1.60	$0.00	$0.00	$2.77	$0.00	$4.37	$839.04	10%	9%	$1,006	C 03211 060 2430	
M170	Concrete, ready mix, 4000 PSI, delivered	8	CY	1.00	$0.00	$0.00	$0.00	$0.00	$101.30	$0.00	$101.30	$810.40	10%	9%	$972	C 03310 535 0300	
M172	Concrete, placing, direct chute, includes vibrating	8	CY	1.00	$8.22	$8.22	$0.50	$0.50	$0.00	$0.00	$8.72	$69.76	10%	9%	$84	C 03310 570 4300	
M171	Concrete finishing, floors, manual	144	SF	1.00	$0.38	$0.38	$0.00	$0.00	$0.00	$0.00	$0.38	$54.72	10%	9%	$66	C 03352 930 0200	
M210	Directional drilling, up to 12" dia	1,900	LF	1.00	$2.22	$2.22	$4.62	$4.62	$0.09	$0.00	$6.93	$13,167.00	10%	9%	$15,787	C 33052 322 0320	
M389	Pipe, HDPE, 6" diam., DR 11	1,900	LF	1.00	$0.00	$0.00	$0.00	$0.00	$5.37	$0.00	$5.37	$10,203.00	10%	9%	$12,233	C 22 11 1378 0082	
M395	Elbow, 90 Deg., HDPE, 6" diam., DR 11	1	EA	1.00	$0.00	$0.00	$0.00	$0.00	$37.59	$0.00	$37.59	$37.59	10%	9%	$45	C 22 11 1378 0332	
M413	Tee, HDPE, 6" diam., DR 11	0	EA	1.00	$0.00	$0.00	$0.00	$0.00	$49.41	$0.00	$49.41	$0.00	10%	9%	$0	C 22 11 1378 0732	
M424	Welding, HDPE, labor per joint, 6" pipe size	97	EA	1.00	$22.87	$22.87	$0.00	$0.00	$0.00	$0.00	$22.87	$2,218.39	10%	9%	$2,660	C 22 11 1378 4080	Includes cost for weld setup
M430	Welding, HDPE, machine, 6" thru 8" diameter	4	DY	1.00	$0.00	$0.00	$108.12	$108.12	$0.00	$0.00	$108.12	$432.48	10%	9%	$519	C 22 11 1378 4370	
M211	Tracer wire	19	CLF	1.00	$140.40	$140.40	$0.00	$0.00	$122.65	$0.00	$263.05	$4,997.95	10%	9%	$5,993	C 26052 680 0260	
M212	Manhole for tracer wire connections, precast concre	4	EA	1.00	$184.08	$184.08	$0.00	$0.00	$394.24	$0.00	$578.32	$2,313.28	10%	9%	$2,774	C 33051 613 0510	
L8	Field Engineer	48	HR	1.00	$82.93	$82.93	$0.00	$0.00	$0.00	$0.00	$82.93	$3,980.64	0%	9%	$4,339	SE SalaryExpert.com	Overhead included in unit labor rate.
E2	Pickup Truck Rental	6	DY	1.00	$0.00	$0.00	$78.74	$78.74	$0.00	$0.00	$78.74	$472.46	10%	9%	$566	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	6	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$64.44	10%	9%	$77	PE N/A	
												TOTAL COST:			$52,007		

LENGTH OF PIPE RUN:	1,900
TOTAL UNIT COST:	$27.37

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-21-GWU3

Groundwater Extraction and Treatment **Cost Worksheet: CW-21-GWU3**
Capital Cost Sub-Element
Influent Piping - NIC#3-4 to New Treatment Plant

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/17/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves installation of influent piping from NIC#3-4 to the New Treatment Plant. Cost assumes local oversight and no per diem.

Cost Analysis:
Cost to Install Influent Piping

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M182	Concrete sawing, up to 12" deep	72	LF	1.00	$2.32	$2.32	$2.78	$2.78	$1.97	$0.00	$7.07	$509.04	10%	9%	$610	C 03811 350 0400	
M183	Selective concrete demolition	10	CY	1.00	$97.76	$97.76	$25.48	$25.48	$0.00	$0.00	$123.24	$1,232.40	10%	9%	$1,478	C 03050 510 0070	
M184	Selective demolition, dump charges	20	TN	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$97.76	$97.76	$1,955.20	10%	9%	$2,344	C 02411 919 0100	
M200	Excavation, machine excavation, hydraulic backhoe	40	BCY	1.00	$10.24	$10.24	$7.59	$7.59	$0.00	$0.00	$17.83	$713.20	10%	9%	$855	C 31231 616 6030	
M201	Hauling, small load	16	LCY	1.00	$4.33	$4.33	$6.18	$6.18	$0.00	$0.00	$10.51	$168.16	10%	9%	$202	C 31232 320 0416	
M216	Backfilling for Piping	32	LCY	1.00	$4.34	$4.34	$2.54	$2.54	$0.00	$0.00	$6.88	$220.16	10%	9%	$264	C 31231 613 3060	
M221	Compaction Fill, Walk behind vibrating Plate	24	ECY	1.00	$3.43	$3.43	$0.48	$0.48	$0.00	$0.00	$3.91	$93.84	10%	9%	$113	C 31232 323 7040	
M202	Fill, gravel fill, compacted, 12" deep	6	ECY	1.00	$6.86	$6.86	$0.67	$0.67	$19.88	$0.00	$27.41	$164.46	10%	9%	$197	C 31232 317 1300	
M173	Reinforcing steel, dowels, 2' long, #6, A615, grade	240	EA	1.00	$1.60	$1.60	$0.00	$0.00	$2.77	$0.00	$4.37	$1,048.80	10%	9%	$1,258	C 03211 060 2430	
M170	Concrete, ready mix, 4000 PSI, delivered	10	CY	1.00	$0.00	$0.00	$0.00	$0.00	$101.30	$0.00	$101.30	$1,013.00	10%	9%	$1,215	C 03310 535 0300	
M172	Concrete, placing, direct chute, includes vibrating	10	CY	1.00	$8.22	$8.22	$0.50	$0.50	$0.00	$0.00	$8.72	$87.20	10%	9%	$105	C 03310 570 4300	
M171	Concrete finishing, floors, manual	180	SF	1.00	$0.38	$0.38	$0.00	$0.00	$0.00	$0.00	$0.38	$68.40	10%	9%	$82	C 03352 930 0200	
M210	Directional drilling, up to 12" dia	2,300	LF	1.00	$2.22	$2.22	$4.62	$4.62	$0.09	$0.00	$6.93	$15,939.00	10%	9%	$19,111	C 33052 322 0320	
M389	Pipe, HDPE, 6" diam., DR 11	2,300	LF	1.00	$0.00	$0.00	$0.00	$0.00	$5.37	$0.00	$5.37	$12,351.00	10%	9%	$14,809	C 22 11 1378 0082	
M395	Elbow, 90 Deg., HDPE, 6" diam., DR 11	1	EA	1.00	$0.00	$0.00	$0.00	$0.00	$37.59	$0.00	$37.59	$37.59	10%	9%	$45	C 22 11 1378 0332	
M413	Tee, HDPE, 6" diam., DR 11	1	EA	1.00	$0.00	$0.00	$0.00	$0.00	$49.41	$0.00	$49.41	$49.41	10%	9%	$59	C 22 11 1378 0732	
M424	Welding, HDPE, labor per joint, 6" pipe size	30	EA	1.00	$22.87	$22.87	$0.00	$0.00	$0.00	$0.00	$22.87	$686.10	10%	9%	$823	C 22 11 1378 4080	Includes cost for weld setup
M430	Welding, HDPE, machine, 6" thru 8" diameter	4	DY	1.00	$0.00	$0.00	$108.12	$108.12	$0.00	$0.00	$108.12	$432.48	10%	9%	$519	C 22 11 1378 4370	
M211	Tracer wire	23	CLF	1.00	$140.40	$140.40	$0.00	$0.00	$122.65	$0.00	$263.05	$6,050.15	10%	9%	$7,254	C 26052 680 0260	
M212	Manhole for tracer wire connections, precast concre	5	EA	1.00	$184.08	$184.08	$0.00	$0.00	$394.24	$0.00	$578.32	$2,891.60	10%	9%	$3,467	C 33051 613 0510	
L8	Field Engineer	56	HR	1.00	$82.93	$82.93	$0.00	$0.00	$0.00	$0.00	$82.93	$4,644.08	0%	9%	$5,062	SE SalaryExpert.com	Overhead included in unit labor rate.
E2	Pickup Truck Rental	7	DY	1.00	$0.00	$0.00	$78.74	$78.74	$0.00	$0.00	$78.74	$551.21	10%	9%	$661	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	7	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$75.18	10%	9%	$90	PE N/A	
												TOTAL COST:			$60,623		

LENGTH OF PIPE RUN:	2,300
TOTAL UNIT COST:	$26.36

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-22-GWU3

Groundwater Extraction and Treatment **Cost Worksheet: CW-22-GWU3**
Capital Cost Sub-Element
Influent Piping - NIC#3-5 to New Treatment Plant

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/17/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves installation of influent piping from NIC#3-5 to the New Treatment Plant. Cost assumes local oversight and no per diem.

Cost Analysis:
Cost to Install Influent Piping

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M182	Concrete sawing, up to 12" deep	36	LF	1.00	$2.32	$2.32	$2.78	$2.78	$1.97	$0.00	$7.07	$254.52	10%	9%	$305	C 03811 350 0400	
M183	Selective concrete demolition	4	CY	1.00	$97.76	$97.76	$25.48	$25.48	$0.00	$0.00	$123.24	$492.96	10%	9%	$591	C 03050 510 0070	
M184	Selective demolition, dump charges	8	TN	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$97.76	$97.76	$782.08	10%	9%	$938	C 02411 919 0100	
M200	Excavation, machine excavation, hydraulic backhoe	16	BCY	1.00	$10.24	$10.24	$7.59	$7.59	$0.00	$0.00	$17.83	$285.28	10%	9%	$342	C 31231 616 6030	
M201	Hauling, small load	7	LCY	1.00	$4.33	$4.33	$6.18	$6.18	$0.00	$0.00	$10.51	$73.57	10%	9%	$88	C 31232 320 0416	
M216	Backfilling for Piping	13	LCY	1.00	$4.34	$4.34	$2.54	$2.54	$0.00	$0.00	$6.88	$89.44	10%	9%	$107	C 31231 613 3060	
M221	Compaction Fill, Walk behind vibrating Plate	10	ECY	1.00	$3.43	$3.43	$0.48	$0.48	$0.00	$0.00	$3.91	$39.10	10%	9%	$47	C 31232 323 7040	
M202	Fill, gravel fill, compacted, 12" deep	3	ECY	1.00	$6.86	$6.86	$0.67	$0.67	$19.88	$0.00	$27.41	$82.23	10%	9%	$99	C 31232 317 1300	
M173	Reinforcing steel, dowels, 2' long, #6, A615, grade	96	EA	1.00	$1.60	$1.60	$0.00	$0.00	$2.77	$0.00	$4.37	$419.52	10%	9%	$503	C 03211 060 2430	
M170	Concrete, ready mix, 4000 PSI, delivered	4	CY	1.00	$0.00	$0.00	$0.00	$0.00	$101.30	$0.00	$101.30	$405.20	10%	9%	$486	C 03310 535 0300	
M172	Concrete, placing, direct chute, includes vibrating	4	CY	1.00	$8.22	$8.22	$0.50	$0.50	$0.00	$0.00	$8.72	$34.88	10%	9%	$42	C 03310 570 4300	
M171	Concrete finishing, floors, manual	72	SF	1.00	$0.38	$0.38	$0.00	$0.00	$0.00	$0.00	$0.38	$27.36	10%	9%	$33	C 03352 930 0200	
M210	Directional drilling, up to 12" dia	750	LF	1.00	$2.22	$2.22	$4.62	$4.62	$0.09	$0.00	$6.93	$5,197.50	10%	9%	$6,232	C 33052 322 0320	
M389	Pipe, HDPE, 6" diam., DR 11	750	LF	1.00	$0.00	$0.00	$0.00	$0.00	$5.37	$0.00	$5.37	$4,027.50	10%	9%	$4,829	C 22 11 1378 0082	
M395	Elbow, 90 Deg., HDPE, 6" diam., DR 11	1	EA	1.00	$0.00	$0.00	$0.00	$0.00	$37.59	$0.00	$37.59	$37.59	10%	9%	$45	C 22 11 1378 0332	
M413	Tee, HDPE, 6" diam., DR 11	1	EA	1.00	$0.00	$0.00	$0.00	$0.00	$49.41	$0.00	$49.41	$49.41	10%	9%	$59	C 22 11 1378 0732	
M424	Welding, HDPE, labor per joint, 6" pipe size	30	EA	1.00	$22.87	$22.87	$0.00	$0.00	$0.00	$0.00	$22.87	$686.10	10%	9%	$823	C 22 11 1378 4080	Includes cost for weld setup
M430	Welding, HDPE, machine, 6" thru 8" diameter	2	DY	1.00	$0.00	$0.00	$108.12	$108.12	$0.00	$0.00	$108.12	$216.24	10%	9%	$259	C 22 11 1378 4370	
M211	Tracer wire	8	CLF	1.00	$140.40	$140.40	$0.00	$0.00	$122.65	$0.00	$263.05	$1,972.88	10%	9%	$2,365	C 26052 680 0260	
M212	Manhole for tracer wire connections, precast concre	2	EA	1.00	$184.08	$184.08	$0.00	$0.00	$394.24	$0.00	$578.32	$1,156.64	10%	9%	$1,387	C 33051 613 0510	
L8	Field Engineer	24	HR	1.00	$82.93	$82.93	$0.00	$0.00	$0.00	$0.00	$82.93	$1,990.32	0%	9%	$2,169	SE SalaryExpert.com	Overhead included in unit labor rate.
E2	Pickup Truck Rental	3	DY	1.00	$0.00	$0.00	$78.74	$78.74	$0.00	$0.00	$78.74	$236.23	10%	9%	$283	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	3	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$32.22	10%	9%	$39	PE N/A	
												TOTAL COST:			$22,071		

LENGTH OF PIPE RUN:	750
TOTAL UNIT COST:	$29.43

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-23-GWU3

Groundwater Extraction and Treatment **Cost Worksheet: CW-23-GWU3**
Capital Cost Sub-Element
Influent Piping - NIC#3-3B to New Treatment Plant

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/17/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves installation of influent piping from NIC#3-3B to the New Treatment Plant. Cost assume local oversight and no per diem.

Cost Analysis:
Cost to Install Inffluent Piping

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M182	Concrete sawing, up to 12" deep	144	LF	1.00	$2.32	$2.32	$2.78	$2.78	$1.97	$0.00	$7.07	$1,018.08	10%	9%	$1,221	C 03811 350 0400	
M183	Selective concrete demolition	22	CY	1.00	$97.76	$97.76	$25.48	$25.48	$0.00	$0.00	$123.24	$2,711.28	10%	9%	$3,251	C 03050 510 0070	
M184	Selective demolition, dump charges	44	TN	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$97.76	$97.76	$4,301.44	10%	9%	$5,157	C 02411 919 0100	
M200	Excavation, machine excavation, hydraulic backhoe	88	BCY	1.00	$10.24	$10.24	$7.59	$7.59	$0.00	$0.00	$17.83	$1,569.04	10%	9%	$1,881	C 31231 616 6030	
M201	Hauling, small load	36	LCY	1.00	$4.33	$4.33	$6.18	$6.18	$0.00	$0.00	$10.51	$378.36	10%	9%	$454	C 31232 320 0416	
M216	Backfilling for Piping	70	LCY	1.00	$4.34	$4.34	$2.54	$2.54	$0.00	$0.00	$6.88	$481.60	10%	9%	$577	C 31231 613 3060	
M221	Compaction Fill, Walk behind vibrating Plate	53	ECY	1.00	$3.43	$3.43	$0.48	$0.48	$0.00	$0.00	$3.91	$207.23	10%	9%	$248	C 31232 323 7040	
M202	Fill, gravel fill, compacted, 12" deep	13	ECY	1.00	$6.86	$6.86	$0.67	$0.67	$19.88	$0.00	$27.41	$356.33	10%	9%	$427	C 31232 317 1300	
M173	Reinforcing steel, dowels, 2' long, #6, A615, grade	528	EA	1.00	$1.60	$1.60	$0.00	$0.00	$2.77	$0.00	$4.37	$2,307.36	10%	9%	$2,767	C 03211 060 2430	
M170	Concrete, ready mix, 4000 PSI, delivered	22	CY	1.00	$0.00	$0.00	$0.00	$0.00	$101.30	$0.00	$101.30	$2,228.60	10%	9%	$2,672	C 03310 535 0300	
M172	Concrete, placing, direct chute, includes vibrating	22	CY	1.00	$8.22	$8.22	$0.50	$0.50	$0.00	$0.00	$8.72	$191.84	10%	9%	$230	C 03310 570 4300	
M171	Concrete finishing, floors, manual	396	SF	1.00	$0.38	$0.38	$0.00	$0.00	$0.00	$0.00	$0.38	$150.48	10%	9%	$180	C 03352 930 0200	
M210	Directional drilling, up to 12" dia	5,300	LF	1.00	$2.22	$2.22	$4.62	$4.62	$0.09	$0.00	$6.93	$36,729.00	10%	9%	$44,038	C 33052 322 0320	
M389	Pipe, HDPE, 6" diam., DR 11	5,300	LF	1.00	$0.00	$0.00	$0.00	$0.00	$5.37	$0.00	$5.37	$28,461.00	10%	9%	$34,125	C 22 11 1378 0082	
M395	Elbow, 90 Deg., HDPE, 6" diam., DR 11	1	EA	1.00	$0.00	$0.00	$0.00	$0.00	$37.59	$0.00	$37.59	$37.59	10%	9%	$45	C 22 11 1378 0332	
M413	Tee, HDPE, 6" diam., DR 11	1	EA	1.00	$0.00	$0.00	$0.00	$0.00	$49.41	$0.00	$49.41	$49.41	10%	9%	$59	C 22 11 1378 0732	
M424	Welding, HDPE, labor per joint, 6" pipe size	30	EA	1.00	$22.87	$22.87	$0.00	$0.00	$0.00	$0.00	$22.87	$686.10	10%	9%	$823	C 22 11 1378 4080	Includes cost for weld setup
M430	Welding, HDPE, machine, 6" thru 8" diameter	9	DY	1.00	$0.00	$0.00	$108.12	$108.12	$0.00	$0.00	$108.12	$973.08	10%	9%	$1,167	C 22 11 1378 4370	
M211	Tracer wire	53	CLF	1.00	$140.40	$140.40	$0.00	$0.00	$122.65	$0.00	$263.05	$13,941.65	10%	9%	$16,716	C 26052 680 0260	
M212	Manhole for tracer wire connections, precast concre	11	EA	1.00	$184.08	$184.08	$0.00	$0.00	$394.24	$0.00	$578.32	$6,361.52	10%	9%	$7,627	C 33051 613 0510	
L8	Field Engineer	128	HR	1.00	$82.93	$82.93	$0.00	$0.00	$0.00	$0.00	$82.93	$10,615.04	0%	9%	$11,570	SE SalaryExpert.com	Overhead included in unit labor rate.
E2	Pickup Truck Rental	16	DY	1.00	$0.00	$0.00	$78.74	$78.74	$0.00	$0.00	$78.74	$1,259.90	10%	9%	$1,511	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	16	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$171.84	10%	9%	$206	PE N/A	
												TOTAL COST:			$136,952		

LENGTH OF PIPE RUN:	5,300
TOTAL UNIT COST:	$25.84

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-24-GWU3

Groundwater Extraction and Treatment
Capital Cost Sub-Element
Pipe Jacking under Railroad Tracks

Cost Worksheet: CW-24-GWU3

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/17/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves installation of jacking casing piping underneath railroad crossings. Cost assumes local oversight and no per diem.

Cost Analysis:
Cost to Install Inffluent Piping

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M182	Concrete sawing, up to 12" deep	100	LF	1.00	$2.32	$2.32	$2.78	$2.78	$1.97	$0.00	$7.07	$707.00	10%	9%	$848	C 03811 350 0400	
M183	Selective concrete demolition	16	CY	1.00	$97.76	$97.76	$25.48	$25.48	$0.00	$0.00	$123.24	$1,971.84	10%	9%	$2,364	C 03050 510 0070	
M184	Selective demolition, dump charges	32	TN	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$97.76	$97.76	$3,128.32	10%	9%	$3,751	C 02411 919 0100	
M200	Excavation, machine excavation, hydraulic backhoe	0	BCY	1.00	$10.24	$10.24	$7.59	$7.59	$0.00	$0.00	$17.83	$0.00	10%	9%	$0	C 31231 616 6030	
M201	Hauling, small load	31	LCY	1.00	$4.33	$4.33	$6.18	$6.18	$0.00	$0.00	$10.51	$325.81	10%	9%	$391	C 31232 320 0416	
M216	Backfilling for Piping	148	LCY	1.00	$4.34	$4.34	$2.54	$2.54	$0.00	$0.00	$6.88	$1,018.24	10%	9%	$1,221	C 31231 613 3060	
M221	Compaction Fill, Walk behind vibrating Plate	111	ECY	1.00	$3.43	$3.43	$0.48	$0.48	$0.00	$0.00	$3.91	$434.01	10%	9%	$520	C 31232 323 7040	
M202	Fill, gravel fill, compacted, 12" deep	14	ECY	1.00	$6.86	$6.86	$0.67	$0.67	$19.88	$0.00	$27.41	$383.74	10%	9%	$460	C 31232 317 1300	
M173	Reinforcing steel, dowels, 2' long, #6, A615, grade	320	EA	1.00	$1.60	$1.60	$0.00	$0.00	$2.77	$0.00	$4.37	$1,398.40	10%	9%	$1,677	C 03211 060 2430	
M170	Concrete, ready mix, 4000 PSI, delivered	16	CY	1.00	$0.00	$0.00	$0.00	$0.00	$101.30	$0.00	$101.30	$1,620.80	10%	9%	$1,943	C 03310 535 0300	
M172	Concrete, placing, direct chute, includes vibrating	16	CY	1.00	$8.22	$8.22	$0.50	$0.50	$0.00	$0.00	$8.72	$139.52	10%	9%	$167	C 03310 570 4300	
M171	Concrete finishing, floors, manual	400	SF	1.00	$0.38	$0.38	$0.00	$0.00	$0.00	$0.00	$0.38	$152.00	10%	9%	$182	C 03352 930 0200	
M209	Horizontal boring, railroad work, 24" diameter	200	LF	1.00	$143.52	$143.52	$96.20	$96.20	$122.65	$0.00	$362.37	$72,474.00	10%	9%	$86,896	C 33052 320 0500	
M208	Dewatering, pumping, 8 hours, attended 2 hours per day	7	DY	1.00	$108.16	$108.16	$24.96	$24.96	$0.00	$0.00	$133.12	$931.84	10%	9%	$1,117	C 31231 920 0650	4" discharge pump, 20 LF of suction hose and 100 LF of discharge hose
L8	Field Engineer	56	HR	1.00	$82.93	$82.93	$0.00	$0.00	$0.00	$0.00	$82.93	$4,644.08	0%	9%	$5,062	SE SalaryExpert.com	Overhead included in unit labor rate.
E2	Pickup Truck Rental	7	DY	1.00	$0.00	$0.00	$78.74	$78.74	$0.00	$0.00	$78.74	$551.21	10%	9%	$661	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	7	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$75.18	10%	9%	$90	PE N/A	
												TOTAL COST:			$107,350		

NO. OF RAILROAD CROSSINGS:	2
TOTAL UNIT COST:	$53,675

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-25-GWU3

Groundwater Extraction and Treatment **Cost Worksheet: CW-25-GWU3**
Capital Cost Sub-Element
Geotechnical Investigation for Treatment Building

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/17/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
Includes foundation, building structure, including interior and exterior finishing for the GWTF. Based on previous work of similar scope by CDM. Geotechnical Investigation includes various soil analysis and testing and also includes investigation report.

Cost Analysis:
Geotechnical Investigation

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M227	Geotechnical Investigation	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$7,650.00	$7,650.00	$7,650.00	10%	9%	$9,172	PE NA	
M228	Investigation and Analysis Report	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$5,100.00	$5,100.00	$5,100.00	10%	9%	$6,115	PE NA	
												TOTAL UNIT COST:			$15,287		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-26-GWU3

Groundwater Extraction and Treatment
Capital Cost Sub-Element
Groundwater Treatment Plant - Building

Cost Worksheet: CW-26-GWU3

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/17/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
Includes foundation, building structure, including interior and exterior finishing for the GWTF. Based on previous work of similar scope by CDM. Pre-Engineered Building includes earthwork for foundation & concrete slab, fabrication, delivery, erection, HVAC, plumbing, interior & exterior finishing, of the building housing the Groundwater Treatment System.

Cost Analysis:

Pre-Engineered Building

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M225	Earthwork and Foundation for Pre-Engineered Building	1,250	SF	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$18.47	$18.47	$23,087.50	10%	9%	$27,682	P NA	
M226	Fabrication and Construction of Pre-Engineered Building	1,250	SF	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$102.60	$102.60	$128,250.00	10%	9%	$153,772	P NA	
M248	Heat for Equipment Building	1,250	SF	1.00	$0.00	$0.00	$0.00	$0.00	$6.95	$0.00	$6.95	$8,687.50	10%	9%	$10,416	P NA	Prevent equipment from freezing during winter
												TOTAL UNIT COST:			$191,870		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-27-GWU3

Groundwater Extraction and Treatment **Cost Worksheet: CW-27-GWU3**
Capital Cost Sub-Element
Groundwater Treatment Plant - Equipment and Piping

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/17/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
Includes treatment system equipment, piping, valves, VFDs, and other items related to the treatment system.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M321	Pipe, plastic, PVC, 8" diameter, schedule 80	250	LF	1.00	$13.72	$13.72	$0.00	$0.00	$30.61	$0.00	$44.33	$11,082.50	10%	9%	$13,288	C 22 11 1374 2570	
M330	Elbow, 90 Deg., plastic, PVC, socket joint, 8", schedule 80	13	EA	1.00	$68.34	$68.34	$0.00	$0.00	$225.55	$0.00	$293.89	$3,820.57	10%	9%	$4,581	C 22 11 1376 2210	
M348	Tee, plastic, PVC, socket joint, 8", schedule 80	5	EA	1.00	$103.02	$103.02	$0.00	$0.00	$317.92	$0.00	$420.94	$2,104.70	10%	9%	$2,524	C 23 11 1376 2500	
M366	Flange, plastic, PVC, socket joint, 150 lb., 8", schedule 80	20	EA	1.00	$37.23	$37.23	$0.00	$0.00	$111.70	$0.00	$148.93	$2,978.60	10%	9%	$3,571	C 23 11 1376 2538	
M308	Valves, iron body, gate, non-rising stem, flanged, 125 lb., 8"	5	EA	1.00	$0.00	$0.00	$0.00	$0.00	$1,511.20	$0.00	$1,511.20	$7,556.00	10%	9%	$9,060	C Per Estimator	
M313	Valves, iron body, swing check, flanged, 125 lb., 8"	5	EA	1.00	$0.00	$0.00	$0.00	$0.00	$854.95	$0.00	$854.95	$4,274.75	10%	9%	$5,125	C Per Estimator	
M303	Venturi flow, measuring device, 8" diameter	3	EA	1.00	$0.00	$0.00	$0.00	$0.00	$1,215.84	$0.00	$1,215.84	$3,647.52	10%	9%	$4,373	P Per Estimator	
M217	Miscellaneaous Piping and Valve Supplies	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$10,200.00	$10,200.00	$10,200.00	10%	9%	$12,230	A NA	
M120	Shallow Tray Air Stripper, 425 gpm max.	1	EA	1.00	$10,400.00	$10,400.00	$0.00	$0.00	$43,958.12	$6,261.84	$60,619.96	$60,619.96	10%	9%	$72,683	V CarbonAir	
M121	4,000 gallon equalization tank, polyethylene	1	EA	1.00	$312.00	$312.00	$0.00	$0.00	$3,175.85	$520.00	$4,007.85	$4,007.85	10%	9%	$4,805	V WaterTanks.com	
M122	Transfer pump, 400 gpm	1	EA	1.00	$457.60	$457.60	$0.00	$0.00	$2,124.53	$260.00	$2,842.13	$2,842.13	10%	9%	$3,408	V Grainger	
M123	Variable frequency drive, enclosed, 5 HP motor size, NEMA 1	1	EA	1.00	$348.40	$348.40	$0.00	$0.00	$1,916.46	$0.00	$2,264.86	$2,264.86	10%	9%	$2,716	C 26292 310 0110	
M243	GAC Adsorption Offgas Treatment	0	EA	1.00	$1,200.00	$1,200.00	$0.00	$0.00	$58,315.14	$0.00	$59,515.14	$0.00	10%	9%	$0	E 33 13 1983	Dual Bed, 2000 cfm
M244	GAC for Offgas Treatment Units	0	LBS	1.00	$0.00	$0.00	$0.00	$0.00	$1.14	$0.00	$1.14	$0.00	10%	9%	$0	E 33 13 1949	GAC for treatment units
M246	Utilities Hookup	1	EA	1.00	$0.00	$0.00	$0.00	$0.00	$3,313.16	$0.00	$3,313.16	$3,313.16	10%	9%	$3,972	E 33 02 9928	Single Hookup
M247	Concrete Pads for Treatment Equipment	438	SF	1.00	$2.40	$2.40	$0.22	$0.22	$3.41	$0.00	$6.03	$2,641.14	10%	9%	$3,167	E 18 02 0321	Assume 35% of the building floor area
												TOTAL UNIT COST:			$145,503		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-28-GWU3

Groundwater Extraction and Treatment **Cost Worksheet: CW-28-GWU3**
Capital Cost Sub-Element
Groundwater Treatment Plant - Facility Control System

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/17/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
Groundwater Treatment (GW) Facility Control System; Assume GWT Includes Laptop, Control System (Computer-based monitoring and control system consisting of Programmable Logic Controller (PLC) for process interface, Variable Frequency Drives (VFD), data acquisition system, and various other control switches), electrical wiring, switches, etc. Allowance for GWTF Control System, Assume 50% of Total Cost for Fabrication and Construction of Pre-Engineered Building, Based on previous work by CDM of similar scope.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M229	Treatment Building Facility Control System	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$64,935.00	$64,935.00	$64,935.00	10%	9%	$77,900	PE NA	
												TOTAL UNIT COST:			$77,900		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-29-GWU3

Groundwater Extraction and Treatment
Capital Cost Sub-Element
Groundwater Treatment Plant - Startup

Cost Worksheet: CW-29-GWU3

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/17/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
The sub-element involves a 14-day startup phase for the groundwater treatment plant with two or more extraction wells. Includes sampling three points (influent, mid-plant, and effluent) one per day during the 14-day startup period. Includes operator time and engineer time durnig the initial startup process.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M3	VOCs, EPA Method SW-846 8260	113	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$80.08	$80.08	$9,049.04	0%	9%	$9,863	V Teklab	
M4	Filtered	0	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$72.80	$72.80	$0.00	0%	9%	$0	V Teklab	
M19	Water Quality Meter and Flow Through Cell	2	WK	1.00	$0.00	$0.00	$0.00	$0.00	$461.85	$0.00	$461.85	$923.70	0%	9%	$1,007	V Pine Env	
M20	Photoionization Detector (PID)	2	WK	1.00	$0.00	$0.00	$0.00	$0.00	$214.81	$0.00	$214.81	$429.62	0%	9%	$468	V Pine Env	Includes calibration gas
M21	Water Level Meter	2	WK	1.00	$0.00	$0.00	$0.00	$0.00	$64.44	$0.00	$64.44	$128.88	0%	9%	$140	V Pine Env	
M22	Turbidimeter	2	WK	1.00	$0.00	$0.00	$0.00	$0.00	$80.55	$0.00	$80.55	$161.10	0%	9%	$176	V Pine Env	
M27	Shipping Rental Equipment	2	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$255.00	$255.00	$510.00	10%	9%	$611	PE N/A	
M29	Miscellaneous Sampling Equipment	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$204.00	$204.00	$204.00	10%	9%	$245	PE N/A	Paper towels, gloves, garbage bags, etc.
L15	Project Manager	10	HR	1.00	$124.22	$124.22	$0.00	$0.00	$0.00	$0.00	$124.22	$1,242.20	0%	9%	$1,354	SE SalaryExpert.com	Overhead included in unit labor rate.
L24	Contracting/Procurement Specialist	19	HR	1.00	$46.54	$46.54	$0.00	$0.00	$0.00	$0.00	$46.54	$884.26	0%	9%	$964	SE SalaryExpert.com	Overhead included in unit labor rate.
L23	General Operator/Technician	280	HR	1.00	$50.70	$50.70	$0.00	$0.00	$0.00	$0.00	$50.70	$14,196.00	0%	9%	$15,474	SE SalaryExpert.com	Overhead included in unit labor rate.
L5	Environmental Engineer	20	HR	1.00	$86.14	$86.14	$0.00	$0.00	$0.00	$0.00	$86.14	$1,722.80	0%	9%	$1,878	SE SalaryExpert.com	Overhead included in unit labor rate.
E2	Pickup Truck Rental	16	DY	1.00	$0.00	$0.00	$78.74	$78.74	$0.00	$0.00	$78.74	$1,259.90	10%	9%	$1,511	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	16	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$171.84	10%	9%	$206	PE N/A	
												TOTAL UNIT COST:			$33,897		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-30-GWU3

Groundwater Extraction and Treatment
Annual Cost Sub-Element
Operation and Maintenance - Extraction Well

Cost Worksheet: CW-30-GWU3

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/17/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves annual operation and maintenance for an extraction well. Cost assume local oversight and no per diem.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M280	Electrical consumption	65,400	kW-HR	0.95	$0.00	$0.00	$0.00	$0.00	$0.11	$0.00	$0.11	$7,194.00	0%	0%	$7,194	P NA	
												TOTAL UNIT COST:			$7,194		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-31-GWU3

Groundwater Extraction and Treatment **Cost Worksheet: CW-31-GWU3**
Annual Cost Sub-Element
Operation and Maintenance - Extraction Well Maintenance

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/17/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves annual operation and maintenance for an extraction well. Cost assume local oversight and no per diem.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M270	Water Supply Wells, acid cleaning	1	EA	0.95	$478.40	$503.58	$0.00	$0.00	$514.71	$0.00	$1,018.29	$1,018.29	10%	9%	$1,221	C 33211 310 8600	
M271	Water Supply Wells, remove and install well pump	1	EA	0.95	$1,196.00	$1,258.95	$2,938.00	$3,092.63	$0.00	$0.00	$4,351.58	$4,351.58	10%	9%	$5,218	C 33211 310 8590	
M272	Water Supply Wells, well development	4	HR	0.95	$101.40	$106.74	$390.00	$410.53	$277.07	$0.00	$794.33	$3,177.33	10%	9%	$3,810	C 33211 310 8500	
												TOTAL UNIT COST:			$10,249		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-32-GWU3

Groundwater Extraction and Treatment **Cost Worksheet: CW-32-GWU3**
Annual Cost Sub-Element
Operation and Maintenance - Gilbert-Mosley Treatment Plant (2 wells)

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/17/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves a portion of the annual operation and maintenance for the Gilbert-Mosley treatment plant. Apportions O&M costs based on volume of flow from GWU3 compared to total volume. Cost assume local oversight and no per diem.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M136	Gilbert-Mosley Treatment Plant Electrical - GWU3 Portion	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$12,448.80	$12,448.80	$12,448.80	10%	9%	$14,926	A Per Estimator	Based on previously incurred O&M costs.
M131	Gilbert-Mosley Treatment Plant O&M - GWU3 Portion	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$3,057.60	$3,057.60	$3,057.60	10%	9%	$3,666	A Per Estimator	Based on previously incurred O&M costs.
M126	Sequestrant for Gilbert-Mosley Treatment System	167	GAL	1.00	$0.00	$0.00	$0.00	$0.00	$23.00	$0.00	$23.00	$3,841.00	10%	9%	$4,605	P Previous Work	Based on current usage at Gilbert-Mosley Site
M141	Gilbert-Mosley Treatment Plant Labor - GWU3 Portion	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$5,241.60	$5,241.60	$5,241.60	10%	9%	$6,285	A Per Estimator	Based on previously incurred O&M costs.
												TOTAL UNIT COST:			$29,482		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-33-GWU3

Groundwater Extraction and Treatment **Cost Worksheet: CW-33-GWU3**
Annual Cost Sub-Element
Operation and Maintenance - Gilbert-Mosley Treatment Plant (1 well)

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/17/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves a portion of the annual operation and maintenance for the Gilbert-Mosley treatment plant. Apportions O&M costs based on volume of flow from GWU3 compared to total volume. Cost assume local oversight and no per diem.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M138	Gilbert-Mosley Treatment Plant Electrical - GWU3 Portion	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$4,149.60	$4,149.60	$4,149.60	10%	9%	$4,975	A Per Estimator	Based on previously incurred O&M costs.
M133	Gilbert-Mosley Treatment Plant O&M - GWU3 Portion	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$1,019.20	$1,019.20	$1,019.20	10%	9%	$1,222	A Per Estimator	Based on previously incurred O&M costs.
M126	Sequestrant for Gilbert-Mosley Treatment System	53	GAL	1.00	$0.00	$0.00	$0.00	$0.00	$23.00	$0.00	$23.00	$1,219.00	10%	9%	$1,462	P Previous Work	Based on current usage at Gilbert-Mosley Site
M143	Gilbert-Mosley Treatment Plant Labor - GWU3 Portion	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$1,747.20	$1,747.20	$1,747.20	10%	9%	$2,095	A Per Estimator	Based on previously incurred O&M costs.
												TOTAL UNIT COST:			$9,754		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-34-GWU3

Groundwater Extraction and Treatment **Cost Worksheet: CW-34-GWU3**
Annual Cost Sub-Element
Operation and Maintenance - New Treatment Plant

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/17/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves annual operation and maintenance for the new groundwater treatment system. Assumes quarterly acid washing/cleaning of the tray air stripper, and a weekly visit by an operation and maintenance technician. Cost assume local oversight and no per diem.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M280	Electrical consumption	154,700	kW-HR	1.00	$0.00	$0.00	$0.00	$0.00	$0.11	$0.00	$0.11	$17,017.00	0%	0%	$17,017	P NA	
M281	Acid wash of air stripper system	4	EA	1.00	$416.00	$416.00	$312.00	$312.00	$547.56	$0.00	$1,275.56	$5,102.24	10%	9%	$6,118	P NA	
M244	GAC for Offgas Treatment Units	0	LBS	1.00	$0.00	$0.00	$0.00	$0.00	$1.14	$0.00	$1.14	$0.00	10%	9%	$0	E 33 13 1949	GAC for treatment units
L23	General Operator/Technician	416	HR	1.00	$50.70	$50.70	$0.00	$0.00	$0.00	$0.00	$50.70	$21,091.20	0%	9%	$22,989	SE SalaryExpert.com	Overhead included in unit labor rate.
												TOTAL UNIT COST:			$46,124		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-35-GWU3

Groundwater Extraction and Treatment **Cost Worksheet: CW-35-GWU3**
Periodic Cost Sub-Element
Replace Equipment - Gilbert-Mosley Treatment Plant

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/17/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves a portion of the replacement costs for the Gilbert-Mosley treatment plant. Apportions replacement costs based on volume of flow from GWU3 compared to total volume of flow. Based on previous estimates for replacement costs at 30 years.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M146	Gilbert-Mosley Treatment System Replacement - GWU3 Portion	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$147,240.08	$147,240.08	$147,240.08	10%	9%	$176,541	A Per Estimator	Based on previous estimates for Gilbert-Mosley Site
												TOTAL UNIT COST:			$176,541		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-36-GWU3

Groundwater Extraction and Treatment **Cost Worksheet: CW-36-GWU3**
Periodic Cost Sub-Element
Minor Equipment Replacement - New Treatment Plant

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/17/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element assumes treatment system equipment will require periodic replacement.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M308	Valves, iron body, gate, non-rising stem, flanged, 125 lb., 8"	5	EA	1.00	$0.00	$0.00	$0.00	$0.00	$1,511.20	$0.00	$1,511.20	$7,556.00	10%	9%	$9,060	C Per Estimator	
M313	Valves, iron body, swing check, flanged, 125 lb., 8"	5	EA	1.00	$0.00	$0.00	$0.00	$0.00	$854.95	$0.00	$854.95	$4,274.75	10%	9%	$5,125	C Per Estimator	
M303	Venturi flow, measuring device, 8" diameter	3	EA	1.00	$0.00	$0.00	$0.00	$0.00	$1,215.84	$0.00	$1,215.84	$3,647.52	10%	9%	$4,373	P Per Estimator	
												TOTAL UNIT COST:			$18,558		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-37-GWU3

Groundwater Extraction and Treatment **Cost Worksheet: CW-37-GWU3**
Periodic Cost Sub-Element
Major Equipment Replacement - New Treatment Plant

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/17/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element assumes treatment system equipment will require periodic replacement.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M120	Shallow Tray Air Stripper, 425 gpm max.	1	EA	1.00	$10,400.00	$10,400.00	$0.00	$0.00	$43,958.12	$6,261.84	$60,619.96	$60,619.96	10%	9%	$72,683	V CarbonAir	
M121	4,000 gallon equalization tank, polyethylene	1	EA	1.00	$312.00	$312.00	$0.00	$0.00	$3,175.85	$520.00	$4,007.85	$4,007.85	10%	9%	$4,805	V WaterTanks.com	
M122	Transfer pump, 400 gpm	1	EA	1.00	$457.60	$457.60	$0.00	$0.00	$2,124.53	$260.00	$2,842.13	$2,842.13	10%	9%	$3,408	V Grainger	
M123	Variable frequency drive, enclosed, 5 HP motor size, NEMA 1	2	EA	1.00	$348.40	$348.40	$0.00	$0.00	$1,916.46	$0.00	$2,264.86	$4,529.72	10%	9%	$5,431	C 26292 310 0110	
M243	GAC Adsorption Offgas Treatment	0	EA	1.00	$1,200.00	$1,200.00	$0.00	$0.00	$58,315.14	$0.00	$59,515.14	$0.00	10%	9%	$0	E 33 13 1983	Dual Bed, 2000 cfm
												TOTAL UNIT COST:			$86,327		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-38-GWU3

Groundwater Extraction and Treatment
Periodic Cost Sub-Element
General Maintenance - New Treatment Plant

Cost Worksheet: CW-38-GWU3

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/17/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element assumes treatment system equipment will require periodic maintenance like painting and rehabilitation of building systems.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M230	Painting building, siding, exterior, alkyd (oil base), paint 2 coats, spray	2,250	SF	1.00	$0.11	$0.11	$0.00	$0.00	$0.18	$0.00	$0.29	$652.50	10%	9%	$782	C 09 91 1360 1000	
M231	Building Electrical System Rehabilitation	1,250	SF	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$17.86	$17.86	$22,325.00	10%	9%	$26,768	P Previous Work	
												TOTAL UNIT COST:			$27,550		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-39-GWU3

Groundwater Extraction and Treatment
Periodic Cost Sub-Element
Replace Equipment - Extraction Well Pumps

Cost Worksheet: CW-39-GWU3

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/17/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves periodic replacement of extraction well pumps. Assumes no salvage value for pulled pumps.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M271	Water Supply Wells, remove and install well pump	1	EA	1.00	$1,196.00	$1,196.00	$2,938.00	$2,938.00	$0.00	$0.00	$4,134.00	$4,134.00	10%	9%	$4,957	C 33211 310 8590	
M82	Submersible Pump, 5 HP, 4", w/controls	1	EA	1.00	$583.00	$583.00	$731.40	$731.40	$11,161.80	$0.00	$12,476.20	$12,476.20	10%	9%	$14,959	E 33 23 0556	
												TOTAL UNIT COST:			$19,916		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-40-GWU3

Groundwater Monitoring
Periodic Cost Sub-Element
Monitoring Well Maintenance - No Action Alternative

Cost Worksheet: CW-40-GWU3

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/17/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves maintenance of monitoring wells for No Action monitoring. Assumes well head repairs (replace vault, j-plug, etc.) and well development. Assumes well development fluid will be collected in a mobile tank and decanted at treatment facility. Cost assumes local oversight and no per diem.

Cost Analysis:
Cost for Mobilize/Demobilize

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M70	Mobilization and Demobilization of DPT Rig	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$510.00	$510.00	$510.00	10%	9%	$611	P N/A	
M41	Decontamination Pad Construction/Removal	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$760.38	$760.38	$760.38	10%	9%	$912	P N/A	
												TOTAL UNIT COST:			$1,523		

Cost Analysis:
Cost to Maintain Monitoring Wells

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
S1	Geoprobe rig and crew	2	DY	0.95	$0.00	$0.00	$0.00	$0.00	$0.00	$1,560.00	$1,560.00	$3,120.00	0%	0%	$3,120	P N/A	Overhead and profit included in rate
M74	Locking J-Plug	10	EA	1.00	$0.00	$0.00	$0.00	$0.00	$13.80	$0.00	$13.80	$138.00	10%	9%	$165	P N/A	
M75	8" Vault	10	EA	1.00	$0.00	$0.00	$0.00	$0.00	$60.02	$0.00	$60.02	$600.20	10%	9%	$720	P N/A	
L11	Geologist	20	HR	1.00	$81.29	$81.29	$0.00	$0.00	$0.00	$0.00	$81.29	$1,625.80	0%	9%	$1,772	SE SalaryExpert.com	Overhead included in unit labor rate.
E2	Pickup Truck Rental	2	DY	1.00	$0.00	$0.00	$78.74	$78.74	$0.00	$0.00	$78.74	$157.49	10%	9%	$189	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	2	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$21.48	10%	9%	$26	PE N/A	
												TOTAL UNIT COST:			$5,992		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-41-GWU3

Groundwater Monitoring
Periodic Cost Sub-Element
Monitoring Well Maintenance

Cost Worksheet: CW-41-GWU3

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/17/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves maintenance of monitoring wells fomonitoring. Assumes well head repairs (replace vault, j-plug, etc.) and well development. Assumes well development fluid will be collected in a mobile tank and decanted at treatment facility. Cost assumes local oversight and no per diem.

Cost Analysis:
Cost for Mobilize/Demobilize

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M70	Mobilization and Demobilization of DPT Rig	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$510.00	$510.00	$510.00	10%	9%	$611	P N/A	
M41	Decontamination Pad Construction/Removal	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$760.38	$760.38	$760.38	10%	9%	$912	P N/A	
												TOTAL UNIT COST:			$1,523		

Cost Analysis:
Cost to Maintain Monitoring Wells

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
S1	Geoprobe rig and crew	9	DY	0.95	$0.00	$0.00	$0.00	$0.00	$0.00	$1,560.00	$1,560.00	$14,040.00	0%	0%	$14,040	P N/A	Overhead and profit included in rate
M74	Locking J-Plug	42	EA	1.00	$0.00	$0.00	$0.00	$0.00	$13.80	$0.00	$13.80	$579.60	10%	9%	$695	P N/A	
M75	8" Vault	42	EA	1.00	$0.00	$0.00	$0.00	$0.00	$60.02	$0.00	$60.02	$2,520.84	10%	9%	$3,022	P N/A	
L11	Geologist	84	HR	1.00	$81.29	$81.29	$0.00	$0.00	$0.00	$0.00	$81.29	$6,828.36	0%	9%	$7,443	SE SalaryExpert.com	Overhead included in unit labor rate.
E2	Pickup Truck Rental	9	DY	1.00	$0.00	$0.00	$78.74	$78.74	$0.00	$0.00	$78.74	$708.70	10%	9%	$850	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	9	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$96.66	10%	9%	$116	PE N/A	
												TOTAL UNIT COST:			$26,166		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-42-GWU3

Groundwater Monitoring
Capital Cost Sub-Element
Monitoring Well Abandonment - No Action Alternative

Cost Worksheet: CW-42-GWU3

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/17/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves abandonment of No Action alternative monitoring wells after site closure. Cost assumes local oversight and no per diem.

Cost Analysis:
Cost for Mobilize/Demobilize

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M70	Mobilization and Demobilization of DPT Rig	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$510.00	$510.00	$510.00	10%	9%	$611	P N/A	
M41	Decontamination Pad Construction/Removal	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$760.38	$760.38	$760.38	10%	9%	$912	P N/A	
												TOTAL UNIT COST:			$1,523		

Cost Analysis:
Cost to Abandon Monitoring Wells

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
S1	Geoprobe rig and crew	2	DY	0.95	$0.00	$0.00	$0.00	$0.00	$0.00	$1,560.00	$1,560.00	$3,120.00	0%	0%	$3,120	P N/A	Overhead and profit included in rate
M100	Grout Continuous Borehole	350	VLF	1.00	$0.00	$0.00	$0.00	$0.00	$7.61	$0.00	$7.61	$2,663.50	10%	9%	$3,194	E 33 23 1820	
L11	Geologist	20	HR	1.00	$81.29	$81.29	$0.00	$0.00	$0.00	$0.00	$81.29	$1,625.80	0%	9%	$1,772	SE SalaryExpert.com	Overhead included in unit labor rate.
E2	Pickup Truck Rental	2	DY	1.00	$0.00	$0.00	$78.74	$78.74	$0.00	$0.00	$78.74	$157.49	10%	9%	$189	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	2	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$21.48	10%	9%	$26	PE N/A	
												TOTAL UNIT COST:			$8,301		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-43-GWU3

Groundwater Monitoring
Capital Cost Sub-Element
Monitoring Well Abandonment

Cost Worksheet: CW-43-GWU3

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/17/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves abandonment of monitoring wells after site closure. Cost assumes local oversight and no per diem.

Cost Analysis:
Cost for Mobilize/Demobilize

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M70	Mobilization and Demobilization of DPT Rig	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$510.00	$510.00	$510.00	10%	9%	$611	P N/A	
												TOTAL UNIT COST:			$611		

Cost Analysis:
Cost to Abandon Monitoring Wells

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
S1	Geoprobe rig and crew	8	DY	0.95	$0.00	$0.00	$0.00	$0.00	$0.00	$1,560.00	$1,560.00	$12,480.00	0%	0%	$12,480	P N/A	Overhead and profit included in rate
M100	Grout Continuous Borehole	1,470	VLF	1.00	$0.00	$0.00	$0.00	$0.00	$7.61	$0.00	$7.61	$11,186.70	10%	9%	$13,413	E 33 23 1820	
L11	Geologist	80	HR	1.00	$81.29	$81.29	$0.00	$0.00	$0.00	$0.00	$81.29	$6,503.20	0%	9%	$7,088	SE SalaryExpert.com	Overhead included in unit labor rate.
E2	Pickup Truck Rental	8	DY	1.00	$0.00	$0.00	$78.74	$78.74	$0.00	$0.00	$78.74	$629.95	10%	9%	$755	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	8	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$85.92	10%	9%	$103	PE N/A	
												TOTAL UNIT COST:			$33,839		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-44-GWU3

Groundwater Extraction and Treatment
Capital Cost Sub-Element
Extraction Well Abandonment

Cost Worksheet: CW-44-GWU3

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/17/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves extraction well abandonment. Cost assume local oversight and no per diem.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M99	Well Abandonment, 18" Well	40	VLF	1.00	$31.02	$31.02	$136.84	$136.84	$3.33	$0.00	$171.19	$6,847.60	10%	9%	$8,210	P Per Estimator	Based on E 33 23 1825 for 8" diameter borehole
L11	Geologist	10	HR	1.00	$81.29	$81.29	$0.00	$0.00	$0.00	$0.00	$81.29	$812.90	0%	9%	$886	SE SalaryExpert.com	Overhead included in unit labor rate.
E2	Pickup Truck Rental	1	DY	1.00	$0.00	$0.00	$78.74	$78.74	$0.00	$0.00	$78.74	$78.74	10%	9%	$94	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	1	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$10.74	10%	9%	$13	PE N/A	
												TOTAL UNIT COST:			$9,203		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-45-GWU3

Groundwater Extraction and Treatment
Capital Cost Sub-Element
Decommissioning Treatment System

Cost Worksheet: CW-45-GWU3

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU3
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/17/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves decommisioning of the new groundwater treatment system. Cost assume local oversight and no per diem.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M235	Removal of treatment system equipment	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$20,800.00	$20,800.00	$20,800.00	10%	9%	$24,939	P Per Estimator	
												TOTAL UNIT COST:			$24,939		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

CALCULATION WORKSHEET INDEX

Wrksht No.	Description
C-01	Calculations for determination of quantities for preparing groundwater monitoring reports
C-02	Calculations for determination of quantities for groundwater monitoring per sampling event - No Action Alternative
C-03	Calculations for determination of quantities for groundwater monitoring per sampling event
C-04	Quantities for installation of monitoring wells
C-05	Quantities for installation of extraction wells
C-06	Quantities for installation of extraction well vaults
C-07	Quantities for installing influent piping #3-1 to Santa Fe
C-08	Quantities for installing influent piping #3-2 to Santa Fe
C-09	Quantities for installing influent piping #3-3A to Treatment Plant
C-10	Quantities for installing influent piping to Gilbert-Mosley Treatment Plant
C-11	Quantities for installing influent piping from #3-1 to Treatment Plant
C-12	Quantities for installing effluent piping from Treatment Plant to Chisholm Creek
C-13	Quantities for installing effluent piping from #3-2 to Treatment Plant
C-14	Quantities for installing influent piping #3-4 to New Treatment Plant
C-15	Quantities for installing influent piping #3-5 to New Treatment Plant
C-16	Quantities for installing influent piping #3-3B to New Treatment Plant
C-17	Pipe Jacking under Railroad Lines
C-18	Quantities for Pre-Engineered Building, Equipment, & Startup
C-19	Determination of electrical consumption for an extraction well
C-20	Treatment Plant Operation and Maintenance
C-21	Treatment Plant Operation and Maintenance - Gilbert-Mosley
C-22	Monitoring Well Maintenance
C-23	Monitoring Well Abandonment
C-24	Extraction Well Abandonment
C-25	Groundwater Treatment Plant - Equipment Replacement

Description: Calculations for determination of quantities for preparing groundwater monitoring reports.

Groundwater Monitoring Report Generation - No Action Alternative

Assumed CAD hours per well, HR:	2	
Assumed Geologist hours per well, HR:	10	*Includes data review and tabulation, report, figures, etc.*
Number of wells:	10	
Project Manager, HR:	8	
CAD Drafter, HR:	20	
Geologist, HR:	100	
Quality Assurance Director, HR:	4	
Clerks, Typist, Bookkeeper & Receptionist, HR:	8	
Reproduction, LS:	1	

Groundwater Sampling Monitoring Report Generation

Assumed CAD hours per well, HR:	2	
Assumed Geologist hours per well, HR:	10	*Includes data review and tabulation, report, figures, etc.*
Number of wells:	42	
Project Manager, HR:	8	
CAD Drafter, HR:	84	
Geologist, HR:	420	
Quality Assurance Director, HR:	4	
Clerks, Typist, Bookkeeper & Receptionist, HR:	10	
Reproduction, LS:	1	

Description: Calculations for determination of quantities for groundwater monitoring per sampling event.

Groundwater Monitoring - No Action Alternative		
No. of monitoring wells to be sampled for general analysis:	**10**	
Analytical Requirements for General Analysis		
VOCs, EPA Method SW-846 8260, EA:	12	*Includes QC samples*
Metals, EPA Method 6010, Field Filtered, EA:	0	
Sampling Equipment		
Water Quality Meter and Flow Through Cell, WK:	1	*Rounded up to nearest week*
Photoionization Detector (PID), WK:	1	*Rounded up to nearest week*
Water Level Meter, WK:	1	*Rounded up to nearest week*
Turbidimeter, WK:	1	*Rounded up to nearest week*
Portable Bladder Pump, WK:	1	*Rounded up to nearest week*
Replacement Poly Bladders, EA:	12	*Assumes 2 extra bladders*
Bladder Pump Controller and Compressor, WK:	1	*Rounded up to nearest week*
Combination Tubing, LF:	600	*Assume 60 feet per well. Rounded up to nearest 100.*
Shipping Rental Equipment, EA:	**2**	
55-gallon Open Head Steel Drum, EA:	**2**	*Assume 500 mL per minute for 60 minutes per well*
Miscellaneous Sampling Equipment, LS:	**1**	
Labor Requirements for General Analysis		
Assumed length of time per day, HR:	**8**	
Time assumed to sample a well, HR:	**2**	*Includes setup, purging, and sample collection*
Number of sampling team members:	**2**	
Prepartory time, HR:	8	
Time to collect water level measurements, HR:	3	*Assume 15 minutes per well. Rounded up to nearest hour*
Time to sample all wells for general analysis, HR:	10	*Rounded up to nearest hour*
Time for decon, HR:	4	*Assume 20 minutes per well. Rounded up to nearest hour*
Time for sample management, HR:	3	*Assume 15 minutes per well. Rounded up to nearest hour*
Total, HR:	**28**	
Time to sample all wells for general analysis, DY:	**4**	*Rounded up to nearest day*
Project Manager, HR:	1	*5 minutes per sample, rounded up to nearest hour*
General Operator/Technician, HR:	56	*Two member team*
Contracting/Procurement Specialist, HR:	2	*10 minutes per sample, rounded up to nearest hour*
Pickup Truck Rental, WK:	1	*Rounded up to nearest week*
Fuel for Pickup Truck, DY:	4	

Description: Calculations for determination of quantities for groundwater monitoring per sampling event.

Groundwater Monitoring - Groundwater Monitoring		
No. of monitoring wells to be sampled for general analysis:	**42**	
No. of surface water samples for VOCs analysis:	**2**	
Analytical Requirements for General Analysis		
VOCs, EPA Method SW-846 8260, EA:	52	*Includes QC samples*
Metals, EPA Method 6010, Field Filtered, EA:	0	
Sampling Equipment		
Water Quality Meter and Flow Through Cell, WK:	2	*Rounded up to nearest week*
Photoionization Detector (PID), WK:	2	*Rounded up to nearest week*
Water Level Meter, WK:	2	*Rounded up to nearest week*
Turbidimeter, WK:	2	*Rounded up to nearest week*
Portable Bladder Pump, WK:	2	*Rounded up to nearest week*
Replacement Poly Bladders, EA:	44	*Assumes 2 extra bladders*
Bladder Pump Controller and Compressor, WK:	2	*Rounded up to nearest week*
Combination Tubing, LF:	2600	*Assume 60 feet per well. Rounded up to nearest 100.*
Shipping Rental Equipment, EA:	**2**	
55-gallon Open Head Steel Drum, EA:	**7**	*Assume 500 mL per minute for 60 minutes per well*
Miscellaneous Sampling Equipment, LS:	**1**	
Labor Requirements for General Analysis		
Assumed length of time per day, HR:	**8**	
Time assumed to sample a well, HR:	**2**	*Includes setup, purging, and sample collection*
Number of sampling team members:	**2**	
Prepartory time, HR:	8	
Time to collect water level measurements, HR:	11	*Assume 15 minutes per well. Rounded up to nearest hour*
Time to sample all wells for general analysis, HR:	42	*Rounded up to nearest hour*
Time for decon, HR:	14	*Assume 20 minutes per well. Rounded up to nearest hour*
Time for sample management, HR:	11	*Assume 15 minutes per well. Rounded up to nearest hour*
Total, HR:	**75**	
Time to sample all wells for general analysis, DY:	**10**	*Rounded up to nearest day*
Project Manager, HR:	4	*5 minutes per sample, rounded up to nearest hour*
General Operator/Technician, HR:	150	*Two member team*
Contracting/Procurement Specialist, HR:	7	*10 minutes per sample, rounded up to nearest hour*
Pickup Truck Rental, WK:	2	*Rounded up to nearest week*
Fuel for Pickup Truck, DY:	10	

Description: Quantities for installation of monitoring wells.

Monitoring Well Installation

Number of Shallow Monitoring Wells:	1		
Deep Monitoring Well Depth, VLF:	25	Top	Bottom
Screened Interval, FT:	10	13	23
Estimated time to install shallow monitoring well, HR:	2		
Number of Deep Monitoring Wells:	1		
Deep Monitoring Well Depth, VLF:	45	Top	Bottom
Screened Interval, FT:	10	32	42
Estimated time to install deep monitoring well, HR:	3		

Shallow Monitoring Well Quantities		Deep Monitoring Well Quantities	
Geoprobe rig and crew, DY:	1	Geoprobe rig and crew, DY:	1
5' Mini-Well Pre-Packed Screen, EA:	2	5' Mini-Well Pre-Packed Screen, EA:	2
PVC Casing, LF:	15	PVC Casing, LF:	35
Well Grout, LF:	15	Well Grout, LF:	35
Locking J-Plug, EA:	1	Locking J-Plug, EA:	1
8" Vault, EA:	1	8" Vault, EA:	1
Monitoring Well Completion, EA:	1	Monitoring Well Completion, EA:	1
Well Development, HR:	1	Well Development, HR:	2
IDW Handling, HR:	1	IDW Handling, HR:	1
Decontamination, HR:	1	Decontamination, HR:	1
Standby Time, HR:	1	Standby Time, HR:	1
55-gallon drum, EA:	0.5	55-gallon drum, EA:	0.5
Geologist, HR:	3	Geologist, HR:	5
Pickup Truck Rental, DY:	1	Pickup Truck Rental, DY:	1
Fuel for Rental Truck, DY:	1	Fuel for Rental Truck, DY:	1

Total

Mobilization and Demobilization of DPT Rig, LS:	1
Decontamination Pad Construction/Removal, LS:	1
Geoprobe rig and crew, DY:	1
Mini-Well Pre-Packed Screen, EA:	4
PVC Casing, LF:	50
Well Grout, LF:	50
Locking J-Plug, EA:	2
8" Vault, EA:	2
Monitoring Well Completion, EA:	2
Monitoring Well Development, HR:	3
IDW Handling, HR:	2
Decontamination, HR:	2
Standby Time, HR:	2
55-gallon Open Head Steel Drum, EA:	1
Geologist, HR:	8
Pickup Truck Rental, DY:	1
Fuel for Rental Truck, DY:	1

Description: Quantities for installation of extraction wells. Well vaults are assumed to be below grade vaults. All well vault pipe materials are assumed to be Schedule 80 PVC.

Extraction Well Installation		
Extraction Well Depth, VLF:	40	
Estimated time to install extraction well, HR:	24	
Extraction Well Quantities		
Borehole diameter, IN:	18	
Well casing inner diameter, IN:	10	
Well casing outer diameter, IN:	10.625	
Drilling – 18-inch nominal borehole, VLF:	40	
Stainless Steel Screen - 10", VLF:	30	
Steel Casing, VLF:	10	
Steel Casing, LBS:	290	*Assumes 29 lbs/foot*
Monitoring Well Completion, EA:	1	
Well Development, HR:	4	
IDW Handling, HR:	2	
Decontamination, HR:	2	
Standby Time, HR:	1	
55-gallon drum, EA:	10	
Geologist, HR:	24	
Pickup Truck Rental, DY:	3	
Fuel for Rental Truck, DY:	3	
Filter Pack, 6" Screen, VLF:	32	*Assumes 2 feet more than screen*
Annular Seal, 6" Well, Portland Cement Grout, VLF:	8	
Bentonite Seal, 6" Well, EA:	1	

Description: Quantities for installation of extraction wells. Well vaults are assumed to be below grade vaults. All well vault pipe materials are assumed to be Schedule 80 PVC.

Extraction Well Vault

Depth of excavation for vault, FT:	6	
Width of excavation for vault, FT:	6	
Length of excavation for vault, FT:	6	
Existing concrete thickness, IN:	12	
Concrete demolition, CY:	2	
Concrete demolition, TN:	4	*Assumes 2 tons per CY*
Saw cut, LF:	28	
Total volume, CF:	216	
Total volume, BCY:	8	*Rounded up to nearest whole number*
Total volume, LCY:	10	*Rounded up to nearest whole number*
Depth of Bedding Material, FT:	1	
Total Volume of Bedding Material Required, BCY:	2	*Rounded up to nearest whole number*
Total Volume of Bedding Material Required, ECY:	3	*Rounded up to nearest whole number*
Well vault, 6'x6'x4', EA:	1	
Well vault door, EA:	1	
Number of Elbow, 90 Deg Required, EA:	4	
Number of Elbow, Tees Required, EA:	1	
Length of 6" PVC piping, LF:	10	
Number of flanged fittings, EA:	8	
Number of check valves, EA:	1	
Number of flow meters, EA:	1	
Number of butterfly valves, EA:	1	
Pipe stands needed, EA:	3	
Concrete to grade, CY:	1	
Finishing, SF:	24	
Field Engineer, HR:	32	
Pickup Truck Rental, DY:	4	
Fuel for Rental Truck, DY:	4	

Description: Quantities for installing influent piping. Assumes all pipe will be directional bored. No open trench installation. All pipe from well vault to treatment plant is assumed to be HDPE. Assumes all connections made in street and would require concrete pavement repair.

Installation of Inffluent Piping from NIC#3-1 to Santa Fe

Estimated distance, LF:	1900	
Assumed length per unit of pipe, LF:	20	
Estimated size of pipe for pipe run, IN:	6	
Number of Elbow, 90 Deg Required, EA:	1	
Number of HDPE flange fittings, EA:	1	
Estimated length per directional bore, LF:	500	
Number of boring locations, EA:	**4**	*Rounded up to nearest whole number.*
Assumed depth of boring location, FT:	6	
Assumed width and length of boring location, FT:	6	
Volume for excavation, CF:	**864**	
Volume for excavation, BCY:	**32**	*Rounded up to nearest whole number.*
Volume for excavation, LCY:	**39**	*Rounded up to nearest whole number.*
Volume for backfill, ECY:	**36**	*Rounded up to nearest whole number.*
Concrete pavement, SF:	**144**	
Existing concrete thickness, IN:	12	
Concrete demolition, CY:	8	
Concrete demolition, TN:	16	*Assumes 2 tons per CY*
Saw cut, LF:	60	
Gravel base for pavement repair, IN:	9	
Gravel base for pavement repair, BCY:	4	*Rounded up to nearest whole number.*
Gravel base, LCY:	**5**	*Rounded up to nearest whole number.*
Gravel base, ECY:	**5**	*Rounded up to nearest whole number.*
Concrete replacement, CY:	8	
Reinforcement dowels, EA:	192	*Assumes 6" spacing along perimeter of cut*
Finishing, SF:	144	
Volume of spoils to haul away, LCY:	13	
Volume for backfilling, LCY:	26	
Volume for backfilling, ECY:	20	*Rounded up to nearest whole number.*
Directional boring, LF:	1900	
Assumed productivity of directional drilling, LF/DAY:	350	
Number of days for directional drilling, DY:	6	
Length of HDPE pipe needed, LF:	1900	
Number of 90 Deg, El, EA:	2	
Number of flange fittings, EA:	1	
Number of HDPE pipe welds, EA:	98	*Assume 20 FT long pipe sections*
Assumed Productivity of Welding Joints, EA/DAY:	30	
Number of Days Required for Welding, DY:	4	
Tracer wire, CLF:	19	
Manholes for tracer wire connection, EA:	4	
Field Engineer, HR:	48	
Pickup Truck Rental, DY:	6	
Fuel for Rental Truck, DY:	6	

Description: Quantities for installing influent piping. Assumes all pipe will be directional bored. No open trench installation. All pipe from well vault to treatment plant is assumed to be HDPE. Assumes all connections made in street and would require concrete pavement repair.

Installation of Influent Piping from NIC#3-2 to Santa Fe

Estimated distance, LF:	2100	
Assumed length per unit of pipe, LF:	20	
Estimated size of pipe for pipe run, IN:	6	
Number of Elbow, 90 Deg Required, EA:	1	
Number of HDPE flange fittings, EA:	1	
Estimated length per directional bore, LF:	500	
Number of boring locations, EA:	**5**	*Rounded up to nearest whole number.*
Assumed depth of boring location, FT:	6	
Assumed width and length of boring location, FT:	6	
Volume for excavation, CF:	**1080**	
Volume for excavation, BCY:	**40**	*Rounded up to nearest whole number.*
Volume for excavation, LCY:	**48**	*Rounded up to nearest whole number.*
Volume for backfill, ECY:	**45**	*Rounded up to nearest whole number.*
Concrete pavement, SF:	**180**	
Existing concrete thickness, IN:	12	
Concrete demolition, CY:	10	
Concrete demolition, TN:	20	*Assumes 2 tons per CY*
Saw cut, LF:	72	
Gravel base for pavement repair, IN:	9	
Gravel base for pavement repair, BCY:	5	*Rounded up to nearest whole number.*
Gravel base, LCY:	**6**	*Rounded up to nearest whole number.*
Gravel base, ECY:	**6**	*Rounded up to nearest whole number.*
Concrete replacement, CY:	10	
Reinforcement dowels, EA:	240	*Assumes 6" spacing along perimeter of cut*
Finishing, SF:	180	
Volume of spoils to haul away, LCY:	16	
Volume for backfilling, LCY:	32	
Volume for backfilling, ECY:	24	*Rounded up to nearest whole number.*
Directional boring, LF:	2100	
Assumed productivity of directional drilling, LF/DAY:	350	
Number of days for directional drilling, DY:	6	
Length of HDPE pipe needed, LF:	2100	
Number of 90 Deg, El, EA:	1	
Number of flange fittings, EA:	1	
Number of HDPE pipe welds, EA:	107	*Assume 20 FT long pipe sections*
Assumed Productivity of Welding Joints, EA/DAY:	30	
Number of Days Required for Welding, DY:	4	
Tracer wire, CLF:	21	
Manholes for tracer wire connection, EA:	5	
Field Engineer, HR:	48	
Pickup Truck Rental, DY:	6	
Fuel for Rental Truck, DY:	6	

Description: Quantities for installing influent piping. Assumes all pipe will be directional bored. No open trench installation. All pipe from well vault to treatment plant is assumed to be HDPE. Assumes all connections made in street and would require concrete pavement repair.

Installation of Influent Piping from NIC#3-3A to Treatment Plant

Estimated distance, LF:	1300	
Assumed length per unit of pipe, LF:	20	
Estimated size of pipe for pipe run, IN:	6	
Number of Elbow, 90 Deg Required, EA:	1	
Number of HDPE flange fittings, EA:	1	
Estimated length per directional bore, LF:	500	
Number of boring locations, EA:	**3**	*Rounded up to nearest whole number.*
Assumed depth of boring location, FT:	6	
Assumed width and length of boring location, FT:	6	
Volume for excavation, CF:	**648**	
Volume for excavation, BCY:	**24**	*Rounded up to nearest whole number.*
Volume for excavation, LCY:	**29**	*Rounded up to nearest whole number.*
Volume for backfill, ECY:	**27**	*Rounded up to nearest whole number.*
Concrete pavement, SF:	**108**	
Existing concrete thickness, IN:	12	
Concrete demolition, CY:	6	
Concrete demolition, TN:	12	*Assumes 2 tons per CY*
Saw cut, LF:	48	
Gravel base for pavement repair, IN:	9	
Gravel base for pavement repair, BCY:	3	*Rounded up to nearest whole number.*
Gravel base, LCY:	**4**	*Rounded up to nearest whole number.*
Gravel base, ECY:	**4**	*Rounded up to nearest whole number.*
Concrete replacement, CY:	6	
Reinforcement dowels, EA:	144	*Assumes 6" spacing along perimeter of cut*
Finishing, SF:	108	
Volume of spoils to haul away, LCY:	10	
Volume for backfilling, LCY:	19	
Volume for backfilling, ECY:	15	*Rounded up to nearest whole number.*
Directional boring, LF:	1300	
Assumed productivity of directional drilling, LF/DAY:	350	
Number of days for directional drilling, DY:	4	
Length of HDPE pipe needed, LF:	1300	
Number of 90 Deg, El, EA:	1	
Number of flange fittings, EA:	1	
Number of HDPE pipe welds, EA:	67	*Assume 20 FT long pipe sections*
Assumed Productivity of Welding Joints, EA/DAY:	30	
Number of Days Required for Welding, DY:	3	
Tracer wire, CLF:	13	
Manholes for tracer wire connection, EA:	3	
Field Engineer, HR:	32	
Pickup Truck Rental, DY:	4	
Fuel for Rental Truck, DY:	4	

Description: Quantities for installing influent piping. Assumes all pipe will be directional bored. No open trench installation. All pipe from well vault to treatment plant is assumed to be HDPE. Assumes all connections made in street and would require concrete pavement repair.

Installation of Influent Piping to Gilbert-Mosley Treatment Plant

Estimated distance, LF:	9350	
Assumed length per unit of pipe, LF:	20	
Estimated size of pipe for pipe run, IN:	6	
Number of Elbow, 90 Deg Required, EA:	1	
Number of HDPE flange fittings, EA:	1	
Estimated length per directional bore, LF:	500	
Number of boring locations, EA:	**19**	*Rounded up to nearest whole number.*
Assumed depth of boring location, FT:	6	
Assumed width and length of boring location, FT:	6	
Volume for excavation, CF:	**4104**	
Volume for excavation, BCY:	**152**	*Rounded up to nearest whole number.*
Volume for excavation, LCY:	**183**	*Rounded up to nearest whole number.*
Volume for backfill, ECY:	**169**	*Rounded up to nearest whole number.*
Concrete pavement, SF:	**684**	
Existing concrete thickness, IN:	12	
Concrete demolition, CY:	38	
Concrete demolition, TN:	76	*Assumes 2 tons per CY*
Saw cut, LF:	240	
Gravel base for pavement repair, IN:	9	
Gravel base for pavement repair, BCY:	19	*Rounded up to nearest whole number.*
Gravel base, LCY:	**23**	*Rounded up to nearest whole number.*
Gravel base, ECY:	**22**	*Rounded up to nearest whole number.*
Concrete replacement, CY:	38	
Reinforcement dowels, EA:	912	*Assumes 6" spacing along perimeter of cut*
Finishing, SF:	684	
Volume of spoils to haul away, LCY:	61	
Volume for backfilling, LCY:	122	
Volume for backfilling, ECY:	92	*Rounded up to nearest whole number.*
Number of railroad crossings:	2	*See Worksheet C-17*
Length per crossing, LF:	100	*See Worksheet C-17*
Total length jacking length, LF:	200	
Directional boring, LF:	9150	*Total length minus jacking length*
Assumed productivity of directional drilling, LF/DAY:	350	
Number of days for directional drilling, DY:	27	
Length of HDPE pipe needed, LF:	9350	
Number of 90 Deg, El, EA:	0	
Number of tees, EA:	3	
Number of flange fittings, EA:	0	
Number of HDPE pipe welds, EA:	471	*Assume 20 FT long pipe sections*
Assumed Productivity of Welding Joints, EA/DAY:	30	
Number of Days Required for Welding, DY:	16	
Tracer wire, CLF:	93.5	
Manholes for tracer wire connection, EA:	19	
Field Engineer, HR:	216	
Pickup Truck Rental, DY:	27	
Fuel for Rental Truck, DY:	27	

Description: Quantities for installing influent piping. Assumes all pipe will be directional bored. No open trench installation. All pipe from well vault to treatment plant is assumed to be HDPE. Assumes all connections made in street and would require concrete pavement repair.

Installation of Influent Piping from NIC#3-1 to New Treatment Plant

Estimated distance, LF:	3950	
Assumed length per unit of pipe, LF:	20	
Estimated size of pipe for pipe run, IN:	6	
Number of Elbow, 90 Deg Required, EA:	1	
Number of HDPE flange fittings, EA:	1	
Estimated length per directional bore, LF:	500	
Number of boring locations, EA:	**8**	*Rounded up to nearest whole number.*
Assumed depth of boring location, FT:	6	
Assumed width and length of boring location, FT:	6	
Volume for excavation, CF:	**1728**	
Volume for excavation, BCY:	**64**	*Rounded up to nearest whole number.*
Volume for excavation, LCY:	**77**	*Rounded up to nearest whole number.*
Volume for backfill, ECY:	**72**	*Rounded up to nearest whole number.*
Concrete pavement, SF:	**288**	
Existing concrete thickness, IN:	12	
Concrete demolition, CY:	16	
Concrete demolition, TN:	32	*Assumes 2 tons per CY*
Saw cut, LF:	108	
Gravel base for pavement repair, IN:	9	
Gravel base for pavement repair, BCY:	8	*Rounded up to nearest whole number.*
Gravel base, LCY:	**10**	*Rounded up to nearest whole number.*
Gravel base, ECY:	**9**	*Rounded up to nearest whole number.*
Concrete replacement, CY:	16	
Reinforcement dowels, EA:	384	*Assumes 6" spacing along perimeter of cut*
Finishing, SF:	288	
Volume of spoils to haul away, LCY:	26	
Volume for backfilling, LCY:	51	
Volume for backfilling, ECY:	39	*Rounded up to nearest whole number.*
Directional boring, LF:	3950	
Assumed productivity of directional drilling, LF/DAY:	350	
Number of days for directional drilling, DY:	12	
Length of HDPE pipe needed, LF:	3950	
Number of 90 Deg, El, EA:	0	
Number of tees, EA:	1	
Number of flange fittings, EA:	1	
Number of HDPE pipe welds, EA:	200	*Assume 20 FT long pipe sections*
Assumed Productivity of Welding Joints, EA/DAY:	30	
Number of Days Required for Welding, DY:	7	
Tracer wire, CLF:	39.5	
Manholes for tracer wire connection, EA:	8	
Field Engineer, HR:	96	
Pickup Truck Rental, DY:	12	
Fuel for Rental Truck, DY:	12	

Description: Quantities for installing effluent piping. Assumes all pipe will be directional bored. No open trench installation. All pipe from treatment plant to discharge location is assumed to be HDPE. Assumes all connections made in street and would require concrete pavement repair.

Installation of Effluent Piping from New Treatment Plant to Chisholm Creek

Estimated distance, LF:	100	
Assumed length per unit of pipe, LF:	20	
Estimated size of pipe for pipe run, IN:	6	
Number of Elbow, 90 Deg Required, EA:	1	
Number of HDPE flange fittings, EA:	1	
Estimated length per directional bore, LF:	500	
Number of boring locations, EA:	**1**	*Rounded up to nearest whole number.*
Assumed depth of boring location, FT:	6	
Assumed width and length of boring location, FT:	6	
Volume for excavation, CF:	**216**	
Volume for excavation, BCY:	**8**	*Rounded up to nearest whole number.*
Volume for excavation, LCY:	**10**	*Rounded up to nearest whole number.*
Volume for backfill, ECY:	**9**	*Rounded up to nearest whole number.*
Concrete pavement, SF:	**36**	
Existing concrete thickness, IN:	12	
Concrete demolition, CY:	2	
Concrete demolition, TN:	4	*Assumes 2 tons per CY*
Saw cut, LF:	24	
Gravel base for pavement repair, IN:	9	
Gravel base for pavement repair, BCY:	1	*Rounded up to nearest whole number.*
Gravel base, LCY:	**2**	*Rounded up to nearest whole number.*
Gravel base, ECY:	**2**	*Rounded up to nearest whole number.*
Concrete replacement, CY:	2	
Reinforcement dowels, EA:	48	*Assumes 6" spacing along perimeter of cut*
Finishing, SF:	36	
Volume of spoils to haul away, LCY:	4	
Volume for backfilling, LCY:	6	
Volume for backfilling, ECY:	5	*Rounded up to nearest whole number.*
Directional boring, LF:	100	
Assumed productivity of directional drilling, LF/DAY:	350	
Number of days for directional drilling, DY:	1	
Length of HDPE pipe needed, LF:	100	
Number of 90 Deg, El, EA:	0	
Number of tees, EA:	0	
Number of flange fittings, EA:	1	
Number of HDPE pipe welds, EA:	6	*Assume 20 FT long pipe sections*
Assumed Productivity of Welding Joints, EA/DAY:	30	
Number of Days Required for Welding, DY:	1	
Tracer wire, CLF:	1	
Manholes for tracer wire connection, EA:	1	
Field Engineer, HR:	8	
Pickup Truck Rental, DY:	1	
Fuel for Rental Truck, DY:	1	

Description: Quantities for installing effluent piping. Assumes all pipe will be directional bored. No open trench installation. All pipe from treatment plant to discharge location is assumed to be HDPE. Assumes all connections made in street and would require concrete pavement repair.

Installation of Influent Piping from NIC#3-2 to New Treatment Plant

Estimated distance, LF:	1900	
Assumed length per unit of pipe, LF:	20	
Estimated size of pipe for pipe run, IN:	6	
Number of Elbow, 90 Deg Required, EA:	1	
Number of HDPE flange fittings, EA:	1	
Estimated length per directional bore, LF:	500	
Number of boring locations, EA:	**4**	*Rounded up to nearest whole number.*
Assumed depth of boring location, FT:	6	
Assumed width and length of boring location, FT:	6	
Volume for excavation, CF:	**864**	
Volume for excavation, BCY:	**32**	*Rounded up to nearest whole number.*
Volume for excavation, LCY:	**39**	*Rounded up to nearest whole number.*
Volume for backfill, ECY:	**36**	*Rounded up to nearest whole number.*
Concrete pavement, SF:	**144**	
Existing concrete thickness, IN:	12	
Concrete demolition, CY:	8	
Concrete demolition, TN:	16	*Assumes 2 tons per CY*
Saw cut, LF:	60	
Gravel base for pavement repair, IN:	9	
Gravel base for pavement repair, BCY:	4	*Rounded up to nearest whole number.*
Gravel base, LCY:	**5**	*Rounded up to nearest whole number.*
Gravel base, ECY:	**5**	*Rounded up to nearest whole number.*
Concrete replacement, CY:	8	
Reinforcement dowels, EA:	192	*Assumes 6" spacing along perimeter of cut*
Finishing, SF:	144	
Volume of spoils to haul away, LCY:	13	
Volume for backfilling, LCY:	26	
Volume for backfilling, ECY:	20	*Rounded up to nearest whole number.*
Directional boring, LF:	1900	
Assumed productivity of directional drilling, LF/DAY:	350	
Number of days for directional drilling, DY:	6	
Length of HDPE pipe needed, LF:	1900	
Number of 90 Deg, El, EA:	1	
Number of tees, EA:	0	
Number of flange fittings, EA:	1	
Number of HDPE pipe welds, EA:	97	*Assume 20 FT long pipe sections*
Assumed Productivity of Welding Joints, EA/DAY:	30	
Number of Days Required for Welding, DY:	4	
Tracer wire, CLF:	19	
Manholes for tracer wire connection, EA:	4	
Field Engineer, HR:	48	
Pickup Truck Rental, DY:	6	
Fuel for Rental Truck, DY:	6	

Description: Quantities for installing influent piping. Assumes all pipe will be directional bored. No open trench installation. All pipe from well vault to treatment plant is assumed to be HDPE. Assumes all connections made in street and would require concrete pavement repair.

Installation of Influent Piping from NIC#3-4 to Treatment Plant

Estimated distance, LF:	2300	
Assumed length per unit of pipe, LF:	20	
Estimated size of pipe for pipe run, IN:	6	
Number of Elbow, 90 Deg Required, EA:	1	
Number of HDPE flange fittings, EA:	1	
Estimated length per directional bore, LF:	500	
Number of boring locations, EA:	**5**	*Rounded up to nearest whole number.*
Assumed depth of boring location, FT:	6	
Assumed width and length of boring location, FT:	6	
Volume for excavation, CF:	**1080**	
Volume for excavation, BCY:	**40**	*Rounded up to nearest whole number.*
Volume for excavation, LCY:	**48**	*Rounded up to nearest whole number.*
Volume for backfill, ECY:	**45**	*Rounded up to nearest whole number.*
Concrete pavement, SF:	**180**	
Existing concrete thickness, IN:	12	
Concrete demolition, CY:	10	
Concrete demolition, TN:	20	*Assumes 2 tons per CY*
Saw cut, LF:	72	
Gravel base for pavement repair, IN:	9	
Gravel base for pavement repair, BCY:	5	*Rounded up to nearest whole number.*
Gravel base, LCY:	**6**	*Rounded up to nearest whole number.*
Gravel base, ECY:	**6**	*Rounded up to nearest whole number.*
Concrete replacement, CY:	10	
Reinforcement dowels, EA:	240	*Assumes 6" spacing along perimeter of cut*
Finishing, SF:	180	
Volume of spoils to haul away, LCY:	16	
Volume for backfilling, LCY:	32	
Volume for backfilling, ECY:	24	*Rounded up to nearest whole number.*
Directional boring, LF:	2300	
Assumed productivity of directional drilling, LF/DAY:	350	
Number of days for directional drilling, DY:	7	
Length of HDPE pipe needed, LF:	2300	
Number of 90 Deg, El, EA:	1	
Number of flange fittings, EA:	1	
Number of HDPE pipe welds, EA:	117	*Assume 20 FT long pipe sections*
Assumed Productivity of Welding Joints, EA/DAY:	30	
Number of Days Required for Welding, DY:	4	
Tracer wire, CLF:	23	
Manholes for tracer wire connection, EA:	5	
Field Engineer, HR:	56	
Pickup Truck Rental, DY:	7	
Fuel for Rental Truck, DY:	7	

Description: Quantities for installing influent piping. Assumes all pipe will be directional bored. No open trench installation. All pipe from well vault to treatment plant is assumed to be HDPE. Assumes all connections made in street and would require concrete pavement repair.

Installation of Influent Piping from NIC#3-5 to Treatment Plant

Estimated distance, LF:	750	
Assumed length per unit of pipe, LF:	20	
Estimated size of pipe for pipe run, IN:	6	
Number of Elbow, 90 Deg Required, EA:	1	
Number of HDPE flange fittings, EA:	1	
Estimated length per directional bore, LF:	500	
Number of boring locations, EA:	**2**	*Rounded up to nearest whole number.*
Assumed depth of boring location, FT:	6	
Assumed width and length of boring location, FT:	6	
Volume for excavation, CF:	**432**	
Volume for excavation, BCY:	**16**	*Rounded up to nearest whole number.*
Volume for excavation, LCY:	**20**	*Rounded up to nearest whole number.*
Volume for backfill, ECY:	**18**	*Rounded up to nearest whole number.*
Concrete pavement, SF:	**72**	
Existing concrete thickness, IN:	12	
Concrete demolition, CY:	4	
Concrete demolition, TN:	8	*Assumes 2 tons per CY*
Saw cut, LF:	36	
Gravel base for pavement repair, IN:	9	
Gravel base for pavement repair, BCY:	2	*Rounded up to nearest whole number.*
Gravel base, LCY:	**3**	*Rounded up to nearest whole number.*
Gravel base, ECY:	**3**	*Rounded up to nearest whole number.*
Concrete replacement, CY:	4	
Reinforcement dowels, EA:	96	*Assumes 6" spacing along perimeter of cut*
Finishing, SF:	72	
Volume of spoils to haul away, LCY:	7	
Volume for backfilling, LCY:	13	
Volume for backfilling, ECY:	10	*Rounded up to nearest whole number.*
Directional boring, LF:	750	
Assumed productivity of directional drilling, LF/DAY:	350	
Number of days for directional drilling, DY:	3	
Length of HDPE pipe needed, LF:	750	
Number of 90 Deg, El, EA:	1	
Number of flange fittings, EA:	1	
Number of HDPE pipe welds, EA:	40	*Assume 20 FT long pipe sections*
Assumed Productivity of Welding Joints, EA/DAY:	30	
Number of Days Required for Welding, DY:	2	
Tracer wire, CLF:	7.5	
Manholes for tracer wire connection, EA:	2	
Field Engineer, HR:	24	
Pickup Truck Rental, DY:	3	
Fuel for Rental Truck, DY:	3	

Description: Quantities for installing influent piping. Assumes all pipe will be directional bored. No open trench installation. All pipe from well vault to treatment plant is assumed to be HDPE. Assumes all connections made in street and would require concrete pavement repair.

Installation of Influent Piping from NIC#3-3B to Treatment Plant

Estimated distance, LF:	5300	
Assumed length per unit of pipe, LF:	20	
Estimated size of pipe for pipe run, IN:	6	
Number of Elbow, 90 Deg Required, EA:	1	
Number of HDPE flange fittings, EA:	1	
Estimated length per directional bore, LF:	500	
Number of boring locations, EA:	**11**	*Rounded up to nearest whole number.*
Assumed depth of boring location, FT:	6	
Assumed width and length of boring location, FT:	6	
Volume for excavation, CF:	**2376**	
Volume for excavation, BCY:	**88**	*Rounded up to nearest whole number.*
Volume for excavation, LCY:	**106**	*Rounded up to nearest whole number.*
Volume for backfill, ECY:	**98**	*Rounded up to nearest whole number.*
Concrete pavement, SF:	**396**	
Existing concrete thickness, IN:	12	
Concrete demolition, CY:	22	
Concrete demolition, TN:	44	*Assumes 2 tons per CY*
Saw cut, LF:	144	
Gravel base for pavement repair, IN:	9	
Gravel base for pavement repair, BCY:	11	*Rounded up to nearest whole number.*
Gravel base, LCY:	**14**	*Rounded up to nearest whole number.*
Gravel base, ECY:	**13**	*Rounded up to nearest whole number.*
Concrete replacement, CY:	22	
Reinforcement dowels, EA:	528	*Assumes 6" spacing along perimeter of cut*
Finishing, SF:	396	
Volume of spoils to haul away, LCY:	36	
Volume for backfilling, LCY:	70	
Volume for backfilling, ECY:	53	*Rounded up to nearest whole number.*
Directional boring, LF:	5300	
Assumed productivity of directional drilling, LF/DAY:	350	
Number of days for directional drilling, DY:	16	
Length of HDPE pipe needed, LF:	5300	
Number of 90 Deg, El, EA:	1	
Number of flange fittings, EA:	1	
Number of HDPE pipe welds, EA:	267	*Assume 20 FT long pipe sections*
Assumed Productivity of Welding Joints, EA/DAY:	30	
Number of Days Required for Welding, DY:	9	
Tracer wire, CLF:	53	
Manholes for tracer wire connection, EA:	11	
Field Engineer, HR:	128	
Pickup Truck Rental, DY:	16	
Fuel for Rental Truck, DY:	16	

Description: Pipe Jacking Under Railroad Lines

Pipe Jacking Under Railroad Lines

Pipe jacking length, LF:	100	
Number of railroad crossing locations, EA:	2	*Rounded up to nearest whole number.*
Number of jacking pits per crossing, EA:	2	
Length for jacking, LF:	200	
Assumed depth of jacking location, FT:	10	
Assumed width and length of jacking location, FT:	10	
Volume for excavation, CF:	**4000**	
Volume for excavation, BCY:	**149**	*Rounded up to nearest whole number.*
Volume for excavation, LCY:	**179**	*Rounded up to nearest whole number.*
Volume for backfill, ECY:	**166**	*Rounded up to nearest whole number.*
Concrete pavement, SF:	**400**	
Existing concrete thickness, IN:	12	
Concrete demolition, CY:	16	
Concrete demolition, TN:	32	*Assumes 2 tons per CY*
Saw cut, LF:	100	
Gravel base for pavement repair, IN:	9	
Gravel base for pavement repair, BCY:	12	*Rounded up to nearest whole number.*
Gravel base, LCY:	**15**	*Rounded up to nearest whole number.*
Gravel base, ECY:	**14**	*Rounded up to nearest whole number.*
Concrete replacement, CY:	16	
Reinforcement dowels, EA:	320	*Assumes 6" spacing along perimeter of cut*
Finishing, SF:	400	
Volume of spoils to haul away, LCY:	31	
Volume for backfilling, LCY:	148	
Volume for backfilling, ECY:	111	*Rounded up to nearest whole number.*
Estimated jacking productivity, LF/HR:	4	
Time required for jacking, DY:	7	*Rounded up to nearest whole number. Assumes 8 hour day.*
Field Engineer, HR:	56	
Pickup Truck Rental, DY:	7	
Fuel for Rental Truck, DY:	7	

Description: Quantities for Pre-Engineered Building, Equipment, and Startup

Pre-Engineered Building		
Dimension of Pre-Engineered Building, FT:	50	*Length of the building*
Dimension of Pre-Engineered Building, FT:	25	*Width of the building*
Heigh of Pre-Engineered Building, FT:	15	
Total Area of the Proposed Pre-Engineered Building, SF:	1250	
Exterior wall square footage, SF:	2250	
Facility Control System		
Total Cost for Fabrication and Const. of Pre-Eng Buld., $:	8,688	*TABLE CW-26-GWU3*
50% of Fabrication Cost, $:	4,344	
Groundwater Treatment Plant - Equipment		
Shallow tray air stripper, EA:	1	*Assume max flow rate of 400 gpm*
Equalization tank, EA:	1	*Assume min 10 min. detention - 4000 gallons*
Transfer pump, EA:	1	*Assume 400 gpm with VFD*
Pipe, plastic, PVC, 8" diameter, SCH 80, LF:	250	
El, 90 Deg., plastic, PVC, socket joint, 8", SCH 80, EA:	13	*Assume every 20 LF*
Tee, plastic, PVC, socket joint, 8", SCH 80, EA:	5	*Assume every 50 LF*
Flange, plastic, PVC, socket joint, 8", SCH 80, EA:	20	
Valves, iron body, gate, flanged, 125 lb., 8", EA:	5	*Assume every 50 LF*
Valves, iron body, swing check, flanged, 125 lb., 8", EA:	5	
Venturi flow, measuring device, 8", EA:	3	*Influent, prior to air stripper and effluent*
Concrete Pads for Treatment Equipment, SF:	438	*Assume 35% of building floor area*
Heat for Equipment Building, SF:	1250	
Groundwater Treatment Plant Startup		
Labor Cost for Startup Technician, HR:	280	*14 days, 10 hour days, 2 techs.*
Labor Cost for Engineer, HR:	20	*2 days, 8 hour days*
Truck Rental, DY:	16	
Fuel for Rental Truck, DY:	16	
Number of days for startup testing, DY:	14	
Number of weeks for startup testing, WK:	2	
Number of sample points, EA:	7	*Each extraction well, influent and effluent of plant*
Sample frequency, EA/DY:	1	
VOCs, EPA Method SW-846 8260, EA:	113	*Includes QC samples*
Metals, EPA Method 6010, Field Filtered, EA:	0	*Includes QC samples*
Water Quality Meter and Flow Through Cell, WK:	2	*Rounded up to nearest week*
Photoionization Detector (PID), WK:	2	*Rounded up to nearest week*
Water Level Meter, WK:	2	*Rounded up to nearest week*
Turbidimeter, WK:	2	*Rounded up to nearest week*
Shipping Rental Equipment, EA:	**2**	
Miscellaneous Sampling Equipment, LS:	**1**	
Project Manager, HR:	10	*5 minutes per sample, rounded up to nearest hour*
Contracting/Procurement Specialist, HR:	19	*10 minutes per sample, rounded up to nearest hour*

Description: Determination of electrical consumption for an extraction well.

Electrical Consumption by Well

Energy equivalent, HP-HR to kW-HR:	0.746	
Assumed pump efficiency, %:	50%	
Assumed HP of extraction well pump, HP:	5	
Number of hours per year, HR:	8760	
Number of HP-HR:	43800	
Equivalent electrical consumption, kW-HR:	65400	*Assumes motor efficiency, rounded up to nearest hundred*

Description: Determination of items related to operation and maintenance of the new groundwater treatment plant. Includes a an estimate of electrical consumption, and O&M technician time.

Treatment Plant Operation and Maintenance

Energy equivalent, HP-HR to kW-HR:	0.746	
Assumed pump efficiency, %:	50%	
Assumed HP of transfer pump, HP:	5	
Assumed HP of air stripper blower, HP:	5	
Number of hours per year, HR:	8760	
Number of HP-HR:	87600	
Equivalent electrical consumption, kW-HR:	130700	*Assumes motor efficiency, rounded up to nearest hundred*
Est. mo. electrical consumption for lights, etc., kW-HR:	2000	
Annual electrical consumption, kW-HR:	24000	
Est. annual total electrical consumption, kW-HR:	154700	
Assumed time per week of O&M tech, HR/WK:	8	
Number of weeks per year, WK/YR:	52	
Annual O&M tech hours, HR:	416	

Description: Determination of items related to operation and maintenance of the Gilbert-Mosley treatment plant for the portion of flow contributed by GWU3. Percentage determined by flow rate is applied in the NIC cost backup spreadsheet.

Treatment Plant Operation and Maintenance - Gilbert-Mosley

Est. total flow to Gilbert-Mosley System, GPM:	1000	
Est. flow rate from NIC #3-1, GPM:	140	
Est. flow rate from NIC #3-2, GPM:	65	
Total GWU3 flow rate to the Gilbert-Mosley system, GPM:	205	
Portion of flow from GWU3, %:	21%	
Est. sequestrant usage of Gilbert-Mosley system, GAL/YR:	712	*At a current designated flow rate*
Flow rate for usage, GPM:	880	
Sequestrant usage, GAL/YR/GPM:	0.81	
Sequestrant usage for GWU3 portion, GAL/YR:	167	*Rounded up to nearest gallon*
Portion of Gilbert-Mosley Electrical Usage:	1	
Portion of Gilbert-Mosley O&M Usage:	1	
Portion of Gilbert-Mosley sequestrant usage, GAL:	167	
Portion of Gilbert Mosley Labor, LS:	1	

Treatment Plant Operation and Maintenance - Gilbert-Mosley

Est. total flow to Gilbert-Mosley System, GPM:	1000	
Est. flow rate from NIC #3-1, GPM:	0	
Est. flow rate from NIC #3-2, GPM:	65	
Total GWU3 flow rate to the Gilbert-Mosley system, GPM:	65	
Portion of flow from GWU3, %:	7%	
Est. sequestrant usage of Gilbert-Mosley system, GAL/YR:	712	*At a current designated flow rate*
Flow rate for usage, GPM:	880	
Sequestrant usage, GAL/YR/GPM:	0.81	
Sequestrant usage for GWU3 portion, GAL/YR:	53	*Rounded up to nearest gallon*
Portion of Gilbert-Mosley Electrical Usage:	1	
Portion of Gilbert-Mosley O&M Usage:	1	
Portion of Gilbert-Mosley sequestrant usage, GAL:	53	
Portion of Gilbert Mosley Labor, LS:	1	

CDM			
PROJECT:	North Industrial Corridor-GWU3	COMPUTED BY :	MW
JOB NO.:	2395-54800	DATE :	3/17/2011
CLIENT:	City of Wichita		

CHECKED BY:	MS
DATE CHECKED:	3/29/2011
WRKSHT NO. :	C-22

Description: Quantities for maintenance of monitoring wells. Assumes all monitoring wells will require replacement of vault and development.

Monitoring Well Maintenance - No Action Monitoring Wells

Number of wells requiring maintenance, EA:	10
Estimated time to complete well head repairs per well, HR:	1
Estimated time to develop well, HR:	1
Total time per well, HR:	2
Total time for all wells, HR:	20
Estimated length of work day, HR:	10
Mobilization and Demobilization of DPT Rig, LS:	1
Decontamination Pad Construction/Removal, LS:	1
Geoprobe rig and crew, DY:	2
Locking J-Plug, EA:	10
8" Vault, EA:	10
Geologist, HR:	20
Pickup Truck Rental, DY:	2
Fuel for Rental Truck, DY:	2

Monitoring Well Maintenance - Groundwater Monitoring Wells

Number of wells requiring maintenance, EA:	42
Estimated time to complete well head repairs per well, HR:	1
Estimated time to develop well, HR:	1
Total time per well, HR:	2
Total time for all wells, HR:	84
Estimated length of work day, HR:	10
Mobilization and Demobilization of DPT Rig, LS:	1
Decontamination Pad Construction/Removal, LS:	1
Geoprobe rig and crew, DY:	9
Locking J-Plug, EA:	42
8" Vault, EA:	42
Geologist, HR:	84
Pickup Truck Rental, DY:	9
Fuel for Rental Truck, DY:	9

Description: Quantities for abandonment of monitoring wells. Assumes all monitoring wells will be abandoned when site is closed.

Monitoring Well Abandonment - No Action Alternative Monitoring Wells

Number of Shallow Monitoring Wells:	5		
Shallow Monitoring Well Depth, VLF:	25	Top	Bottom
Screened Interval, FT:	10	13	23
Estimated time to abandon shallow monitoring well, HR:	1		
Number of Deep Monitoring Wells:	5		
Deep Monitoring Well Depth, VLF:	45	Top	Bottom
Screened Interval, FT:	10	32	42
Estimated time to abandon deep monitoring well, HR:	2		
Estimated length of work day, HR:	10		

Shallow Monitoring Well Quantities		Deep Monitoring Well Quantities	
Geoprobe rig and crew, HR:	5	Geoprobe rig and crew, HR:	10
Geoprobe rig and crew, DY:	1	Geoprobe rig and crew, DY:	1
Grout well, VLF:	125	Grout well, VLF:	225

Total

Mobilization and Demobilization of DPT Rig, LS:	1
Decontamination Pad Construction/Removal, LS:	1
Geoprobe rig and crew, DY:	2
Grout well, VLF:	350
Geologist, HR:	20
Pickup Truck Rental, DY:	2
Fuel for Rental Truck, DY:	2

Monitoring Well Abandonment - Groundwater Monitoring Alternative Monitoring Wells

Number of Shallow Monitoring Wells:	21		
Shallow Monitoring Well Depth, VLF:	25	Top	Bottom
Screened Interval, FT:	10	13	23
Estimated time to abandon shallow monitoring well, HR:	1		
Number of Deep Monitoring Wells:	21		
Deep Monitoring Well Depth, VLF:	45	Top	Bottom
Screened Interval, FT:	10	32	42
Estimated time to abandon deep monitoring well, HR:	2		
Estimated length of work day, HR:	10		

Shallow Monitoring Well Quantities		Deep Monitoring Well Quantities	
Geoprobe rig and crew, HR:	21	Geoprobe rig and crew, HR:	42
Geoprobe rig and crew, DY:	3	Geoprobe rig and crew, DY:	5
Grout well, VLF:	525	Grout well, VLF:	945

Total

Mobilization and Demobilization of DPT Rig, LS:	1
Decontamination Pad Construction/Removal, LS:	1
Geoprobe rig and crew, DY:	8
Grout well, VLF:	1470
Geologist, HR:	80
Pickup Truck Rental, DY:	8
Fuel for Rental Truck, DY:	8

Description: Quantities for abandonment of extraction wells. Assumes all extraction wells will be abandoned when site is closed.

Extraction Well Abandonment

Extraction Well Depth, VLF:	40
Grout well, VLF:	40
Estimated productivity, VLF/HR:	4
Total time to abandon well, HR:	10
Estimated length of work day, HR:	10
Geologist, HR:	10
Pickup Truck Rental, DY:	1
Fuel for Rental Truck, DY:	1

Description: Quantities for minor and major replacement of equipment for treatment system.

Groundwater Treatment Plant - Equipment Replacement

Minor Equipment Replacement

Valves, iron body, gate, flanged, 125 lb., 8", EA:	5	
Valves, iron body, swing check, flanged, 125 lb., 8", EA:	5	
Venturi flow, measuring device, 8", EA:	3	

Major Equipment Replacement

Shallow tray air stripper, EA:	1	*Assume max flow rate of 400 gpm*
Equalization tank, EA:	1	*Assume min 10 min. detention - 4000 gallons*
Transfer pump, EA:	1	*Assume 400 gpm with VFD*
VFD, enclosed, 5 HP motor size, NEMA 1, EA:	2	
GAC adsorption, offgas vessels, EA:	0	

Appendix E3
Detailed Cost Analysis of Retained Alternatives for GWU4

COST SUMMARY INDEX

Sheet Name	Title	Description
CS-S-GWU4	Alternative Cost Summary	Summary of GWU4 Alternative Costs
CS-GWU4-1	Cost Estimate Summary	Alternative GWU4-1 No Action
PV-GWU4-1	Present Value Analysis	Alternative GWU4-1 No Action
CS-GWU4-2	Cost Estimate Summary	Alternative GWU4-2 Groundwater Extraction (Containment Only), Discharge to Gilbert-Mosley Treatment
PV-GWU4-2	Present Value Analysis	Alternative GWU4-2 Groundwater Extraction (Containment Only), Discharge to Gilbert-Mosley Treatment
CS-GWU4-3	Cost Estimate Summary	Alternative GWU4-3 Groundwater Extraction (Containment Only), Treatment and Discharge to Storm
PV-GWU4-3	Present Value Analysis	Alternative GWU4-3 Groundwater Extraction (Containment Only), Treatment and Discharge to Storm
CS-GWU4-3	Cost Estimate Summary	Alternative GWU4-4 Groundwater Extraction (Containment Only), Treatment and Discharge to Storm Sewer and Gilbert-Mosley Treatment Plant
PV-GWU4-3	Present Value Analysis	Alternative GWU4-4 Groundwater Extraction (Containment Only), Treatment and Discharge to Storm Sewer and Gilbert-Mosley Treatment Plant
PV-AERFT	Annual Escalation Rate	Summary of Annual Escalation Rate Factors Table
PV-ADRFT	Annual Discount Rate Factors	Summary of Annual Discount Rate Factors Table

TABLE CS-S-GWU4

ALTERNATIVE COST SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Alternative	Total Capital Cost	Total Annual O&M Cost	Total Periodic Cost	Present Value Cost
GWU4-1	$124,000	$1,304,000	$312,000	$1,418,000
GWU4-2	$789,000	$3,300,000	$478,000	$3,745,000
GWU4-3	$1,409,000	$4,504,000	$618,000	$5,373,000
GWU4-4	$1,878,000	$3,670,000	$427,000	$7,298,000

Notes:

1 - Capital costs, annual costs, and periodic costs are presented on tables CS-GWU4-1 through CS-GWU4-4
2 - Estimated remedial timeframes and associated present value analysis for each remedial alternative are provided on tables PV-GWU4-1 through PV-GWU4-4.
3 - Costs presented have an expected accuracy range for feasibility study estimates (-30% to +50% of the actual cost of the alternative).

TABLE CS-GWU4-1

ALTERNATIVE GWU4-1
NO ACTION

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: The No Action alternative (Alternative GWU4-1) would include ongoing monitoring to determine the extent of the groundwater plume. There would be no change in groundwater contaminant concentrations because no treatment, containment or removal of contaminated groundwater is included in this alternative. The No Action alternative is carried through the FS process as required by the NCP to provide a baseline set of conditions can be established against which other remedial actions may be compared.

CAPITAL COSTS: (Assumed to be Incurred During Year 1)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Institutional Controls	CW-1-GWU4	1	LS	$20,014	$20,014	
Miscellaneous Requirements for Sampling	CW-7-GWU4	1	LS	$50,143	$50,143	
				SUBTOTAL	$70,157	
Contingency (Scope and Bid)		20%			$14,031	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$84,188	
Project Management		10%			$8,419	Percentage from Exhibit 5-8 was used.
Remedial Design		0%			$0	No remedial design required under this alternative.
Construction Management		0%			$0	No construction management required under this alternative.
Technical Support		15%			$12,628	Middle value of the recommended range was used.
				TOTAL	$105,235	
				TOTAL CAPITAL COST	**$105,000**	Total capital cost is rounded to the nearest $1,000.

FUTURE CAPITAL COSTS: (Assumed to be Incurred During Year 28)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Monitoring Well Abandonment - No Action Alternative	CW-31-GWU4	1	LS	$9,824	$9,824	
				SUBTOTAL	$9,824	
Contingency (Scope and Bid)		20%			$1,965	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$11,789	
Project Management		10%			$1,179	Percentage from Exhibit 5-8 was used.
Remedial Design		20%			$2,358	Percentage from Exhibit 5-8 was used.
Construction Management		15%			$1,768	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$1,768	Middle value of the recommended range was used.
				TOTAL	$18,862	
				TOTAL FUTURE CAPITAL COST	**$19,000**	Total future capital cost is rounded to the nearest $1,000.

TABLE CS-GWU4-1

ALTERNATIVE GWU4-1

NO ACTION

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: The No Action alternative (Alternative GWU4-1) would include ongoing monitoring to determine the extent of the groundwater plume. There would be no change in groundwater contaminant concentrations because no treatment, containment or removal of contaminated groundwater is included in this alternative. The No Action alternative is carried through the FS process as required by the NCP to provide a baseline set of conditions can be established against which other remedial actions may be compared.

QUARTERLY MONITORING ANNUAL COSTS: (Assumed to be Incurred During Year 1 through 2

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Groundwater Sampling Event - No Action Alternative	CW-5-GWU4	4	EA	$7,643	$30,572	
Groundwater Sampling Event Report Preparation - No Action Alternative	CW-3-GWU4	4	EA	$13,165	$52,660	
				SUBTOTAL	$83,232	
Contingency (Scope and Bid)		20%			$16,646	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$99,878	
Project Management		10%			$9,988	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$14,982	Middle value of the recommended range was used.
				TOTAL	$124,848	
	TOTAL QUARTERLY MONITORING COSTS (Years 1 through 2)				**$125,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

SEMIANNUAL MONITORING ANNUAL COSTS: (Assumed to be Incurred During Year 3 through 10

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Groundwater Sampling Event - No Action Alternative	CW-5-GWU4	2	EA	$7,643	$15,286	
Groundwater Sampling Event Report Preparation - No Action Alternative	CW-3-GWU4	2	EA	$13,165	$26,330	
				SUBTOTAL	$41,616	
Contingency (Scope and Bid)		20%			$8,323	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$49,939	
Project Management		10%			$4,994	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$7,491	Middle value of the recommended range was used.
				TOTAL	$62,424	
	TOTAL SEMIANNUAL MONITORING COST (Year 3 through 10)				**$62,000**	Total semiannual monitoring cost is rounded to the nearest $1,000.

ANNUAL MONITORING ANNUAL COSTS: (Assumed to be Incurred During Year 11 through 28

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Groundwater Sampling Event - No Action Alternative	CW-5-GWU4	1	EA	$7,643	$7,643	
Groundwater Sampling Event Report Preparation - No Action Alternative	CW-3-GWU4	1	EA	$13,165	$13,165	
				SUBTOTAL	$20,808	
Contingency (Scope and Bid)		20%			$4,162	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$24,970	
Project Management		10%			$2,497	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$3,746	Middle value of the recommended range was used.
				TOTAL	$31,213	
	TOTAL ANNUAL MONITORING COST (Year 11 through28)				**$31,000**	Total annual monitoring cost is rounded to the nearest $1,000.

TABLE CS-GWU4-1

ALTERNATIVE GWU4-1

NO ACTION

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: The No Action alternative (Alternative GWU4-1) would include ongoing monitoring to determine the extent of the groundwater plume. There would be no change in groundwater contaminant concentrations because no treatment, containment or removal of contaminated groundwater is included in this alternative. The No Action alternative is carried through the FS process as required by the NCP to provide a baseline set of conditions can be established against which other remedial actions may be compared.

MONITORING WELL MAINTENANCE PERIODIC COSTS (Years 10 and 20)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Monitoring Well Maintenance - No Action Alternative	CW-29-GWU4	1	LS	$7,515	$7,515	Assumes well head repairs and development required.
				SUBTOTAL	$7,515	
Contingency (Scope and Bid)		20%			$1,503	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$9,018	
Project Management		10%			$902	The high end of the recommended range was used.
Technical Support		15%			$1,353	Middle value of the recommended range was used.
				TOTAL	$11,273	
	TOTAL MONITORING WELL MAINTENANCE PERIODIC COST				**$11,000**	Total periodic monitoring well maintenance cost is rounded to the nearest $1,000.

FIVE-YEAR SITE REVIEW PERIODIC COSTS (Years 5, 10, 15, 20, and 25)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Five-Year Site Review	CW-2-GWU4	1	LS	$38,547	$38,547	
				SUBTOTAL	$38,547	
Contingency (Scope and Bid)		20%			$7,709	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$46,256	
Project Management		10%			$4,626	The high end of the recommended range was used.
Technical Support		15%			$6,938	Middle value of the recommended range was used.
				TOTAL	$57,820	
	TOTAL FIVE-YEAR SITE REVIEW PERIODIC COST				**$58,000**	Total Five-Year Review periodic cost is rounded to the nearest $1,000.

Notes:
Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.

Abbreviations:

EA	Each
QTY	Quantity
LS	Lump Sum

TABLE PV-GWU4-1

ALTERNATIVE GWU4-1
NO ACTION

PRESENT VALUE ANALYSIS

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Escalation Rate: 3%
Discount Rate: 5%

		O&M COSTS		PERIODIC COSTS								
Year[1]	Capital Costs[2]	O&M Costs[2]	Monitoring Costs[2]	Monitoring Well Maintenance[2,3]	Minor Equipment Replacement Costs[2,4]	Major Equipment Replacement Costs[2,5]	Five-year Review Costs[2]	Total Annual Expenditure[6]	Escalation Factor (3%)	Escalated Cost[7]	Discount Factor (5%)	Present Value[8,9]
0	$105,000	$0	$0	$0	$0	$0	$0	$105,000	1.0000	$105,000	1.0000	$105,000
1	$0	$0	$125,000	$0	$0	$0	$0	$125,000	1.0300	$128,750	0.9524	$122,622
2	$0	$0	$125,000	$0	$0	$0	$0	$125,000	1.0609	$132,613	0.9070	$120,280
3	$0	$0	$62,000	$0	$0	$0	$0	$62,000	1.0927	$67,747	0.8638	$58,520
4	$0	$0	$62,000	$0	$0	$0	$0	$62,000	1.1255	$69,781	0.8227	$57,409
5	$0	$0	$62,000	$0	$0	$0	$58,000	$120,000	1.1593	$139,116	0.7835	$108,997
6	$0	$0	$62,000	$0	$0	$0	$0	$62,000	1.1941	$74,034	0.7462	$55,244
7	$0	$0	$62,000	$0	$0	$0	$0	$62,000	1.2299	$76,254	0.7107	$54,194
8	$0	$0	$62,000	$0	$0	$0	$0	$62,000	1.2668	$78,542	0.6768	$53,157
9	$0	$0	$62,000	$0	$0	$0	$0	$62,000	1.3048	$80,898	0.6446	$52,147
10	$0	$0	$62,000	$11,000	$0	$0	$58,000	$131,000	1.3439	$176,051	0.6139	$108,078
11	$0	$0	$31,000	$0	$0	$0	$0	$31,000	1.3842	$42,910	0.5847	$25,090
12	$0	$0	$31,000	$0	$0	$0	$0	$31,000	1.4258	$44,200	0.5568	$24,610
13	$0	$0	$31,000	$0	$0	$0	$0	$31,000	1.4685	$45,524	0.5303	$24,141
14	$0	$0	$31,000	$0	$0	$0	$0	$31,000	1.5126	$46,891	0.5051	$23,684
15	$0	$0	$31,000	$0	$0	$0	$58,000	$89,000	1.5580	$138,662	0.4810	$66,696
16	$0	$0	$31,000	$0	$0	$0	$0	$31,000	1.6047	$49,746	0.4581	$22,789
17	$0	$0	$31,000	$0	$0	$0	$0	$31,000	1.6528	$51,237	0.4363	$22,355
18	$0	$0	$31,000	$0	$0	$0	$0	$31,000	1.7024	$52,774	0.4155	$21,928
19	$0	$0	$31,000	$0	$0	$0	$0	$31,000	1.7535	$54,359	0.3957	$21,510
20	$0	$0	$31,000	$11,000	$0	$0	$58,000	$100,000	1.8061	$180,610	0.3769	$68,072
21	$0	$0	$31,000	$0	$0	$0	$0	$31,000	1.8603	$57,669	0.3589	$20,698
22	$0	$0	$31,000	$0	$0	$0	$0	$31,000	1.9161	$59,399	0.3418	$20,303
23	$0	$0	$31,000	$0	$0	$0	$0	$31,000	1.9736	$61,182	0.3256	$19,921
24	$0	$0	$31,000	$0	$0	$0	$0	$31,000	2.0328	$63,017	0.3101	$19,542
25	$0	$0	$31,000	$0	$0	$0	$58,000	$89,000	2.0938	$186,348	0.2953	$55,029
26	$0	$0	$31,000	$0	$0	$0	$0	$31,000	2.1566	$66,855	0.2812	$18,800
27	$0	$0	$31,000	$0	$0	$0	$0	$31,000	2.2213	$68,860	0.2678	$18,441
28	$19,000	$0	$31,000	$0	$0	$0	$0	$50,000	2.2879	$114,395	0.2551	$29,182
TOTALS:	**$124,000**	**$0**	**$1,304,000**	**$22,000**	**$0**	**$0**	**$290,000**	**$1,740,000**		**$2,513,421**		$1,418,439
TOTAL PRESENT VALUE OF ALTERNATIVE GWU4-1												**$1,418,000**

Notes:
1 - Duration is assumed to be 28 years for present value analysis. Estimated remedial timeframes are discussed within the FS report.
2 - Capital costs, for purposes of this analysis, are assumed to be distributed as indicated on Table CS-GWU4-1
3 - Includes replacement of monitoring well vault and development.
4 - Total annual expenditure is the total cost per year with no escalation or discounting.
5 - Escalation cost is the total cost per year including an escalation rate for that year. See Table PV-AERFT for details.
6 - Present value is the total cost per year including a discount factor for that year. See Table PV-ADRFT for details.
7 - Total present value is rounded to the nearest $1,000. Depreciation is excluded from the present value cost.

TABLE CS-GWU4-2

ALTERNATIVE GWU4-2

GROUNDWATER EXTRACTION (CONTAINMENT ONLY), DISCHARGE TO GILBERT-MOSLEY TREATMENT PLANT

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Under Alternative GWU4-2, an extraction well would be installed on the leading edge of the groundwater plume. Extracted groundwater would be discharged through water pipeline to the Gilbert-Mosley treatment plant. Groundwater monitoring, both upgradient and downgradient of the extraction well, would be performed as part of this alternative to demonstrate the effectiveness of the containment system. This alternative assumes there is sufficient treatment capacity at the Gilbert-Mosley treatment plant.

CONTROLS CAPITAL COSTS: (Assumed to be Incurred During Year 1)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Institutional Controls	CW-1-GWU4	1	LS	$20,014	$20,014	
Miscellaneous Requirements for Sampling	CW-7-GWU4	1	LS	$50,143	$50,143	
Monitoring Well Installation	CW-9-GWU4	1	LS	$7,522	$7,522	Additional monitoring well clusters to increase monitoring coverage.
Miscellaneous Requirements for Construction	CW-8-GWU4	1	LS	$91,725	$91,725	
Mobilization and Demobilization of Drill Rig	CW-10-GWU4	1	LS	$10,610	$10,610	
Extraction Well Installation	CW-11-GWU4	1	EA	$48,460	$48,460	
Extraction Well Vault	CW-12-GWU4	1	EA	$49,416	$49,416	
Mobilization or Demobilization of Construction Equipment	CW-13-GWU4	2	EA	$2,086	$4,172	
Influent Piping - NIC#4-1 to Sante Fe	CW-15-GWU4	1,200	LF	$28.66	$34,392	Extraction well NIC#4-1 to tie in point for the Gilbert-Mosley treatment plant
Pipe Jacking under Railroad Tracks	CW-17-GWU4	2	EA	$55,868	$111,736	
				SUBTOTAL	$428,190	
Contingency (Scope and Bid)		20%			$85,638	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$513,828	
Project Management		6%			$30,830	Percentage from Exhibit 5-8 was used.
Remedial Design		12%			$61,659	Percentage from Exhibit 5-8 was used.
Construction Management		8%			$41,106	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$77,074	Middle value of the recommended range was used.
				TOTAL	$724,497	
				TOTAL CAPITAL COST	**$724,000**	Total capital cost is rounded to the nearest $1,000.

FUTURE CAPITAL COSTS: (Assumed to be Incurred During Year 28)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Mobilization and Demobilization of Drill Rig	CW-10-GWU4	1	LS	$10,610	$10,610	
Extraction Well Abandonment	CW-33-GWU4	1	EA	$9,203	$9,203	
Monitoring Well Abandonment	CW-32-GWU4	1	LS	$14,293	$14,293	
				SUBTOTAL	$34,106	
Contingency (Scope and Bid)		20%			$6,821	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$40,927	
Project Management		10%			$4,093	Percentage from Exhibit 5-8 was used.
Remedial Design		20%			$8,185	Percentage from Exhibit 5-8 was used.
Construction Management		15%			$6,139	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$6,139	Middle value of the recommended range was used.
				TOTAL	$65,483	
				TOTAL FUTURE CAPITAL COST	**$65,000**	Total future capital cost is rounded to the nearest $1,000.

TABLE CS-GWU4-2

ALTERNATIVE GWU4-2

GROUNDWATER EXTRACTION (CONTAINMENT ONLY), DISCHARGE TO GILBERT-MOSLEY TREATMENT PLANT

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Under Alternative GWU4-2, an extraction well would be installed on the leading edge of the groundwater plume. Extracted groundwater would be discharged through water pipeline to the Gilbert-Mosley treatment plant. Groundwater monitoring, both upgradient and downgradient of the extraction well, would be performed as part of this alternative to demonstrate the effectiveness of the containment system. This alternative assumes there is sufficient treatment capacity at the Gilbert-Mosley treatment plant.

QUARTERLY MONITORING ANNUAL COSTS: (Assumed to be Incurred During Year 1 through 2)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Groundwater Sampling Event - Plume Stability	CW-6-GWU4	4	EA	$9,905	$39,620	
Groundwater Monitoring Event Report Preparation	CW-4-GWU4	4	EA	$19,570	$78,280	
				SUBTOTAL	$117,900	
Contingency (Scope and Bid)		20%			$23,580	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$141,480	
Project Management		8%			$11,318	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$21,222	Middle value of the recommended range was used.
				TOTAL	$174,020	
TOTAL QUARTERLY MONITORING COSTS (Years 1 through 2)					**$174,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

SEMIANNUAL MONITORING ANNUAL COSTS: (Assumed to be Incurred During Year 3 through 10)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Groundwater Sampling Event - Plume Stability	CW-6-GWU4	2	EA	$9,905	$19,810	
Groundwater Monitoring Event Report Preparation	CW-4-GWU4	2	EA	$19,570	$39,140	
				SUBTOTAL	$58,950	
Contingency (Scope and Bid)		20%			$11,790	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$70,740	
Project Management		10%			$7,074	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$10,611	Middle value of the recommended range was used.
				TOTAL	$88,425	
TOTAL SEMIANNUAL MONITORING COST (Year 3 through 10)					**$88,000**	Total semiannual monitoring cost is rounded to the nearest $1,000.

ANNUAL MONITORING ANNUAL COSTS: (Assumed to be Incurred During Year 11 through 28)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Groundwater Sampling Event - Plume Stability	CW-6-GWU4	1	EA	$9,905	$9,905	
Groundwater Monitoring Event Report Preparation	CW-4-GWU4	1	EA	$19,570	$19,570	
				SUBTOTAL	$29,475	
Contingency (Scope and Bid)		20%			$5,895	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$35,370	
Project Management		10%			$3,537	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$5,306	Middle value of the recommended range was used.
				TOTAL	$44,213	
TOTAL ANNUAL MONITORING COST (Year 11 through 28)					**$44,000**	Total annual monitoring cost is rounded to the nearest $1,000.

TABLE CS-GWU4-2

ALTERNATIVE GWU4-2

GROUNDWATER EXTRACTION (CONTAINMENT ONLY), DISCHARGE TO GILBERT-MOSLEY TREATMENT PLANT

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Under Alternative GWU4-2, an extraction well would be installed on the leading edge of the groundwater plume. Extracted groundwater would be discharged through water pipeline to the Gilbert-Mosley treatment plant. Groundwater monitoring, both upgradient and downgradient of the extraction well, would be performed as part of this alternative to demonstrate the effectiveness of the containment system. This alternative assumes there is sufficient treatment capacity at the Gilbert-Mosley treatment plant.

ANNUAL OPERATING AND MAINTENANCE COSTS: (Assumed to be Incurred During Year 1 through 28)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Operation and Maintenance - Extraction Well	CW-23-GWU4	1	EA	$7,194	$7,194	
Operation and Maintenance - Extraction Well Maintenance	CW-24-GWU4	1	EA	$10,249	$10,249	Assume annual maintenance for each extraction well.
Operation and Maintenance - Gilbert-Mosley Treatment Plant	CW-25-GWU4	1	LS	$16,918	$16,918	Portion of overall costs based on estimated contribution from GWU4.
				SUBTOTAL	$34,361	
Contingency (Scope and Bid)		20%			$6,872	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$41,233	
Project Management		10%			$4,123	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$6,185	Middle value of the recommended range was used.
				TOTAL	$51,541	
TOTAL ANNUAL OPERATING AND MAINTENANCE COST (Year 1 through 28)					**$52,000**	Total annual O&M cost is rounded to the nearest $1,000.

PERIODIC MINOR EQUIPMENT REPLACEMENT COSTS: (Years 5, 10, 15, 20, and 25)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Replace Equipment - Extraction Well Pumps	CW-28-GWU4	1	EA	$19,916	$19,916	Assumes pump replacement every 5 years
				SUBTOTAL	$19,916	
Contingency (Scope and Bid)		20%			$3,983	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$23,899	
Project Management		10%			$2,390	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$3,585	Middle value of the recommended range was used.
				TOTAL	$29,874	
TOTAL PERIODIC MINOR EQUIPMENT REPLACEMENT COST					**$30,000**	Total periodic minor equipment replacement cost is rounded to the nearest $1,000.

MONITORING WELL MAINTENANCE PERIODIC COSTS (Years 10 and 20)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Monitoring Well Maintenance	CW-30-GWU4	1	LS	$12,444	$12,444	Assumes well head repairs and development required.
				SUBTOTAL	$12,444	
Contingency (Scope and Bid)		20%			$2,489	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$14,933	
Project Management		10%			$1,493	The high end of the recommended range was used.
Technical Support		15%			$2,240	Middle value of the recommended range was used.
				TOTAL	$18,666	
TOTAL MONITORING WELL MAINTENANCE PERIODIC COST					**$19,000**	Total periodic monitoring well maintenance cost is rounded to the nearest $1,000.

TABLE CS-GWU4-2

ALTERNATIVE GWU4-2

GROUNDWATER EXTRACTION (CONTAINMENT ONLY), DISCHARGE TO GILBERT-MOSLEY TREATMENT PLANT

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Under Alternative GWU4-2, an extraction well would be installed on the leading edge of the groundwater plume. Extracted groundwater would be discharged through water pipeline to the Gilbert-Mosley treatment plant. Groundwater monitoring, both upgradient and downgradient of the extraction well, would be performed as part of this alternative to demonstrate the effectiveness of the containment system. This alternative assumes there is sufficient treatment capacity at the Gilbert-Mosley treatment plant.

FIVE-YEAR SITE REVIEW PERIODIC COSTS (Years 5, 10, 15, 20, and 25)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Five-Year Site Review	CW-2-GWU4	1	LS	$38,547	$38,547	
				SUBTOTAL	$38,547	
Contingency (Scope and Bid)		20%			$7,709	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$46,256	
Project Management		10%			$4,626	The high end of the recommended range was used.
Technical Support		15%			$6,938	Middle value of the recommended range was used.
				TOTAL	$57,820	
		TOTAL FIVE-YEAR SITE REVIEW PERIODIC COST			**$58,000**	Total Five-Year Review periodic cost is rounded to the nearest $1,000.

Notes:

Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.

Abbreviations:

EA Each
QTY Quantity
LS Lump Sum

TABLE PV-GWU4-2

ALTERNATIVE GWU4-2
GROUNDWATER EXTRACTION (CONTAINMENT ONLY), DISCHARGE TO GILBERT-MOSLEY TREATMENT PLANT

PRESENT VALUE ANALYSIS

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Escalation Rate:	**3%**
Discount Rate:	**5%**

		O&M COSTS		PERIODIC COSTS								
Year[1]	**Capital Costs[2]**	**O&M Costs[2]**	**Monitoring Costs[2]**	**Monitoring Well Maintenance[2,3]**	**Minor Equipment Replacement Costs[2,4]**	**Major Equipment Replacement Costs[2,5]**	**Five-year Review Costs[2]**	**Total Annual Expenditure[6]**	**Escalation Factor (3%)**	**Escalated Cost[7]**	**Discount Factor (5%)**	**Present Value[8,9]**
0	$724,000	$0	$0	$0	$0	$0	$0	$724,000	1.0000	$724,000	1.0000	$724,000
1	$0	$52,000	$174,000	$0	$0	$0	$0	$226,000	1.0300	$232,780	0.9524	$221,700
2	$0	$52,000	$174,000	$0	$0	$0	$0	$226,000	1.0609	$239,763	0.9070	$217,465
3	$0	$52,000	$88,000	$0	$0	$0	$0	$140,000	1.0927	$152,978	0.8638	$132,142
4	$0	$52,000	$88,000	$0	$0	$0	$0	$140,000	1.1255	$157,570	0.8227	$129,633
5	$0	$52,000	$88,000	$0	$30,000	$0	$58,000	$228,000	1.1593	$264,320	0.7835	$207,095
6	$0	$52,000	$88,000	$0	$0	$0	$0	$140,000	1.1941	$167,174	0.7462	$124,745
7	$0	$52,000	$88,000	$0	$0	$0	$0	$140,000	1.2299	$172,186	0.7107	$122,373
8	$0	$52,000	$88,000	$0	$0	$0	$0	$140,000	1.2668	$177,352	0.6768	$120,032
9	$0	$52,000	$88,000	$0	$0	$0	$0	$140,000	1.3048	$182,672	0.6446	$117,750
10	$0	$52,000	$88,000	$19,000	$30,000	$0	$58,000	$247,000	1.3439	$331,943	0.6139	$203,780
11	$0	$52,000	$44,000	$0	$0	$0	$0	$96,000	1.3842	$132,883	0.5847	$77,697
12	$0	$52,000	$44,000	$0	$0	$0	$0	$96,000	1.4258	$136,877	0.5568	$76,213
13	$0	$52,000	$44,000	$0	$0	$0	$0	$96,000	1.4685	$140,976	0.5303	$74,760
14	$0	$52,000	$44,000	$0	$0	$0	$0	$96,000	1.5126	$145,210	0.5051	$73,345
15	$0	$52,000	$44,000	$0	$30,000	$0	$58,000	$184,000	1.5580	$286,672	0.4810	$137,889
16	$0	$52,000	$44,000	$0	$0	$0	$0	$96,000	1.6047	$154,051	0.4581	$70,571
17	$0	$52,000	$44,000	$0	$0	$0	$0	$96,000	1.6528	$158,669	0.4363	$69,227
18	$0	$52,000	$44,000	$0	$0	$0	$0	$96,000	1.7024	$163,430	0.4155	$67,905
19	$0	$52,000	$44,000	$0	$0	$0	$0	$96,000	1.7535	$168,336	0.3957	$66,611
20	$0	$52,000	$44,000	$19,000	$30,000	$0	$58,000	$203,000	1.8061	$366,638	0.3769	$138,186
21	$0	$52,000	$44,000	$0	$0	$0	$0	$96,000	1.8603	$178,589	0.3589	$64,096
22	$0	$52,000	$44,000	$0	$0	$0	$0	$96,000	1.9161	$183,946	0.3418	$62,873
23	$0	$52,000	$44,000	$0	$0	$0	$0	$96,000	1.9736	$189,466	0.3256	$61,690
24	$0	$52,000	$44,000	$0	$0	$0	$0	$96,000	2.0328	$195,149	0.3101	$60,516
25	$0	$52,000	$44,000	$0	$30,000	$0	$58,000	$184,000	2.0938	$385,259	0.2953	$113,767
26	$0	$52,000	$44,000	$0	$0	$0	$0	$96,000	2.1566	$207,034	0.2812	$58,218
27	$0	$52,000	$44,000	$0	$0	$0	$0	$96,000	2.2213	$213,245	0.2678	$57,107
28	$65,000	$52,000	$44,000	$0	$0	$0	$0	$161,000	2.2879	$368,352	0.2551	$93,967
TOTALS:	**$789,000**	**$1,456,000**	**$1,844,000**	**$38,000**	**$150,000**	**$0**	**$290,000**	**$4,567,000**		**$6,577,520**		$3,745,353
TOTAL PRESENT VALUE OF ALTERNATIVE GWU4-2												**$3,745,000**

Notes:
1 - Duration is assumed to be 28 years for present value analysis. Estimated remedial timeframes are discussed within the FS report.
2 - Capital costs, for purposes of this analysis, are assumed to be distributed as indicated on Table CS-GWU4-2
3 - Includes replacement of monitoring well vault and development.
4 - Total annual expenditure is the total cost per year with no escalation or discounting.
5 - Escalation cost is the total cost per year including an escalation rate for that year. See Table PV-AERFT for details.
6 - Present value is the total cost per year including a discount factor for that year. See Table PV-ADRFT for details.
7 - Total present value is rounded to the nearest $1,000. Depreciation is excluded from the present value cost.

TABLE CS-GWU4-3

ALTERNATIVE GWU4-3

GROUNDWATER EXTRACTION (CONTAINMENT ONLY), TREATMENT AND DISCHARGE TO STORM SEWER

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Under Alternative GWU4-3, an extraction well would be installed on the leading edge of the groundwater plume. Extracted groundwater would be treated through an air stripper system and discharged into Chisholm Creek via a surface water pipeline. The off gas from the stripper would discharge into the atmosphere. Groundwater monitoring, both upgradient and downgradient of the extraction wells, would be performed as part of this alternative to demonstrate the effectiveness of the containment system.

CONTROLS CAPITAL COSTS: (Assumed to be Incurred During Year 1)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Institutional Controls	CW-1-GWU4	1	LS	$20,014	$20,014	
Miscellaneous Requirements for Sampling	CW-7-GWU4	1	LS	$50,143	$50,143	
Monitoring Well Installation	CW-9-GWU4	1	LS	$7,522	$7,522	Additional monitoring well clusters to increase monitoring coverage.
Miscellaneous Requirements for Construction	CW-8-GWU4	1	LS	$91,725	$91,725	
Mobilization and Demobilization of Drill Rig	CW-10-GWU4	1	LS	$10,610	$10,610	
Extraction Well Installation	CW-11-GWU4	1	EA	$48,460	$48,460	
Extraction Well Vault	CW-12-GWU4	1	EA	$49,416	$49,416	
Mobilization or Demobilization of Construction Equipment	CW-13-GWU4	2	EA	$2,086	$4,172	
Influent Piping - NIC#4-1/2 to New Treatment Plant	CW-14-GWU4	1,000	LF	$27.16	$27,160	Extraction well NIC#4-1
Effluent Piping - New Treatment Plant to Storm Sewer	CW-16-GWU4	300	LF	$31.07	$9,321	
Geotechnical Investigation for Treatment Building	CW-18-GWU4	1	LS	$15,287	$15,287	
Groundwater Treatment Plant - Building	CW-19-GWU4	1	LS	$191,870	$191,870	Includes earthwork, foundation, HVAC, lighting, insulation, etc.
Groundwater Treatment Plant - Equipment and Piping	CW-20-GWU4	1	LS	$141,130	$141,130	
Groundwater Treatment Plant - Facility Control System	CW-21-GWU4	1	LS	$77,900	$77,900	
Groundwater Treatment Plant - Startup	CW-22-GWU4	1	LS	$21,140	$21,140	
				SUBTOTAL	$765,870	
Contingency (Scope and Bid)		20%			$153,174	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$919,044	
Project Management		6%			$55,143	Percentage from Exhibit 5-8 was used.
Remedial Design		12%			$110,285	Percentage from Exhibit 5-8 was used.
Construction Management		8%			$73,524	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$137,857	Middle value of the recommended range was used.
				TOTAL	$1,295,853	
				TOTAL CAPITAL COST	**$1,296,000**	Total capital cost is rounded to the nearest $1,000.

TABLE CS-GWU4-3

ALTERNATIVE GWU4-3

GROUNDWATER EXTRACTION (CONTAINMENT ONLY), TREATMENT AND DISCHARGE TO STORM SEWER

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Under Alternative GWU4-3, an extraction well would be installed on the leading edge of the groundwater plume. Extracted groundwater would be treated through an air stripper system and discharged into Chisholm Creek via a surface water pipeline. The off gas from the stripper would discharge into the atmosphere. Groundwater monitoring, both upgradient and downgradient of the extraction wells, would be performed as part of this alternative to demonstrate the effectiveness of the containment system.

FUTURE CAPITAL COSTS: (Assumed to be Incurred During Year 28)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Mobilization and Demobilization of Drill Rig	CW-10-GWU4	1	LS	$10,610	$10,610	
Extraction Well Abandonment	CW-33-GWU4	1	EA	$9,203	$9,203	
Monitoring Well Abandonment	CW-32-GWU4	1	LS	$14,293	$14,293	
Decommissioning Treatment System	CW-34-GWU4	1	LS	$24,939	$24,939	
				SUBTOTAL	$59,045	
Contingency (Scope and Bid)		20%			$11,809	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$70,854	
Project Management		10%			$7,085	Percentage from Exhibit 5-8 was used.
Remedial Design		20%			$14,171	Percentage from Exhibit 5-8 was used.
Construction Management		15%			$10,628	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$10,628	Middle value of the recommended range was used.
				TOTAL	$113,366	
				TOTAL FUTURE CAPITAL COST	**$113,000**	Total future capital cost is rounded to the nearest $1,000.

QUARTERLY MONITORING ANNUAL COSTS: (Assumed to be Incurred During Year 1 through 2

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Groundwater Sampling Event - Plume Stability	CW-6-GWU4	4	EA	$9,905	$39,620	
Groundwater Monitoring Event Report Preparation	CW-4-GWU4	4	EA	$19,570	$78,280	
				SUBTOTAL	$117,900	
Contingency (Scope and Bid)		20%			$23,580	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$141,480	
Project Management		8%			$11,318	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$21,222	Middle value of the recommended range was used.
				TOTAL	$174,020	
	TOTAL QUARTERLY MONITORING COSTS (Years 1 through 2)				**$174,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

TABLE CS-GWU4-3

ALTERNATIVE GWU4-3

GROUNDWATER EXTRACTION (CONTAINMENT ONLY), TREATMENT AND DISCHARGE TO STORM SEWER

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Under Alternative GWU4-3, an extraction well would be installed on the leading edge of the groundwater plume. Extracted groundwater would be treated through an air stripper system and discharged into Chisholm Creek via a surface water pipeline. The off gas from the stripper would discharge into the atmosphere. Groundwater monitoring, both upgradient and downgradient of the extraction wells, would be performed as part of this alternative to demonstrate the effectiveness of the containment system.

SEMIANNUAL MONITORING ANNUAL COSTS: (Assumed to be Incurred During Year 3 through 10

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Groundwater Sampling Event - Plume Stability	CW-6-GWU4	2	EA	$9,905	$19,810	
Groundwater Monitoring Event Report Preparation	CW-4-GWU4	2	EA	$19,570	$39,140	
				SUBTOTAL	$58,950	
Contingency (Scope and Bid)		20%			$11,790	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$70,740	
Project Management		10%			$7,074	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$10,611	Middle value of the recommended range was used.
				TOTAL	$88,425	
TOTAL SEMIANNUAL MONITORING COST (Year 3 through 10					**$88,000**	Total semiannual monitoring cost is rounded to the nearest $1,000.

ANNUAL MONITORING ANNUAL COSTS: (Assumed to be Incurred During Year 11 through 28

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Groundwater Sampling Event - Plume Stability	CW-6-GWU4	1	EA	$9,905	$9,905	
Groundwater Monitoring Event Report Preparation	CW-4-GWU4	1	EA	$19,570	$19,570	
				SUBTOTAL	$29,475	
Contingency (Scope and Bid)		20%			$5,895	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$35,370	
Project Management		10%			$3,537	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$5,306	Middle value of the recommended range was used.
				TOTAL	$44,213	
TOTAL ANNUAL MONITORING COST (Year 11 through 28					**$44,000**	Total annual monitoring cost is rounded to the nearest $1,000.

ANNUAL OPERATING AND MAINTENANCE COSTS: (Assumed to be Incurred During Year 1 through 28

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Operation and Maintenance - Extraction Well	CW-23-GWU4	1	EA	$7,194	$7,194	
Operation and Maintenance - Extraction Well Maintenance	CW-24-GWU4	1	EA	$10,249	$10,249	Assume annual maintenance for each extraction well.
Operation and Maintenance - Treatment Plant	CW-26-GWU4	1	LS	$46,124	$46,124	
				SUBTOTAL	$63,567	
Contingency (Scope and Bid)		20%			$12,713	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$76,280	
Project Management		10%			$7,628	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$11,442	Middle value of the recommended range was used.
				TOTAL	$95,350	
TOTAL ANNUAL OPERATING AND MAINTENANCE COST (Year 1 through 28					**$95,000**	Total annual O&M cost is rounded to the nearest $1,000.

TABLE CS-GWU4-3

ALTERNATIVE GWU4-3

GROUNDWATER EXTRACTION (CONTAINMENT ONLY), TREATMENT AND DISCHARGE TO STORM SEWER

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Under Alternative GWU4-3, an extraction well would be installed on the leading edge of the groundwater plume. Extracted groundwater would be treated through an air stripper system and discharged into Chisholm Creek via a surface water pipeline. The off gas from the stripper would discharge into the atmosphere. Groundwater monitoring, both upgradient and downgradient of the extraction wells, would be performed as part of this alternative to demonstrate the effectiveness of the containment system.

PERIODIC MINOR EQUIPMENT REPLACEMENT COSTS: (Years 5, 10, 15, 20, and 25)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Replace Equipment - Extraction Well Pumps	CW-28-GWU4	1	EA	$19,916	$19,916	Assumes pump replacement every 5 years
Minor Equipment Replacement - Treatment Plant	CW-27-GWU4	1	LS	$18,558	$18,558	
				SUBTOTAL	$38,474	
Contingency (Scope and Bid)		20%			$7,695	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$46,169	
Project Management		10%			$4,617	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$6,925	Middle value of the recommended range was used.
				TOTAL	$57,711	
				TOTAL PERIODIC MINOR EQUIPMENT REPLACEMENT COST	**$58,000**	Total periodic minor equipment replacement cost is rounded to the nearest $1,000.

MONITORING WELL MAINTENANCE PERIODIC COSTS (Years 10 and 20)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Monitoring Well Maintenance	CW-30-GWU4	1	LS	$12,444	$12,444	Assumes well head repairs and development required.
				SUBTOTAL	$12,444	
Contingency (Scope and Bid)		20%			$2,489	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$14,933	
Project Management		10%			$1,493	The high end of the recommended range was used.
Technical Support		15%			$2,240	Middle value of the recommended range was used.
				TOTAL	$18,666	
				TOTAL MONITORING WELL MAINTENANCE PERIODIC COST	**$19,000**	Total periodic monitoring well maintenance cost is rounded to the nearest $1,000.

FIVE-YEAR SITE REVIEW PERIODIC COSTS (Years 5, 10, 15, 20, and 25)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Five-Year Site Review	CW-2-GWU4	1	LS	$38,547	$38,547	
				SUBTOTAL	$38,547	
Contingency (Scope and Bid)		20%			$7,709	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$46,256	
Project Management		10%			$4,626	The high end of the recommended range was used.
Technical Support		15%			$6,938	Middle value of the recommended range was used.
				TOTAL	$57,820	
				TOTAL FIVE-YEAR SITE REVIEW PERIODIC COST	**$58,000**	Total Five-Year Review periodic cost is rounded to the nearest $1,000.

Notes:
Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.

Abbreviations:
EA Each
QTY Quantity
LS Lump Sum

TABLE PV-GWU4-3

ALTERNATIVE GWU4-3
GROUNDWATER EXTRACTION (CONTAINMENT ONLY), TREATMENT AND DISCHARGE TO STORM SEWER

PRESENT VALUE ANALYSIS

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Escalation Rate: 3%
Discount Rate: 5%

		O&M COSTS		PERIODIC COSTS								
Year[1]	Capital Costs[2]	O&M Costs[2]	Monitoring Costs[2]	Monitoring Well Maintenance[2,3]	Minor Equipment Replacement Costs[2,4]	Major Equipment Replacement Costs[2,5]	Five-year Review Costs[2]	Total Annual Expenditure[6]	Escalation Factor (3%)	Escalated Cost[7]	Discount Factor (5%)	Present Value[8,9]
0	$1,296,000	$0	$0	$0	$0	$0	$0	$1,296,000	1.0000	$1,296,000	1.0000	$1,296,000
1	$0	$95,000	$174,000	$0	$0	$0	$0	$269,000	1.0300	$277,070	0.9524	$263,881
2	$0	$95,000	$174,000	$0	$0	$0	$0	$269,000	1.0609	$285,382	0.9070	$258,842
3	$0	$95,000	$88,000	$0	$0	$0	$0	$183,000	1.0927	$199,964	0.8638	$172,729
4	$0	$95,000	$88,000	$0	$0	$0	$0	$183,000	1.1255	$205,967	0.8227	$169,449
5	$0	$95,000	$88,000	$0	$58,000	$0	$58,000	$299,000	1.1593	$346,631	0.7835	$271,585
6	$0	$95,000	$88,000	$0	$0	$0	$0	$183,000	1.1941	$218,520	0.7462	$163,060
7	$0	$95,000	$88,000	$0	$0	$0	$0	$183,000	1.2299	$225,072	0.7107	$159,958
8	$0	$95,000	$88,000	$0	$0	$0	$0	$183,000	1.2668	$231,824	0.6768	$156,899
9	$0	$95,000	$88,000	$0	$0	$0	$0	$183,000	1.3048	$238,778	0.6446	$153,917
10	$0	$95,000	$88,000	$19,000	$58,000	$0	$58,000	$318,000	1.3439	$427,360	0.6139	$262,356
11	$0	$95,000	$44,000	$0	$0	$0	$0	$139,000	1.3842	$192,404	0.5847	$112,499
12	$0	$95,000	$44,000	$0	$0	$0	$0	$139,000	1.4258	$198,186	0.5568	$110,350
13	$0	$95,000	$44,000	$0	$0	$0	$0	$139,000	1.4685	$204,122	0.5303	$108,246
14	$0	$95,000	$44,000	$0	$0	$0	$0	$139,000	1.5126	$210,251	0.5051	$106,198
15	$0	$95,000	$44,000	$0	$58,000	$0	$58,000	$255,000	1.5580	$397,290	0.4810	$191,096
16	$0	$95,000	$44,000	$0	$0	$0	$0	$139,000	1.6047	$223,053	0.4581	$102,181
17	$0	$95,000	$44,000	$0	$0	$0	$0	$139,000	1.6528	$229,739	0.4363	$100,235
18	$0	$95,000	$44,000	$0	$0	$0	$0	$139,000	1.7024	$236,634	0.4155	$98,321
19	$0	$95,000	$44,000	$0	$0	$0	$0	$139,000	1.7535	$243,737	0.3957	$96,447
20	$0	$95,000	$44,000	$19,000	$58,000	$0	$58,000	$274,000	1.8061	$494,871	0.3769	$186,517
21	$0	$95,000	$44,000	$0	$0	$0	$0	$139,000	1.8603	$258,582	0.3589	$92,805
22	$0	$95,000	$44,000	$0	$0	$0	$0	$139,000	1.9161	$266,338	0.3418	$91,034
23	$0	$95,000	$44,000	$0	$0	$0	$0	$139,000	1.9736	$274,330	0.3256	$89,322
24	$0	$95,000	$44,000	$0	$0	$0	$0	$139,000	2.0328	$282,559	0.3101	$87,622
25	$0	$95,000	$44,000	$0	$58,000	$0	$58,000	$255,000	2.0938	$533,919	0.2953	$157,666
26	$0	$95,000	$44,000	$0	$0	$0	$0	$139,000	2.1566	$299,767	0.2812	$84,295
27	$0	$95,000	$44,000	$0	$0	$0	$0	$139,000	2.2213	$308,761	0.2678	$82,686
28	$113,000	$95,000	$44,000	$0	$0	$0	$0	$252,000	2.2879	$576,551	0.2551	$147,078
TOTALS:	**$1,409,000**	**$2,660,000**	**$1,844,000**	**$38,000**	**$290,000**	**$0**	**$290,000**	**$6,531,000**		**$9,383,662**		$5,373,274
TOTAL PRESENT VALUE OF ALTERNATIVE GWU4-3												**$5,373,000**

Notes:

1 - Duration is assumed to be 28 years for present value analysis. Estimated remedial timeframes are discussed within the FS report.

2 - Capital costs, for purposes of this analysis, are assumed to be distributed as indicated on Table CS-GWU4-3

3 - Includes replacement of monitoring well vault and development.

4 - Includes replacement of extraction well pumps, some valves and system controls.

5 - Includes major building maintenance (painting, etc.), replacement of building HVAC system, replacement of building electrical system, and replacement treatment system components.

6 - Total annual expenditure is the total cost per year with no escalation or discounting.

7 - Escalation cost is the total cost per year including an escalation rate for that year. See Table PV-AERFT for details

8 - Present value is the total cost per year including a discount factor for that year. See Table PV-ADRFT for details.

9 - Total present value is rounded to the nearest $1,000. Depreciation is excluded from the present value cost.

TABLE CS-GWU4-4

ALTERNATIVE GWU4-4
GROUNDWATER EXTRACTION (CONTAINMENT ONLY), TREATMENT AND DISCHARGE TO STORM SEWER AND GILBERT-MOSLEY TREATMENT PLANT

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Under Alternative GWU4-4, extraction wells would be installed on the leading edge of the groundwater plume. Extracted groundwater from 1 well would be treated through an air stripper system and discharged into the storm sewer via a surface water pipeline. The off gas from the stripper would discharge into the atmosphere. Extracted groundwater from 1 well would be discharged through water pipeline to the Gilbert-Mosley treatment plant. Groundwater monitoring, both upgradient and downgradient of the extraction wells, would be performed as part of this alternative to demonstrate the effectiveness of the containment system. This alternative assumes there is sufficient treatment capacity at the Gilbert-Mosley treatment plant.

CONTROLS CAPITAL COSTS: (Assumed to be Incurred During Year 1)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Institutional Controls	CW-1-GWU4	1	LS	$20,014	$20,014	
Miscellaneous Requirements for Sampling	CW-7-GWU4	1	LS	$50,143	$50,143	
Monitoring Well Installation	CW-9-GWU4	1	LS	$7,522	$7,522	Additional monitoring well clusters to increase monitoring coverage.
Miscellaneous Requirements for Construction	CW-8-GWU4	1	LS	$91,725	$91,725	
Mobilization and Demobilization of Drill Rig	CW-10-GWU4	2	LS	$10,610	$21,220	
Extraction Well Installation	CW-11-GWU4	2	EA	$48,460	$96,920	
Extraction Well Vault	CW-12-GWU4	2	EA	$49,416	$98,832	
Mobilization or Demobilization of Construction Equipment	CW-13-GWU4	2	EA	$2,086	$4,172	
Influent Piping - NIC#4-1 to Sante Fe	CW-15-GWU4	1,200	LF	$28.66	$34,392	Extraction well NIC#4-1 to tie in point for the Gilbert-Mosley treatment plant
Pipe Jacking under Railroad Tracks	CW-17-GWU4	2	EA	$55,868	$111,736	
Influent Piping - NIC#4-1/2 to New Treatment Plant	CW-14-GWU4	1,000	LF	$27.16	$27,160	Extraction well NIC#4-2
Effluent Piping - New Treatment Plant to Storm Sewer	CW-16-GWU4	300	LF	$31.07	$9,321	
Geotechnical Investigation for Treatment Building	CW-18-GWU4	1	LS	$15,287	$15,287	
Groundwater Treatment Plant - Building	CW-19-GWU4	1	LS	$191,870	$191,870	Includes earthwork, foundation, HVAC, lighting, insulation, etc.
Groundwater Treatment Plant - Equipment and Piping	CW-20-GWU4	1	LS	$141,130	$141,130	
Groundwater Treatment Plant - Facility Control System	CW-21-GWU4	1	LS	$77,900	$77,900	
Groundwater Treatment Plant - Startup	CW-22-GWU4	1	LS	$21,140	$21,140	
				SUBTOTAL	$1,020,484	
Contingency (Scope and Bid)		20%			$204,097	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$1,224,581	
Project Management		6%			$73,475	Percentage from Exhibit 5-8 was used.
Remedial Design		12%			$146,950	Percentage from Exhibit 5-8 was used.
Construction Management		8%			$97,966	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$183,687	Middle value of the recommended range was used.
				TOTAL	$1,726,659	
				TOTAL CAPITAL COST	**$1,727,000**	Total capital cost is rounded to the nearest $1,000.

TABLE CS-GWU4-4

ALTERNATIVE GWU4-4
GROUNDWATER EXTRACTION (CONTAINMENT ONLY), TREATMENT AND DISCHARGE TO STORM SEWER AND GILBERT-MOSLEY TREATMENT PLANT

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Under Alternative GWU4-4, extraction wells would be installed on the leading edge of the groundwater plume. Extracted groundwater from 1 well would be treated through an air stripper system and discharged into the storm sewer via a surface water pipeline. The off gas from the stripper would discharge into the atmosphere. Extracted groundwater from 1 well would be discharged through water pipeline to the Gilbert-Mosley treatment plant. Groundwater monitoring, both upgradient and downgradient of the extraction wells, would be performed as part of this alternative to demonstrate the effectiveness of the containment system. This alternative assumes there is sufficient treatment capacity at the Gilbert-Mosley treatment plant.

FUTURE CAPITAL COSTS: (Assumed to be Incurred During Year 14)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Mobilization and Demobilization of Drill Rig	CW-10-GWU4	1	LS	$10,610	$10,610	
Extraction Well Abandonment	CW-33-GWU4	1	EA	$9,203	$9,203	Abandon NIC#4-2
Decommissioning Treatment System	CW-34-GWU4	1	LS	$24,939	$24,939	
				SUBTOTAL	$44,752	
Contingency (Scope and Bid)		20%			$8,950	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$53,702	
Project Management		10%			$5,370	Percentage from Exhibit 5-8 was used.
Remedial Design		20%			$10,740	Percentage from Exhibit 5-8 was used.
Construction Management		15%			$8,055	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$8,055	Middle value of the recommended range was used.
				TOTAL	$85,922	
				TOTAL FUTURE CAPITAL COST	**$86,000**	Total future capital cost is rounded to the nearest $1,000.

FUTURE CAPITAL COSTS: (Assumed to be Incurred During Year 18)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Mobilization and Demobilization of Drill Rig	CW-10-GWU4	1	LS	$10,610	$10,610	
Extraction Well Abandonment	CW-33-GWU4	1	EA	$9,203	$9,203	Abandon NIC#4-1
Monitoring Well Abandonment	CW-32-GWU4	1	LS	$14,293	$14,293	
				SUBTOTAL	$34,106	
Contingency (Scope and Bid)		20%			$6,821	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$40,927	
Project Management		10%			$4,093	Percentage from Exhibit 5-8 was used.
Remedial Design		20%			$8,185	Percentage from Exhibit 5-8 was used.
Construction Management		15%			$6,139	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$6,139	Middle value of the recommended range was used.
				TOTAL	$65,483	
				TOTAL FUTURE CAPITAL COST	**$65,000**	Total future capital cost is rounded to the nearest $1,000.

TABLE CS-GWU4-4

ALTERNATIVE GWU4-4
GROUNDWATER EXTRACTION (CONTAINMENT ONLY), TREATMENT AND DISCHARGE TO STORM SEWER AND GILBERT-MOSLEY TREATMENT PLANT

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Under Alternative GWU4-4, extraction wells would be installed on the leading edge of the groundwater plume. Extracted groundwater from 1 well would be treated through an air stripper system and discharged into the storm sewer via a surface water pipeline. The off gas from the stripper would discharge into the atmosphere. Extracted groundwater from 1 well would be discharged through water pipeline to the Gilbert-Mosley treatment plant. Groundwater monitoring, both upgradient and downgradient of the extraction wells, would be performed as part of this alternative to demonstrate the effectiveness of the containment system. This alternative assumes there is sufficient treatment capacity at the Gilbert-Mosley treatment plant.

QUARTERLY MONITORING ANNUAL COSTS: (Assumed to be Incurred During Year 1 through 2)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Groundwater Sampling Event - Plume Stability	CW-6-GWU4	4	EA	$9,905	$39,620	
Groundwater Monitoring Event Report Preparation	CW-4-GWU4	4	EA	$19,570	$78,280	
				SUBTOTAL	$117,900	
Contingency (Scope and Bid)		20%			$23,580	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$141,480	
Project Management		8%			$11,318	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$21,222	Middle value of the recommended range was used.
				TOTAL	$174,020	
TOTAL QUARTERLY MONITORING COSTS (Years 1 through 2)					**$174,000**	Total quarterly monitoring cost is rounded to the nearest $1,000.

SEMIANNUAL MONITORING ANNUAL COSTS: (Assumed to be Incurred During Year 3 through 10)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Groundwater Sampling Event - Plume Stability	CW-6-GWU4	2	EA	$9,905	$19,810	
Groundwater Monitoring Event Report Preparation	CW-4-GWU4	2	EA	$19,570	$39,140	
				SUBTOTAL	$58,950	
Contingency (Scope and Bid)		20%			$11,790	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$70,740	
Project Management		10%			$7,074	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$10,611	Middle value of the recommended range was used.
				TOTAL	$88,425	
TOTAL SEMIANNUAL MONITORING COST (Year 3 through 10)					**$88,000**	Total semiannual monitoring cost is rounded to the nearest $1,000.

ANNUAL MONITORING ANNUAL COSTS: (Assumed to be Incurred During Year 11 through 18)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Groundwater Sampling Event - Plume Stability	CW-6-GWU4	1	EA	$9,905	$9,905	
Groundwater Monitoring Event Report Preparation	CW-4-GWU4	1	EA	$19,570	$19,570	
				SUBTOTAL	$29,475	
Contingency (Scope and Bid)		20%			$5,895	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$35,370	
Project Management		10%			$3,537	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$5,306	Middle value of the recommended range was used.
				TOTAL	$44,213	
TOTAL ANNUAL MONITORING COST (Year 11 through 18)					**$44,000**	Total annual monitoring cost is rounded to the nearest $1,000.

TABLE CS-GWU4-4

ALTERNATIVE GWU4-4
GROUNDWATER EXTRACTION (CONTAINMENT ONLY), TREATMENT AND DISCHARGE TO STORM SEWER AND GILBERT-MOSLEY TREATMENT PLANT

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Under Alternative GWU4-4, extraction wells would be installed on the leading edge of the groundwater plume. Extracted groundwater from 1 well would be treated through an air stripper system and discharged into the storm sewer via a surface water pipeline. The off gas from the stripper would discharge into the atmosphere. Extracted groundwater from 1 well would be discharged through water pipeline to the Gilbert-Mosley treatment plant. Groundwater monitoring, both upgradient and downgradient of the extraction wells, would be performed as part of this alternative to demonstrate the effectiveness of the containment system. This alternative assumes there is sufficient treatment capacity at the Gilbert-Mosley treatment plant.

ANNUAL OPERATING AND MAINTENANCE COSTS: (Assumed to be Incurred During Year 1 through 18)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Operation and Maintenance - Extraction Well	CW-23-GWU4	1	EA	$7,194	$7,194	
Operation and Maintenance - Extraction Well Maintenance	CW-24-GWU4	1	EA	$10,249	$10,249	Assume annual maintenance for NIC#4-1
Operation and Maintenance - Gilbert-Mosley Treatment Plant	CW-25-GWU4	1	LS	$16,918	$16,918	Portion of overall costs based on estimated contribution from GWU4.
				SUBTOTAL	$34,361	
Contingency (Scope and Bid)		20%			$6,872	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$41,233	
Project Management		10%			$4,123	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$6,185	Middle value of the recommended range was used.
				TOTAL	$51,541	
TOTAL ANNUAL OPERATING AND MAINTENANCE COST (Year 1 through 18)					**$52,000**	Total annual O&M cost is rounded to the nearest $1,000.

ANNUAL OPERATING AND MAINTENANCE COSTS: (Assumed to be Incurred During Year 1 through 14)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Operation and Maintenance - Extraction Well	CW-23-GWU4	1	EA	$7,194	$7,194	
Operation and Maintenance - Extraction Well Maintenance	CW-24-GWU4	1	EA	$10,249	$10,249	Assume annual maintenance for NIC#4-2
Operation and Maintenance - Treatment Plant	CW-26-GWU4	1	LS	$46,124	$46,124	
				SUBTOTAL	$63,567	
Contingency (Scope and Bid)		20%			$12,713	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$76,280	
Project Management		10%			$7,628	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$11,442	Middle value of the recommended range was used.
				TOTAL	$95,350	
TOTAL ANNUAL OPERATING AND MAINTENANCE COST (Year 1 through 14)					**$95,000**	Total annual O&M cost is rounded to the nearest $1,000.

PERIODIC MINOR EQUIPMENT REPLACEMENT COSTS: (Years 5 and 10)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Replace Equipment - Extraction Well Pumps	CW-28-GWU4	1	EA	$19,916	$19,916	Assumes pump replacement every 5 years - NIC#4-2
				SUBTOTAL	$19,916	
Contingency (Scope and Bid)		20%			$3,983	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$23,899	
Project Management		10%			$2,390	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$3,585	Middle value of the recommended range was used.
				TOTAL	$29,874	
TOTAL PERIODIC MINOR EQUIPMENT REPLACEMENT COST					**$30,000**	Total periodic minor equipment replacement cost is rounded to the nearest $1,000.

TABLE CS-GWU4-4

ALTERNATIVE GWU4-4
GROUNDWATER EXTRACTION (CONTAINMENT ONLY), TREATMENT AND DISCHARGE TO STORM SEWER AND GILBERT-MOSLEY TREATMENT PLANT

COST ESTIMATE SUMMARY

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011
Date: March 2011

Description: Under Alternative GWU4-4, extraction wells would be installed on the leading edge of the groundwater plume. Extracted groundwater from 1 well would be treated through an air stripper system and discharged into the storm sewer via a surface water pipeline. The off gas from the stripper would discharge into the atmosphere. Extracted groundwater from 1 well would be discharged through water pipeline to the Gilbert-Mosley treatment plant. Groundwater monitoring, both upgradient and downgradient of the extraction wells, would be performed as part of this alternative to demonstrate the effectiveness of the containment system. This alternative assumes there is sufficient treatment capacity at the Gilbert-Mosley treatment plant.

PERIODIC MINOR EQUIPMENT REPLACEMENT COSTS: (Years 5, 10, and 15)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Replace Equipment - Extraction Well Pumps	CW-28-GWU4	1	EA	$19,916	$19,916	Assumes pump replacement every 5 years - NIC#4-1
Minor Equipment Replacement - Treatment Plant	CW-27-GWU4	1	LS	$18,558	$18,558	
				SUBTOTAL	$38,474	
Contingency (Scope and Bid)		20%			$7,695	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$46,169	
Project Management		10%			$4,617	Percentage from Exhibit 5-8 was used.
Technical Support		15%			$6,925	Middle value of the recommended range was used.
				TOTAL	$57,711	
	TOTAL PERIODIC MINOR EQUIPMENT REPLACEMENT COST				**$58,000**	Total periodic minor equipment replacement cost is rounded to the nearest $1,000.

MONITORING WELL MAINTENANCE PERIODIC COSTS (Year 10)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Monitoring Well Maintenance	CW-30-GWU4	1	LS	$12,444	$12,444	Assumes well head repairs and development required.
				SUBTOTAL	$12,444	
Contingency (Scope and Bid)		20%			$2,489	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$14,933	
Project Management		10%			$1,493	The high end of the recommended range was used.
Technical Support		15%			$2,240	Middle value of the recommended range was used.
				TOTAL	$18,666	
	TOTAL MONITORING WELL MAINTENANCE PERIODIC COST				**$19,000**	Total periodic monitoring well maintenance cost is rounded to the nearest $1,000.

FIVE-YEAR SITE REVIEW PERIODIC COSTS (Years 5, 10, and 15)

DESCRIPTION	WORKSHEET	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Five-Year Site Review	CW-2-GWU4	1	LS	$38,547	$38,547	
				SUBTOTAL	$38,547	
Contingency (Scope and Bid)		20%			$7,709	10% Scope, 10% Bid (Low end of the recommended range).
				SUBTOTAL	$46,256	
Project Management		10%			$4,626	The high end of the recommended range was used.
Technical Support		15%			$6,938	Middle value of the recommended range was used.
				TOTAL	$57,820	
	TOTAL FIVE-YEAR SITE REVIEW PERIODIC COST				**$58,000**	Total Five-Year Review periodic cost is rounded to the nearest $1,000.

Notes:
Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.

Abbreviations:
EA Each
QTY Quantity
LS Lump Sum

TABLE PV-GWU4-4

ALTERNATIVE GWU4-4
GROUNDWATER EXTRACTION (CONTAINMENT ONLY), TREATMENT AND DISCHARGE TO STORM SEWER AND GILBERT-MOSLEY TREATMENT PLANT

PRESENT VALUE ANALYSIS

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Escalation Rate:	**3%**
Discount Rate:	**5%**

		O&M COSTS		PERIODIC COSTS								
Year[1]	**Capital Costs[2]**	**O&M Costs[2]**	**Monitoring Costs[2]**	**Monitoring Well Maintenance[2,3]**	**Minor Equipment Replacement Costs[2,4]**	**Major Equipment Replacement Costs[2,5]**	**Five-year Review Costs[2]**	**Total Annual Expenditure[6]**	**Escalation Factor (3%)**	**Escalated Cost[7]**	**Discount Factor (5%)**	**Present Value[8,9]**
0	$1,727,000	$0	$0	$0	$0	$0	$0	$1,727,000	1.0000	$1,727,000	1.0000	$1,727,000
1	$0	$147,000	$174,000	$0	$0	$0	$0	$468,000	1.0300	$482,040	0.9524	$459,095
2	$0	$147,000	$174,000	$0	$0	$0	$0	$468,000	1.0609	$496,501	0.9070	$450,327
3	$0	$147,000	$88,000	$0	$0	$0	$0	$382,000	1.0927	$417,411	0.8638	$360,560
4	$0	$147,000	$88,000	$0	$0	$0	$0	$382,000	1.1255	$429,941	0.8227	$353,712
5	$0	$147,000	$88,000	$0	$88,000	$0	$58,000	$528,000	1.1593	$612,110	0.7835	$479,588
6	$0	$147,000	$88,000	$0	$0	$0	$0	$382,000	1.1941	$456,146	0.7462	$340,376
7	$0	$147,000	$88,000	$0	$0	$0	$0	$382,000	1.2299	$469,822	0.7107	$333,902
8	$0	$147,000	$88,000	$0	$0	$0	$0	$382,000	1.2668	$483,918	0.6768	$327,515
9	$0	$147,000	$88,000	$0	$0	$0	$0	$382,000	1.3048	$498,434	0.6446	$321,290
10	$0	$147,000	$88,000	$19,000	$88,000	$0	$58,000	$547,000	1.3439	$735,113	0.6139	$451,286
11	$0	$147,000	$44,000	$0	$0	$0	$0	$338,000	1.3842	$467,860	0.5847	$273,558
12	$0	$147,000	$44,000	$0	$0	$0	$0	$338,000	1.4258	$481,920	0.5568	$268,333
13	$0	$147,000	$44,000	$0	$0	$0	$0	$338,000	1.4685	$496,353	0.5303	$263,216
14	$86,000	$147,000	$44,000	$0	$0	$0	$0	$424,000	1.5126	$641,342	0.5051	$323,942
15	$0	$52,000	$44,000	$0	$58,000	$0	$58,000	$264,000	1.5580	$411,312	0.4810	$197,841
16	$0	$52,000	$44,000	$0	$0	$0	$0	$148,000	1.6047	$237,496	0.4581	$108,797
17	$0	$52,000	$44,000	$0	$0	$0	$0	$148,000	1.6528	$244,614	0.4363	$106,725
18	$65,000	$52,000	$44,000	$0	$0	$0	$0	$213,000	1.7024	$362,611	0.4155	$150,665
TOTALS:	**$1,878,000**	**$2,266,000**	**$1,404,000**	**$19,000**	**$234,000**	**$0**	**$174,000**	**$8,241,000**		**$10,151,945**		$7,297,728
TOTAL PRESENT VALUE OF ALTERNATIVE GWU4-4												**$7,298,000**

Notes:

1 - Duration is assumed to be 18 years for present value analysis. Estimated remedial timeframes are discussed within the FS report.

2 - Capital costs, for purposes of this analysis, are assumed to be distributed as indicated on Table CS-GWU4-4

3 - Includes replacement of monitoring well vaulty and development.

4 - Includes replacement of extraction well pumps, some valves and system controls.

5 - Includes major building maintenance (painting, etc.), replacement of building HVAC system, replacement of building electrical system, and replacement treatment system components.

6 - Total annual expenditure is the total cost per year with no escalation or discounting.

7 - Escalation cost is the total cost per year including an escalation rate for that year. See Table PV-AERFT for details

8 - Present value is the total cost per year including a discount factor for that year. See Table PV-ADRFT for details.

9 - Total present value is rounded to the nearest $1,000. Depreciation is excluded from the present value cost.

TABLE PV-AERFT

ANNUAL ESCALATION RATE FACTORS TABLE

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Escalation Rate (Percent): 3%

Year	Escalation Factor	Year	Escalation Factor
0	1.0000	31	2.5001
1	1.0300	32	2.5301
2	1.0609	33	2.5601
3	1.0927	34	2.5901
4	1.1255	35	2.6201
5	1.1593	36	2.6501
6	1.1941	37	2.6801
7	1.2299	38	2.7101
8	1.2668	39	2.7401
9	1.3048	40	2.7701
10	1.3439	41	2.8001
11	1.3842	42	2.8301
12	1.4258	43	2.8601
13	1.4685	44	2.8901
14	1.5126	45	2.9201
15	1.5580	46	2.9501
16	1.6047	47	2.9801
17	1.6528	48	3.0101
18	1.7024	49	3.0401
19	1.7535	50	3.0701
20	1.8061	51	3.1001
21	1.8603	52	3.1301
22	1.9161	53	3.1601
23	1.9736	54	3.1901
24	2.0328	55	3.2201
25	2.0938	56	3.2501
26	2.1566	57	3.2801
27	2.2213	58	3.3101
28	2.2879	59	3.3401
29	2.3566	60	3.3701
30	2.4273		

Notes:
The net present value will not be calculated with the real discount rate as recommended by EPA's *A Guide to Developing and Documenting Cost Estimates during the Feasibility Study* ; rather an inflation rate of 3 percent and a nominal discount (interest) rate of 5 percent (typical of city bonds) was applied separately in the determination of net present value.

TABLE PV-ADRFT

ANNUAL DISCOUNT RATE FACTORS TABLE

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Discount Rate (Percent): 5%

Year	Discount Factor[1,2]	Year	Discount Factor[1,2]
0	1.0000	31	0.2204
1	0.9524	32	0.2099
2	0.9070	33	0.1999
3	0.8638	34	0.1904
4	0.8227	35	0.1813
5	0.7835	36	0.1727
6	0.7462	37	0.1644
7	0.7107	38	0.1566
8	0.6768	39	0.1491
9	0.6446	40	0.1420
10	0.6139	41	0.1353
11	0.5847	42	0.1288
12	0.5568	43	0.1227
13	0.5303	44	0.1169
14	0.5051	45	0.1113
15	0.4810	46	0.1060
16	0.4581	47	0.1009
17	0.4363	48	0.0961
18	0.4155	49	0.0916
19	0.3957	50	0.0872
20	0.3769	51	0.0831
21	0.3589	52	0.0791
22	0.3418	53	0.0753
23	0.3256	54	0.0717
24	0.3101	55	0.0683
25	0.2953	56	0.0651
26	0.2812	57	0.0620
27	0.2678	58	0.0590
28	0.2551	59	0.0562
29	0.2429	60	0.0535
30	0.2314		

Notes:

[1] Annual discount factors were calculated using the formulas and guidance presented in Section 4.0 of *A Guide to Developing and Documenting Cost Estimates During the Feasibility Study*, EPA 2000.

[2] The net present value will not be calculated with the real discount rate as recommended by EPA's *A Guide to Developing and Documenting Cost Estimates during the Feasibility Study*; rather an inflation rate of 3 percent and a nominal discount (interest) rate of 5 percent (typical of city bonds) was applied separately in the determination of net present value.

COST WORKSHEET INDEX

Wrksht No.	Description
CW-1-GWU4	Institutional Controls
CW-2-GWU4	Five-Year Site Review
CW-3-GWU4	Groundwater Sampling Event Report Preparation - No Action Alternative
CW-4-GWU4	Groundwater Monitoring Event Report Preparation
CW-5-GWU4	Groundwater Sampling Event - No Action Alternative
CW-6-GWU4	Groundwater Sampling Event - Plume Stability
CW-7-GWU4	Miscellaneous Requirements for Sampling
CW-8-GWU4	Miscellaneous Requirements for Construction
CW-9-GWU4	Monitoring Well Installation
CW-10-GWU4	Mobilization and Demobilization of Drill Rig
CW-11-GWU4	Extraction Well Installation
CW-12-GWU4	Extraction Well Vault
CW-13-GWU4	Mobilization or Demobilization of Construction Equipment
CW-14-GWU4	Influent Piping - NIC#4-1/2 to New Treatment Plant
CW-15-GWU4	Influent Piping - NIC#4-1 to Sante Fe
CW-16-GWU4	Effluent Piping - New Treatment Plant to Storm Sewer
CW-17-GWU4	Pipe Jacking under Railroad Tracks
CW-18-GWU4	Geotechnical Investigation for Treatment Building
CW-19-GWU4	Groundwater Treatment Plant - Building
CW-20-GWU4	Groundwater Treatment Plant - Equipment and Piping
CW-21-GWU4	Groundwater Treatment Plant - Facility Control System
CW-22-GWU4	Groundwater Treatment Plant - Startup
CW-23-GWU4	Operation and Maintenance - Extraction Well
CW-24-GWU4	Operation and Maintenance - Extraction Well Maintenance
CW-25-GWU4	Operation and Maintenance - Gilbert-Mosley Treatment Plant
CW-26-GWU4	Operation and Maintenance - Treatment Plant
CW-27-GWU4	Minor Equipment Replacement - Treatment Plant
CW-28-GWU4	Replace Equipment - Extraction Well Pumps
CW-29-GWU4	Monitoring Well Maintenance - No Action Alternative
CW-30-GWU4	Monitoring Well Maintenance
CW-31-GWU4	Monitoring Well Abandonment - No Action Alternative
CW-32-GWU4	Monitoring Well Abandonment
CW-33-GWU4	Extraction Well Abandonment
CW-34-GWU4	Decommissioning Treatment System

TABLE CW-1-GWU4

Institutional Controls
Capital Cost Sub-Element

Cost Worksheet: CW-1-GWU4

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/16/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves implemention of institutional control for the site. The following cost includes hours for a legal procedures and cost for document submission.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
L6	Environmental Lawyer	120	HR	1.00	$114.32	$114.32	$0.00	$0.00	$0.00	$0.00	$114.32	$13,718.40	0%	9%	$14,953	SE SalaryExpert.com	Overhead included in unit labor rate.
L18	Paralegal	60	HR	1.00	$47.27	$47.27	$0.00	$0.00	$0.00	$0.00	$47.27	$2,836.20	0%	9%	$3,091	SE SalaryExpert.com	Overhead included in unit labor rate.
L3	Clerks, Typist, Bookkeeper & Receptionist	40	HR	1.00	$30.90	$30.90	$0.00	$0.00	$0.00	$0.00	$30.90	$1,236.00	0%	9%	$1,347	SE SalaryExpert.com	Overhead included in unit labor rate.
M1	Reproduction Costs for Institutional Controls	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$520.00	$520.00	$520.00	10%	9%	$623	PE N/A	Includes copying and shipping
												TOTAL UNIT COST:			$20,014		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-2-GWU4

Five-Year Site Review
Periodic Cost Sub-Element

Cost Worksheet: CW-2-GWU4

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/16/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves preparation of Five-Year site review report.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
E1	Pickup Truck Rental	1	WK	1.00	$0.00	$0.00	$393.72	$393.72	$0.00	$0.00	$393.72	$393.72	10%	9%	$472	V Enterprise	Includes applicable taxes.
L23	General Operator/Technician	40	HR	1.00	$50.70	$50.70	$0.00	$0.00	$0.00	$0.00	$50.70	$2,028.00	0%	9%	$2,211	SE SalaryExpert.com	Overhead included in unit labor rate.
L15	Project Manager	40	HR	1.00	$124.22	$124.22	$0.00	$0.00	$0.00	$0.00	$124.22	$4,968.80	0%	9%	$5,416	SE SalaryExpert.com	Overhead included in unit labor rate.
L5	Environmental Engineer	120	HR	1.00	$86.14	$86.14	$0.00	$0.00	$0.00	$0.00	$86.14	$10,336.80	0%	9%	$11,267	SE SalaryExpert.com	Overhead included in unit labor rate.
L7	Environmental Scientist	160	HR	1.00	$64.56	$64.56	$0.00	$0.00	$0.00	$0.00	$64.56	$10,329.60	0%	9%	$11,259	SE SalaryExpert.com	Overhead included in unit labor rate.
L16	Quality Control Engineer	24	HR	1.00	$73.57	$73.57	$0.00	$0.00	$0.00	$0.00	$73.57	$1,765.68	0%	9%	$1,925	SE SalaryExpert.com	Overhead included in unit labor rate.
L1	CAD Drafter	40	HR	1.00	$78.06	$78.06	$0.00	$0.00	$0.00	$0.00	$78.06	$3,122.40	0%	9%	$3,403	SE SalaryExpert.com	Overhead included in unit labor rate.
L3	Clerks, Typist, Bookkeeper & Receptionist	40	HR	1.00	$30.90	$30.90	$0.00	$0.00	$0.00	$0.00	$30.90	$1,236.00	0%	9%	$1,347	SE SalaryExpert.com	Overhead included in unit labor rate.
M2	Reports	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$1,040.00	$1,040.00	$1,040.00	10%	9%	$1,247	PE N/A	Includes copying and shipping
												TOTAL UNIT COST:			$38,547		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-3-GWU4

Groundwater Monitoring **Cost Worksheet: CW-3-GWU4**
Annual Cost Sub-Element
Groundwater Sampling Event Report Preparation - No Action Alternative

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/16/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves preparation of a report summarizing groundwater sample results under the No Action alternative. The following cost includes hours for preparation of document with contaminant plume and potentiometric surface maps, analysis of groundwater sample results, review, reproduction and shipping.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
L15	Project Manager	8	HR	1.00	$124.22	$124.22	$0.00	$0.00	$0.00	$0.00	$124.22	$993.76	0%	9%	$1,083	SE SalaryExpert.com	Overhead included in unit labor rate.
L1	CAD Drafter	20	HR	1.00	$78.06	$78.06	$0.00	$0.00	$0.00	$0.00	$78.06	$1,561.20	0%	9%	$1,702	SE SalaryExpert.com	Overhead included in unit labor rate.
L11	Geologist	100	HR	1.00	$81.29	$81.29	$0.00	$0.00	$0.00	$0.00	$81.29	$8,129.00	0%	9%	$8,861	SE SalaryExpert.com	Overhead included in unit labor rate.
L17	Quality Assurance Director	4	HR	1.00	$146.55	$146.55	$0.00	$0.00	$0.00	$0.00	$146.55	$586.20	0%	9%	$639	SE SalaryExpert.com	Overhead included in unit labor rate.
L3	Clerks, Typist, Bookkeeper & Receptionist	8	HR	1.00	$30.90	$30.90	$0.00	$0.00	$0.00	$0.00	$30.90	$247.20	0%	9%	$269	SE SalaryExpert.com	Overhead included in unit labor rate.
M30	Reproduction Costs for Groundwater Sampling Event Reports	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$510.00	$510.00	$510.00	10%	9%	$611	PE N/A	Includes copying and shipping
												TOTAL UNIT COST:			$13,165		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-4-GWU4

Groundwater Monitoring **Cost Worksheet: CW-4-GWU4**
Annual Cost Sub-Element
Groundwater Monitoring Event Report Preparation

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/16/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves preparation of a report summarizing groundwater sample results. The following cost includes hours for preparation of document with contaminant plume and potentiometric surface maps, analysis of groundwater sample results, review, reproduction and shipping.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
L15	Project Manager	8	HR	1.00	$124.22	$124.22	$0.00	$0.00	$0.00	$0.00	$124.22	$993.76	0%	9%	$1,083	SE SalaryExpert.com	Overhead included in unit labor rate.
L1	CAD Drafter	32	HR	1.00	$78.06	$78.06	$0.00	$0.00	$0.00	$0.00	$78.06	$2,497.92	0%	9%	$2,723	SE SalaryExpert.com	Overhead included in unit labor rate.
L11	Geologist	160	HR	1.00	$81.29	$81.29	$0.00	$0.00	$0.00	$0.00	$81.29	$13,006.40	0%	9%	$14,177	SE SalaryExpert.com	Overhead included in unit labor rate.
L17	Quality Assurance Director	4	HR	1.00	$146.55	$146.55	$0.00	$0.00	$0.00	$0.00	$146.55	$586.20	0%	9%	$639	SE SalaryExpert.com	Overhead included in unit labor rate.
L3	Clerks, Typist, Bookkeeper & Receptionist	10	HR	1.00	$30.90	$30.90	$0.00	$0.00	$0.00	$0.00	$30.90	$309.00	0%	9%	$337	SE SalaryExpert.com	Overhead included in unit labor rate.
M30	Reproduction Costs for Groundwater Sampling Event Reports	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$510.00	$510.00	$510.00	10%	9%	$611	PE N/A	Includes copying and shipping
												TOTAL UNIT COST:			$19,570		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-5-GWU4

Groundwater Monitoring **Cost Worksheet: CW-5-GWU4**
Annual Cost Sub-Element
Groundwater Sampling Event - No Action Alternative

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/16/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves groundwater sampling at the site. The following cost includes hours for sample collection and management and costs for sample analysis, sampling equipment, and vehicle rental. Assumes local sampling crew; no per diem included.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M3	VOCs, EPA Method SW-846 8260	12	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$80.08	$80.08	$960.96	0%	9%	$1,047	V Teklab	
M4	Filtered	0	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$72.80	$72.80	$0.00	0%	9%	$0	V Teklab	
M19	Water Quality Meter and Flow Through Cell	1	WK	1.00	$0.00	$0.00	$0.00	$0.00	$461.85	$0.00	$461.85	$461.85	0%	9%	$503	V Pine Env	
M20	Photoionization Detector (PID)	1	WK	1.00	$0.00	$0.00	$0.00	$0.00	$214.81	$0.00	$214.81	$214.81	0%	9%	$234	V Pine Env	Includes calibration gas
M21	Water Level Meter	1	WK	1.00	$0.00	$0.00	$0.00	$0.00	$64.44	$0.00	$64.44	$64.44	0%	9%	$70	V Pine Env	
M22	Turbidimeter	1	WK	1.00	$0.00	$0.00	$0.00	$0.00	$80.55	$0.00	$80.55	$80.55	0%	9%	$88	V Pine Env	
M23	Portable Bladder Pump	1	WK	1.00	$0.00	$0.00	$0.00	$0.00	$161.11	$0.00	$161.11	$161.11	0%	9%	$176	V Pine Env	
M24	Replacement Poly Bladders	12	EA	1.00	$0.00	$0.00	$0.00	$0.00	$8.59	$0.00	$8.59	$103.08	0%	9%	$112	V Pine Env	
M25	Bladder Pump Controller and Compressor	1	WK	1.00	$0.00	$0.00	$0.00	$0.00	$322.22	$0.00	$322.22	$322.22	0%	9%	$351	V Pine Env	
M26	Combination Tubing for Bladder Pump	600	LF	1.00	$0.00	$0.00	$0.00	$0.00	$0.54	$0.00	$0.54	$324.00	0%	9%	$353	V Pine Env	
M27	Shipping Rental Equipment	2	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$255.00	$255.00	$510.00	10%	9%	$611	PE N/A	
M28	55-gallon Open Head Steel Drum	2	EA	1.00	$0.00	$0.00	$0.00	$0.00	$137.43	$0.00	$137.43	$274.86	10%	9%	$330	V Global Indust.	Includes shipping
M29	Miscellaneous Sampling Equipment	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$204.00	$204.00	$204.00	10%	9%	$245	PE N/A	Paper towels, gloves, garbage bags, etc.
L15	Project Manager	1	HR	1.00	$124.22	$124.22	$0.00	$0.00	$0.00	$0.00	$124.22	$124.22	0%	9%	$135	SE SalaryExpert.com	Overhead included in unit labor rate.
L23	General Operator/Technician	50	HR	1.00	$50.70	$50.70	$0.00	$0.00	$0.00	$0.00	$50.70	$2,535.00	0%	9%	$2,763	SE SalaryExpert.com	Overhead included in unit labor rate.
L24	Contracting/Procurement Specialist	2	HR	1.00	$46.54	$46.54	$0.00	$0.00	$0.00	$0.00	$46.54	$93.08	0%	9%	$101	SE SalaryExpert.com	Overhead included in unit labor rate.
E1	Pickup Truck Rental	1	WK	1.00	$0.00	$0.00	$393.72	$393.72	$0.00	$0.00	$393.72	$393.72	10%	9%	$472	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	4	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$42.96	10%	9%	$52	PE N/A	
												TOTAL UNIT COST:			$7,643		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-6-GWU4

Groundwater Monitoring
Annual Cost Sub-Element
Groundwater Sampling Event - Plume Stability

Cost Worksheet: CW-6-GWU4

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/16/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves preparation of a plume stability monitoring report summarizing groundwater sample results. The following cost includes hours for preparation of document with contaminant plume and potentiometric surface maps, analysis of groundwater sample results, review, reproduction and shipping. Assumes local sampling crew; no per diem included.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M3	VOCs, EPA Method SW-846 8260	19	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$80.08	$80.08	$1,521.52	0%	9%	$1,658	V Teklab	
M4	Filtered	0	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$72.80	$72.80	$0.00	0%	9%	$0	V Teklab	
M19	Water Quality Meter and Flow Through Cell	1	WK	1.00	$0.00	$0.00	$0.00	$0.00	$461.85	$0.00	$461.85	$461.85	0%	9%	$503	V Pine Env	
M20	Photoionization Detector (PID)	1	WK	1.00	$0.00	$0.00	$0.00	$0.00	$214.81	$0.00	$214.81	$214.81	0%	9%	$234	V Pine Env	Includes calibration gas
M21	Water Level Meter	1	WK	1.00	$0.00	$0.00	$0.00	$0.00	$64.44	$0.00	$64.44	$64.44	0%	9%	$70	V Pine Env	
M22	Turbidimeter	1	WK	1.00	$0.00	$0.00	$0.00	$0.00	$80.55	$0.00	$80.55	$80.55	0%	9%	$88	V Pine Env	
M23	Portable Bladder Pump	1	WK	1.00	$0.00	$0.00	$0.00	$0.00	$161.11	$0.00	$161.11	$161.11	0%	9%	$176	V Pine Env	
M24	Replacement Poly Bladders	18	EA	1.00	$0.00	$0.00	$0.00	$0.00	$8.59	$0.00	$8.59	$154.62	0%	9%	$169	V Pine Env	
M25	Bladder Pump Controller and Compressor	1	WK	1.00	$0.00	$0.00	$0.00	$0.00	$322.22	$0.00	$322.22	$322.22	0%	9%	$351	V Pine Env	
M26	Combination Tubing for Bladder Pump	1,000	LF	1.00	$0.00	$0.00	$0.00	$0.00	$0.54	$0.00	$0.54	$540.00	0%	9%	$589	V Pine Env	
M27	Shipping Rental Equipment	2	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$255.00	$255.00	$510.00	10%	9%	$611	PE N/A	
M28	55-gallon Open Head Steel Drum	3	EA	1.00	$0.00	$0.00	$0.00	$0.00	$137.43	$0.00	$137.43	$412.29	10%	9%	$494	V Global Indust.	Includes shipping
M29	Miscellaneous Sampling Equipment	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$204.00	$204.00	$204.00	10%	9%	$245	PE N/A	Paper towels, gloves, garbage bags, etc.
L15	Project Manager	2	HR	1.00	$124.22	$124.22	$0.00	$0.00	$0.00	$0.00	$124.22	$248.44	0%	9%	$271	SE SalaryExpert.com	Overhead included in unit labor rate.
L23	General Operator/Technician	68	HR	1.00	$50.70	$50.70	$0.00	$0.00	$0.00	$0.00	$50.70	$3,447.60	0%	9%	$3,758	SE SalaryExpert.com	Overhead included in unit labor rate.
L24	Contracting/Procurement Specialist	3	HR	1.00	$46.54	$46.54	$0.00	$0.00	$0.00	$0.00	$46.54	$139.62	0%	9%	$152	SE SalaryExpert.com	Overhead included in unit labor rate.
E1	Pickup Truck Rental	1	WK	1.00	$0.00	$0.00	$393.72	$393.72	$0.00	$0.00	$393.72	$393.72	10%	9%	$472	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	5	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$53.70	10%	9%	$64	PE N/A	
												TOTAL UNIT COST:			$9,905		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-7-GWU4

Miscellaneous Requirements **Cost Worksheet: CW-7-GWU4**
Capital Cost Sub-Element
Miscellaneous Requirements for Sampling

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/16/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element includes all miscellaneous tasks and items that are required for preparing plans for the quality assurance plan and sampling and analysis plan for general sampling at the site, and are not included under other cost worksheet tasks or professional/technical services.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M31	Contractor Quality Assurance Plan	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$15,300.00	$15,300.00	$15,300.00	10%	9%	$18,345	PE N/A	
M34	Sampling and Analysis Plan	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$20,400.00	$20,400.00	$20,400.00	10%	9%	$24,460	PE N/A	
M35	Site Safety and Health Plan	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$6,120.00	$6,120.00	$6,120.00	10%	9%	$7,338	PE N/A	
												TOTAL UNIT COST:			$50,143		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-8-GWU4

Miscellaneous Requirements **Cost Worksheet: CW-8-GWU4**
Capital Cost Sub-Element
Miscellaneous Requirements for Construction

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/16/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element includes all miscellaneous tasks and items that are required for completion of the alternative, and are not included under other cost worksheet tasks or professional/technical services. Items included in this sub-element include contratctor work plans.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M31	Contractor Quality Assurance Plan	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$15,300.00	$15,300.00	$15,300.00	10%	9%	$18,345	PE N/A	
M32	Construction Schedule	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$4,080.00	$4,080.00	$4,080.00	10%	9%	$4,892	PE N/A	
M33	Environmental Protection Plan	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$8,160.00	$8,160.00	$8,160.00	10%	9%	$9,784	PE N/A	
M34	Sampling and Analysis Plan	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$20,400.00	$20,400.00	$20,400.00	10%	9%	$24,460	PE N/A	
M35	Site Safety and Health Plan	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$6,120.00	$6,120.00	$6,120.00	10%	9%	$7,338	PE N/A	
M36	Site Work Plan	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$10,200.00	$10,200.00	$10,200.00	10%	9%	$12,230	PE N/A	
M37	Miscellaneous Submittals	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$12,240.00	$12,240.00	$12,240.00	10%	9%	$14,676	PE N/A	
												TOTAL UNIT COST:			$91,725		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-9-GWU4

Groundwater Monitoring
Capital Cost Sub-Element
Monitoring Well Installation

Cost Worksheet: CW-9-GWU4

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/16/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves construction of additional monitoring wells. Cost assumes local oversight and no per diem.

Cost Analysis:
Cost for Mobilize/Demobilize

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M70	Mobilization and Demobilization of DPT Rig	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$510.00	$510.00	$510.00	10%	9%	$611	P N/A	
M41	Decontamination Pad Construction/Removal	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$760.38	$760.38	$760.38	10%	9%	$912	P N/A	
												TOTAL UNIT COST:			$1,523		

Cost Analysis:
Cost to Install Monitoring Wells

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
S1	Geoprobe rig and crew	1	DY	0.95	$0.00	$0.00	$0.00	$0.00	$0.00	$1,560.00	$1,560.00	$1,560.00	0%	0%	$1,560	P N/A	Overhead and profit included in rate
M71	Mini-Well Pre-Packed Screen	4	EA	1.00	$0.00	$0.00	$0.00	$0.00	$103.24	$0.00	$103.24	$412.96	10%	9%	$495	P N/A	
M72	PVC Casing	41	LF	1.00	$0.00	$0.00	$0.00	$0.00	$3.70	$0.00	$3.70	$151.70	10%	9%	$182	P N/A	
M73	Well Grout	41	LF	1.00	$0.00	$0.00	$0.00	$0.00	$6.00	$0.00	$6.00	$246.00	10%	9%	$295	P N/A	
M74	Locking J-Plug	2	EA	1.00	$0.00	$0.00	$0.00	$0.00	$13.80	$0.00	$13.80	$27.60	10%	9%	$33	P N/A	
M75	8" Vault	2	EA	1.00	$0.00	$0.00	$0.00	$0.00	$60.02	$0.00	$60.02	$120.04	10%	9%	$144	P N/A	
M44	Monitoring Well Completion	2	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$156.00	$156.00	$312.00	10%	9%	$374	P N/A	
M45	Monitoring Well Development	3	HR	0.95	$0.00	$0.00	$0.00	$0.00	$0.00	$182.40	$182.40	$547.20	10%	9%	$656	P N/A	
M46	IDW Handling	2	HR	0.95	$0.00	$0.00	$0.00	$0.00	$0.00	$192.66	$192.66	$385.32	10%	9%	$462	P N/A	
M47	Decontamination	2	HR	0.95	$0.00	$0.00	$0.00	$0.00	$0.00	$192.66	$192.66	$385.32	10%	9%	$462	P N/A	
M48	Standby Time	2	HR	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$148.20	$148.20	$296.40	10%	9%	$355	P N/A	
M28	55-gallon Open Head Steel Drum	1	EA	1.00	$0.00	$0.00	$0.00	$0.00	$137.43	$0.00	$137.43	$137.43	10%	9%	$165	V Global Indust.	Includes shipping
L11	Geologist	8	HR	1.00	$81.29	$81.29	$0.00	$0.00	$0.00	$0.00	$81.29	$650.32	0%	9%	$709	SE SalaryExpert.com	Overhead included in unit labor rate.
E2	Pickup Truck Rental	1	DY	1.00	$0.00	$0.00	$78.74	$78.74	$0.00	$0.00	$78.74	$78.74	10%	9%	$94	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	1	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$10.74	10%	9%	$13	PE N/A	
												TOTAL UNIT COST:			$5,999		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-10-GWU4

Groundwater Extraction and Treatment
Capital Cost Sub-Element
Mobilization and Demobilization of Drill Rig

Cost Worksheet: CW-10-GWU4

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/16/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves mob/demob for construction of extraction well. Cost assume local oversight and no per diem.

Cost Analysis:
Cost for Mobilize/Demobilize

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M40	Mobilization and Demobilization of Drill Rig	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$8,088.00	$8,088.00	$8,088.00	10%	9%	$9,698	P N/A	
M41	Decontamination Pad Construction/Removal	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$760.38	$760.38	$760.38	10%	9%	$912	P N/A	
												TOTAL UNIT COST:			$10,610		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-11-GWU4

Groundwater Extraction and Treatment
Capital Cost Sub-Element
Extraction Well Installation

Cost Worksheet: CW-11-GWU4

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/16/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves construction of extraction well and setting extraction well pump. Cost assumes local oversight and no per diem.

Cost Analysis:
Cost to Install Extraction Well

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M111	Well, drilled, 18" diameter borehole, reverse circulation	40	LF	0.95	$36.37	$38.28	$160.53	$168.98	$0.00	$0.00	$207.26	$8,290.53	10%	9%	$9,940	P Per Estimator	Based on E 33 23 1123 for 15" diameter borehole
M112	Well, well screen assembly, stainless steel, 10" diameter	30	LF	0.95	$11.29	$11.88	$39.22	$41.28	$116.43	$0.00	$169.60	$5,087.95	10%	9%	$6,100	E 33 23 0228	
M113	Stainless Steel Well Casing, 10"	10	LF	0.95	$11.29	$11.88	$39.22	$41.28	$201.56	$0.00	$254.73	$2,547.28	10%	9%	$3,054	E 33 23 0127	
M114	Well Filter Pack, 10" Screen	32	LF	0.95	$11.29	$11.88	$39.22	$41.28	$5.30	$0.00	$58.47	$1,870.99	10%	9%	$2,243	E 33 23 1405	
M115	Annular Seal, 10" Well, Portland Cement Grout	8	LF	0.95	$11.29	$11.88	$39.22	$41.28	$14.44	$0.00	$67.61	$540.87	10%	9%	$648	E 33 23 1805	
M116	Bentonite Seal, 10" Well	1	EA	0.95	$60.16	$63.33	$265.43	$279.40	$75.06	$0.00	$417.79	$417.79	10%	9%	$501	E 33 23 2106	
M62	Develop Well	4	HR	0.95	$96.39	$101.46	$387.60	$408.00	$259.92	$0.00	$769.38	$3,077.53	10%	9%	$3,690	C 33 21 1310 8500	
M117	Well, pump, 6" submersible, w/controls	1	EA	0.95	$763.20	$803.37	$932.80	$981.89	$8,929.44	$0.00	$10,714.70	$10,714.70	10%	9%	$12,847	E 33 23 0562	
M85	Stainless steel pipe, 4"	30	LF	0.95	$9.57	$10.07	$1.34	$1.41	$97.47	$0.00	$108.95	$3,268.63	10%	9%	$3,919	C 22111 364 1370	
M86	Steel, nipple, 6" x 4"	1	EA	0.95	$42.12	$44.34	$0.00	$0.00	$110.61	$0.00	$154.95	$154.95	10%	9%	$186	C 22111 366 3986	
M87	Steel flange, 4"	1	EA	0.95	$70.20	$73.89	$9.88	$10.40	$26.83	$0.00	$111.12	$111.12	10%	9%	$133	C 22111 347 6140	
M46	IDW Handling	2	HR	0.95	$0.00	$0.00	$0.00	$0.00	$0.00	$192.66	$192.66	$385.32	10%	9%	$462	P N/A	
M47	Decontamination	2	HR	0.95	$0.00	$0.00	$0.00	$0.00	$0.00	$192.66	$192.66	$385.32	10%	9%	$462	P N/A	
M48	Standby Time	1	HR	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$148.20	$148.20	$148.20	10%	9%	$178	P N/A	
M28	55-gallon Open Head Steel Drum	10	EA	1.00	$0.00	$0.00	$0.00	$0.00	$137.43	$0.00	$137.43	$1,374.30	10%	9%	$1,648	V Global Indust.	Includes shipping
L11	Geologist	24	HR	1.00	$81.29	$81.29	$0.00	$0.00	$0.00	$0.00	$81.29	$1,950.96	0%	9%	$2,127	SE SalaryExpert.com	Overhead included in unit labor rate.
E2	Pickup Truck Rental	3	DY	1.00	$0.00	$0.00	$78.74	$78.74	$0.00	$0.00	$78.74	$236.23	10%	9%	$283	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	3	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$32.22	10%	9%	$39	PE N/A	
												TOTAL UNIT COST:			$48,460		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-12-GWU4

Groundwater Extraction and Treatment
Capital Cost Sub-Element
Extraction Well Vault

Cost Worksheet: CW-12-GWU4

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/16/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves installation of the extraction well vault. Cost assumes local oversight and no per diem.

Cost Analysis:
Cost to Install Extraction Well

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M182	Concrete sawing, up to 12" deep	28	LF	1.00	$2.32	$2.32	$2.78	$2.78	$1.97	$0.00	$7.07	$197.96	10%	9%	$237	C 03811 350 0400	
M183	Selective concrete demolition	2	CY	1.00	$97.76	$97.76	$25.48	$25.48	$0.00	$0.00	$123.24	$246.48	10%	9%	$296	C 03050 510 0070	
M184	Selective demolition, dump charges	4	TN	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$97.76	$97.76	$391.04	10%	9%	$469	C 02411 919 0100	
M200	Excavation, machine excavation, hydraulic backhoe	8	BCY	1.00	$10.24	$10.24	$7.59	$7.59	$0.00	$0.00	$17.83	$142.64	10%	9%	$171	C 31231 616 6030	
M201	Hauling, small load	12	LCY	1.00	$4.33	$4.33	$6.18	$6.18	$0.00	$0.00	$10.51	$126.12	10%	9%	$151	C 31232 320 0416	
M202	Fill, gravel fill, compacted, 12" deep	3	ECY	1.00	$6.86	$6.86	$0.67	$0.67	$19.88	$0.00	$27.41	$82.23	10%	9%	$99	C 31232 317 1300	
M203	Precast concrete vault, 5' x 5', 4' deep	1	EA	1.00	$556.40	$556.40	$222.56	$222.56	$1,533.17	$0.00	$2,312.13	$2,312.13	10%	9%	$2,772	C 33051 613 0510	
M204	Access hatch, aluminum, H-20, 60" x 60"	1	EA	1.00	$0.00	$0.00	$0.00	$0.00	$5,475.60	$0.00	$5,475.60	$5,475.60	10%	9%	$6,565	V Bilco	
M170	Concrete, ready mix, 4000 PSI, delivered	1	CY	1.00	$0.00	$0.00	$0.00	$0.00	$101.30	$0.00	$101.30	$101.30	10%	9%	$121	C 03310 535 0300	
M171	Concrete finishing, floors, manual	24	SF	1.00	$0.38	$0.38	$0.00	$0.00	$0.00	$0.00	$0.38	$9.12	10%	9%	$11	C 03352 930 0200	
M172	Concrete, placing, direct chute, includes vibrating	1	CY	1.00	$8.22	$8.22	$0.50	$0.50	$0.00	$0.00	$8.72	$8.72	10%	9%	$10	C 03310 570 4300	
M329	Elbow, 90 Deg., plastic, PVC, socket joint, 6", schedule 80	4	EA	1.00	$40.80	$40.80	$0.00	$0.00	$33.83	$0.00	$74.63	$298.52	10%	9%	$358	C 22 11 1376 2200	
M347	Tee, plastic, PVC, socket joint, 6", schedule 80	1	EA	1.00	$61.20	$61.20	$0.00	$0.00	$56.93	$0.00	$118.13	$118.13	10%	9%	$142	C 22 11 1376 2490	
M320	Pipe, plastic, PVC, 6" diameter, schedule 80	10	LF	1.00	$10.81	$10.81	$0.00	$0.00	$20.73	$0.00	$31.54	$315.40	10%	9%	$378	C 22 11 1374 2560	
M365	Flange, plastic, PVC, socket joint, 150 lb., 6", schedule 80	8	EA	1.00	$22.44	$22.44	$0.00	$0.00	$25.78	$0.00	$48.22	$385.76	10%	9%	$463	C 22 11 1376 2534	
M312	Valves, iron body, swing check, flanged, 125 lb., 6"	1	EA	1.00	$214.20	$214.20	$0.00	$0.00	$698.14	$0.00	$912.34	$912.34	10%	9%	$1,094	C 23 05 2330 6070	
M302	Venturi flow, measuring device, 6" diameter	1	EA	1.00	$182.58	$182.58	$0.00	$0.00	$993.51	$0.00	$1,176.09	$1,176.09	10%	9%	$1,410	C 23 21 2088 0280	
M307	Valves, iron body, gate, non-rising stem, flanged, 125 lb., 6"	1	EA	1.00	$214.20	$214.20	$0.00	$0.00	$1,235.17	$0.00	$1,449.37	$1,449.37	10%	9%	$1,738	C 23 05 2330 2300	
M260	Pipe stands	3	EA	1.00	$0.00	$0.00	$0.00	$0.00	$164.27	$0.00	$164.27	$492.81	10%	9%	$591	P NA	
M190	Instrumentation allowance for extraction well vault	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$8,601.00	$8,601.00	$8,601.00	10%	9%	$10,313	P NA	Includes RTF transmitter, level and flow transmittters, etc.
M191	Electrical connection allowance for extraction well vault	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$15,600.00	$15,600.00	$15,600.00	10%	9%	$18,704	P NA	Includes transformer, wiring, breaker box, etc.
L8	Field Engineer	32	HR	1.00	$82.93	$82.93	$0.00	$0.00	$0.00	$0.00	$82.93	$2,653.76	0%	9%	$2,893	SE SalaryExpert.com	Overhead included in unit labor rate.
E2	Pickup Truck Rental	4	DY	1.00	$0.00	$0.00	$78.74	$78.74	$0.00	$0.00	$78.74	$314.98	10%	9%	$378	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	4	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$42.96	10%	9%	$52	PE N/A	
												TOTAL UNIT COST:			$49,416		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-13-GWU4

Groundwater Extraction and Treatment **Cost Worksheet: CW-13-GWU4**
Capital Cost Sub-Element
Mobilization or Demobilization of Construction Equipment

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/16/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves mobilization and demobilization of heavy equipment.

Cost Analysis:
Cost to Install Extraction Well

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M90	Mobilization/demobilization of directional drilling rig	1	EA	1.00	$390.00	$390.00	$811.20	$811.20	$0.00	$0.00	$1,201.20	$1,201.20	10%	9%	$1,440	C 33052 322 0302	
M91	Mobilization or demobilization of dozer, loader, backhoe or excavator	1	EA	1.00	$57.20	$57.20	$276.64	$276.64	$0.00	$0.00	$333.84	$333.84	10%	9%	$400	C 01543 650 0100	
M92	Mobilization/demobilization of small equipment placed in rear of, or towed by pickup	2	EA	1.00	$41.60	$41.60	$60.84	$60.84	$0.00	$0.00	$102.44	$204.88	10%	9%	$246	C 01543 650 1150	
												TOTAL UNIT COST:			$2,086		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-14-GWU4

Groundwater Extraction and Treatment **Cost Worksheet: CW-14-GWU4**
Capital Cost Sub-Element
Influent Piping - NIC#4-1/2 to New Treatment Plant

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/16/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves installation of influent piping from NIC#4-1/2 to the New Treatment Plant. Cost assume local oversight and no per diem.

Cost Analysis:
Cost to Install Influent Piping

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M182	Concrete sawing, up to 12" deep	36	LF	1.00	$2.32	$2.32	$2.78	$2.78	$1.97	$0.00	$7.07	$254.52	10%	9%	$305	C 03811 350 0400	
M183	Selective concrete demolition	4	CY	1.00	$97.76	$97.76	$25.48	$25.48	$0.00	$0.00	$123.24	$492.96	10%	9%	$591	C 03050 510 0070	
M184	Selective demolition, dump charges	8	TN	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$97.76	$97.76	$782.08	10%	9%	$938	C 02411 919 0100	
M200	Excavation, machine excavation, hydraulic backhoe	16	BCY	1.00	$10.24	$10.24	$7.59	$7.59	$0.00	$0.00	$17.83	$285.28	10%	9%	$342	C 31231 616 6030	
M201	Hauling, small load	7	LCY	1.00	$4.33	$4.33	$6.18	$6.18	$0.00	$0.00	$10.51	$73.57	10%	9%	$88	C 31232 320 0416	
M216	Backfilling for Piping	13	LCY	1.00	$4.34	$4.34	$2.54	$2.54	$0.00	$0.00	$6.88	$89.44	10%	9%	$107	C 31231 613 3060	
M221	Compaction Fill, Walk behind vibrating Plate	10	ECY	1.00	$3.43	$3.43	$0.48	$0.48	$0.00	$0.00	$3.91	$39.10	10%	9%	$47	C 31232 323 7040	
M202	Fill, gravel fill, compacted, 12" deep	3	ECY	1.00	$6.86	$6.86	$0.67	$0.67	$19.88	$0.00	$27.41	$82.23	10%	9%	$99	C 31232 317 1300	
M173	Reinforcing steel, dowels, 2' long, #6, A615, grade	96	EA	1.00	$1.60	$1.60	$0.00	$0.00	$2.77	$0.00	$4.37	$419.52	10%	9%	$503	C 03211 060 2430	
M170	Concrete, ready mix, 4000 PSI, delivered	4	CY	1.00	$0.00	$0.00	$0.00	$0.00	$101.30	$0.00	$101.30	$405.20	10%	9%	$486	C 03310 535 0300	
M172	Concrete, placing, direct chute, includes vibrating	4	CY	1.00	$8.22	$8.22	$0.50	$0.50	$0.00	$0.00	$8.72	$34.88	10%	9%	$42	C 03310 570 4300	
M171	Concrete finishing, floors, manual	72	SF	1.00	$0.38	$0.38	$0.00	$0.00	$0.00	$0.00	$0.38	$27.36	10%	9%	$33	C 03352 930 0200	
M210	Directional drilling, up to 12" dia	1,000	LF	1.00	$2.22	$2.22	$4.62	$4.62	$0.09	$0.00	$6.93	$6,930.00	10%	9%	$8,309	C 33052 322 0320	
M389	Pipe, HDPE, 6" diam., DR 11	1,000	LF	1.00	$0.00	$0.00	$0.00	$0.00	$5.37	$0.00	$5.37	$5,370.00	10%	9%	$6,439	C 22 11 1378 0082	
M395	Elbow, 90 Deg., HDPE, 6" diam., DR 11	2	EA	1.00	$0.00	$0.00	$0.00	$0.00	$37.59	$0.00	$37.59	$75.18	10%	9%	$90	C 22 11 1378 0332	
M424	Welding, HDPE, labor per joint, 6" pipe size	53	EA	1.00	$22.87	$22.87	$0.00	$0.00	$0.00	$0.00	$22.87	$1,212.11	10%	9%	$1,453	C 22 11 1378 4080	Includes cost for weld setup
M430	Welding, HDPE, machine, 6" thru 8" diameter	2	DY	1.00	$0.00	$0.00	$108.12	$108.12	$0.00	$0.00	$108.12	$216.24	10%	9%	$259	C 22 11 1378 4370	
M211	Tracer wire	10	CLF	1.00	$140.40	$140.40	$0.00	$0.00	$122.65	$0.00	$263.05	$2,630.50	10%	9%	$3,154	C 26052 680 0260	
M212	Manhole for tracer wire connections, precast concre	2	EA	1.00	$184.08	$184.08	$0.00	$0.00	$394.24	$0.00	$578.32	$1,156.64	10%	9%	$1,387	C 33051 613 0510	
L8	Field Engineer	24	HR	1.00	$82.93	$82.93	$0.00	$0.00	$0.00	$0.00	$82.93	$1,990.32	0%	9%	$2,169	SE SalaryExpert.com	Overhead included in unit labor rate.
E2	Pickup Truck Rental	3	DY	1.00	$0.00	$0.00	$78.74	$78.74	$0.00	$0.00	$78.74	$236.23	10%	9%	$283	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	3	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$32.22	10%	9%	$39	PE N/A	
												TOTAL COST:			$27,163		

LENGTH OF PIPE RUN:	1,000
TOTAL UNIT COST:	$27.16

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-15-GWU4

Groundwater Extraction and Treatment
Capital Cost Sub-Element
Influent Piping - NIC#4-1 to Sante Fe

Cost Worksheet: CW-15-GWU4

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/16/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves installation of influent piping from NIC#4-1 to the tie in point on Santa Fe for influent piping from GWU4 to the Gilbert-Mosley Treatment Plant. Cost assume local oversight and no per diem.

Cost Analysis:
Cost to Install Influent Piping

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M182	Concrete sawing, up to 12" deep	48	LF	1.00	$2.32	$2.32	$2.78	$2.78	$1.97	$0.00	$7.07	$339.36	10%	9%	$407	C 03811 350 0400	
M183	Selective concrete demolition	6	CY	1.00	$97.76	$97.76	$25.48	$25.48	$0.00	$0.00	$123.24	$739.44	10%	9%	$887	C 03050 510 0070	
M184	Selective demolition, dump charges	12	TN	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$97.76	$97.76	$1,173.12	10%	9%	$1,407	C 02411 919 0100	
M200	Excavation, machine excavation, hydraulic backhoe	24	BCY	1.00	$10.24	$10.24	$7.59	$7.59	$0.00	$0.00	$17.83	$427.92	10%	9%	$513	C 31231 616 6030	
M201	Hauling, small load	10	LCY	1.00	$4.33	$4.33	$6.18	$6.18	$0.00	$0.00	$10.51	$105.10	10%	9%	$126	C 31232 320 0416	
M216	Backfilling for Piping	19	LCY	1.00	$4.34	$4.34	$2.54	$2.54	$0.00	$0.00	$6.88	$130.72	10%	9%	$157	C 31231 613 3060	
M221	Compaction Fill, Walk behind vibrating Plate	15	ECY	1.00	$3.43	$3.43	$0.48	$0.48	$0.00	$0.00	$3.91	$58.65	10%	9%	$70	C 31232 323 7040	
M202	Fill, gravel fill, compacted, 12" deep	4	ECY	1.00	$6.86	$6.86	$0.67	$0.67	$19.88	$0.00	$27.41	$109.64	10%	9%	$131	C 31232 317 1300	
M173	Reinforcing steel, dowels, 2' long, #6, A615, grade	144	EA	1.00	$1.60	$1.60	$0.00	$0.00	$2.77	$0.00	$4.37	$629.28	10%	9%	$755	C 03211 060 2430	
M170	Concrete, ready mix, 4000 PSI, delivered	6	CY	1.00	$0.00	$0.00	$0.00	$0.00	$101.30	$0.00	$101.30	$607.80	10%	9%	$729	C 03310 535 0300	
M172	Concrete, placing, direct chute, includes vibrating	6	CY	1.00	$8.22	$8.22	$0.50	$0.50	$0.00	$0.00	$8.72	$52.32	10%	9%	$63	C 03310 570 4300	
M171	Concrete finishing, floors, manual	108	SF	1.00	$0.38	$0.38	$0.00	$0.00	$0.00	$0.00	$0.38	$41.04	10%	9%	$49	C 03352 930 0200	
M210	Directional drilling, up to 12" dia	1,200	LF	1.00	$2.22	$2.22	$4.62	$4.62	$0.09	$0.00	$6.93	$8,316.00	10%	9%	$9,971	C 33052 322 0320	
M389	Pipe, HDPE, 6" diam., DR 11	1,200	LF	1.00	$0.00	$0.00	$0.00	$0.00	$5.37	$0.00	$5.37	$6,444.00	10%	9%	$7,726	C 22 11 1378 0082	
M395	Elbow, 90 Deg., HDPE, 6" diam., DR 11	2	EA	1.00	$0.00	$0.00	$0.00	$0.00	$37.59	$0.00	$37.59	$75.18	10%	9%	$90	C 22 11 1378 0332	
M424	Welding, HDPE, labor per joint, 6" pipe size	63	EA	1.00	$22.87	$22.87	$0.00	$0.00	$0.00	$0.00	$22.87	$1,440.81	10%	9%	$1,728	C 22 11 1378 4080	Includes cost for weld setup
M430	Welding, HDPE, machine, 6" thru 8" diameter	3	DY	1.00	$0.00	$0.00	$108.12	$108.12	$0.00	$0.00	$108.12	$324.36	10%	9%	$389	C 22 11 1378 4370	
M211	Tracer wire	12	CLF	1.00	$140.40	$140.40	$0.00	$0.00	$122.65	$0.00	$263.05	$3,156.60	10%	9%	$3,785	C 26052 680 0260	
M212	Manhole for tracer wire connections, precast concre	3	EA	1.00	$184.08	$184.08	$0.00	$0.00	$394.24	$0.00	$578.32	$1,734.96	10%	9%	$2,080	C 33051 613 0510	
L8	Field Engineer	32	HR	1.00	$82.93	$82.93	$0.00	$0.00	$0.00	$0.00	$82.93	$2,653.76	0%	9%	$2,893	SE SalaryExpert.com	Overhead included in unit labor rate.
E2	Pickup Truck Rental	4	DY	1.00	$0.00	$0.00	$78.74	$78.74	$0.00	$0.00	$78.74	$314.98	10%	9%	$378	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	4	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$42.96	10%	9%	$52	PE N/A	
												TOTAL COST:			$34,386		

LENGTH OF PIPE RUN:	1,200
TOTAL UNIT COST:	$28.66

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-16-GWU4

Groundwater Extraction and Treatment **Cost Worksheet: CW-16-GWU4**
Capital Cost Sub-Element
Effluent Piping - New Treatment Plant to Storm Sewer

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/16/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves installation of effluent piping from New Treatment Plant to Storm Sewer. Cost assume local oversight and no per diem.

Cost Analysis:
Cost to Install Influent Piping

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M182	Concrete sawing, up to 12" deep	24	LF	1.00	$2.32	$2.32	$2.78	$2.78	$1.97	$0.00	$7.07	$169.68	10%	9%	$203	C 03811 350 0400	
M183	Selective concrete demolition	2	CY	1.00	$97.76	$97.76	$25.48	$25.48	$0.00	$0.00	$123.24	$246.48	10%	9%	$296	C 03050 510 0070	
M184	Selective demolition, dump charges	4	TN	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$97.76	$97.76	$391.04	10%	9%	$469	C 02411 919 0100	
M200	Excavation, machine excavation, hydraulic backhoe	8	BCY	1.00	$10.24	$10.24	$7.59	$7.59	$0.00	$0.00	$17.83	$142.64	10%	9%	$171	C 31231 616 6030	
M201	Hauling, small load	4	LCY	1.00	$4.33	$4.33	$6.18	$6.18	$0.00	$0.00	$10.51	$42.04	10%	9%	$50	C 31232 320 0416	
M216	Backfilling for Piping	6	LCY	1.00	$4.34	$4.34	$2.54	$2.54	$0.00	$0.00	$6.88	$41.28	10%	9%	$49	C 31231 613 3060	
M221	Compaction Fill, Walk behind vibrating Plate	5	ECY	1.00	$3.43	$3.43	$0.48	$0.48	$0.00	$0.00	$3.91	$19.55	10%	9%	$23	C 31232 323 7040	
M202	Fill, gravel fill, compacted, 12" deep	2	ECY	1.00	$6.86	$6.86	$0.67	$0.67	$19.88	$0.00	$27.41	$54.82	10%	9%	$66	C 31232 317 1300	
M173	Reinforcing steel, dowels, 2' long, #6, A615, grade	48	EA	1.00	$1.60	$1.60	$0.00	$0.00	$2.77	$0.00	$4.37	$209.76	10%	9%	$252	C 03211 060 2430	
M170	Concrete, ready mix, 4000 PSI, delivered	2	CY	1.00	$0.00	$0.00	$0.00	$0.00	$101.30	$0.00	$101.30	$202.60	10%	9%	$243	C 03310 535 0300	
M172	Concrete, placing, direct chute, includes vibrating	2	CY	1.00	$8.22	$8.22	$0.50	$0.50	$0.00	$0.00	$8.72	$17.44	10%	9%	$21	C 03310 570 4300	
M171	Concrete finishing, floors, manual	36	SF	1.00	$0.38	$0.38	$0.00	$0.00	$0.00	$0.00	$0.38	$13.68	10%	9%	$16	C 03352 930 0200	
M210	Directional drilling, up to 12" dia	300	LF	1.00	$2.22	$2.22	$4.62	$4.62	$0.09	$0.00	$6.93	$2,079.00	10%	9%	$2,493	C 33052 322 0320	
M389	Pipe, HDPE, 6" diam., DR 11	300	LF	1.00	$0.00	$0.00	$0.00	$0.00	$5.37	$0.00	$5.37	$1,611.00	10%	9%	$1,932	C 22 11 1378 0082	
M395	Elbow, 90 Deg., HDPE, 6" diam., DR 11	0	EA	1.00	$0.00	$0.00	$0.00	$0.00	$37.59	$0.00	$37.59	$0.00	10%	9%	$0	C 22 11 1378 0332	
M413	Tee, HDPE, 6" diam., DR 11	0	EA	1.00	$0.00	$0.00	$0.00	$0.00	$49.41	$0.00	$49.41	$0.00	10%	9%	$0	C 22 11 1378 0732	
M424	Welding, HDPE, labor per joint, 6" pipe size	16	EA	1.00	$22.87	$22.87	$0.00	$0.00	$0.00	$0.00	$22.87	$365.92	10%	9%	$439	C 22 11 1378 4080	Includes cost for weld setup
M430	Welding, HDPE, machine, 6" thru 8" diameter	1	DY	1.00	$0.00	$0.00	$108.12	$108.12	$0.00	$0.00	$108.12	$108.12	10%	9%	$130	C 22 11 1378 4370	
M211	Tracer wire	3	CLF	1.00	$140.40	$140.40	$0.00	$0.00	$122.65	$0.00	$263.05	$789.15	10%	9%	$946	C 26052 680 0260	
M212	Manhole for tracer wire connections, precast concre	1	EA	1.00	$184.08	$184.08	$0.00	$0.00	$394.24	$0.00	$578.32	$578.32	10%	9%	$693	C 33051 613 0510	
L8	Field Engineer	8	HR	1.00	$82.93	$82.93	$0.00	$0.00	$0.00	$0.00	$82.93	$663.44	0%	9%	$723	SE SalaryExpert.com	Overhead included in unit labor rate.
E2	Pickup Truck Rental	1	DY	1.00	$0.00	$0.00	$78.74	$78.74	$0.00	$0.00	$78.74	$78.74	10%	9%	$94	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	1	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$10.74	10%	9%	$13	PE N/A	
												TOTAL COST:			$9,322		

LENGTH OF PIPE RUN:	300
TOTAL UNIT COST:	$31.07

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-17-GWU4

Groundwater Extraction and Treatment
Capital Cost Sub-Element
Pipe Jacking under Railroad Tracks

Cost Worksheet: CW-17-GWU4

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/16/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves installation of jacking casing piping underneath railroad crossings. Cost assume local oversight and no per diem.

Cost Analysis:
Cost to Install Inffluent Piping

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M182	Concrete sawing, up to 12" deep	60	LF	1.00	$2.32	$2.32	$2.78	$2.78	$1.97	$0.00	$7.07	$424.20	10%	9%	$509	C 03811 350 0400	
M183	Selective concrete demolition	8	CY	1.00	$97.76	$97.76	$25.48	$25.48	$0.00	$0.00	$123.24	$985.92	10%	9%	$1,182	C 03050 510 0070	
M184	Selective demolition, dump charges	16	TN	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$97.76	$97.76	$1,564.16	10%	9%	$1,875	C 02411 919 0100	
M200	Excavation, machine excavation, hydraulic backhoe	75	BCY	1.00	$10.24	$10.24	$7.59	$7.59	$0.00	$0.00	$17.83	$1,337.25	10%	9%	$1,603	C 31231 616 6030	
M201	Hauling, small load	16	LCY	1.00	$4.33	$4.33	$6.18	$6.18	$0.00	$0.00	$10.51	$168.16	10%	9%	$202	C 31232 320 0416	
M216	Backfilling for Piping	74	LCY	1.00	$4.34	$4.34	$2.54	$2.54	$0.00	$0.00	$6.88	$509.12	10%	9%	$610	C 31231 613 3060	
M221	Compaction Fill, Walk behind vibrating Plate	56	ECY	1.00	$3.43	$3.43	$0.48	$0.48	$0.00	$0.00	$3.91	$218.96	10%	9%	$263	C 31232 323 7040	
M202	Fill, gravel fill, compacted, 12" deep	7	ECY	1.00	$6.86	$6.86	$0.67	$0.67	$19.88	$0.00	$27.41	$191.87	10%	9%	$230	C 31232 317 1300	
M173	Reinforcing steel, dowels, 2' long, #6, A615, grade	160	EA	1.00	$1.60	$1.60	$0.00	$0.00	$2.77	$0.00	$4.37	$699.20	10%	9%	$838	C 03211 060 2430	
M170	Concrete, ready mix, 4000 PSI, delivered	8	CY	1.00	$0.00	$0.00	$0.00	$0.00	$101.30	$0.00	$101.30	$810.40	10%	9%	$972	C 03310 535 0300	
M172	Concrete, placing, direct chute, includes vibrating	8	CY	1.00	$8.22	$8.22	$0.50	$0.50	$0.00	$0.00	$8.72	$69.76	10%	9%	$84	C 03310 570 4300	
M171	Concrete finishing, floors, manual	200	SF	1.00	$0.38	$0.38	$0.00	$0.00	$0.00	$0.00	$0.38	$76.00	10%	9%	$91	C 03352 930 0200	
M209	Horizontal boring, railroad work, 24" diameter	100	LF	1.00	$143.52	$143.52	$96.20	$96.20	$122.65	$0.00	$362.37	$36,237.00	10%	9%	$43,448	C 33052 320 0500	
M208	Dewatering, pumping, 8 hours, attended 2 hours per day	4	DY	1.00	$108.16	$108.16	$24.96	$24.96	$0.00	$0.00	$133.12	$532.48	10%	9%	$638	C 31231 920 0650	4" discharge pump, 20 LF of suction hose and 100 LF of discharge hose
L8	Field Engineer	32	HR	1.00	$82.93	$82.93	$0.00	$0.00	$0.00	$0.00	$82.93	$2,653.76	0%	9%	$2,893	SE SalaryExpert.com	Overhead included in unit labor rate.
E2	Pickup Truck Rental	4	DY	1.00	$0.00	$0.00	$78.74	$78.74	$0.00	$0.00	$78.74	$314.98	10%	9%	$378	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	4	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$42.96	10%	9%	$52	PE N/A	
												TOTAL COST:			$55,868		

NO. OF RAILROAD CROSSINGS:	1
TOTAL UNIT COST:	$55,868

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-18-GWU4

Groundwater Extraction and Treatment **Cost Worksheet: CW-18-GWU4**
Capital Cost Sub-Element
Geotechnical Investigation for Treatment Building

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/16/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
Based on previous work of similar scope by CDM. Geotechnical Investigation includes various soil analysis and testing and also includes investigation report.

Cost Analysis:
Geotechnical Investigation

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M227	Geotechnical Investigation	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$7,650.00	$7,650.00	$7,650.00	10%	9%	$9,172	PE NA	
M228	Investigation and Analysis Report	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$5,100.00	$5,100.00	$5,100.00	10%	9%	$6,115	PE NA	
												TOTAL UNIT COST:			$15,287		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-19-GWU4

Groundwater Extraction and Treatment
Capital Cost Sub-Element
Groundwater Treatment Plant - Building

Cost Worksheet: CW-19-GWU4

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/16/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
Includes foundation, building structure, including interior and exterior finishing for the GWTF. Based on previous work of similar scope by CDM. Pre-Engineered Building includes earthwork for foundation & concrete slab, fabrication, delivery, erection, HVAC, plumbing, interior & exterior finishing, of the building housing the Groundwater Treatment System.

Cost Analysis:

Pre-Engineered Building

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M225	Earthwork and Foundation for Pre-Engineered Building	1,250	SF	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$18.47	$18.47	$23,087.50	10%	9%	$27,682	P NA	
M226	Fabrication and Construction of Pre-Engineered Building	1,250	SF	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$102.60	$102.60	$128,250.00	10%	9%	$153,772	P NA	
M248	Heat for Equipment Building	1,250	SF	1.00	$0.00	$0.00	$0.00	$0.00	$6.95	$0.00	$6.95	$8,687.50	10%	9%	$10,416	P NA	Prevent equipment from freezing during winter
												TOTAL UNIT COST:			$191,870		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-20-GWU4

Groundwater Extraction and Treatment **Cost Worksheet: CW-20-GWU4**
Capital Cost Sub-Element
Groundwater Treatment Plant - Equipment and Piping

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/16/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
Costs for Groundwater Treatment Plant - equipment and piping.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M321	Pipe, plastic, PVC, 8" diameter, schedule 80	250	LF	1.00	$13.72	$13.72	$0.00	$0.00	$30.61	$0.00	$44.33	$11,082.50	10%	9%	$13,288	C 22 11 1374 2570	
M330	Elbow, 90 Deg., plastic, PVC, socket joint, 8", schedule 80	13	EA	1.00	$68.34	$68.34	$0.00	$0.00	$225.55	$0.00	$293.89	$3,820.57	10%	9%	$4,581	C 22 11 1376 2210	
M348	Tee, plastic, PVC, socket joint, 8", schedule 80	5	EA	1.00	$103.02	$103.02	$0.00	$0.00	$317.92	$0.00	$420.94	$2,104.70	10%	9%	$2,524	C 23 11 1376 2500	
M366	Flange, plastic, PVC, socket joint, 150 lb., 8", schedule 80	20	EA	1.00	$37.23	$37.23	$0.00	$0.00	$111.70	$0.00	$148.93	$2,978.60	10%	9%	$3,571	C 23 11 1376 2538	
M308	Valves, iron body, gate, non-rising stem, flanged, 125 lb., 8"	5	EA	1.00	$0.00	$0.00	$0.00	$0.00	$1,511.20	$0.00	$1,511.20	$7,556.00	10%	9%	$9,060	C Per Estimator	
M313	Valves, iron body, swing check, flanged, 125 lb., 8"	5	EA	1.00	$0.00	$0.00	$0.00	$0.00	$854.95	$0.00	$854.95	$4,274.75	10%	9%	$5,125	C Per Estimator	
M217	Miscellaneaous Piping and Valve Supplies	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$10,200.00	$10,200.00	$10,200.00	10%	9%	$12,230	A NA	
M120	Shallow Tray Air Stripper, 425 gpm max.	1	EA	1.00	$10,400.00	$10,400.00	$0.00	$0.00	$43,958.12	$6,261.84	$60,619.96	$60,619.96	10%	9%	$72,683	V CarbonAir	
M121	4,000 gallon equalization tank, polyethylene	1	EA	1.00	$312.00	$312.00	$0.00	$0.00	$3,175.85	$520.00	$4,007.85	$4,007.85	10%	9%	$4,805	V WaterTanks.com	
M122	Transfer pump, 400 gpm	1	EA	1.00	$457.60	$457.60	$0.00	$0.00	$2,124.53	$260.00	$2,842.13	$2,842.13	10%	9%	$3,408	V Grainger	
M123	Variable frequency drive, enclosed, 5 HP motor size, NEMA 1	1	EA	1.00	$348.40	$348.40	$0.00	$0.00	$1,916.46	$0.00	$2,264.86	$2,264.86	10%	9%	$2,716	C 26292 310 0110	
M246	Utilities Hookup	1	EA	1.00	$0.00	$0.00	$0.00	$0.00	$3,313.16	$0.00	$3,313.16	$3,313.16	10%	9%	$3,972	E 33 02 9928	Single Hookup
M247	Concrete Pads for Treatment Equipment	438	SF	1.00	$2.40	$2.40	$0.22	$0.22	$3.41	$0.00	$6.03	$2,641.14	10%	9%	$3,167	E 18 02 0321	Assume 35% of the building floor area
												TOTAL UNIT COST:			$141,130		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-21-GWU4

Groundwater Extraction and Treatment **Cost Worksheet: CW-21-GWU4**
Capital Cost Sub-Element
Groundwater Treatment Plant - Facility Control System

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/16/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
Groundwater Treatment (GW) Facility Control System; Assume GWT Includes Laptop, Control System (Computer-based monitoring and control system consisting of Programmable Logic Controller (PLC) for process interface, Variable Frequency Drives (VFD), data acquisition system, and various other control switches), electrical wiring, switches, etc. Allowance for GWTF Control System, Assume 50% of Total Cost for Fabrication and Construction of Pre-Engineered Building, Based on previous work by CDM of similar scope.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M229	Treatment Building Facility Control System	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$64,935.00	$64,935.00	$64,935.00	10%	9%	$77,900	PE NA	
												TOTAL UNIT COST:			$77,900		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-22-GWU4

Groundwater Extraction and Treatment
Capital Cost Sub-Element
Groundwater Treatment Plant - Startup

Cost Worksheet: CW-22-GWU4

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/16/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
The sub-element involves a 14-day startup phase for the groundwater treatment plant with one extraction well. Includes sampling three points (influent, mid-plant, and effluent) one per day during the 14-day startup period. Includes operator time and engineer time durnig the initial startup process.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M3	VOCs, EPA Method SW-846 8260	50	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$80.08	$80.08	$4,004.00	0%	9%	$4,364	V Teklab	
M4	Filtered	0	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$72.80	$72.80	$0.00	0%	9%	$0	V Teklab	
M19	Water Quality Meter and Flow Through Cell	2	WK	1.00	$0.00	$0.00	$0.00	$0.00	$461.85	$0.00	$461.85	$923.70	0%	9%	$1,007	V Pine Env	
M20	Photoionization Detector (PID)	2	WK	1.00	$0.00	$0.00	$0.00	$0.00	$214.81	$0.00	$214.81	$429.62	0%	9%	$468	V Pine Env	Includes calibration gas
M21	Water Level Meter	2	WK	1.00	$0.00	$0.00	$0.00	$0.00	$64.44	$0.00	$64.44	$128.88	0%	9%	$140	V Pine Env	
M22	Turbidimeter	2	WK	1.00	$0.00	$0.00	$0.00	$0.00	$80.55	$0.00	$80.55	$161.10	0%	9%	$176	V Pine Env	
M27	Shipping Rental Equipment	2	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$255.00	$255.00	$510.00	10%	9%	$611	PE N/A	
M29	Miscellaneous Sampling Equipment	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$204.00	$204.00	$204.00	10%	9%	$245	PE N/A	Paper towels, gloves, garbage bags, etc.
L15	Project Manager	5	HR	1.00	$124.22	$124.22	$0.00	$0.00	$0.00	$0.00	$124.22	$621.10	0%	9%	$677	SE SalaryExpert.com	Overhead included in unit labor rate.
L24	Contracting/Procurement Specialist	9	HR	1.00	$46.54	$46.54	$0.00	$0.00	$0.00	$0.00	$46.54	$418.86	0%	9%	$457	SE SalaryExpert.com	Overhead included in unit labor rate.
L23	General Operator/Technician	140	HR	1.00	$50.70	$50.70	$0.00	$0.00	$0.00	$0.00	$50.70	$7,098.00	0%	9%	$7,737	SE SalaryExpert.com	Overhead included in unit labor rate.
L5	Environmental Engineer	40	HR	1.00	$86.14	$86.14	$0.00	$0.00	$0.00	$0.00	$86.14	$3,445.60	0%	9%	$3,756	SE SalaryExpert.com	Overhead included in unit labor rate.
E2	Pickup Truck Rental	14	DY	1.00	$0.00	$0.00	$78.74	$78.74	$0.00	$0.00	$78.74	$1,102.42	10%	9%	$1,322	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	14	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$150.36	10%	9%	$180	PE N/A	
												TOTAL UNIT COST:			$21,140		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-23-GWU4

Groundwater Extraction and Treatment
Annual Cost Sub-Element
Operation and Maintenance - Extraction Well

Cost Worksheet: CW-23-GWU4

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/16/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves annual operation and maintenance for an extraction well. Cost assume local oversight and no per diem.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M280	Electrical consumption	65,400	kW-HR	0.95	$0.00	$0.00	$0.00	$0.00	$0.11	$0.00	$0.11	$7,194.00	0%	0%	$7,194	P NA	
												TOTAL UNIT COST:			$7,194		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-24-GWU4

Groundwater Extraction and Treatment **Cost Worksheet: CW-24-GWU4**
Annual Cost Sub-Element
Operation and Maintenance - Extraction Well Maintenance

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/16/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves annual operation and maintenance for an extraction well. Cost assume local oversight and no per diem.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M270	Water Supply Wells, acid cleaning	1	EA	0.95	$478.40	$503.58	$0.00	$0.00	$514.71	$0.00	$1,018.29	$1,018.29	10%	9%	$1,221	C 33211 310 8600	
M271	Water Supply Wells, remove and install well pump	1	EA	0.95	$1,196.00	$1,258.95	$2,938.00	$3,092.63	$0.00	$0.00	$4,351.58	$4,351.58	10%	9%	$5,218	C 33211 310 8590	
M272	Water Supply Wells, well development	4	HR	0.95	$101.40	$106.74	$390.00	$410.53	$277.07	$0.00	$794.33	$3,177.33	10%	9%	$3,810	C 33211 310 8500	
												TOTAL UNIT COST:			$10,249		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-25-GWU4

Groundwater Extraction and Treatment **Cost Worksheet: CW-25-GWU4**
Annual Cost Sub-Element
Operation and Maintenance - Gilbert-Mosley Treatment Plant

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/16/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves annual operation and maintenance for the new groundwater treatment system. Assumes quarterly acid washing/cleaning of the tray air stripper, a minimum of one changeout of the vapor-phase carbon, and a weekly visit by an operation and maintenance technician. Cost assume local oversight and no per diem.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M137	Gilbert-Mosley Treatment Plant Electrical - GWU4 Portion	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$7,113.60	$7,113.60	$7,113.60	10%	9%	$8,529	A Per Estimator	Based on previously incurred O&M costs.
M132	Gilbert-Mosley Treatment Plant O&M - GWU4 Portion	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$1,747.20	$1,747.20	$1,747.20	10%	9%	$2,095	A Per Estimator	Based on previously incurred O&M costs.
M126	Sequestrant for Gilbert-Mosley Treatment System	98	GAL	1.00	$0.00	$0.00	$0.00	$0.00	$23.00	$0.00	$23.00	$2,254.00	10%	9%	$2,703	P Previous Work	Based on current usage at Gilbert-Mosley Site
M142	Gilbert-Mosley Treatment Plant Labor - GWU4 Portion	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$2,995.20	$2,995.20	$2,995.20	10%	9%	$3,591	A Per Estimator	Based on previously incurred O&M costs.
												TOTAL UNIT COST:			$16,918		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-26-GWU4

Groundwater Extraction and Treatment
Annual Cost Sub-Element
Operation and Maintenance - Treatment Plant

Cost Worksheet: CW-26-GWU4

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/16/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves annual operation and maintenance for the new groundwater treatment system. Assumes quarterly acid washing/cleaning of the tray air stripper, and a weekly visit by an operation and maintenance technician. Cost assume local oversight and no per diem.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M280	Electrical consumption	154,700	kW-HR	1.00	$0.00	$0.00	$0.00	$0.00	$0.11	$0.00	$0.11	$17,017.00	0%	0%	$17,017	P NA	
M281	Acid wash of air stripper system	4	EA	1.00	$416.00	$416.00	$312.00	$312.00	$547.56	$0.00	$1,275.56	$5,102.24	10%	9%	$6,118	P NA	
L23	General Operator/Technician	416	HR	1.00	$50.70	$50.70	$0.00	$0.00	$0.00	$0.00	$50.70	$21,091.20	0%	9%	$22,989	SE SalaryExpert.com	Overhead included in unit labor rate.
												TOTAL UNIT COST:			$46,124		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-27-GWU4

Groundwater Extraction and Treatment **Cost Worksheet: CW-27-GWU4**
Periodic Cost Sub-Element
Minor Equipment Replacement - Treatment Plant

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/16/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element assumes treatment system equipment will require periodic replacement.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M308	Valves, iron body, gate, non-rising stem, flanged, 125 lb., 8"	5	EA	1.00	$0.00	$0.00	$0.00	$0.00	$1,511.20	$0.00	$1,511.20	$7,556.00	10%	9%	$9,060	C Per Estimator	
M313	Valves, iron body, swing check, flanged, 125 lb., 8"	5	EA	1.00	$0.00	$0.00	$0.00	$0.00	$854.95	$0.00	$854.95	$4,274.75	10%	9%	$5,125	C Per Estimator	
M303	Venturi flow, measuring device, 8" diameter	3	EA	1.00	$0.00	$0.00	$0.00	$0.00	$1,215.84	$0.00	$1,215.84	$3,647.52	10%	9%	$4,373	P Per Estimator	
												TOTAL UNIT COST:			$18,558		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-28-GWU4

Groundwater Extraction and Treatment
Periodic Cost Sub-Element
Replace Equipment - Extraction Well Pumps

Cost Worksheet: CW-28-GWU4

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/16/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves periodic replacement of extraction well pumps. Assumes no salvage value for pulled pumps.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M271	Water Supply Wells, remove and install well pump	1	EA	1.00	$1,196.00	$1,196.00	$2,938.00	$2,938.00	$0.00	$0.00	$4,134.00	$4,134.00	10%	9%	$4,957	C 33211 310 8590	
M82	Submersible Pump, 5 HP, 4", w/controls	1	EA	1.00	$583.00	$583.00	$731.40	$731.40	$11,161.80	$0.00	$12,476.20	$12,476.20	10%	9%	$14,959	E 33 23 0556	
												TOTAL UNIT COST:			$19,916		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-29-GWU4

Groundwater Monitoring
Periodic Cost Sub-Element
Monitoring Well Maintenance - No Action Alternative

Cost Worksheet: CW-29-GWU4

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/16/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves maintenance of monitoring wells for No Action monitoring. Assumes well head repairs (replace vault, j-plug, etc.) and well development. Assumes well development fluid will be collected in a mobile tank and decanted at treatment facility. Cost assumes local oversight and no per diem.

Cost Analysis:
Cost for Mobilize/Demobilize

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M70	Mobilization and Demobilization of DPT Rig	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$510.00	$510.00	$510.00	10%	9%	$611	P N/A	
M41	Decontamination Pad Construction/Removal	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$760.38	$760.38	$760.38	10%	9%	$912	P N/A	
												TOTAL UNIT COST:			$1,523		

Cost Analysis:
Cost to Maintain Monitoring Wells

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
S1	Geoprobe rig and crew	2	DY	0.95	$0.00	$0.00	$0.00	$0.00	$0.00	$1,560.00	$1,560.00	$3,120.00	0%	0%	$3,120	P N/A	Overhead and profit included in rate
M74	Locking J-Plug	10	EA	1.00	$0.00	$0.00	$0.00	$0.00	$13.80	$0.00	$13.80	$138.00	10%	9%	$165	P N/A	
M75	8" Vault	10	EA	1.00	$0.00	$0.00	$0.00	$0.00	$60.02	$0.00	$60.02	$600.20	10%	9%	$720	P N/A	
L11	Geologist	20	HR	1.00	$81.29	$81.29	$0.00	$0.00	$0.00	$0.00	$81.29	$1,625.80	0%	9%	$1,772	SE SalaryExpert.com	Overhead included in unit labor rate.
E2	Pickup Truck Rental	2	DY	1.00	$0.00	$0.00	$78.74	$78.74	$0.00	$0.00	$78.74	$157.49	10%	9%	$189	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	2	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$21.48	10%	9%	$26	PE N/A	
												TOTAL UNIT COST:			$5,992		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-30-GWU4

Groundwater Monitoring
Periodic Cost Sub-Element
Monitoring Well Maintenance

Cost Worksheet: CW-30-GWU4

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/16/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves maintenance of monitoring wells for Plume Stability monitoring. Assumes well head repairs (replace vault, j-plug, etc.) and well development. Assumes well development fluid will be collected in a mobile tank and decanted at treatment facility. Cost assumes local oversight and no per diem.

Cost Analysis:
Cost for Mobilize/Demobilize

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M70	Mobilization and Demobilization of DPT Rig	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$510.00	$510.00	$510.00	10%	9%	$611	P N/A	
M41	Decontamination Pad Construction/Removal	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$760.38	$760.38	$760.38	10%	9%	$912	P N/A	
												TOTAL UNIT COST:			$1,523		

Cost Analysis:
Cost to Maintain Monitoring Wells

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
S1	Geoprobe rig and crew	4	DY	0.95	$0.00	$0.00	$0.00	$0.00	$0.00	$1,560.00	$1,560.00	$6,240.00	0%	0%	$6,240	P N/A	Overhead and profit included in rate
M74	Locking J-Plug	16	EA	1.00	$0.00	$0.00	$0.00	$0.00	$13.80	$0.00	$13.80	$220.80	10%	9%	$265	P N/A	
M75	8" Vault	16	EA	1.00	$0.00	$0.00	$0.00	$0.00	$60.02	$0.00	$60.02	$960.32	10%	9%	$1,151	P N/A	
L11	Geologist	32	HR	1.00	$81.29	$81.29	$0.00	$0.00	$0.00	$0.00	$81.29	$2,601.28	0%	9%	$2,835	SE SalaryExpert.com	Overhead included in unit labor rate.
E2	Pickup Truck Rental	4	DY	1.00	$0.00	$0.00	$78.74	$78.74	$0.00	$0.00	$78.74	$314.98	10%	9%	$378	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	4	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$42.96	10%	9%	$52	PE N/A	
												TOTAL UNIT COST:			$10,921		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-31-GWU4

Groundwater Monitoring
Capital Cost Sub-Element
Monitoring Well Abandonment - No Action Alternative

Cost Worksheet: CW-31-GWU4

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/16/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves abandonment of No Action alternative monitoring wells after site closure. Cost assumes local oversight and no per diem.

Cost Analysis:
Cost for Mobilize/Demobilize

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M70	Mobilization and Demobilization of DPT Rig	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$510.00	$510.00	$510.00	10%	9%	$611	P N/A	
M41	Decontamination Pad Construction/Removal	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$760.38	$760.38	$760.38	10%	9%	$912	P N/A	
												TOTAL UNIT COST:			$1,523		

Cost Analysis:
Cost to Abandon Monitoring Wells

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
S1	Geoprobe rig and crew	2	DY	0.95	$0.00	$0.00	$0.00	$0.00	$0.00	$1,560.00	$1,560.00	$3,120.00	0%	0%	$3,120	P N/A	Overhead and profit included in rate
M100	Grout Continuous Borehole	350	VLF	1.00	$0.00	$0.00	$0.00	$0.00	$7.61	$0.00	$7.61	$2,663.50	10%	9%	$3,194	E 33 23 1820	
L11	Geologist	20	HR	1.00	$81.29	$81.29	$0.00	$0.00	$0.00	$0.00	$81.29	$1,625.80	0%	9%	$1,772	SE SalaryExpert.com	Overhead included in unit labor rate.
E2	Pickup Truck Rental	2	DY	1.00	$0.00	$0.00	$78.74	$78.74	$0.00	$0.00	$78.74	$157.49	10%	9%	$189	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	2	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$21.48	10%	9%	$26	PE N/A	
												TOTAL UNIT COST:			$8,301		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-32-GWU4

Groundwater Monitoring
Capital Cost Sub-Element
Monitoring Well Abandonment

Cost Worksheet: CW-32-GWU4

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/16/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves abandonment ofmonitoring wells after site closure. Cost assumes local oversight and no per diem.

Cost Analysis:
Cost for Mobilize/Demobilize

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M70	Mobilization and Demobilization of DPT Rig	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$510.00	$510.00	$510.00	10%	9%	$611	P N/A	
M41	Decontamination Pad Construction/Removal	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$760.38	$760.38	$760.38	10%	9%	$912	P N/A	
												TOTAL UNIT COST:			$1,523		

Cost Analysis:
Cost to Abandon Monitoring Wells

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
S1	Geoprobe rig and crew	3	DY	0.95	$0.00	$0.00	$0.00	$0.00	$0.00	$1,560.00	$1,560.00	$4,680.00	0%	0%	$4,680	P N/A	Overhead and profit included in rate
M100	Grout Continuous Borehole	560	VLF	1.00	$0.00	$0.00	$0.00	$0.00	$7.61	$0.00	$7.61	$4,261.60	10%	9%	$5,110	E 33 23 1820	
L11	Geologist	30	HR	1.00	$81.29	$81.29	$0.00	$0.00	$0.00	$0.00	$81.29	$2,438.70	0%	9%	$2,658	SE SalaryExpert.com	Overhead included in unit labor rate.
E2	Pickup Truck Rental	3	DY	1.00	$0.00	$0.00	$78.74	$78.74	$0.00	$0.00	$78.74	$236.23	10%	9%	$283	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	3	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$32.22	10%	9%	$39	PE N/A	
												TOTAL UNIT COST:			$12,770		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-33-GWU4

Groundwater Extraction and Treatment
Capital Cost Sub-Element
Extraction Well Abandonment

Cost Worksheet: CW-33-GWU4

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/16/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves abandonment of extraction wells.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M99	Well Abandonment, 18" Well	40	VLF	1.00	$31.02	$31.02	$136.84	$136.84	$3.33	$0.00	$171.19	$6,847.60	10%	9%	$8,210	P Per Estimator	Based on E 33 23 1825 for 8" diameter borehole
L11	Geologist	10	HR	1.00	$81.29	$81.29	$0.00	$0.00	$0.00	$0.00	$81.29	$812.90	0%	9%	$886	SE SalaryExpert.com	Overhead included in unit labor rate.
E2	Pickup Truck Rental	1	DY	1.00	$0.00	$0.00	$78.74	$78.74	$0.00	$0.00	$78.74	$78.74	10%	9%	$94	V Enterprise	Includes applicable taxes.
M38	Fuel for Rental Truck	1	DY	1.00	$0.00	$0.00	$0.00	$0.00	$10.74	$0.00	$10.74	$10.74	10%	9%	$13	PE N/A	
												TOTAL UNIT COST:			$9,203		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

TABLE CW-34-GWU4

Groundwater Extraction and Treatment
Capital Cost Sub-Element
Decommissioning Treatment System

Cost Worksheet: CW-34-GWU4

COST WORKSHEET

Site: North Industrial Corridor
Operable Unit: GWU4
Location: Wichita, Kansas
Phase: Feasibility Study
Base Year: 2011

Prepared By: MW **Date:** 3/16/2011
Checked By: MS **Date:** 3/29/2011

Work Statement:
This sub-element involves decommission of the Treatment Plant.

Cost Analysis:

COST DATABASE CODE	DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	PC OH	PC PF	BUR LIC	COST SOURCE CITATION	COMMENTS
M235	Removal of treatment system equipment	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$20,800.00	$20,800.00	$20,800.00	10%	9%	$24,939	P Per Estimator	
												TOTAL UNIT COST:			$24,939		

Notes:
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
The Cost Database Code is a reference code for linking with line item cost information with the cost source database and is not otherwise used within these cost worksheets.

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:

Cost Adjustment Checklist:
FACTOR:
H&S Productivity (labor and equipment only)
Escalation to Base Year
Area Cost Factor
Subcontractor Overhead and Profit
Prime Contractor Overhead and Profit

NOTES:
Field work will be in Level "D" PPE.
MII assembly costs include HPF adjustments.
2011 cost sources are not escalated (EF=1.00). All other costs are escalated based on the USACE CWCCIS, EM 1110-2-1304, September 20
An AF of 0.95 is used for Kansas, except that an AF of 1.00 (national unmodified average) is used for local vendor quotes.
It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

Abbreviations:

QTY	quantity	DY	day
EQUIP	equipment	EA	each
MATL	material	ECY	embankment cubic yards
HPF	HTRW productivity factor	GAL	gallons
ADJ LABOR	adjusted labor for HFP	HR	hour
ADJ EQUIP	adjusted equipment for HFP	KW-HR	kilowatt-hour
UNMOD UC	unmodified unit cost	LBS	pounds
UNMOD LIC	unmodified line item cost	LCY	loose cubic yards
UNBUR LIC	unburdened line item cost	LF	linear foot
PC OH	prime contractor overhead	LS	lump sum
PC PF	prime contractor profit	SF	square feet
BUR LIC	burdened line item cost	TN	ton
BCY	bank cubic yard	VLF	vertical linear foot
CLF	hundred linear feet	WK	week
CY	cubic yards		

CALCULATION WORKSHEET INDEX

Wrksht No.	Description
C-01	Calculations for determination of quantities for preparing groundwater monitoring reports.
C-02	Calculations for determination of quantities for groundwater monitoring per sampling event - No Action/ General
C-03	Calculations for determination of quantities for groundwater monitoring per sampling event - Plume Stability
C-04	Calculations for determination of quantities for installation of monitoring wells.
C-05	Calculations for determination of quantities for installation of extraction wells.
C-06	Calculations for determination of quantities for installation of extraction well vaults.
C-07	Calculations for determination of quantities for installation of influent piping from NIC#4-1 to new treatment plant
C-08	Calculations for determination of quantities for installation of influent piping from NIC#4-1 to Sante Fe
C-09	Calculations for determination of quantities for installation of effluent piping from new treatment plant to storm sewer
C-10	Calculations for determination of quantities for pipe jacking under railroad lines
C-11	Calculations for determination of quantities for pre-Engineered building, equipment, & startup - single well treatment system
C-12	Calculations for determination of quantities for electrical consumption by well
C-13	Calculations for determination of quantities for treatment plant operation and maintenance
C-14	Calculations for determination of quantities for treatment plant operation and maintenance - Gilbert-Mosley
C-15	Calculations for determination of quantities for groundwater treatment plant - equipment replacement
C-16	Calculations for determination of quantities for monitoring well maintenance
C-17	Calculations for determination of quantities for monitoring well abandonment
C-18	Calculations for determination of quantities for extraction well abandonment

Description: Calculations for determination of quantities for preparing groundwater monitoring reports.

Groundwater Monitoring Report Generation - No Action Alternative

Assumed CAD hours per well, HR:	2	
Assumed Geologist hours per well, HR:	10	*Includes data review and tabulation, report, figures, etc.*
Number of wells:	10	
Project Manager, HR:	8	
CAD Drafter, HR:	20	
Geologist, HR:	100	
Quality Assurance Director, HR:	4	
Clerks, Typist, Bookkeeper & Receptionist, HR:	8	
Reproduction, LS:	1	

Groundwater Monitoring Report Generation - Plume Stability

Assumed CAD hours per well, HR:	2	
Assumed Geologist hours per well, HR:	10	*Includes data review and tabulation, report, figures, etc.*
Number of wells:	16	
Project Manager, HR:	8	
CAD Drafter, HR:	32	
Geologist, HR:	160	
Quality Assurance Director, HR:	4	
Clerks, Typist, Bookkeeper & Receptionist, HR:	10	
Reproduction, LS:	1	

Description: Calculations for determination of quantities for groundwater monitoring per sampling event.

Groundwater Monitoring - No Action Alternative		
No. of monitoring wells to be sampled for general analysis:	**10**	
Analytical Requirements for General Analysis		
VOCs, EPA Method SW-846 8260, EA:	12	*Includes QC samples*
Metals, EPA Method 6010, Field Filtered, EA:	0	
Sampling Equipment		
Water Quality Meter and Flow Through Cell, WK:	1	*Rounded up to nearest week*
Photoionization Detector (PID), WK:	1	*Rounded up to nearest week*
Water Level Meter, WK:	1	*Rounded up to nearest week*
Turbidimeter, WK:	1	*Rounded up to nearest week*
Portable Bladder Pump, WK:	1	*Rounded up to nearest week*
Replacement Poly Bladders, EA:	12	*Assumes 2 extra bladders*
Bladder Pump Controller and Compressor, WK:	1	*Rounded up to nearest week*
Combination Tubing, LF:	600	*Assume 60 feet per well. Rounded up to nearest 100.*
Shipping Rental Equipment, EA:	**2**	
55-gallon Open Head Steel Drum, EA:	**2**	*Assume 500 mL per minute for 60 minutes per well*
Miscellaneous Sampling Equipment, LS:	**1**	
Labor Requirements for General Analysis		
Assumed length of time per day, HR:	**8**	
Time assumed to sample a well, HR:	**2**	*Includes setup, purging, and sample collection*
Number of sampling team members:	**2**	
Prepartory time, HR:	8	
Time to collect water level measurements, HR:	3	*Assume 15 minutes per well. Rounded up to nearest hour*
Time to sample all wells for general analysis, HR:	10	*Rounded up to nearest hour*
Time for decon, HR:	4	*Assume 20 minutes per well. Rounded up to nearest hour*
Time for sample management, HR:	3	*Assume 15 minutes per well. Rounded up to nearest hour*
Total, HR:	**25**	
Time to sample all wells for general analysis, DY:	**4**	*Rounded up to nearest day*
Project Manager, HR:	1	*5 minutes per sample, rounded up to nearest hour*
General Operator/Technician, HR:	50	*Two member team*
Contracting/Procurement Specialist, HR:	2	*10 minutes per sample, rounded up to nearest hour*
Pickup Truck Rental, WK:	1	*Rounded up to nearest week*
Fuel for Pickup Truck, DY:	4	

Description: Calculations for determination of quantities for groundwater monitoring per sampling event.

Groundwater Monitoring - Plume Stability		
No. of monitoring wells to be sampled for general analysis:	**16**	
Analytical Requirements for General Analysis		
VOCs, EPA Method SW-846 8260, EA:	19	*Includes QC samples*
Metals, EPA Method 6010, Field Filtered, EA:	0	
Sampling Equipment		
Water Quality Meter and Flow Through Cell, WK:	1	*Rounded up to nearest week*
Photoionization Detector (PID), WK:	1	*Rounded up to nearest week*
Water Level Meter, WK:	1	*Rounded up to nearest week*
Turbidimeter, WK:	1	*Rounded up to nearest week*
Portable Bladder Pump, WK:	1	*Rounded up to nearest week*
Replacement Poly Bladders, EA:	18	*Assumes 2 extra bladders*
Bladder Pump Controller and Compressor, WK:	1	*Rounded up to nearest week*
Combination Tubing, LF:	1000	*Assume 60 feet per well. Rounded up to nearest 100.*
Shipping Rental Equipment, EA:	**2**	
55-gallon Open Head Steel Drum, EA:	**3**	*Assume 500 mL per minute for 60 minutes per well*
Miscellaneous Sampling Equipment, LS:	**1**	
Labor Requirements for General Analysis		
Assumed length of time per day, HR:	**8**	
Time assumed to sample a well, HR:	**2**	*Includes setup, purging, and sample collection*
Number of sampling team members:	**2**	
Prepartory time, HR:	8	
Time to collect water level measurements, HR:	4	*Assume 15 minutes per well. Rounded up to nearest hour*
Time to sample all wells for general analysis, HR:	16	*Rounded up to nearest hour*
Time for decon, HR:	6	*Assume 20 minutes per well. Rounded up to nearest hour*
Time for sample management, HR:	4	*Assume 15 minutes per well. Rounded up to nearest hour*
Total, HR:	**34**	
Time to sample all wells for general analysis, DY:	**5**	*Rounded up to nearest day*
Project Manager, HR:	2	*5 minutes per sample, rounded up to nearest hour*
General Operator/Technician, HR:	68	*Two member team*
Contracting/Procurement Specialist, HR:	3	*10 minutes per sample, rounded up to nearest hour*
Pickup Truck Rental, WK:	1	*Rounded up to nearest week*
Fuel for Pickup Truck, DY:	5	

Description: Quantities for installation of monitoring wells.

Monitoring Well Installation

Number of Shallow Monitoring Wells:	1		
Deep Monitoring Well Depth, VLF:	25	Top	Bottom
Screened Interval, FT:	10	13	23
Estimated time to install shallow monitoring well, HR:	2		
Number of Deep Monitoring Wells:	1		
Deep Monitoring Well Depth, VLF:	36	Top	Bottom
Screened Interval, FT:	10	24	34
Estimated time to install deep monitoring well, HR:	3		

Shallow Monitoring Well Quantities		Deep Monitoring Well Quantities	
Geoprobe rig and crew, DY:	1	Geoprobe rig and crew, DY:	1
5' Mini-Well Pre-Packed Screen, EA:	2	5' Mini-Well Pre-Packed Screen, EA:	2
PVC Casing, LF:	15	PVC Casing, LF:	26
Well Grout, LF:	15	Well Grout, LF:	26
Locking J-Plug, EA:	1	Locking J-Plug, EA:	1
8" Vault, EA:	1	8" Vault, EA:	1
Monitoring Well Completion, EA:	1	Monitoring Well Completion, EA:	1
Well Development, HR:	1	Well Development, HR:	2
IDW Handling, HR:	1	IDW Handling, HR:	1
Decontamination, HR:	1	Decontamination, HR:	1
Standby Time, HR:	1	Standby Time, HR:	1
55-gallon drum, EA:	0.5	55-gallon drum, EA:	0.5
Geologist, HR:	3	Geologist, HR:	5
Pickup Truck Rental, DY:	1	Pickup Truck Rental, DY:	1
Fuel for Rental Truck, DY:	1	Fuel for Rental Truck, DY:	1

Total

Mobilization and Demobilization of DPT Rig, LS:	1
Decontamination Pad Construction/Removal, LS:	1
Geoprobe rig and crew, DY:	1
Mini-Well Pre-Packed Screen, EA:	4
PVC Casing, LF:	41
Well Grout, LF:	41
Locking J-Plug, EA:	2
8" Vault, EA:	2
Monitoring Well Completion, EA:	2
Monitoring Well Development, HR:	3
IDW Handling, HR:	2
Decontamination, HR:	2
Standby Time, HR:	2
55-gallon Open Head Steel Drum, EA:	1
Geologist, HR:	8
Pickup Truck Rental, DY:	1
Fuel for Rental Truck, DY:	1

Description: Quantities for installation of extraction wells. Well vaults are assumed to be below grade vaults. All well vault pipe materials are assumed to be Schedule 80 PVC.

Extraction Well Installation		
Shallow Monitoring Well Depth, VLF:	40	
Estimated time to install shallow monitoring well, HR:	24	
Extraction Well Quantities		
Borehole diameter, IN:	18	
Well casing inner diameter, IN:	10	
Well casing outer diameter, IN:	10.625	
Drilling – 18-inch nominal borehole, VLF:	40	
Stainless Steel Screen - 10", VLF:	30	
Steel Casing, VLF:	10	
Steel Casing, LBS:	290	*Assumes 29 lbs/foot*
Monitoring Well Completion, EA:	1	
Well Development, HR:	4	
IDW Handling, HR:	2	
Decontamination, HR:	2	
Standby Time, HR:	1	
55-gallon drum, EA:	10	
Geologist, HR:	24	
Pickup Truck Rental, DY:	3	
Fuel for Rental Truck, DY:	3	
Filter Pack, 6" Screen, VLF:	32	*Assumes 2 feet more than screen*
Annular Seal, 6" Well, Portland Cement Grout, VLF:	8	
Bentonite Seal, 6" Well, EA:	1	

Description: Quantities for installation of extraction wells. Well vaults are assumed to be below grade vaults. All well vault pipe materials are assumed to be Schedule 80 PVC.

Extraction Well Vault

Depth of excavation for vault, FT:	6	
Width of excavation for vault, FT:	6	
Length of excavation for vault, FT:	6	
Existing concrete thickness, IN:	12	
Concrete demolition, CY:	2	
Concrete demolition, TN:	4	*Assumes 2 tons per CY*
Saw cut, LF:	28	
Total volume, CF:	216	
Total volume, BCY:	8	*Rounded up to nearest whole number*
Total volume, LCY:	10	*Rounded up to nearest whole number*
Depth of Bedding Material, FT:	1	
Total Volume of Bedding Material Required, BCY:	2	*Rounded up to nearest whole number*
Total Volume of Bedding Material Required, ECY:	3	*Rounded up to nearest whole number*
Well vault, 6'x6'x4', EA:	1	
Well vault door, EA:	1	
Number of Elbow, 90 Deg Required, EA:	4	
Number of Elbow, Tees Required, EA:	1	
Length of 6" PVC piping, LF:	10	
Number of flanged fittings, EA:	8	
Number of check valves, EA:	1	
Number of flow meters, EA:	1	
Number of butterfly valves, EA:	1	
Pipe stands needed, EA:	3	
Concrete to grade, CY:	1	
Finishing, SF:	24	
Field Engineer, HR:	32	
Pickup Truck Rental, DY:	4	
Fuel for Rental Truck, DY:	4	

Description: Quantities for installing influent piping. Assumes all pipe will be directional bored. No open trench installation. All pipe from well vault to treatment plant is assumed to be HDPE. Assumes all connections made in street and would require concrete pavement repair.

Installation of Influent Piping from NIC#4-1 to New Treatment Plant

Estimated distance, LF:	1000	
Assumed length per unit of pipe, LF:	20	
Estimated size of pipe for pipe run, IN:	6	
Number of Elbow, 90 Deg Required, EA:	1	
Number of HDPE flange fittings, EA:	1	
Estimated length per directional bore, LF:	500	
Number of boring locations, EA:	**2**	*Rounded up to nearest whole number.*
Assumed depth of boring location, FT:	6	
Assumed width and length of boring location, FT:	6	
Volume for excavation, CF:	**432**	
Volume for excavation, BCY:	**16**	*Rounded up to nearest whole number.*
Volume for excavation, LCY:	**20**	*Rounded up to nearest whole number.*
Volume for backfill, ECY:	**18**	*Rounded up to nearest whole number.*
Concrete pavement, SF:	**72**	
Existing concrete thickness, IN:	12	
Concrete demolition, CY:	4	
Concrete demolition, TN:	8	*Assumes 2 tons per CY*
Saw cut, LF:	36	
Gravel base for pavement repair, IN:	9	
Gravel base for pavement repair, BCY:	2	*Rounded up to nearest whole number.*
Gravel base, LCY:	**3**	*Rounded up to nearest whole number.*
Gravel base, ECY:	**3**	*Rounded up to nearest whole number.*
Concrete replacement, CY:	4	
Reinforcement dowels, EA:	96	*Assumes 6" spacing along perimeter of cut*
Finishing, SF:	72	
Volume of spoils to haul away, LCY:	7	
Volume for backfilling, LCY:	13	
Volume for backfilling, ECY:	10	*Rounded up to nearest whole number.*
Directional boring, LF:	1000	
Assumed productivity of directional drilling, LF/DAY:	350	
Number of days for directional drilling, DY:	3	
Length of HDPE pipe needed, LF:	1000	
Number of 90 Deg, El, EA:	2	
Number of flange fittings, EA:	1	
Number of HDPE pipe welds, EA:	53	*Assume 20 FT long pipe sections*
Assumed Productivity of Welding Joints, EA/DAY:	30	
Number of Days Required for Welding, DY:	2	
Tracer wire, CLF:	10	
Manholes for tracer wire connection, EA:	2	
Field Engineer, HR:	24	
Pickup Truck Rental, DY:	3	
Fuel for Rental Truck, DY:	3	

Description: Quantities for installing influent piping. Assumes all pipe will be directional bored. No open trench installation. All pipe from well vault to treatment plant is assumed to be HDPE. Assumes all connections made in street and would require concrete pavement repair.

Installation of Influent Piping from NIC#4-1 to Sante Fe

Estimated distance, LF:	1200	
Assumed length per unit of pipe, LF:	20	
Estimated size of pipe for pipe run, IN:	6	
Number of Elbow, 90 Deg Required, EA:	1	
Number of HDPE flange fittings, EA:	1	
Estimated length per directional bore, LF:	500	
Number of boring locations, EA:	**3**	*Rounded up to nearest whole number.*
Assumed depth of boring location, FT:	6	
Assumed width and length of boring location, FT:	6	
Volume for excavation, CF:	**648**	
Volume for excavation, BCY:	**24**	*Rounded up to nearest whole number.*
Volume for excavation, LCY:	**29**	*Rounded up to nearest whole number.*
Volume for backfill, ECY:	**27**	*Rounded up to nearest whole number.*
Concrete pavement, SF:	**108**	
Existing concrete thickness, IN:	12	
Concrete demolition, CY:	6	
Concrete demolition, TN:	12	*Assumes 2 tons per CY*
Saw cut, LF:	48	
Gravel base for pavement repair, IN:	9	
Gravel base for pavement repair, BCY:	3	*Rounded up to nearest whole number.*
Gravel base, LCY:	**4**	*Rounded up to nearest whole number.*
Gravel base, ECY:	**4**	*Rounded up to nearest whole number.*
Concrete replacement, CY:	6	
Reinforcement dowels, EA:	144	*Assumes 6" spacing along perimeter of cut*
Finishing, SF:	108	
Volume of spoils to haul away, LCY:	10	
Volume for backfilling, LCY:	19	
Volume for backfilling, ECY:	15	*Rounded up to nearest whole number.*
Directional boring, LF:	1200	
Assumed productivity of directional drilling, LF/DAY:	350	
Number of days for directional drilling, DY:	4	
Length of HDPE pipe needed, LF:	1200	
Number of 90 Deg, El, EA:	2	
Number of flange fittings, EA:	1	
Number of HDPE pipe welds, EA:	63	*Assume 20 FT long pipe sections*
Assumed Productivity of Welding Joints, EA/DAY:	30	
Number of Days Required for Welding, DY:	3	
Tracer wire, CLF:	12	
Manholes for tracer wire connection, EA:	3	
Field Engineer, HR:	32	
Pickup Truck Rental, DY:	4	
Fuel for Rental Truck, DY:	4	

Description: Quantities for installing effluent piping. Assumes all pipe will be directional bored. No open trench installation. All pipe from treatment plant to discharge location is assumed to be HDPE. Assumes all connections made in street and would require concrete pavement repair.

Installation of Effluent Piping from New Treatment Plant to Storm Sewer

Estimated distance, LF:	300	
Assumed length per unit of pipe, LF:	20	
Estimated size of pipe for pipe run, IN:	6	
Number of Elbow, 90 Deg Required, EA:	1	
Number of HDPE flange fittings, EA:	1	
Estimated length per directional bore, LF:	500	
Number of boring locations, EA:	**1**	*Rounded up to nearest whole number.*
Assumed depth of boring location, FT:	6	
Assumed width and length of boring location, FT:	6	
Volume for excavation, CF:	**216**	
Volume for excavation, BCY:	**8**	*Rounded up to nearest whole number.*
Volume for excavation, LCY:	**10**	*Rounded up to nearest whole number.*
Volume for backfill, ECY:	**9**	*Rounded up to nearest whole number.*
Concrete pavement, SF:	**36**	
Existing concrete thickness, IN:	12	
Concrete demolition, CY:	2	
Concrete demolition, TN:	4	*Assumes 2 tons per CY*
Saw cut, LF:	24	
Gravel base for pavement repair, IN:	9	
Gravel base for pavement repair, BCY:	1	*Rounded up to nearest whole number.*
Gravel base, LCY:	**2**	*Rounded up to nearest whole number.*
Gravel base, ECY:	**2**	*Rounded up to nearest whole number.*
Concrete replacement, CY:	2	
Reinforcement dowels, EA:	48	*Assumes 6" spacing along perimeter of cut*
Finishing, SF:	36	
Volume of spoils to haul away, LCY:	4	
Volume for backfilling, LCY:	6	
Volume for backfilling, ECY:	5	*Rounded up to nearest whole number.*
Directional boring, LF:	300	
Assumed productivity of directional drilling, LF/DAY:	350	
Number of days for directional drilling, DY:	1	
Length of HDPE pipe needed, LF:	300	
Number of 90 Deg, El, EA:	0	
Number of tees, EA:	0	
Number of flange fittings, EA:	1	
Number of HDPE pipe welds, EA:	16	*Assume 20 FT long pipe sections*
Assumed Productivity of Welding Joints, EA/DAY:	30	
Number of Days Required for Welding, DY:	1	
Tracer wire, CLF:	3	
Manholes for tracer wire connection, EA:	1	
Field Engineer, HR:	8	
Pickup Truck Rental, DY:	1	
Fuel for Rental Truck, DY:	1	

Description: Pipe Jacking Under Railroad Lines

Pipe Jacking Under Railroad Lines

Pipe jacking length, LF:	100	
Number of railroad crossing locations, EA:	1	*Rounded up to nearest whole number.*
Number of jacking pits per crossing, EA:	2	
Length for jacking, LF:	100	
Assumed depth of jacking location, FT:	10	
Assumed width and length of jacking location, FT:	10	
Volume for excavation, CF:	**2000**	
Volume for excavation, BCY:	**75**	*Rounded up to nearest whole number.*
Volume for excavation, LCY:	**90**	*Rounded up to nearest whole number.*
Volume for backfill, ECY:	**84**	*Rounded up to nearest whole number.*
Concrete pavement, SF:	**200**	
Existing concrete thickness, IN:	12	
Concrete demolition, CY:	8	
Concrete demolition, TN:	16	*Assumes 2 tons per CY*
Saw cut, LF:	60	
Gravel base for pavement repair, IN:	9	
Gravel base for pavement repair, BCY:	6	*Rounded up to nearest whole number.*
Gravel base, LCY:	**8**	*Rounded up to nearest whole number.*
Gravel base, ECY:	**7**	*Rounded up to nearest whole number.*
Concrete replacement, CY:	8	
Reinforcement dowels, EA:	160	*Assumes 6" spacing along perimeter of cut*
Finishing, SF:	200	
Volume of spoils to haul away, LCY:	16	
Volume for backfilling, LCY:	74	
Volume for backfilling, ECY:	56	*Rounded up to nearest whole number.*
Estimated jacking productivity, LF/HR:	4	
Time required for jacking, DY:	4	*Rounded up to nearest whole number. Assumes 8 hour day.*
Field Engineer, HR:	32	
Pickup Truck Rental, DY:	4	
Fuel for Rental Truck, DY:	4	

Description: Quantities for Pre-Engineered Building

Pre-Engineered Building, Equipment, & Startup - Single Well Treatment System

Pre-Engineered Building		
Dimension of Pre-Engineered Building, FT:	50	*Length of the building*
Dimension of Pre-Engineered Building, FT:	25	*Width of the building*
Heigh of Pre-Engineered Building, FT:	15	
Total Area of the Proposed Pre-Engineered Building, SF:	1250	
Exterior wall square footage, SF:	2250	
Facility Control System		
Total Cost for Fabrication and Const. of Pre-Eng Buld., $:	8,688	*TABLE CW-19-GWU4*
50% of Fabrication Cost, $:	4,344	
Groundwater Treatment Plant - Equipment		
Shallow tray air stripper, EA:	1	*Assume max flow rate of 400 gpm*
Equalization tank, EA:	1	*Assume min 10 min. detention - 4000 gallons*
Transfer pump, EA:	1	*Assume 400 gpm with VFD*
Pipe, plastic, PVC, 8" diameter, SCH 80, LF:	250	
El, 90 Deg., plastic, PVC, socket joint, 8", SCH 80, EA:	13	*Assume every 20 LF*
Tee, plastic, PVC, socket joint, 8", SCH 80, EA:	5	*Assume every 50 LF*
Flange, plastic, PVC, socket joint, 8", SCH 80, EA:	20	
Valves, iron body, gate, flanged, 125 lb., 8", EA:	5	*Assume every 50 LF*
Valves, iron body, swing check, flanged, 125 lb., 8", EA:	5	
Venturi flow, measuring device, 8", EA:	3	
Concrete Pads for Treatment Equipment, SF:	438	*Assume 35% of building floor area*
Heat for Equipment Building, SF:	1250	
Groundwater Treatment Plant Startup		
Labor Cost for Startup Technician, HR:	140	*10 hour days*
Labor Cost for Engineer, HR:	40	*2 days, 8 hour days*
Truck Rental, DY:	14	
Fuel for Rental Truck, DY:	14	
Number of days for startup testing, DY:	14	
Number of weeks for startup testing, WK:	2	
Number of sample points, EA:	3	*Each extraction well, influent and effluent of plant*
Sample frequency, EA/DY:	1	
VOCs, EPA Method SW-846 8260, EA:	50	*Includes QC samples*
Metals, EPA Method 6010, Field Filtered, EA:	0	*Includes QC samples*
Water Quality Meter and Flow Through Cell, WK:	2	*Rounded up to nearest week*
Photoionization Detector (PID), WK:	2	*Rounded up to nearest week*
Water Level Meter, WK:	2	*Rounded up to nearest week*
Turbidimeter, WK:	2	*Rounded up to nearest week*
Shipping Rental Equipment, EA:	**2**	
Miscellaneous Sampling Equipment, LS:	**1**	
Project Manager, HR:	5	*5 minutes per sample, rounded up to nearest hour*
Contracting/Procurement Specialist, HR:	9	*10 minutes per sample, rounded up to nearest hour*

Description: Determination of electrical consumption for an extraction well.

Electrical Consumption by Well

Energy equivalent, HP-HR to kW-HR:	0.746	
Assumed pump efficiency, %:	50%	
Assumed HP of extraction well pump, HP:	5	
Number of hours per year, HR:	8760	
Number of HP-HR:	43800	
Equivalent electrical consumption, kW-HR:	65400	*Assumes motor efficiency, rounded up to nearest hundred*

Description: Determination of items related to operation and maintenance of the new groundwater treatment plant. Includes a an estimate of electrical consumption, and O&M technician time.

Treatment Plant Operation and Maintenance

Energy equivalent, HP-HR to kW-HR:	0.746	
Assumed pump efficiency, %:	50%	
Assumed HP of transfer pump, HP:	5	
Assumed HP of air stripper blower, HP:	5	
Number of hours per year, HR:	8760	
Number of HP-HR:	87600	
Equivalent electrical consumption, kW-HR:	130700	*Assumes motor efficiency, rounded up to nearest hundred*
Est. mo. electrical consumption for lights, etc., kW-HR:	2000	
Annual electrical consumption, kW-HR:	24000	
Est. annual total electrical consumption, kW-HR:	154700	
Assumed time per week of O&M tech, HR/WK:	8	
Number of weeks per year, WK/YR:	52	
Annual O&M tech hours, HR:	416	

Description: Determination of items related to operation and maintenance of the Gilbert-Mosley treatment plant for the portion of flow contributed by GWU4. Percentage determined by flow rate is applied in the NIC cost backup spreadsheet.

Treatment Plant Operation and Maintenance - Gilbert-Mosley

Est. total flow to Gilbert-Mosley System, GPM:	1000	
Est. flow rate from NIC #4-1, GPM:	120	
Total GWU4 flow rate to the Gilbert-Mosley system, GPM:	120	
Portion of flow from GWU4, %:	12%	
Est. sequestrant usage of Gilbert-Mosley system, GAL/YR:	712	*At a current designated flow rate*
Flow rate for usage, GPM:	880	
Sequestrant usage, GAL/YR/GPM:	0.81	
Sequestrant usage for GWU4 portion, GAL/YR:	98	*Rounded up to nearest gallon*
Portion of Gilbert-Mosley Electrical Usage:	1	
Portion of Gilbert-Mosley O&M Usage:	1	
Portion of Gilbert-Mosley sequestrant usage, GAL:	98	
Portion of Gilbert Mosley Labor, LS:	1	

Description: Quantities for minor and major replacement of equipment for treatment system.

Groundwater Treatment Plant - Equipment Replacement

Minor Equipment Replacement

Valves, iron body, gate, flanged, 125 lb., 8", EA:	5	
Valves, iron body, swing check, flanged, 125 lb., 8", EA:	5	
Venturi flow, measuring device, 8", EA:	3	

Major Equipment Replacement

Shallow tray air stripper, EA:	1	*Assume max flow rate of 400 gpm*
Equalization tank, EA:	1	*Assume min 10 min. detention - 4000 gallons*
Transfer pump, EA:	1	*Assume 400 gpm with VFD*
VFD, enclosed, 5 HP motor size, NEMA 1, EA:	2	
GAC adsorption, offgas vessels, EA:	0	

Description: Quantities for maintenance of monitoring wells. Assumes all monitoring wells will require replacement of vault and development.

Monitoring Well Maintenance - No Action Monitoring Wells

Number of wells requiring maintenance, EA:	10
Estimated time to complete well head repairs per well, HR:	1
Estimated time to develop well, HR:	1
Total time per well, HR:	2
Total time for all wells, HR:	20
Estimated length of work day, HR:	10
Mobilization and Demobilization of DPT Rig, LS:	1
Decontamination Pad Construction/Removal, LS:	1
Geoprobe rig and crew, DY:	2
Locking J-Plug, EA:	10
8" Vault, EA:	10
Geologist, HR:	20
Pickup Truck Rental, DY:	2
Fuel for Rental Truck, DY:	2

Monitoring Well Maintenance - Plume Stability Monitoring Wells

Number of wells requiring maintenance, EA:	16
Estimated time to complete well head repairs per well, HR:	1
Estimated time to develop well, HR:	1
Total time per well, HR:	2
Total time for all wells, HR:	32
Estimated length of work day, HR:	10
Mobilization and Demobilization of DPT Rig, LS:	1
Decontamination Pad Construction/Removal, LS:	1
Geoprobe rig and crew, DY:	4
Locking J-Plug, EA:	16
8" Vault, EA:	16
Geologist, HR:	32
Pickup Truck Rental, DY:	4
Fuel for Rental Truck, DY:	4

Description: Quantities for abandonment of monitoring wells. Assumes all monitoring wells will abandoned upon site closure.

Monitoring Well Abandonment - No Action Alternative Monitoring Wells

Number of Shallow Monitoring Wells:	5		
Shallow Monitoring Well Depth, VLF:	25	Top	Bottom
Screened Interval, FT:	10	13	23
Estimated time to abandon shallow monitoring well, HR:	1		
Number of Deep Monitoring Wells:	5		
Deep Monitoring Well Depth, VLF:	45	Top	Bottom
Screened Interval, FT:	10	32	42
Estimated time to abandon deep monitoring well, HR:	2		
Estimated length of work day, HR:	10		

Shallow Monitoring Well Quantities		Deep Monitoring Well Quantities	
Geoprobe rig and crew, HR:	5	Geoprobe rig and crew, HR:	10
Geoprobe rig and crew, DY:	1	Geoprobe rig and crew, DY:	1
Grout well, VLF:	125	Grout well, VLF:	225

Total

Mobilization and Demobilization of DPT Rig, LS:	1
Decontamination Pad Construction/Removal, LS:	1
Geoprobe rig and crew, DY:	2
Grout well, VLF:	350
Geologist, HR:	20
Pickup Truck Rental, DY:	2
Fuel for Rental Truck, DY:	2

Monitoring Well Abandonment - Plume Stability Monitoring Alternative Monitoring Wells

Number of Shallow Monitoring Wells:	8		
Shallow Monitoring Well Depth, VLF:	25	Top	Bottom
Screened Interval, FT:	10	13	23
Estimated time to abandon shallow monitoring well, HR:	1		
Number of Deep Monitoring Wells:	8		
Deep Monitoring Well Depth, VLF:	45	Top	Bottom
Screened Interval, FT:	10	32	42
Estimated time to abandon deep monitoring well, HR:	2		
Estimated length of work day, HR:	10		

Shallow Monitoring Well Quantities		Deep Monitoring Well Quantities	
Geoprobe rig and crew, HR:	8	Geoprobe rig and crew, HR:	16
Geoprobe rig and crew, DY:	1	Geoprobe rig and crew, DY:	2
Grout well, VLF:	200	Grout well, VLF:	360

Total

Mobilization and Demobilization of DPT Rig, LS:	1
Decontamination Pad Construction/Removal, LS:	1
Geoprobe rig and crew, DY:	3
Grout well, VLF:	560
Geologist, HR:	30
Pickup Truck Rental, DY:	3
Fuel for Rental Truck, DY:	3

Description: Quantities for abandonment of extraction wells. Assumes all extraction wells will be abandoned when site is closed.

Extraction Well Abandonment

Extraction Well Depth, VLF:	40
Grout well, VLF:	40
Estimated productivity, VLF/HR:	4
Total time to abandon well, HR:	10
Estimated length of work day, HR:	10
Geologist, HR:	10
Pickup Truck Rental, DY:	1
Fuel for Rental Truck, DY:	1

CDM

North Industrial Corridor Site
Appendix F
Feasibility Study Groundwater Modeling Report

City of Wichita

June 2011

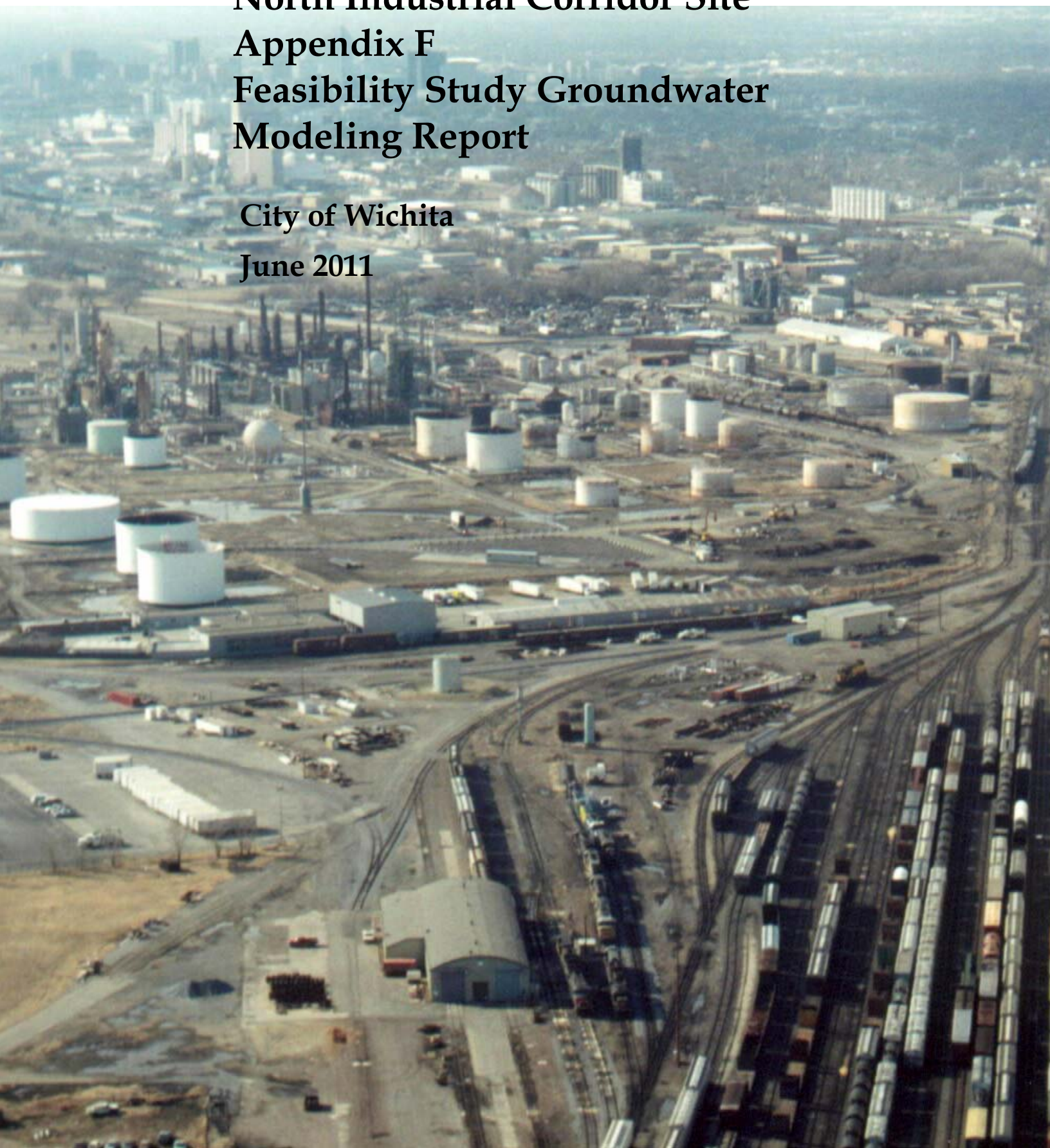


Table of Contents

1.0 Introduction 1
1.1 Site Location and History 1
1.2 Modeling Objectives 1
1.3 Structure of This Report 2
2.0 Model Design and Construction 3
2.1 Overview of Site Conceptual Model 3
2.1.1 Geology and Hydrostratigraphy 3
2.1.2 Surface Water 5
2.1.3 Pumping Wells 7
2.1.4 Precipitation and Net Recharge 8
2.1.5 Groundwater Flow 8
2.1.6 Hydraulic Conductivity 11
2.2 Software Utilized 12
2.3 Model Extent and Model Grid 13
2.3.1 Areal Extent and Horizontal Grid Spacing 13
2.3.2 Vertical Layering 14
2.4 Aquifer Properties 14
2.5 Boundary Conditions 15
2.5.1 Head-Dependent – River Package 15
2.5.2 Head-Dependent – General Head Boundary Package 16
2.5.3 Specified Flux – Well Package 17
2.5.4 Specified Flux – Recharge Package 17
2.5.5 No Flow 17
3.0 Calibration Approach 18
3.1 Calibration Parameters 19
3.2 Calibration Targets 19
3.3 Verification of Calibrated Model 20
4.0 Calibration Results 21
4.1 Calibration Results, Base Model 21
4.1.1 Simulated Versus Observed Conditions 21
4.1.2 Simulated Water Budgets 22
4.2 Calibrated Parameters 24
4.3 Results of Verification of Calibrated Model 26
4.4 Overview of Model Sensitivity 26
4.5 Simulated Groundwater Velocity 28
5.0 Evaluation of Remedial Alternatives 29
5.1 Alternative 1: Containment of GWU3 and GWU4 Plumes 30
5.2 Alternative 2: Containment of GWU3 and GWU4 Plumes, and GWU3 Interior Pumping 31
5.3 Alternative 3a: GWU2 Plume Containment Along with Containment of GWU3 and GWU4 Plumes 33
5.4 Alternative 3b: GWU2 Plume Containment Along with Containment of GWU3 and GWU4 Plumes and GWU3 Interior Pumping 33

5.5 Alternative 4: More Aggressive Mass Removal and Containment Along Chisholm Creek 34
5.6 Sensitivity Analysis on Capture Zones 36
5.6.1 Capture Zones with Higher Hydraulic Conductivity and Higher Net Recharge 36
5.6.2 Capture Zones with Higher River Conductances 37
5.6.3 Capture Zones with Lower River Stages 37
5.6.4 Capture Zones with Higher River Stages 37
6.0 Summary and Conclusions 38
7.0 References 41

List of Attachments

Attachment F1 NIC Groundwater Model Work Plan
Attachment F2 Supporting Data for Bedrock Surface Outside of NIC Boundary
Attachment F3 Water Level Trends and Particle Tracking Figures
Attachment F4 CD with Model Input/Output Results – 2001/2004 /2008 Calibration Runs

List of Figures

Figure 1 Site Map
Figure 2 Base of Aquifer Surface Map
Figure 3 Locations of Surface Water Level Measurements
Figure 4 Locations of Pumping Wells Used in the Model
Figure 5 Long-Term Annual Precipitation at NOAA Station Wichita Mid-Continent
Figure 6 Potentiometric Surface Map for August 2001
Figure 7 Potentiometric Surface Map for August 2004
Figure 8 Vertical Head Differences at Nested Wells in August 2001
Figure 9 Locations of Aquifer Pumping Tests Conducted at NIC Site
Figure 10 Model Extent and Model Grid
Figure 11 Boundary Conditions in Model Layer 1
Figure 12 Boundary Conditions in Model Layer 2
Figure 13 Monitoring Well Locations Used for Model Calibration in Layer 1
Figure 14 Monitoring Well Locations Used for Model Calibration in Layer 2
Figure 15 Comparison of Simulated versus Observed Groundwater Levels, August 2001
Figure 16 Simulated Water Levels in Model Layer 1, August 2001
Figure 17 Simulated Water Levels in Model Layer 2, August 2001
Figure 18 Calibrated Net Recharge Distribution
Figure 19 Calibrated Hydraulic Conductivity Distribution in Model Layer 1
Figure 20 Calibrated Hydraulic Conductivity Distribution in Model Layer 2
Figure 21 Calibrated Boundary Reaches in Model Layer 1
Figure 22 Comparison of Simulated versus Observed Groundwater Levels, August 2004
Figure 23 Simulated Water Levels in Model Layer 1, August 2004
Figure 24 Simulated Water Levels in Model Layer 2, August 2004
Figure 25 Comparison of Simulated versus Observed Groundwater Levels, January 2008
Figure 26 Proposed Groundwater Units and TCE Plume in Deep Aquifer
Figure 27 Simulated Capture Zones, Alternative 1
Figure 28 Simulated Capture Zones, Alternative 2
Figure 29 Simulated Capture Zones, Alternative 3a
Figure 30 Simulated Capture Zones, Alternative 3b
Figure 31 Simulated Capture Zones, Alternative 4

Figure 32 Simulated Capture Zones with Higher Hydraulic Conductivity and Higher Net Recharge
Figure 33 Simulated Capture Zones with Higher River Conductances
Figure 34 Simulated Capture Zones with Lower River Stages at Chisholm Creek and its Branches
Figure 35 Simulated Capture Zones with Higher River Stages

List of Tables

Table 1 Surface Water Level Measurements, August 2001
Table 2 Pumping Rates of Extraction Wells Used in the Model
Table 3 Simulated versus Observed Water Levels, August 2001
Table 4 Calibrated Parameter Values
Table 5 Calibrated Boundary Heads and Conductances
Table 6 Simulated versus Observed Water Levels, August 2004
Table 7 Simulated versus Observed Water Levels, January 2008

1.0 Introduction

1.1 Site Location and History

The North Industrial Corridor (NIC) Site is located in the north-central portion of the City of Wichita, Kansas. The Site consists of approximately six square miles of urban industrial, commercial, recreational, and residential property that has been developed from agricultural land over the past century. With industrialization, environmental impacts to groundwater and soils at the Site have occurred. In 1983, a U.S. Environmental Protection Agency (EPA) investigation revealed the presence of volatile organic compounds (VOCs) in groundwater produced from two industrial wells in the area. Subsequent investigations throughout the 1980s and early 1990s revealed widespread VOC contamination in groundwater in the NIC Site. **Figure 1** shows the Site map including the Gilbert-Mosley Site in the south.

The NIC Site was formally established when the Kansas Department of Environmental Health (KDHE) and City of Wichita finalized the NIC Settlement Agreement on November 14, 1995. One of the requirements of the settlement agreement was to conduct a Remedial Investigation and Feasibility Study (RI/FS) for the NIC Site. CDM conducted RI activities between 1997 and 2005 (CDM 2007a, CDM 2007b, CDM 2007c, CDM 2004a, CDM 2004b, CDM 2003, CDM 2000a, CDM 2000b, CDM 1997a, CDM 1997b, CDM 1997c). The work plans and reports associated with these activities are available through the KDHE and/or the City of Wichita. The general objectives of the RI were to define the degree and extent of contamination, characterize contaminant fate and transport, identify potential receptors, and identify and characterize significant source areas.

Among the VOCs detected in groundwater at the Site, tetrachloroethene (PCE), trichloroethene (TCE), *cis*-1,2-dichloroethene (C12DCE), and vinyl chloride (VC) have been found throughout the Site. Within these four contaminants, the extent of contamination of TCE and C12DCE in groundwater is significantly greater than others.

1.2 Modeling Objectives

CDM was retained by the City of Wichita (City) in 2008 to develop a groundwater flow model for the Site. The modeling objectives are as follows:

- Incorporate data from the NIC Site investigations and information from the adjacent Gilbert-Mosley Site in the south (CDM 2006, CDM 2004c, CDM 2000c).
- Support analysis of remedial alternatives for the NIC Site FS, which focus on hydraulic issues and evaluate capture zones of alternatives.
- Serve as a framework that can be expanded in the future to address issues related to source area remedial alternatives, contaminant fate and transport, allocation of remedial costs among responsible parties, or final design of the remedial alternative(s).

1.3 Structure of This Report

This report includes the following sections:

- Section 2.0 – Model Design and Construction
- Section 3.0 – Calibration Approach
- Section 4.0 – Calibration Results
- Section 5.0 – Evaluation of Remedial Alternatives
- Section 6.0 – Summary and Conclusions
- Section 7.0 – References

2.0 Model Design and Construction

2.1 Overview of Site Conceptual Model

In October 2008, CDM submitted a document titled *North Industrial Corridor (NIC) Site Groundwater Modeling Work Plan* (Model Work Plan) for KDHE review. The Model Work Plan is provided as **Attachment F1** to this NIC FS Groundwater Model Report. The Model Work Plan presented the Site conceptual model information and the mathematical model to be used. In response to the KDHE's March 17, 2009 comment letter on the Model Work Plan, additional Site conceptual model information has been provided in this section. Any information not presented in this report should be available in the Model Work Plan provided as **Attachment F1**.

A conceptual model of groundwater flow and a hydrogeologic system is an interpretation or working description of characteristics and dynamics of the physical hydrogeologic system. The purpose of the conceptual model is to consolidate Site and regional hydrogeologic data into a set of assumptions and concepts that can be evaluated quantitatively. The conceptual model identifies and describes important aspects of the physical system including geologic and hydrologic framework, media type, physical (and chemical to a lesser degree) processes, hydraulic properties, and sources and sinks (water budget). The conceptual model associated with the groundwater flow modeling effort considers each of the following items:

- Geology and Hydrostratigraphy
- Surface Water
- Pumping Wells
- Precipitation and Net Recharge
- Groundwater Flow
- Hydraulic Conductivity

Each of these is briefly summarized below. More detailed information is available in **Attachment F1**. The actual construction of the model, based on the conceptual model, is then presented in subsequent sections.

2.1.1 Geology and Hydrostratigraphy

The subsurface materials underlying the Site consist of four discreet hydrostratigraphic units from the top to the bottom:

- *Hydrostratigraphic Unit 1* is comprised primarily of clays which are of relatively low permeability. Saturation of the base of this unit occurs locally. Saturation also occurs in the upper clay units within an area restricted to the upland terrace deposits in the northeast corner of the Site. This clay layer thins near the lower

southwestern corner of the Site. The thickness of this unit ranges from 0 to approximately 20 feet with an average thickness of approximately 8 to 10 feet.

- *Hydrostratigraphic Unit 2* is the principal alluvial aquifer consisting of fine to coarse-grained sands, with intermediate and locally discontinuous clay lenses. This unit is generally continuous throughout the NIC Site with the exception of the northeast corner where the sands thin to the east and become laterally discontinuous. The thickness of these sands across the Site ranges from approximately 10 to 45 feet thick with an average of approximately 28 to 30 feet thick.

- *Hydrostratigraphic Unit 3* is comprised of stiff, moist, low permeability clays that represent the weathered bedrock surface. This clay unit ranges from less than 0.5 feet to approximately 10 feet in thickness and averages approximately 5 feet thick. Unit 3 is laterally discontinuous throughout the NIC Site.

- *Hydrostratigraphic Unit 4* consists of competent shale bedrock (Wellington Shale) and is the basal geologic unit considered in this investigation. Unit 4 is composed of medium to dark gray claystones and shales and is the basal aquitard for the overlying alluvial sediments. The bedrock within the NIC Site was encountered at depths ranging from 0.5 to approximately 45 feet below ground surface and averages about 40 feet below ground surface.

Hydrostratigraphic Units 3 and 4 comprise the base of the aquifer. Ongoing KDHE-approved remedial projects within the alluvial valley in Wichita consider the shale to be the base of the aquifer, and remedial efforts within the Wellington formation are not ongoing. Examples of such projects include the Gilbert-Mosley, 29th and Grove, and 57th and Broadway Sites, as well as ongoing source remediation projects within the NIC Site. The consideration of the Wellington Shale as the base of the aquifer at the NIC Site is consistent with these Sites.

The NIC Site is generally flat. The surface dips gently to the west and southwest. A topographic high is present east of Chisholm Creek. This topographic high is located outside the eastern boundary of the Site and intersects the northeast corner of the NIC Site. This topographic high is due to the presence of the alluvial valley wall. The alluvial valley wall also represents the eastern limit of significant sand deposits.

The upper clay unit (hydrostratigraphic unit 1) was not rigorously modeled in the model except the northeast corner of the NIC Site because the most of the clay unit is unsaturated, *i.e.*, no contact with groundwater. Therefore, there is no need to simulate this clay unit in the model for the most area of the Site. The clay unit in the northeast corner of the Site is included in the model (see discussion in Section 2.3.2).

Data from approximately 200 lithologic borehole logs that reached the top of clay or the competent bedrock was compiled to produce contours of the bottom of the aquifer. The bottom of aquifer was designated as either top of bedrock or the top of the low permeable clay overlying the bedrock surface. The bottom of aquifer slopes to the west

and southwest with a high in the northeast corner of the Site. The contour map of the base of aquifer is extended to the area outside of the NIC Site eastern boundary and is depicted on **Figure 2**. Additionally, **Attachment F2** provides the information used to estimate the bedrock surface outside of the NIC Site.

2.1.2 Surface Water

Several surface water bodies are located in and near the NIC Site. These surface waters include:

- Little Arkansas River;
- Arkansas River;
- Chisholm Creek and its branches including main fork, Middle Fork, West Fork, East Fork, and unnamed middle drainage; and
- Onsite and offsite ponds.

All surface water bodies existing in and around the NIC Site are depicted on **Figure 1**. Each of these is brief described below. Surface water levels were measured periodically at these surface water bodies. **Figure 3** shows the locations of surface water level measurements and also indicates the losing and gaining stretches. **Table 1** lists measurements of surface water levels taken in August 2001.

Little Arkansas River and Arkansas River

The Little Arkansas River is located between approximately 200 and 6,500 feet outside the western boundary of the NIC Site and flows to the south in the area. The Little Arkansas River joins the Arkansas River just between the NIC Site and the Gilbert-Mosley Site. Three surface water stations, SWL-09, SWL-10, and SWL-11, are located on the Little Arkansas River (**Figure 3**). The March and August 2001 groundwater level measurements at nearby monitoring wells (shown on Figures 4-5 and 4-6 of Attachment F1) were compared to the surface water levels at the Little Arkansas River. For these two water level rounds, the data indicate that the surface water levels were higher than the groundwater levels and therefore, the Little Arkansas River is characterized as a losing stream for at least the segment between SWL-09 and SWL-11.

Two low head dams are located at the lower end of the Little Arkansas River. One is at the Central Street crossing and the other is at the confluence of the Little Arkansas River and the Arkansas River. The sections of the Little Arkansas River above these low head dams are pooled.

The Arkansas River flows towards the south near the western border of the Gilbert-Mosley Site and then turns east in the south of the Gilbert-Mosley Site. Surface water levels were measured at the Arkansas River in the Gilbert-Mosley Site (**Figure 3**). By comparing the surface water levels to the groundwater levels at the nearby monitoring locations, the northern portion of the river within the Gilbert-Mosley Site (north of Lincoln Street dam, *i.e.*, north of Station RG-LN-N) is a losing stream and the southern

portion of the river (south of the Lincoln Street dam, *i.e.*, south of Station RG-LN-N) is a gaining stream.

Chisholm Creek

The branches of Chisholm Creek in the immediate vicinity of the NIC Site include the main fork, the Middle Fork, the East Fork, the West Fork, and an unnamed middle drainage (former lower reach of the Middle Fork), as presented in **Figure 1**.

The main fork of Chisholm Creek is located near the eastern boundary of the Site. In the Gilbert-Mosley area, the Chisholm Creek forms the eastern boundary of the Gilbert-Mosley Site. It flows toward the south and into the Arkansas River approximately ¾ mile southeast of the southern border of the Gilbert-Mosley Site. The main fork of Chisholm Creek is a gaining stream, as stated in Section 4.3.8 of RI report (CDM 2007a).

The current Middle Fork defines a portion of the northern boundary of the NIC Site and flows into the Little Arkansas River. There is no surface water station located on the Middle Fork. It appears to be a losing stream based on adjacent groundwater flow direction. The unnamed middle drainage (also referred to as the Middle Fork in the NIC RI Reports (CDM 2007a and CDM 2007b) enters the West Fork of Chisholm Creek just above the West Fork confluence with the East Fork of Chisholm Creek. The northern section of the unnamed middle drainage near Station SWL-02 appears to be a losing stretch as indicated by surface water levels measured at Station SWL-02 (**Figure 3**) and adjacent groundwater levels. The southern section of the unnamed middle drainage appears to be a gaining stretch based on the water level maps (shown on Figures 4-5 and 4-6 of Attachment F1).

The East Fork and West Fork merge and form the main fork of Chisholm Creek. The East Fork is characterized as a gaining stream based on the water levels measured at Station SWL-05 (**Figure 3**) and the adjacent groundwater measurements. The most of West Fork has been dry for recent several years. The lower reach of the West Fork is a gaining stretch. The detailed relationship between groundwater and Chisholm Creek and its branches is stated in Section 4.3.8 of RI report (CDM 2007a). The majority of the West Fork was not included in the model except a very small section that converges with the East Fork of Chisholm Creek because the section was not dry during the 2001 and 2004 water level measurement events.

Onsite and Offsite Ponds

Several small surface water bodies exist in and around the Site. Grove Pond is located along the eastern boundary of the Site just south of K-96 highway. This pond was constructed with a clay liner and there may have minimal groundwater/surface water interaction. Coleman Pond is located north of K-96 and east of I-135, along the western boundary of Coleman's property. The locations of the Grove Pond and the Coleman Pond are presented in **Figure 1**. Cornejo Pond is located southwest of the I-135 and K-96 and was nearly completely backfilled as of the completion of the Phase II RI field investigation; therefore, it was not included in the model. The pond is completely backfilled at this time.

2.1.3 Pumping Wells

The major water users identified in the NIC Site with known pumping rates and significant impact to the groundwater elevations are:

- Coleman North /Evcon (CN) facility remedial system;
- Coleman Northeast (CNE) facility remedial system; and
- Former Unocal Chemicals Division Distribution (UCL) facility remedial system.

The major water users identified in Gilbert-Mosley Site are:

- Coleman Downtown Wichita facility remedial system; and
- City of Wichita Gilbert-Mosley remedial system.

The locations of these remediation wells are shown on **Figure 4**. The pumping rates of these remediation wells in August 2001, August 2004, January 2008, and future condition (for prediction simulations) are listed in **Table 2**.

Coleman North/Evcon (CN) Facility

The CN remedial system consists of four wells, CN-RW-01, CN-RW-02, CN-RW-NIND, and CN-RW-SIND (**Figure 4**). CN-RW-NIND and CN-RW-SIND were installed in the past and only CN-RW-SIND is still in operation. CN-RW-01 and CN-RW-02 were installed around 1988, and CN-RW-01 was shut down in June 2006. The average pumping of CN-RW-01 is approximately 195 gpm from January 1997 to June 2006. The combined flow rate of CN-RW-02 and CN-RW-SIND is about 355 gpm from January 1997 to June 2008. As indicated by the system operator, CN-RW-SIND provides about 240 gpm of water.

Coleman Northeast (CNE) Facility

The CNE remedial system consists of three recovery wells, CNE-PW-01, CNE-PW-02, and CNE-PW-03 (**Figure 4**). The average extraction rates of these three wells are 35 gpm, 15 gpm, and 45 gpm, respectively.

Former Unocal Chemicals Division Distribution (UCL) Facility

The UCL remedial system consists of 12 extraction wells (**Figure 4**). The system was installed in 1994 and the operation started in January 1995. The system was shut down on August 30, 2006. Based on the discharge rates in 2002 to 2006 provided by the City's Water and Sewer Department, the total average flow rate of the UCL system was approximately 6.3 gpm. Unocal pumping was terminated in 2006.

Coleman Downtown Wichita Facility

The remedial system consists of seven recovery wells, RW-1 to RW-7. Four of them (RW-1 to RW-4) were shut down in 1990s. The average total pumping from the remaining three wells is about 105 gpm.

City of Wichita Gilbert-Mosley Remedial System

The groundwater treatment system includes 13 extraction wells and an air stripper (**Figure 4**). The system was installed in 2002 and has been in continuous operations since December 2002.

2.1.4 Precipitation and Net Recharge

The data at the nearby National Oceanic and Atmospheric Administration (NOAA) station Wichita Mid-Continent indicates the long-term annual average precipitation is 31.3 inches (in) based on the precipitation collected from 1954 to 2009. **Figure 5** shows the annual precipitation from 1954 to 2009 and the long-term annual average precipitation. The range of one standard deviation of the annual average precipitation is also shown on **Figure 5**. With a few exceptions, the annual precipitation for most of the years is within the range of one standard deviation of the annual average precipitation, which indicates that annual precipitation is quite consistent over the years without much difference.

Recharge to the alluvial aquifer (hydrostratigraphic unit 2) generally occurs through direct infiltration of precipitation through permeable materials at the surface. In the NIC Site, precipitation generally infiltrates initially to the top clay unit (hydrostratigraphic unit 1), and then vertically through the clay unit to the alluvial aquifer unit. As discussed earlier, the clay unit is not explicitly modeled except the northeast corner, and the downward leakage from the clay unit is therefore represented in the model through the net recharge values applied to the alluvial aquifer, which is consistent with the conceptual understanding that most water in the clay unit ultimately recharges the underlying aquifer. Therefore, the net recharge rates applied do not represent "net recharge to the subsurface", but instead represent "net recharge to the aquifer". The estimated recharge to groundwater in the study area is 2 to 4 in/yr based upon hydrologic data for the area and the modeling performed for the Gilbert-Mosley Site (CDM 2006). The recharge estimates in the Gilbert-Mosley model were based on water balance modeling and the flow model calibration. The actual values for net recharge assigned in the model are treated as calibration parameters (discussed later).

2.1.5 Groundwater Flow

Water level elevations and groundwater flow directions have remained fairly consistent within the Site since the Phase 1/1a investigation was conducted in 1997-1998. The aquifer saturated thickness, the impact of the bedrock, water level measurements, water level time trends, flow directions, and horizontal and vertical gradients are discussed below:

Aquifer Saturated Thickness

With the exception of the northeast corner, groundwater occurs at approximately 15 feet bgs. Groundwater occurs at depths of less than 10 feet bgs within the northeast corner of the NIC Site, where groundwater occurs in upland terrace deposits (as opposed to the alluvial sand aquifer underlying the majority of the NIC Site). The saturated thickness of the alluvial aquifer varies throughout the NIC Site from less than 0.5 feet in the

northeast corner to 36.5 feet along the western boundary. The overall saturated thickness throughout the NIC Site averages approximately 22 to 35 feet thick.

Impact of Bedrock on Groundwater

Overall, bedrock topography has little effect on the Site-wide flow of groundwater within the NIC Site. The primary exception to this statement is the northeastern-most portion of the NIC Site in the vicinity the former Unocal facility. In this area, the permeable alluvial material is very thin and the bedrock elevation is higher than elsewhere in the Site. Groundwater flow in the far northeast portion of the NIC Site is controlled more by the slope of the bedrock surface (generally west, southwest, and south-southwest). For the remainder of the NIC Site, the bedrock surface generally slopes east to west. This bedrock slope does not appear to have a significant impact on the general tendency of the groundwater to flow from north to south. A detailed discussion of the physical characteristics of the NIC Site is provided in Section 4 of the NIC RI Report (CDM 2007a). The NIC RI report provides potentiometric surface maps, a map of the saturated thickness, a map of the base of aquifer surface, and geologic cross-sections. At the request of the KDHE, Attachment F2 has been modified to show additional cross-sections of the area to the east of Chisholm Creek. The cross-sections were included in a report on the 29th Street and Grove Site by The Forrester Group. The report was titled *Revised Remedial Investigation Report, 29th and Grove Site, Wichita, Kansas, Case #01-E-0191* and dated June 16, 2006.

Water Level Measurements

NIC Site water level maps are available for October 1997 and April/May 1998 of Phase 1/1a investigation, March 2001 and August 2001 of Phase 2 investigation, and August 2004. The potentiometric surface maps of water levels measured in August 2001 and August 2004 (period used for model calibration and verification) are depicted in **Figure 6** and **Figure 7**. Additionally, the January 2008 water levels are provided as **Plate 2-1** in this FS report. Water level trends for selected wells within the NIC Site are provided in **Attachment F3**. Well locations can be referenced from **Plate 2-1** of this FS. The 11-year water level trends for this NIC Site show that water levels are fairly consistent with only minor fluctuations. This is consistent with the potentiometric surface maps referenced above. While Site-wide water level data are limited, the data do not show significant differences in groundwater flow during the different seasons (fall 1997, spring 1998, winter 2001, summer 2001, summer 2004, winter 2008). With respect to the potentiometric surface maps presented in the NIC RI (CDM 2007a), NIC RI Addendum (CDM 2007b), and Section 2 of the NIC FS, most of the variability in the contouring between different dates is attributable to an increasingly robust data base (more wells) over time. The consistent water levels over time reflect the consistency of the precipitation over time (see Section 2.1.4).

There are insufficient data to identify specific seasonal changes and trends for the NIC Site; however, CDM has also reviewed the quarterly monitoring reports for the Gilbert-Mosley Site (representing the southern half of the model) for the period from 1997 through 2004. The Gilbert-Mosley Site has been subject to semiannual monitoring from 2005. These reports are available through the KDHE archives in Topeka, Kansas as well

as the library at the City of Wichita's Office of Environmental Health at 1900 E. Ninth Street in Wichita, Kansas. Included in these reports are potentiometric surface maps, water level data, and presentation and evaluation of vertical gradients within the Gilbert-Mosley Site. A typical summary of these water level observations is provided in the *Fourth Quarter 2003 Report and Annual Summary – Site Monitoring Network – Gilbert and Mosley Site – Wichita, Kansas* dated January 2004 and prepared by CDM for the City of Wichita (CDM 2004c). Excerpts from the above report are provided below.

> *"All of the hydrographs show a general trend of increased water level variability closer to the Arkansas River, and less variability within the interior of the Site."*
>
> *"Water levels were relatively constant within the interior of the Site in 2003 … Water levels in wells near the Arkansas River (Figures 2-8a-c and Figure 2-11) were highest in June 2003, subsequent to precipitation events that resulted in higher river stage (see Figure 2-12)."*

The data observed for the Gilbert-Mosley Site are consistent with the data collected to date at the NIC Site. Thus, the seasonal changes of the water level are small for the majority of the Site except for localized areas and therefore, are expected to have little impact to the overall groundwater flow direction and the capture zones of the proposed remediation wells.

Groundwater Flow Direction

The overall groundwater flow direction in the NIC Site is toward the south. With the exception of the northeast corner, groundwater generally flows south to southwest in the upper portion of the Site. The groundwater flow direction in the northeast corner of the NIC Site is nearly due west to southwest. Near the middle of the NIC Site, the flow direction is south to southeast. Groundwater flows south to southeast in the southern portion of the NIC Site with nearly due east flow in the very southeastern portion of the Site near Chisholm Creek at the eastern NIC Site boundary. Groundwater also flows to the southwest within localized areas of the southwestern portion of the NIC Site.

Horizontal and Vertical Gradients

Groundwater gradients have also remained relatively constant since the Phase 1/1a investigations. Upon evaluation of the August 2001 potentiometric surface map, two predominant gradients exist within the Site. The predominant gradient across the Site ranges 0.0008 ft/ft to 0.001 ft/ft. Within the northeast portion of the Site, the horizontal gradient is about 0.023 ft/ft due to rapid changes in elevation and low permeability soils in this area. Figures 4-4 through 4-7 in **Attachment F1** and **Figures 6** and **7** of this document show the influence of the East Fork of Chisholm Creek and some of the higher production extraction wells of this Site. The East Fork of Chisholm Creek is a strongly gaining stream below 21st Street and the hydraulic gradient increases in its vicinity.

The vertical gradient was obtained from water level differences in the nested wells of August 2001 water levels. **Figure 8** shows the locations of the nested wells and the vertical head differences in August 2001. A table presenting the vertical head

differences was provided in Appendix G-5 of the NIC RI report (CDM 2007a). A detailed discussion of the vertical gradients at the NIC Site is provided in Section 4.3.7 of the NIC RI report (CDM 2007a). There are 217 vertical head difference measurements presented in Appendix G-5 of the NIC RI report for the March and August 2001 measurements. Among those 217 vertical head differences, only 37 vertical head differences are greater than 0.1 feet in which 10 of them are incorrect due to inaccurate measurement of the wellhead measuring points; 4 of the measurements are due to the presence of the free product in the wells, and 13 of the measurements are due to the presence of localized clay. Excluding ones for wells with inaccurate surveys and those with free product, the average of the absolute values of the head differences is only about 0.08 feet. Water level differences of less than 0.1 foot are not considered because these small differences can be affected by localized conditions, short-term fluctuations in groundwater elevation, and minor measurement errors. Moreover, it is difficult to maintain vertical gradients in a system as permeable as that at the NIC Site, since heads will equilibrate rapidly away from recharge sources that may cause localized vertical gradients.

The NIC vertical gradients are consistent with the vertical gradient observations at the Gilbert-Mosley Site. A typical summary of the vertical gradient observations is provided in the *Fourth Quarter 2003 Report and Annual Summary – Site Monitoring Network – Gilbert and Mosley Site – Wichita, Kansas* dated January 2004 and prepared by CDM for the City of Wichita (CDM 2004c). Excerpts from the above report are provided below.

> *"Typically, water levels have been measured in both shallow and deep monitoring wells every other quarter. … Nested well water level elevation differences were similar to elevation differences reported in the fourth quarter 2003 [sic - 2002] report with no significant vertical gradients indicated. Therefore, pumping of the extraction wells has not resulted in significant changes in vertical gradients across the Site."*
>
> *"The average and median nested well differences for all four events presented in Appendix F were essentially zero (e.g. the fourth quarter of 2003 average difference was -0.01 feet). The distribution of nested well difference data for the fourth quarter of 2003 is depicted on Figure 2-14. This distribution data indicates that there are no measureable vertical gradients at the Site."*

Therefore, the vertical gradients are relatively insignificant for most of the Site. Moreover, localized lithological features and vertical gradients are expected to have little to no impact on the overall groundwater model due to the size of the model cells (10,000 square feet) and the Site-wide focus of the model.

2.1.6 Hydraulic Conductivity

Several aquifer pumping tests were conducted at NIC Site and listed in the table below. Most of the following information was provided in Section 4.3.7 of the NIC RI Report (CDM 2007a). **Figure 9** shows the locations of the aquifer pumping tests.

Location	Hydraulic Conductivity	Reference
Coleman North Plant Operable Unit-upper part of the aquifer (CN-RW-NIND)	225 ft/day	GTI 1992
Coleman North Plant Operable Unit-entire aquifer (CN-RW-NIND)	435 ft/day	GTI 1992
Hydrocarbon Recyclers (near 25th St. No. and New York)	135 ft/day	HWS Technologies, Inc. 1990
OHSE production wells (near 22nd St. N. and Broadway)	185 ft/day	Groundwater Associates, Inc. June 27, 1987 (see Appendix K of GTI 1996)
Coleman Downtown Wichita Facility (CDTW-RW-5)	380 ft/day	GTI 1993
House Oil Company	167 ft/day	Terra Tech 1994

Short-term pumping tests (< 4 hours) were also performed in Gilbert-Mosley Site which is immediately south of the NIC Site. The hydraulic conductivity was calculated to range between 380 ft/day to 707 ft/day. A transient groundwater flow model using DynFlow was developed and calibrated by CDM for the Gilbert-Mosley Site (CDM 2006).

The hydraulic conductivities of saturated materials in the upland terrace deposits of the Northeast Investigation Area are considerably lower than the hydraulic conductivities encountered throughout the remainder of the NIC Site where groundwater occurs predominantly in alluvial sands. Hydraulic conductivities in the Northeast Investigation Area range from 0.049 ft/day to 38.6 ft/day. Woodward-Clyde Consultants performed slug tests on two wells at the Unocal facility in 1991, which resulted in hydraulic conductivity values of 0.049 ft/day and 0.783 ft/day. Maude Environmental Inc. conducted a pumping test on one of these wells in 1993. The test results ranged from 2.43 ft/day to 7.39 ft/day. A pumping test conducted by Smith Environmental Technologies Corp. at the Unocal facility in 1996 (utilizing three separate methods) determined the hydraulic conductivity ranged from 0.21 ft/day to 38.6 ft/day. Specific information regarding these pumping tests is located in Appendix G-3 of the NIC RI Report (CDM 2007a).

2.2 Software Utilized

The model was constructed using Groundwater Vistas software (version 5) and simulations were performed using MODFLOW 2000, which simulates three-dimensional groundwater flow through a porous medium by using a finite-difference method. Particle tracking was performed with MODPATH version 3.

For this modeling effort, CDM elected to use the MODFLOW 2000 model with Block-Centered Flow (BCF) package and Preconditioned Conjugate-Gradient 2 (PCG2)

package instead of MODFLOW 2000 Layer Property Flow (LPF) as indicated in the model work plan (CDM 2008). Through trial and error, the PCG2 solver available for the MODFLOW 2000 package appeared to be better able to address the hydrogeologic conditions along the eastern border of the groundwater model where the alluvium abuts a valley wall composed of low permeability shales.

MODFLOW 2000 LPF package requires input of vertical hydraulic conductivity and computes a vertical conductance (VCONT) internally while MODFLOW 2000 BCF package requires input of VCONT (leakance). The LPF updates VCONT for each solver iteration for saturated convertible layers while MODFLOW 2000 BCF uses the fixed VCONT/leakance values for all the iterations. Thus, when dry cells occur during a run, the VCONT/leakance values are quite different between the iterations because of the drastic changes in the saturated thickness when using MODFLOW 2000 LPF package. The sudden changes in the VCONT/leakance cause the stability issue and convergence problem. Using the MODFLOW 2000 BCF with fixed VCONT/leakance, the stability issue and convergence problem is much less when dealing with the dry cells.

The MODFLOW 2000 model with the BCF package and PCG2 solver provided more stable and reliable solutions for the eastern boundary and was selected over the MODFLOW 2000 model with LPF package which had been identified in the groundwater model work plan (CDM 2008).

2.3 Model Extent and Model Grid

2.3.1 Areal Extent and Horizontal Grid Spacing

The model covers an area of 52,200 ft by 17,700 ft with a total active area is approximately 14,770 acres. This active area is bounded as follows:

- North – Middle Fork of the Chisholm Creek which flows into Little Arkansas River.
- West – Little Arkansas River from intersection with Middle Fork of Chisholm Creek to confluence with Arkansas River, and then to Arkansas River section closest to McCarthur Road.
- South – Section of Arkansas River closet to McCarthur Road to projected intersection with Hillside Avenue.
- East – Intersection of Hillside Avenue with Arkansas River to intersection of Hillside Avenue with Middle Fork of Chisholm Creek. Alluvial Valley wall exists generally at Hillside Avenue between 37th Street and Arkansas River except the northeast corner.

The model is discretized into 522 rows and 177 columns. The model extent is illustrated in **Figure 10**. The model grid has a uniform spacing of 100 ft. Groundwater velocities within the Site are estimated to range between 300 and 900 feet per year. A 100 ft grid size is equivalent to 1/3 to 1/9 of the anticipated groundwater migration within a year.

The model area includes the NIC Site, and also incorporates the area of the Gilbert-Mosley Site, since remedial pumping in this area has the potential to impact the southern portion of the area of interest. The calibrated hydrogeologic properties in Gilbert-Mosley model are used in the model (CDM 2006 – Appendix E; and CDM 2000c).

2.3.2 Vertical Layering

The model is represented vertically by two layers. As discussed earlier, the upper clay unit was not simulated in the model except the northeast corner of the NIC Site since this unit is largely unsaturated. Hydrostratigraphic Unit 2 was represented with two model layers to be consistent with shallow and deep monitoring wells installed within the NIC Site and Gilbert-Mosley Site. In the northeast corner of the NIC Site, the upper clay unit is represented as layer 1 and the sand unit is represented as layer 2. The land surface is used as the approximation for the top surface of the model.

The lower boundary of the model was represented by the contact with either the weathered clay unit overlying the Wellington Shale, or intact Wellington Shale. The lower boundary is represented as no-flow boundary which is consistent with other groundwater remediation projects in the area.

Representation of the aquifer system as a three-dimensional system provides flexibility in assessing potential alternatives by simulating the vertical movement that will occur due to recharge to the system. Significant features, such as Chisholm Creek, occur in the vicinity of plumes that could create vertical movement. Most pumping alternatives are likely to include fully penetrating wells, thus not necessarily requiring multiple layers. Simulation of transport processes is also aided by having sufficient vertical discretization through use of several layers.

2.4 Aquifer Properties

Based on the modeling experience from the Gilbert-Mosley Site, the average horizontal hydraulic conductivity within the alluvial aquifer is in the range of 450 ft/day to 500 ft/day. This was further reinforced by aquifer testing at the Gilbert-Mosley Site during the remedial design efforts. Therefore, a uniform value of 500 ft/day was used as an initial horizontal hydraulic conductivity for both layers 1 and 2 and within the NIC Site. For the northeast corner of the NIC Site, a value of 1 ft/day was used as an initial horizontal and vertical hydraulic conductivity for layer 1 to represent the clay unit in that area.

An anisotropy ratio of 2:1 (horizontal hydraulic conductivity versus vertical hydraulic conductivity) was used based on the nature of the deposits comprising of the aquifer and based on the modeling and field experiences from the Gilbert-Mosley Site. There are no significant interbeds of lower permeability material that would suggest a higher contrast between horizontal and vertical permeability.

An effective porosity value of 0.3 is used for the particle tracking using MODPATH, which is selected based on a published value for sand material. If a Site-specific effective

porosity is obtained in the future, the particle tracking simulations will be revised using the Site-specific value. The effective porosity can also be determined through calibration of the solute transport model. The value of the effective porosity does not impact the simulated results of the steady-state flow model and it only impacts the particle travel time when using MODPATH. The transient capture zones (*i.e.*, the simulated capture zones over time) will be different when using different effective porosity but the final (long-term) capture zones will be the same. The general equation for groundwater velocity is as follows:

$$\mathbf{V = (K^*(dh/dl))/n}$$

Where V = groundwater velocity
K = hydraulic conductivity
dh/dl = the hydraulic gradient
n = effective porosity

If K and dh/dl are constant, the groundwater velocity will increase as the effective porosity decreases. The value of 30 percent used in the model provides a conservative value to estimate remediation times under pumping conditions.

2.5 Boundary Conditions

Boundary condition types assigned in the model include:

- Head Dependant (River Package)
- Head Dependant (General Head Boundary Package, or GHB)
- Specified Flux (Well Package)
- Specified Flux (Recharge Package)
- No Flow

Head dependant boundaries allow water into or out of the model, as a function of the simulated head in the model at the location of the boundary. Specified flux boundaries allow water into or out of the model at a specified rate. No flow boundaries are a special form of a specified flux boundary, with a flux of zero. Each of these is described below. The locations of river package, GHB, and no-flow boundaries of each model layer are presented in **Figure 11** and **Figure 12**. Locations of extraction wells within the model domain are presented in Section 2.4.3.

2.5.1 Head-Dependent – River Package

The MODFLOW river package was used herein to simulate the flux of water between the groundwater system and the following surface water features:

- Little Arkansas River;

- Arkansas River; and
- Chisholm Creek including main fork, Middle Fork, West Fork, East Fork, and unnamed middle drainage

The required parameters for MODFLOW river package are river stage elevation, river bed bottom elevation, and river bed conductance. The use of the river package differs from use of specified heads in that the model calculates the head in the aquifer (rather than using a specified head), and then the flux of water into or out of the model is calculated based on the assigned stage of the boundary, the simulated head in the aquifer, and the conductance term. If the head in the aquifer falls below the river bed bottom elevation, the flux of water into the model becomes a constant value.

The surface water measurements are used as input parameters in the model. The stages for other on-Site features were estimated based on the USGS topographic map and the surrounding groundwater elevations. The river bottom elevations were assumed to be 0.5 to 5.0 ft below the river stages. The conductance of each feature was treated as a calibration parameter.

The MODFLOW river package was used to represent the connection between the river and the upper saturated layer in the model, thus it is a partially penetrating river condition. The relatively high hydraulic conductivity of the aquifer materials results in good connectivity between the river and the aquifer, with subtle vertical gradients driven by the discharge to the river. In essence, this results in little difference between a partially penetrating and fully penetrating river. Significant underflow crossing beneath the river or creek is not expected, unless significant groundwater pumping occurs on the opposite bank of the creek or river. In this instance, there could be some underflow of the river or creek if the groundwater flow is significant.

2.5.2 Head-Dependent – General Head Boundary Package

The contact of the Alluvial Valley and the Wellington Shale exists along the model eastern extent boundary except the northeast corner. Both the clay unit and the underlying sand unit are continuous at the northeast corner of the Site. The groundwater flows into the model area from the northeast corner of the Site. The MODFLOW general head boundary (GHB) package, which simulates flux of water into or out of a model cell from an external source, was used to present the northeastern edge of the model in all two layers (**Figures 11** and **12**).

The required parameters for the MODFLOW GHB package are boundary elevation and boundary conductance. The model calculates the head in the aquifer (which is generally different from the elevation assigned to the boundary), and then the flux of water into or out of the model is calculated based on the assigned elevation of the boundary, the simulated head in the aquifer, and the conductance term. The boundary heads and conductance values were treated as calibration parameters.

2.5.3 Specified Flux – Well Package

Locations of pumping wells are indicated on **Figure 4**. The City of Wichita Gilbert-Mosley remedial system did not start operation until December 2002. Thus the extraction wells of City of Wichita Gilbert-Mosley remedial system are not included during model calibration period of August 2001. However, these remediation wells are included during model verification period of August 2004 and January 2008 (discussed later).

All extraction wells are assumed to be screened across the entire aquifer and are assigned in both model layers with the exception of the sump pump well 36767 which is in model layer 1 only. GWVistas (the pre-processor that was utilized) apportioned the well rates between layers, based on a weighted average of the transmissivity values in the model (which is determined from the stratigraphic elevations and the assigned hydraulic conductivity values).

2.5.4 Specified Flux – Recharge Package

MODFLOW Recharge Package was used to present the areal net recharge to the groundwater. The actual value of net recharge assigned in the model was treated as a calibration parameter.

Grove Pond and Coleman Pond were simulated using MODFLOW Recharge Package to represent the net infiltration to the groundwater. Their recharge rate was treated as a calibration parameter.

2.5.5 No Flow

The areas beyond the Middle Fork of Chisholm Creek, Little Arkansas River, and Arkansas River were assigned as no flow in the north, west, and south of the model. In the east, no flow boundary was used to represent model boundary associated with the contact with the Wellington Shale along the eastern model boundary. A no flow boundary was also used at the base of the model, since leakage to and from the bedrock zone is assumed to be minimal. The bedrock within the model Site is the Wellington Shale which appears to have weathered to an even lower permeability plastic clay in most of the model area.

3.0 Calibration Approach

The model was calibrated to steady-state conditions using the extensive water level measurements collected in August, 2001 since these water level measurements and the potentiometric surface map provide the most current and detailed potentiometric data for the model area without the remediation pumping conditions within the Gilbert-Mosley portion of the model area. As stated in Section 2.1.4, the precipitation is quite consistent over years. This consistency corresponds to the consistent water levels over years with only minor fluctuations. Therefore, long-term average flow and climatic conditions was used in the calibration.

The use of steady-state flow fields is appropriate for the site-wide feasibility analysis of remedial alternatives at the Site. The steady-state flow field represents equilibration with recharge and boundary conditions in the model. The steady-state model does not represent the seasonal fluctuations or other transient conditions that may be important for remedial design at individual groundwater units. The effects such as localized vertical gradients due to small-scale or local hydrogeological variability are not represented in the steady-state model. Also, the impacts on containment due to features not fully represented in the feasibility-level model will be evaluated during remedial design.

Development of steady-state conditions is anticipated to occur within less than 1 to 2 years, due to the presence of the surface water bodies that interact with groundwater and the relatively high permeability of the aquifer in the NIC area. The particle tracking evaluations that are conducted include a temporal component, allowing estimation of the transit time for groundwater within the capture zone.

The steady-state model calibration reflects the average groundwater conditions in the aquifer, which result from the various sources of recharge to the system. The relatively high hydraulic conductivity of the aquifer materials limits the development of significant vertical gradients. The evaluated pumping wells are simulated to produce from the entire saturated thickness of the aquifer, and the capture zone analysis is fully three-dimensional in nature. Therefore, the vertical gradient does not significantly impact he capture zones.

The water levels in August 2004 were used for the model verification in response to the pumping stresses caused by the operation of the Gilbert-Mosley remediation systems. The recent water level measurements, January 2008 data, were also used for model verification after the submittal of the draft modeling report in response to the shutdown of UCL remediation system and Coleman well CN-RW-01. These verification evaluations increase the confidence that the model is well calibrated. No flux terms, such as estimates of baseflow to rivers or streams, recharge from rivers/streams to groundwater, or discharge from springs or seeps are available. The use of a significantly different flow regime in the 2001, 2004, and 2008 periods provides a robust calibration.

After submittal of the draft modeling report to KDHE, CDM reviewed the results of the particle tracking component of the model where particles were originated at various

locations at the known or suspected source areas within the NIC Site. The results indicated that the uniform hydraulic conductivity applied to the NIC portion of the groundwater model in the draft report needed to be refined so that particles would track similar to known groundwater plumes within various areas of the NIC Site. To have simulated particles track closely with known groundwater contaminant plumes, the hydraulic conductivity distribution as well as the boundary heads and conductances were refined. Pumping rates of existing remediation wells and surface water level measurements during the calibration period were used in the model. The calibration utilized the difference between the observed and modeled water levels as a measure of the error in the model. The model calibration minimized these residuals by varying sensitive model parameters, using trial-and-error technique. Sensitivity analyses were conducted to assess the impact of uncertainty on model calibration.

3.1 Calibration Parameters

Calibration of a groundwater flow model is the process of adjusting model calibration parameters within reasonable ranges to obtain an acceptable match between observed and simulated heads, flow rates, or other calibration targets. The model parameters varied during the calibration were:

- Net recharge rate values
- Horizontal hydraulic conductivity values
- Vertical hydraulic conductivity values
- River conductance values
- River stages
- GHB conductance values
- GHB heads

Sizes and shapes of parameter zones (such as for horizontal and vertical hydraulic conductivity) were also varied during model calibration.

3.2 Calibration Targets

The primary calibration targets are:

- Observed water levels
- Observed general flow patterns
- Observed contaminate plume migration patterns

Steady-state calibration was performed for the stress condition in August 2001, which maximizes the number of water level observations. **Figures 13** and **14** show the

locations of the monitoring wells where observed water levels are used for model calibration in model layer 1 and layer 2, respectively.

The pathlines of particles originated from different sources were simulated and then compared with the observed contaminate plume migration patterns which provides more robust calibration.

The goal is to statistically match simulated versus observed water levels such that the residual mean (the sum of residuals divided by the number of observations) is close to zero, and such that the absolute residual mean (the sum of the absolute values of the residuals divided by the number of observations) is less than 10% of the observed range of water levels, and ideally less than 5% (these are groundwater modeling "rules-of-thumb"). The statistical results of the calibration are presented in Section 4.1.

3.3 Verification of Calibrated Model

To further support the calibration of the model, water levels were simulated in response to August 2004 pumping stresses which show the City of Wichita Gilbert-Mosley remedial system is in operation. The predicted water levels were then compared to observed water levels in August 2004. In addition, the water levels were also simulated corresponding to January 2008 pumping stresses. The simulated water levels were compared to observed water levels in January 2008.

These verification evaluations increase the confidence that the model is well calibrated. The extraction rates in August 2004 and January 2008 are listed in **Table 2**.

The results of this verification exercise are presented in Section 4.2.

4.0 Calibration Results

Calibration was performed primarily via trial and error simulations in an attempt to match observed conditions. Observed water levels, flow patterns, and plume migration patterns were used as calibration targets. As stated earlier, the goal is to statistically match simulated versus observed water levels such that the residual mean (the sum of residuals divided by number of observations) is close to zero, and such that the absolute residual mean (the sum of the absolute values of the residuals divided by the number of observations) is less than 10% of the observed range of water levels, and ideally less than 5% (these are groundwater modeling "rule-of-thumb").

4.1 Calibration Results, Base Model

The calibration period used for base model calibration is August 2001 since the extensive water level measurements collected in this period and it is consistent with long-term climatic condition.

4.1.1 Simulated Versus Observed Conditions

Table 3 lists the simulated water levels, observed water levels, and the residuals (observed minus simulated water levels) at each water level target. The calibration statistics are also listed in **Table 3**.

The results indicate that the mean error is -0.57 ft, which is close to the goal of 0 ft with a little bias to simulated high. The mean absolute error (1.08 ft) divided by the range of observed values (78.22 ft) is 1.4% which is much lower than the 10% goal (and even below the more strict goal of 5%). **Figure 15** summarizes the simulated water levels versus the observed water levels on a "45-degree line". Ideally, all points should fall along the 45-degree line. Most residuals appear to be similarly distributed above and below the 45-degree line, which is preferable. There are a small group of wells above the 45-degree line. These wells are generally located in the north of the Site. Even the simulated water levels are higher than the observed water levels at these wells, the pathlines of the particles originated from the sources in the north of the Site are consistent with the observed contaminant migration paths.

The simulated water levels for model layers 1 and 2 are illustrated in **Figure 16** and **Figure 17**. These figures can be compared to the previously interpreted water level map for August 2001 (**Figure 6**). The results indicate that observed flow conditions are generally reproduced by model including the following:

- The overall groundwater direction is toward the south. With the exception of the northeast corner, groundwater generally flows south to southwest in the upper portion of the NIC Site. Groundwater flows south to southeast in the southern portion of the NIC Site.
- The groundwater flow direction in the northeast corner of the NIC Site is due southwest.

- Majority of the unnamed middle drainage of Chisholm Creek is gaining water from the aquifer indicated by the "V" shape that points upstream except the stretch near Station SWL-02.

- The main folk and East Folk of Chisholm Creek are gaining streams indicated by the "V" shape that points to the upstream.

- The southern portion of the Arkansas River in the Gilbert-Mosley Site, south of the Lincoln Street Dam (Station RG-LN-N), gains water from the aquifer based on the configuration of the potentiometric surface.

- The model simulated potentiometric surface maps in layers 1 and 2, as shown on **Figures 16** and **17**, are very similar, which is consistent with the Site conceptual model of very small vertical gradient and vertical head differences.

- The pathlines of the particles originated from 42 sources are generally consistent with the observed contaminant plume migration patterns.

4.1.2 Simulated Water Budgets

For a groundwater system, the water flowing into the system and the water flowing out of the system have to be balanced, *i.e.*, inflow to the groundwater system has to equal to the outflow out of the groundwater system.

For the NIC model, the inflow includes net recharge, flow into the groundwater system through the GHBs, and flow from the rivers. The outflow includes pumping from wells and flow to the rivers. The simulated model-wide water budgets are listed below for August 2001 calibration period.

Boundary Source	Inflow		Outflow	
	cfs	%	cfs	%
Well	-	-	2.19	14.4%
GHB	0.50	3.3%	-	-
River	9.19	60.6%	12.98	85.6%
Recharge	5.47	36.1%	-	-
Total	***15.16***	***100%***	***15.16***	***100%***

Note:
Inflows indicate the boundaries providing water to the aquifer; outflows indicate the boundaries gaining water from the aquifer.
cfs = cubic feet per second

Based on the table above, inflow to the groundwater is 15.16 cfs which equals to the outflow for the NIC model area. There is a net discharge of 3.79 cfs to the river systems in the model. The estimates on water budget components were not available for the Site. If they become available in the future, the model will be confirmed with these data and revised if necessary. Only the model simulated water budgets are presented here.

As shown in the table, the inflow through GHBs at the northeast boundary is 0.5 cfs which is reasonable given that the saturated thickness is very small and the sand unit is very thin to laterally discontinuous at the northeast boundary. The conditions result in small amount of water flowing into the groundwater system of the NIC model area.

Within 12.98 cfs modeled outflow from the groundwater to the rivers, only 3.39 cfs, (26.2% of the total outflow), is attributed to the entire Chisholm Creek and its branches. Even though the potentiometric surface map shows a strong hydraulic gradient toward Chisholm Creek, the actual discharge flow to Chisholm Creek and its branches is less when compared to the Little Arkansas River and the Arkansas River. Chisholm Creek and its branches are much smaller than the Arkansas and Little Arkansas Rivers and thus the creek bed conductances are much smaller than the Little Arkansas River and the Arkansas River bed conductances.

A more detailed water budget for Chisholm Creek and its branches; a section of the Little Arkansas River with surface water level measurements; and a section of the Arkansas River with surface water level measurements are listed in the table below.

Name	Flow Rate (cfs)	Gaining or Losing Stream
Chisholm Creek Main Fork	2.46	Gaining
East Fork	0.58	Gaining
West Fork	0.02	Gaining
Unnamed Drainage	0.26	Gaining
Little Arkansas River (from SWL-09 to Central Street)	1.50	Losing
Arkansas River (from B-2ND to RG-LN-N)	0.29	Losing
Arkansas River (South of RG-LN-N)	2.19	Gaining

From the table above, the following conclusions were made which are consistent with the site conceptual model and the observed flow conditions:

- The section of the West Fork of Chisholm Creek that is simulated in the model is gaining water from the aquifer. The majority of the West Fork of Chisholm Creek is dry and thus there is little groundwater flowing into the creek;

- The main fork of Chisholm Creek, the East Fork, and the unnamed drainage are generally gaining water from the aquifer. The flux of modeled flow from the groundwater to Chisholm Creek and its branches is in the reasonable range for the volume of flow visually observed in the creek;

- The section of the Little Arkansas River from surface water station SWL-09 to the Central Street is generally losing water to the aquifer;

- The section of the Arkansas River from surface water station B-2ND to the Harry Road (south of the Lincoln Street dam) is generally losing water to the aquifer; and

- The section of the Arkansas River south of the Harry Road (south of the Lincoln Street dam) is generally gaining water from the aquifer.

Even though the model-simulated potentiometric surface maps (**Figures 16-17**) are similar for layers 1 and 2, it does not mean that there is no vertical flow in the model. On the contrary, it only means that the vertical flow occurs at a very fine scale which is consistent with the Site conceptual model (that the vertical gradients at the Site are very small). The layer by layer water budgets demonstrates the vertical flux between two layers simulated by the model, as listed below for August 2001 calibration period.

Source		Flow Rate in Layer 1 (cfs)	Flow Rate in Layer 2 (cfs)
Well (outflow)		1.79	0.40
Recharge (inflow)		5.36	0.11
River	Inflow	9.19	-
	Outflow	12.98	-
GHB (inflow)		0.28	0.22
Vertical Flow with Other Layer	Inflow	7.59	7.66
	Outflow	7.66	7.59

Note:
Inflow means that groundwater flowing into the aquifer of that layer.
Outflow means that groundwater flowing out of the aquifer of that layer.
Vertical flow means the flow exchange between layer 1 and layer 2 through the bottom of the layer 1.

4.2 Calibrated Parameters

This section provides a summary of values assigned to the "calibration parameters" in the calibrated model.

The calibrated net recharge distribution is illustrated in **Figure 18** and summarized in **Table 4**. The net recharge was calibrated based on the initial estimates from the modeling experience for the Gilbert-Mosley Site (CDM 2006). The following net recharge zones were assigned in the model:

- A zone of 3.0 in/yr is assigned to most of the NIC Site and the northern portion of the Gilbert-Mosley Site, to better match observed water levels

- A zone of 4.0 in/yr was calibrated for the most of Gilbert-Mosley Site to better match the observed water levels

- A zone of much lower net recharge (0.04 in/yr) was added for the Grove Pond to present the minor groundwater/surface water interaction because of the clay liner at the bottom of the pond

- A zone of relatively higher net recharge (5 in/yr) was added for the Coleman Pond to indicate the infiltration from the pond to the groundwater

The calibrated hydraulic conductivity values (K_h for horizontal hydraulic conductivity and K_v for vertical hydraulic conductivity) in model layers 1 and 2 are summarized in **Table 4** and illustrated in **Figure 19** to **Figure 20**. The calibrated values for hydraulic conductivity are reasonable for the types of aquifer materials the model represents.

- A hydraulic conductivity of 1 ft/day for both K_h and K_v was assigned to the northeast corner of layer 1 to represent the clay unit in that area;

- The calibrated hydraulic conductivity distribution from the Gilbert-Mosley groundwater model was used with the increasing trend from 200 ft/day in the east to 800 ft/day in the west;

- Vertical anisotropy of 2:1 (K_h: K_v) was assigned to all hydraulic conductivity zones except the northeast corner of layer 1;

- The hydraulic conductivity values in the NIC Site follow the similar trend as in the Gilbert-Mosley Site with K_h increase from 200 ft/day in the east to 700 ft/day to the west, to match the observed water levels and to better match the plume migration patterns;

- A zone of 600 ft/day (K_h) was assigned to an area in layer 1 surrounding a stretch of Chisholm Creek between the 13th Street and the Center Street to provide more consistency with the plume migration patterns in that area.

The boundary conductance value is a lumped parameter. For the river boundary (*i.e.*, using MODFLOW River Package), the boundary conductance is based on river bed hydraulic conductivity, model cell width and/or length of the river, and the thickness of the river bed. For the GHB boundary, the boundary conductance is based on: GHB hydraulic conductivity; model cell width and saturated thickness of the GHB; and the distance to the GHB. The river and GHB boundary conductances were refined to have the simulated particle tracking consistent with the plume migration patterns.

The calibrated boundary heads and conductances are summarized in **Table 5** and illustrated in **Figure 21**. Due to the two low head dams on the Little Arkansas River, fine grain sediments that have accumulated in the pool area result in lower river bed hydraulic conductivity, as indicated by conductance values in reaches 8 and 36 (**Table 5**). Also, relative small river condutances in this area improved the model calibration.

4.3 Results of Verification of Calibrated Model

As discussed in Section 3.3, the calibrated model was also verified with August 2004 and January 2008 conditions. Model verification is that a different pumping stress is imported into the model without changing the other boundary conditions (rivers, GHBs, recharge, *etc.*) and aquifer properties (hydraulic conductivity, *etc.*) to see if the simulated water levels are in the reasonable range of the observed water levels.

Groundwater levels were simulated in response to August 2004 pumping stresses which show the City of Wichita Gilbert-Mosley remedial system is in operation. The predicted water levels were then compared to observed water levels in August 2004. This verification evaluation increases the confidence that the model well calibrated.

Table 6 lists the simulated water levels, observed water levels, and the residuals (observed minus simulated water levels) at each water level target. The statistics are also listed in **Table 6**.

The results indicate that the mean error is 0.55 ft, which is close to the goal of 0 ft with a little bias to simulated low. The mean absolute error (0.80 ft) divided by the range of observed values (43.93 ft) is 1.8% which is much lower than the 10% goal (and even below the more strict goal of 5%). **Figure 22** summarizes the simulated water levels versus the observed water levels on a "45-degree line". The simulated water levels for model layers 1 and 2 are illustrated in **Figure 23** and **Figure 24**. These figures can be compared to the previously interpreted water level map for August 2004 (**Figure 7**).

The January 2008 groundwater level measurements have also been verified by the calibrated model using the pumping stress of January 2008 in the model. **Table 7** lists the simulated water levels, observed water levels, and the residuals (observed minus simulated water levels) at each water level target. The statistics are also listed in **Table 7**. The mean error of -0.64 ft is close to the goal of 0 ft. The mean absolute error of 0.97 ft divided by the range of observed values (58.28 ft) is 1.7% which is much lower than the 10% goal and even below the much more strict goal of 5%. **Figure 25** shows the simulated water levels versus the observed water levels on a "45-degree line".

CDM has provided three zip files on a CD as **Attachment F4**. These three zip files, Test23.zip, Test23_04.zip, and Test23_08.zip contain the input and output files as well as the Groundwater Vista files for the model calibration and verification. Test23.zip is for model calibration for August 2001 period. Test23_04.zip is for model verification for August 2004 period. Test23_08.zip is for model verification for January 2008 period.

4.4 Overview of Model Sensitivity

Sensitivity of a model parameter is often expressed as the degree of change in the model results relative to a specific change in the model parameters. Therefore a model is sensitive to a parameter/boundary when a small change in the input parameter or boundary condition causes a significant change in the model results. The following model parameters have been changed to evaluate the sensitivity of these parameters to the model calibration results:

- Sensitivity 1 – Increasing hydraulic conductivity values and net recharge values by 50%;

- Sensitivity 2 – Increasing conductance values of Arkansas River, Little Arkansas River, and Chisholm Creek and its branches by a factor of 2;

- Sensitivity 3 – Lower river stages of Chisholm Creek and its branches by 0.5 ft; and

- Sensitivity 4 – Increase river stages of Arkansas River, Little Arkansas River, Chisholm Creek and its branches by 1.0 ft.

The same sensitivity analyses above were also performed to evaluate the impact of some aquifer properties and boundary conditions on the extent of the capture zones of the groundwater extraction wells. The discussion of the sensitivity analysis on capture zones is presented in Section 5.6. The calibration statistics for the model calibration run and the four sensitivity runs are listed in the table below.

Statistics	**Calibration**	**Sensitivity 1**	**Sensitivity 2**	**Sensitivity 3**	**Sensitivity 4**
Residual Mean	-0.57	-0.76	-0.48	-0.38	-1.55
Res. Std. Dev.	1.72	1.78	1.79	1.72	1.74
Abs. Res. Mean	1.08	1.22	1.05	1.02	1.80
Abs. Res. Mean/Head Range	1.4%	1.6%	1.3%	1.3%	2.3%

Note:
Res. Std. Dev. = Residual Standard Deviation
Abs. Res. Mean = Absolute Residual Mean

As indicated from the table above, the calibration statistics are not much different from each other between the calibration run and sensitivity runs 1, 2, and 3. Increasing the hydraulic conductivities and net recharge by 50% has little change to the calibration statistics; however, it provides a worst case scenario for the capture zones of the proposed remedial alternative (see discussion in Section 5.6.1). Increasing the river conductances and lowering the river stages of Chisholm Creek and its branches improve the calibration statistics slightly. Increasing the river stages worsens the model calibration, but it is still within the reasonable range. However, increasing river condutances and changing the river stages has little impact to the capture zones of proposed remedial alternative (Sections 5.6.2 to 5.6.4).

A uniform effective porosity value of 0.3 is used for the whole model domain. The effective porosity affects the travel time of the particles on particle tracking results. Since the lithologic variation within the Site is not significant and no Site-specific effective porosity is available, the uniform value for effective porosity used in the model is reasonable and relatively conservative. All simulations were conducted in steady-state

mode, so the only impact of the effective porosity estimate is the groundwater velocity. The effective porosity has no impact on the particle path, just the length of time for particle traveling. Since the final capture zones are the major concern to determine the pumping strategies, there is no need to perform the sensitivity analysis on effective porosity regarding the model calibration.

4.5 Simulated Groundwater Velocity

Once the model was calibrated, particle tracking was performed using MODPATH v3.0 to simulate pathlines of groundwater flow at several selected locations. Particles were input at various locations within the Site where groundwater contamination was known to be present. The model was allowed to run and produce five year increments of particle tracking. Results of the particle tracking are provided in **Attachment F3** to this Appendix. The particle tracking results were used to estimate groundwater advective velocity (without retardation effects) and travel times under current known pumping conditions. Groundwater velocities for the input areas are estimated based upon the particle tracking in **Attachment F3**. The 5-year increments were based upon an effective porosity of 30 percent.

Location	Capture Area (GWU)	Approximate 5-Year Travel Distance	Groundwater Velocity (ft/yr)
Location 1 - Near projected 27th and Santa Fe intersection	2	4274	855
Location 2 - Near 21st and Mosley intersection	2	3562	712
Location 3 - at K96 and Hydraulic intersection	1	2290	458
Location 4 - near 13th and Mosley intersection	3	3698	740
Location 5 - near 11th and State intersection	4	5246	1049

5.0 Evaluation of Remedial Alternatives

Simulations were performed to evaluate the extent of the capture of different hydraulic containment alternatives. Due to extent of TCE plume in deep aquifer is more widespread than that in shallow aquifer, the simulated capture zones were compared to the TCE plume in deep aquifer to determine whether the capture zones are sufficient relative to the TCE plume outlines. **Figure 26** illustrates the TCE plume in the deep aquifer as well as the proposed six groundwater units (GWUs), formerly referred to as operable units (OUs).

The following hydraulic containment alternatives are evaluated and simulated:

- Alternative 1: This alternative is to contain TCE plumes at the downgradient extents of GWU3 and GWU4 along the southern boundary of NIC Site. Extraction wells are placed at the downgradient extent of GWU3 and GWU4. Multiple simulations were performed to determine the optimal locations and pumping rates of the extraction wells, as well as the minimum number of extraction wells required to provide plume capture.

- Alternative 2: In addition to the containment at the downgradient extent of GWU3 and GWU4 plumes, an extraction well is also placed in the GWU3 interior areas with high TCE concentration in order to remove the contaminant mass. Multiple simulations were performed to determine the locations and pumping rate of the mid-GWU3 extraction well.

- Alternative 3a: This scenario is to simulate the GWU2 pumping to contain the high concentration plume in GWU2 in addition to the capture of GWU3 and GWU4 plumes as in Alternative 1. A pumping well is placed at the downgradient extent of 100 µg/L TCE plume in GWU2 between the West Fork and the unnamed drainage to represent the remediation system to be considered for GWU2 containment.

- Alternative 3b: This scenario is same as Alternative 3a except it is based on Alternative 2, *i.e.*, an extraction well is placed in the mid-plume area of GWU3.

- Alternative 4: This scenario is to simulate more aggressive mass removal in the interior of GWU1 to GWU4 and more aggressive containment along Chisholm Creek. Several remediation wells are proposed at the high concentrations areas and along Chisholm Creek.

For each simulation, the calibrated flow model was used to predict the steady-state groundwater flow field for different pumping scenarios, and then particle tracking was performed using MODPATH v3.0 to simulate the capture zones of proposed remediation wells and to assess effectiveness of hydraulic capture by comparing the simulated capture zones with the TCE plume. A trial-and-error approach was used to determine the appropriate locations and pumping rates of the remediation wells. All the

proposed remediation wells are fully penetrating wells of the aquifer, *i.e.*, screened in both model layers.

The technique used for this particle tracking exercise was to release a particle in every model cell in areas of GWU2, GWU3, GWU4, GWU5, most GWU1, and in areas west of the Site. Each particle is then tracked forward in space and time, and the final location of each particle is identified. A symbol is posted at the initial location of each particle captured by the proposed remediation well and some existing extraction wells.

As can be seen in the modeling results and as noted in the NIC RI Report, Chisholm Creek is a gaining stream; therefore, groundwater discharge to surface water is occurring. This includes the discharge of VOC contaminants to the surface water. Surface water sampling of the Chisholm Creek system has been conducted during the NIC RI and FS work, El Paso monitoring, Clean Harbors monitoring, 29th and Grove monitoring, and the Gilbert-Mosley Site Investigation and monitoring. Discharge of contaminated groundwater within the NIC Site, especially within the GWU3 stretch has been occurring since at least 1997 based upon groundwater plume contouring presented in the NIC RI (CDM 2007a). To date, no chlorinated solvents associated with the NIC Site-wide groundwater contaminants have been detected above the federal drinking water standard MCLs in Chisholm Creek within the GWU3 area or further downstream within the Gilbert-Mosley Site. Therefore, the alternatives evaluated and presented in this model report have not been configured to fully capture the VOC plumes before they intersect Chisholm Creek.

5.1 Alternative 1: Containment of GWU3 and GWU4 Plumes

Simulations using trial-and-error approach were performed to determine the locations and pumping rates of the remediation wells that could contain the TCE plumes at the downgradient extents of GWU3 and GWU4.

In addition to containment, another target for the modeling was to determine the minimum number of wells necessary to achieve containment in order to minimize long term maintenance costs. The selected well configuration may allow a very minor portion of the NIC GWU3 contaminant plume to pass from the NIC Site into the Gilbert-Mosley Site. However the Gilbert-Mosley remediation groundwater extraction system, including the Coleman Downtown Wichita Facility pumping wells, will address the portions of the NIC groundwater plume not captured by the NIC containment system. Simulations were performed to find the combination of number of wells, locations, and pumping rates in order to achieve the containment of GWU3 and GWU4 with minimum number of wells.

Two extraction wells are proposed at the downgradient extent of the GWU3 plume and one well is proposed to contain the GWU4 plume along the southern property boundary. **Figure 27** shows the locations of the proposed remediation wells and the capture zones of 5, 10, 15, 20, 25 years and final capture zones for the proposed wells and some existing wells. As indicated by **Figure 27**, different colors represent the areas

of groundwater captured by different extraction wells. The following observations are made:

- One well, NIC#4-1, with a pumping rate of 120 gpm is required to achieve the capture of GWU4 plume. A small portion of GWU4 plume in the southwest with low concentration in migrates south toward the sump pump 36767. The capture of GWU4 plume is achieved within five years based on the particle tracking results.

- Two remediation wells, NIC#3-1 and NIC#3-2, with total pumping rate of 205 gpm are required to capture most GWU3 plume at the southern property boundary. A small portion of low concentration plume (near MCL levels) migrates past the southern Site boundary and eventually is captured by Coleman wells (RW wells) as presented by area covered in light blue and the Gilbert-Mosley remediation well EW-B3 as indicated by the area covered in deep yellow. The capture of one pore volume within the GWU3 plume is achieved within 10 years based on the particle tracking results.

- North portion of GWU plume continues migrating to Chisholm Creek. GWU1 and most of GWU2 plumes also discharge into Chisholm Creek and its branches. However, even though the discharge of contaminated groundwater to Chisholm Creek and its branches within GWU1 and GWU2 has been occurring since at least 1997, there have only been three isolated historical detections of chlorinated solvents exceeding MCLs associated with the NIC Site-wide groundwater contaminants. No NIC Site-wide groundwater chlorinated solvent MCL exceedences in the surface waters within GWU1 and GWU2 were observed in the 2007-2008 surface water samples.

The table below lists the pumping rates of the proposed extraction wells for this alternative.

Proposed Extraction Well	Location	Pumping Rate (gpm)
NIC#3-1	Downgradient of GWU3	140
NIC#3-2	Downgradient of GWU3	65
NIC#4-1	Downgradient of GWU4	120

5.2 Alternative 2: Containment of GWU3 and GWU4 Plumes, and GWU3 Interior Pumping

In addition to the containment at the downgradient extent of GWU3 and GWU4 plumes, extraction wells were also considered with placement within the interior of the GWU3. The goal of the pumping at interior plume area was to remove the contaminant mass.

Simulations were run on a trial and error basis with the placement of one to two interior plume wells at various locations and at various pumping rates. The presented

alternative consists of one well placed in the interior of GWU3, as shown on **Figure 28**. **Figure 28** shows the 5, 10, 15, 20, 25 year capture zones and final capture zones of the proposed wells as well as some existing wells. The following observations are made as follows:

- GWU4 containment well NIC#4-1 is required to have pumping rate of 120 gpm to achieve the capture of GWU4 plume. The capture covers the GWU4 plume within five years based on the particle tracking results.

- The total pumping rate at downgradient GWU3 is 205 gpm. Similar capture zones are achieved as in Alternative 1 by proposed wells NIC#3-1 and NIC#3-2. A small portion of low concentration plume (near MCL levels) migrates past the southern Site boundary and eventually is captured by Coleman wells (RW wells) and the Gilbert-Mosley remediation well EW-B3. The capture of GWU3 plume by these downgradient wells (NIC#3-1 and NIC#3-2) is achieved within 10 years based on the particle tracking results.

- The capture zone of the GWU3 interior well, NIC#3-3 with pumping rate of 110 gpm, covers most of GWU3 plume north of the 13th Street which migrates to Chisholm Creek in Alternative 1. Between five to 10 years of pumping, this well starts to capture the plume from GWU2.

- The capture zones of the GWU3 interior well NIC#3-3 and the GWU3 downgradient wells (NIC#3-1 and NIC#3-2) are not overlapping primarily because of the direction of groundwater flow in the south-central and southeastern portion of GWU3. Thus, the addition of NIC#3-3 within GWU3 does not appear to significantly reduce the operational time of the downgradient plume containment wells (NIC#3-1 and NIC#3-2).

- The remainder of the GWU3 plume that is not captured by three GWU3 remediation wells continues migrating to Chisholm Creek. However, no chlorinated solvents associated with the NIC Site-wide groundwater contaminants have been detected above MCLs in Chisholm Creek even though the discharge of contaminated groundwater to Chisholm Creek appears to have been occurring since at least 1997.

The table below lists the pumping rates of the proposed extraction wells for this alternative.

Proposed Extraction Well	Location	Pumping Rate (gpm)
NIC#3-1	Downgradient of GWU3	140
NIC#3-2	Downgradient of GWU3	65
NIC#3-3	Interior of GWU3	110
NIC#4-1	Downgradient of GWU4	120

5.3 Alternative 3a: GWU2 Plume Containment Along with Containment of GWU3 and GWU4 Plumes

The remediation of GWU2 plume is considered in this alternative. To evaluate the impact of GWU2 pumping on the capture zones of GWU3 remediation wells, a pumping well is placed at downgradient of 100 µg/L TCE plume between the West Fork and the unnamed drainage for GWU2 containment.

In addition to the proposed pumping strategy in Alternative 1, simulations were performed to include GWU2 pumping. **Figure 29** shows the capture zones of GWU3 and GWU4 downgradient extraction wells as well as the capture zone of GWU2 extraction well NIC#2-1. There are basically no changes to capture zones of GWU3 and GWU4 remediation wells comparing to Alternative 1. Within 10 years of operation of GWU2 well NIC#2-1, the capture of 100 µg/L TCE plume in GWU2 is achieved.

The table below lists the pumping rates of the proposed extraction wells for this alternative.

Proposed Extraction Well	Location	Pumping Rate (gpm)
NIC#2-1	GWU2	100
NIC#3-1	Downgradient of GWU3	140
NIC#3-2	Downgradient of GWU3	65
NIC#4-1	Downgradient of GWU4	120

5.4 Alternative 3b: GWU2 Plume Containment Along with Containment of GWU3 and GWU4 Plumes and GWU3 Interior Pumping

Same as Alternative 3a, a GWU2 containment well is placed at the downgradient extent of the 100 µg/L TCE plume in GWU2 in addition to the pumping strategy of Alternative 2 for GWU3 and GWU4. **Figure 30** shows the capture zones of GWU2, GWU3, and GWU4 extraction wells. The capture zone of GWU3 interior extraction well NIC#3-3 is pushed slightly to the west in GWU2 area due to the pumping in GWU2. The table below lists the pumping rates of the proposed extraction wells for this alternative.

Proposed Extraction Well	Location	Pumping Rate (gpm)
NIC#2-1	GWU2	100
NIC#3-1	Downgradient of GWU3	140
NIC#3-2	Downgradient of GWU3	65
NIC#3-3	Interior of GWU3	110
NIC#4-1	Downgradient of GWU4	120

5.5 Alternative 4: More Aggressive Mass Removal and Containment Along Chisholm Creek

The KDHE provided comments on the draft FS report indicating that containment scenarios that would prevent plume migration into Chisholm Creek and provide complete containment of the plume along the southern NIC property boundary should be evaluated. As a result of the January 27, 2011 meeting with the KDHE, the KDHE indicated that complete plume containment prior to discharge to Chisholm Creek was no longer a priority but more aggressive pumping scenarios focusing on mass removal within the interior of the plumes was still required. Therefore, an alternative was proposed where additional pumping wells addressing the high groundwater concentrations within GWU1, GWU2, and GWU3 units was developed and evaluated. Additionally, the KDHE agreed to consider the use of extraction wells within the northern portion of the Gilbert-Mosley Site to provide supplemental containment of the NIC groundwater plumes, but wanted contingency wells evaluated to provide containment within the NIC Site.

The Coleman Downtown Wichita facility wells (RW-5, RW-6, and RW-7) are located adjacent to the NIC southern property boundary. Several extraction wells of the Gilbert-Mosley remediation system are also located very close to the NIC southern property boundary. The pumping of these two facilities results in the high hydraulic gradient at the southern property boundary. It would be difficult to reverse this high hydraulic gradient at the southern property boundary without impacting the operation of the Gilbert-Mosley wells. Moreover, there will be only a small amount of TCE plumes with low concentrations migrating past the property boundary and being captured by RW wells of the Coleman Downtown Wichita facility and EW-B3 of the Gilbert-Mosley remediation system.

Simulations and particle tracking were performed to determine the locations and pumping rates of the proposed remediation wells. The following extraction wells are evaluated in this Alternative:

- Two extraction wells, NIC#3-1 and NIC#3-2 are proposed at the downgradient extent of the GWU3 plume to contain the plume at the property boundary.
- One well NIC#4-1 is proposed to contain the GWU4 plume along the southern property boundary.
- Two extraction wells within GWU3, NIC#3-4 and NIC#3-5, are proposed along Chisholm Creek to prevent the high concentration plume migrating to the river.
- Two extraction wells, NIC#2-1 and NIC#2-2, are proposed to contain the high concentration plume in GWU2.
- Three interior extraction wells, NIC#1-1, NIC#3-3, and NIC#4-2, are proposed to aggressively remove the mass in GWU1, GWU3, and GWU4, respectively.

The capture zones of 5, 10, 15, 20, 25 years and final capture zones for the proposed wells and some existing wells, as well as the locations of the proposed contingency remediation wells, are shown on **Figure 31**. Different colors represent the areas of groundwater captured by different extraction wells. The following observations are made:

- A 50 gpm pumping well at proposed location NIC#1-1 in GWU1 area will contain and clean up the northern portion of GWU1 plume.

- GWU2 well NIC#2-1 with pumping of 130 gpm can fully contain the portion of GWU2 plume with high concentration of 100 µg/L between the West Fork and the unnamed drainage. The other GWU2 well, NIC#2-2, pumping 50 gpm will intercept the portion of the 100 µg/L plume within GWU2 south of 21st Street before it migrates to Chisholm Creek.

- With NIC#3-1 and NIC#3-2 pumping a total 200 gpm, the GWU3 plume can almost be fully contained along the southern property boundary except for a very small portion between wells NIC#3-1 and NIC#4-1. The small area not captured within the NIC Site is a low concentration plume that is being captured by RW wells and EW-B3.

- The capture zone of NIC#3-3 with pumping rate of 100 gpm basically covers a greater than 20 µg/L lobe of GWU3 plume that is separate from the main GWU3 plume.

- NIC#3-4 and NIC#3-5 with pumping rates of 50 gpm each address the higher contamination plumes within GWU3 that are migrating toward Chisholm Creek in the southern portion of the Site (south of 13th Street).

- With NIC#4-1 pumping at a rate of 120 gpm at the downgradient of GWU4 plume, the GWU4 plume north of the well is almost fully contained. The interior well NIC#4-2 pumping at a rate of 100 gpm will speed the mass removal and shorten the cleanup time of GWU4 plume.

- The containment of GWU4 plume will be achieved in five years. The capture of GWU3 plume will be reached in 10 years. The capture of targeted GWU2 plume will be achieved between five and 10 years.

The pumping rates of each proposed well is listed in the table below.

Proposed Extraction Well	Location	Pumping Rate (gpm)
NIC#1-1	Interior of GWU1	50
NIC#2-1	GWU2	130
NIC#2-2	Downgradient of GWU2	50
NIC#3-1	Downgradient of GWU3	140

Proposed Extraction Well	Location	Pumping Rate (gpm)
NIC#3-2	Downgradient of GWU3	60
NIC#3-3	Interior of GWU3	100
NIC#3-4	Interior of GWU3	50
NIC#3-5	Interior of GWU3	50
NIC#4-1	Downgradient of GWU4	120
NIC#4-2	Interior of GWU4	100

5.6 Sensitivity Analysis on Capture Zones

Sensitivity analysis was performed on capture zones to test the model robustness. Alternative 4 was used as the base case for the sensitivity analysis. Three sensitivity analyses were performed to evaluate the sensitivity of the model parameters on the capture zones.

- A worst case scenario with higher hydraulic conductivity values and higher net recharge;
- Increased river conductances;
- Lower river stages; and
- Increased river stages.

A uniform effective porosity value of 0.3 is used for the whole model domain. The effective porosity affects the travel time of the particles on particle tracking results. Therefore, the effective porosity has no impact to the final capture zones, but it does impact the cleanup time estimates. The higher the effective porosity, the lower the groundwater flow velocity, and thus the longer the cleanup time. The effective porosity of 30 percent is conservative with respect to estimating cleanup times. A lower effective porosity will reduce the duration of the pumping events to achieve seven pore volume removal within the plume.

5.6.1 Capture Zones with Higher Hydraulic Conductivity and Higher Net Recharge

Sensitivity analysis on higher recharge and higher hydraulic conductivity was performed to evaluate a worst case scenario for capture zones. All zones of the hydraulic conductivity and all zones of net recharge were increased by a factor of 1.5 (*i.e.*, increase by 50%). The capture zones for the proposed wells and some existing wells are shown on **Figure 32**. By comparing the results to the results of Alternative 4 (**Figure 31**), the following observations was made:

- With higher hydraulic conductivity and higher recharge, the capture zone for each well is much narrower.

- With higher hydraulic conductivity, the groundwater flow rate is higher. The capture zones are much longer at same time period.

- NIC#2-2 can still contain 100 µg/L plume in southern GWU2 that is flowing into the main fork of Chisholm Creek. The capture of 100 µg/L plume between the West Fork and the unnamed drainage is almost achieved by the combined pumping of NIC#2-1 and NIC#2-2.

- The containment along the NIC southern property boundary is still achieved by the combined pumping from NIC#3-1, NIC#3-2, RW wells, and EW-B3.

- There are small gaps occurring between the capture zones of NIC#3-2 and NIC#3-5 and NIC#3-4 and NIC#3-5. NIC#3-4 captures most of 100 µg/L plume but small amounts continue migrating into Chisholm Creek from both sides of capture zone of NIC#3-5.

The results indicate the that model is sensitive to the impact of higher hydraulic conductivity and net recharge, but that capture and containment goals are still primarily achieved even with a 50% increase in the input values.

5.6.2 Capture Zones with Higher River Conductances

Sensitivity analysis was performed on river conductances to evaluate the impact of the river conductances on capture zones. The river conductances of the Arkansas River, Little Arkansas River, Chisholm Creek and its branches are doubled. The capture zones are shown on **Figure 33**. By comparing with base case (**Figure 31**), there are little differences on capture zones except that the capture zones shift slightly to the west. This indicates that the simulated capture zones are not sensitive to river conductances.

5.6.3 Capture Zones with Lower River Stages

Sensitivity analysis was performed on river stages to evaluate the impact of the river stages on capture zones. The river stages of Chisholm Creek and its branches were lowered by 0.5 ft which is reasonably representative for seasonal changes and the uncertainty associated with the surface water level measurements. The capture zones are shown on **Figure 34**. There are no noticeable differences on capture zones when compared to the base case (**Figure 31**). This demonstrates that the capture zones are not sensitive to river stages on Chisholm Creek and its branches.

5.6.4 Capture Zones with Higher River Stages

Sensitivity analysis was performed on river stages to evaluate the impact of the river stages on capture zones. The river stages of all rivers and creeks were increased by 1.0 ft which is reasonably representative for seasonal changes and the uncertainty associated with the surface water level measurements. The capture zones are shown on **Figure 35**. There are no noticeable differences on capture zones when compared to the base case (**Figure 31**). This demonstrates that the capture zones are not sensitive to river stages.

6.0 Summary and Conclusions

A steady-state flow model for the NIC Site has been constructed and calibrated. The model also includes the Gilbert-Mosley Site in the south. For the August 2001 calibration period, the model reasonably matches observed water levels, and also reasonably matches observed flow patterns. The model was also calibrated to the plume migration patterns via particle tracking analysis. Additional verification of model regarding observed water levels in August 2004 and January 2008 in response to different pumping rates increases confidence that the model reasonably represents the real-world system.

The hydraulic containment alternatives simulated using the calibrated model and particle tracking method are:

- Alternative 1: This alternative is to contain TCE plumes at the downgradient extents of GWU3 and GWU4 along the southern boundary of NIC Site.

- Alternative 2: In addition to the containment at the downgradient extent of GWU3 and GWU4 plumes, an extraction well is also placed in the GWU3 interior areas with high TCE concentration in order to remove the contaminant mass flowing into Chisholm Creek.

- Alternative 3a: In addition to the containment at the downgradient extent of GWU3 and GWU4 plumes (Alternative 1), this scenario includes an extraction well within GWU2 pumping at the downgradient extent of the 100 μg/L TCE plume.

- Alternative 3b: This scenario is same as Alternative 3a plus an additional extraction well in GWU3 in the position evaluated for Alternative 2.

- Alternative 4: This scenario is to simulate more aggressive mass removal in the interior of GWUs 1 through 4 combined with more aggressive plume containment along Chisholm Creek. A number of interior plume extraction wells have been added to Alternative 1.

Alternative 1

Two extraction wells with total pumping of 205 gpm are placed at the downgradient of GWU3 plume at the property boundary. The particle tracking results indicate that the majority of the GWU3 plume along the southern NIC Site boundary is captured. A small portion of GWU3 plume would migrate past the NIC Site boundary and be captured by RW wells of Coleman Downtown Wichita remediation system and EW-B3 of the Gilbert-Mosley remediation system. The northern portion of the GWU3 plume would be contained by Chisholm Creek. The capture of GWU3 plume will be achieved within 10 years based on particle tracking results. One extraction well with pumping of 120 gpm is required to capture GWU4 plume along the southern NIC Site boundary. The capture of GWU4 plume will be achieved in five years based on particle tracking results.

Alternative 2

Alternative 2 is the same as the Alternative 1 except that one GWU3 interior well with pumping of 110 gpm is placed on the 13th Street. The interior pumping would capture portions of the GWU3 and GWU2 plumes. The interior GWU3 well (NIC#3-3) would not significantly reduce the operation time of the downgradient plume containment wells (NIC#3-1 and NIC#3-2) because the capture zone of the GWU3 interior well does not overlap with the GWU3 downgradient wells.

Alternative 3a

Alternative 3a includes the Alternative 1 pumping scenario plus one GWU2 extraction well (NIC#2-1) pumping at 100 gpm. NIC#2-1 is placed at the downgradient extent of the 100 µg/L TCE plume between the West Fork and the unnamed drainage. The complete capture of the 100 µg/L TCE plume in GWU2 is mostly achieved. Within five years of operation of NIC#2-1, the capture of 100 µg/L TCE plume in GWU2 above 21st Street would be achieved based on particle tracking results.

Alternative 3b

Alternative 3b includes the Alternative 2 pumping scenario and the GWU2 extraction well (NIC#2-1) identified in Alternative 3a. GWU3 interior pumping (NIC#3-3) and GWU2 pumping (NIC#2-1) capture most of GWU2 plume. Portions of the GWU2 and GWU3 plumes are contained by Chisholm Creek.

Alternative 4

Alternative 4 consists of the well locations in Alternative 3a with one interior well in GWU1, one downgradient extent well in GWU2, three additional interior wells in GWU3, and one interior well in GWU4.

One interior well, NIC#1-1, is placed in GWU1 with a pumping rate of 50 gpm to capture the bulk of the TCE contamination >100 µg/L north of 29th Street and south of the Coleman Northeast containment wells. The purpose of this well is to reduce the contaminant mass within a shorter time frame than a monitored natural attenuation time frame.

Two extraction wells are placed in GWU2. One well (NIC#2-1) has a pumping rate of 130 gpm and fully contains the >100 µg/L plume between the West Fork and the unnamed drainage. The other GWU2 well (NIC#2-2) has a pumping rate of 50 gpm and intercepts the portion of the >100 µg/L plume south of 21st Street that would migrate to Chisholm Creek.

Two extraction wells (NIC#3-1 and NIC#3-2) with total pumping rate of 200 gpm capture most of the downgradient GWU3 plume at the southern NIC Site boundary. A small portion of GWU3 plume will be captured by Gilbert-Mosley wells RW wells and EW-B3. The GWU3 interior NIC#3-3 well pumping at a rate of 100 gpm basically captures the >20 µg/L lobe that is separated from the main GWU3 plume area. Two other GWU3 extraction wells along Chisholm Creek (NIC#3-4 and NIC#3-5) would

pump at 50 gpm each and address most of the >100 μg/L plume within GWU3 before it is intercepted by Chisholm Creek.

Two extraction wells are placed in GWU4. One well (NIC#4-1) is placed at the downgradient extent of GWU4 with pumping rate of 120 gpm. The other well (NIC#4-2) is placed in the interior of the GWU4 plume to reduce the overall remediation time. The GWU4 plume is contained within the NIC Site. The interior well NIC#4-2 with a pumping rate of 100 gpm will speed the mass removal and shorten the cleanup time of GWU4 plume.

Model Sensitivity Analyses on Model Calibration and Capture Zones

Sensitivity analyses were performed to evaluate the impacts of aquifer properties and boundary conditions on the model calibration and the capture zones of proposed remedial alternative. Four sensitivity analyses were performed: 1) higher hydraulic conductivity and higher net recharge; 2) increased river conductances; 3) lower river stages; and 4) increase river stages.

The calibration statistics of these sensitivity simulations indicate that the higher hydraulic conductivity and higher net recharge, increased river condutances, and lower river stages have small impact to the calibration statistics. The latter two sensitivity simulations also improve the calibration statistics slightly. The sensitivity simulation with increasing river stages by 1.0 ft has relatively bigger impact to the calibration statistics but still with the reasonable range.

The capture zone sensitivity results indicate that capture zones are quite sensitive to hydraulic conductivity and net recharge. With a 50% increase in hydraulic conductivity and net recharge, the capture zones are narrower. However, the proposed pumping scenarios still contain the majority of the groundwater plumes at the southern NIC Site Boundary and complete containment is still achieved with the pumping from the RW wells and EW-B3. The full capture of the 100 μg/L plume areas in GWU2 can still be achieved. The 100 μg/L plume in GWU3 is not fully captured and a portion of the groundwater plume is contained by Chisholm Creek instead of the interior plume wells.

The simulated capture zones of the sensitivity simulation with the river conductances increased by 100% are almost the same as the base case. This indicates that the capture zones are not sensitive to river conductances. The river stages of Chisholm Creek and its branches are lowered by 0.5 ft and the river stages of all rivers are increased by 1.0 ft which are in the reasonable range for seasonal changes and uncertainty associated with water level measurements. The simulated capture zones of these two sensitivity simulations are basically the same as the base case. This indicates that the capture zones are not sensitive to river stages.

7.0 References

Camp Dresser & McKee Inc. (CDM). 2008. *North Industrial Corridor (NIC) Site Groundwater Modeling Work Plan.* October 2008.

CDM. 2007a. *North Industrial Corridor (NIC) Site Remedial Investigation Report.* February 2007.

CDM. 2007b. *North Industrial Corridor (NIC) Site Remedial Investigation Report Addendum.* February 2007.

CDM. 2007c. *Baseline Risk Assessment for the North Industrial Corridor.* February 2007.

CDM. 2006. *Second Semi-Annual 2005 Report and Annual Summary – Site Monitoring Network – Gilbert and Mosley – Wichita, Kansas. (NOTE: Appendix E provides the results of the Gilbert Mosley Site Model Re-Calibration and Assessment of Capture Zone).* March 2006.

CDM. 2004a. *Work Plan for Investigation Activities at Identified Source Areas in the NIC Site, Wichita, Kansas*. July 23, 2004.

CDM. 2004b. *Work Plan for Investigation Activities at Suspect Source Areas in the NIC Site, Wichita, Kansas*. March 29, 2004.

CDM. 2004c. *Fourth Quarter 2003 Report and Annual Summary – Site Monitoring Network – Gilbert and Mosley Site – Wichita, Kansas*. January 2004.

CDM. 2003. *Downgradient Investigation Activities in the NIC Site*. Letter to KDHE dated December 4, 2003.

CDM. 2000a. *North Industrial Corridor Final Work Plan Addendum*.

CDM. 2000b. *North Industrial Corridor Site Phase I/IA Technical Memorandum*.

CDM. 2000c. *Gilbert and Mosley Site, Wichita, Kansas - Draft Final Design Report – Final Interim Groundwater Remediation Plumes ABE*. April 2000.

CDM. 1997a. *North Industrial Corridor Field Sampling Plan*.

CDM. 1997b. *North Industrial Corridor Quality Assurance Project Plan*.

CDM. 1997c. *North Industrial Corridor Work Plan for RI/FS.*

The Forrester Group, Inc. 2006. *Revised Remedial Investigation Report, 29th and Grove Site, Wichita, Kansas, Case #01-E-0191*. June 16, 2006.

Harbaugh, A.W., Banta, E.R., Hill, M.C., and McDonald, M.G. 2000. *MODFLOW-2000, the U.S. Geological Survey modular ground-water model -- User guide to modularization*

concepts and the Ground-Water Flow Process: U.S. Geological Survey Open-File Report 00-92, 121 p.

Pollock, D.W. 1994. *User's Guide for MODPATH/MODPATH-PLOT, Version 3: A particle tracking post-processing package for MODFLOW, the U.S. Geological Survey finite-difference ground-water flow model:* U.S. Geological Survey Open-File Report 94-464, 6 ch.

City of Wichita. *North Industrial Corridor Application for Certificate and Release for Environmental Conditions, Love Box Company, Inc.*, 700 E. 37th Street North, Wichita, Kansas 67219.

G&E. 1997. "*Draft*" *Site Assessment Report, 1707 North Mosley Street, Wichita, Kansas.* G&E Engineering, Oklahoma City, Oklahoma, November 1997.

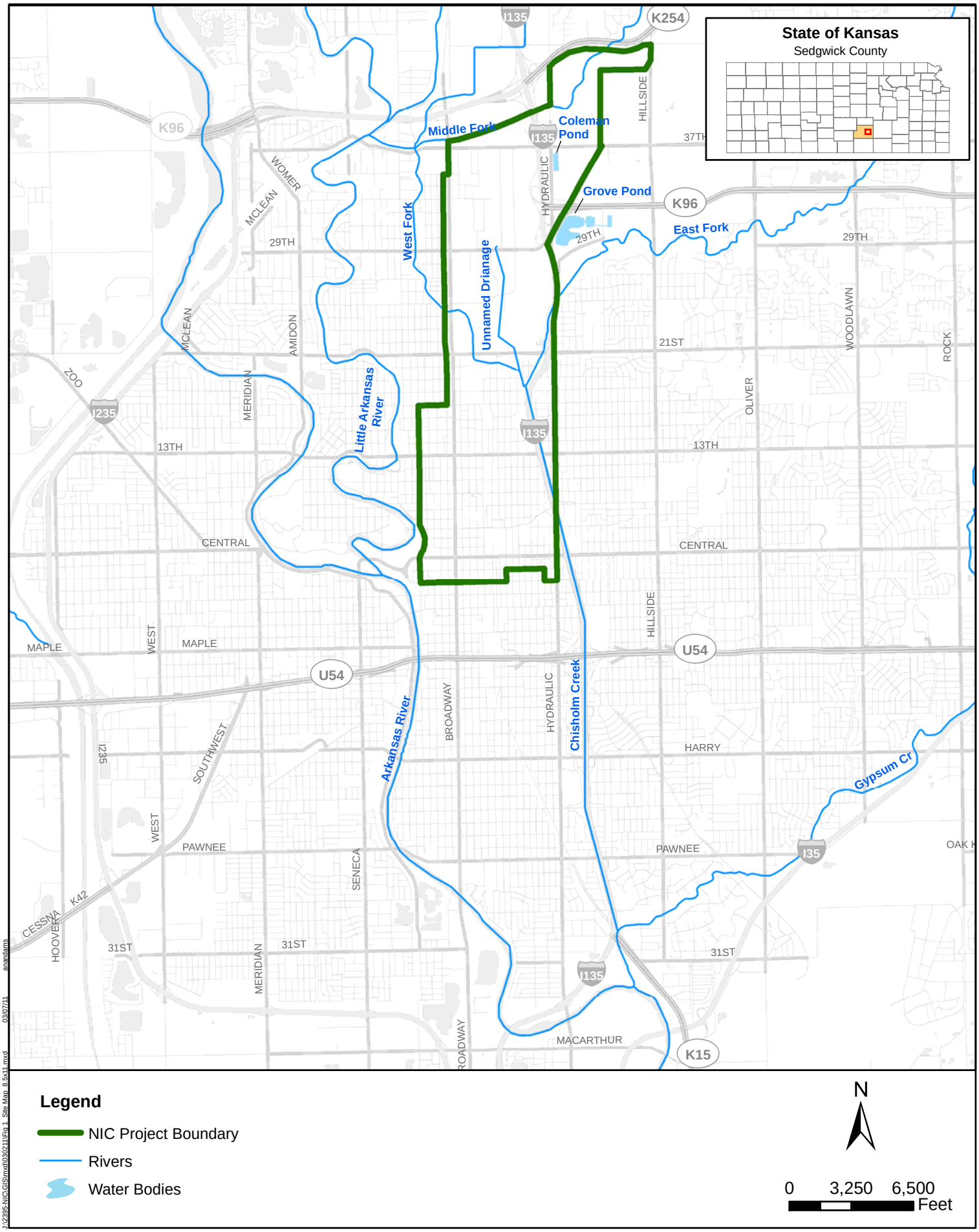
Kansas Department of Health and Environment (KDHE). 1993. *Expanded Site Investigation, 13th and Washington Site, Wichita, Kansas, CERCLIS Identification Number KSD984988456.* Kansas Department of Health and Environment, Bureau of Environmental Remediation, Pre-Remedial Unit/Remediation Section, September 1993.

Kreonite, Inc. 1998. *North Industrial Corridor Redevelopment District, Application for Certificate and Release for Environmental Conditions*. November 11, 1998.

TerraTech, 1993. *Preliminary Assessment, Groundwater Investigation Utilizing the Heated Headspace Method, 936 - 940 N. Waco, Wichita, Kansas.* Prepared for Bank IV Kansas, N.A.

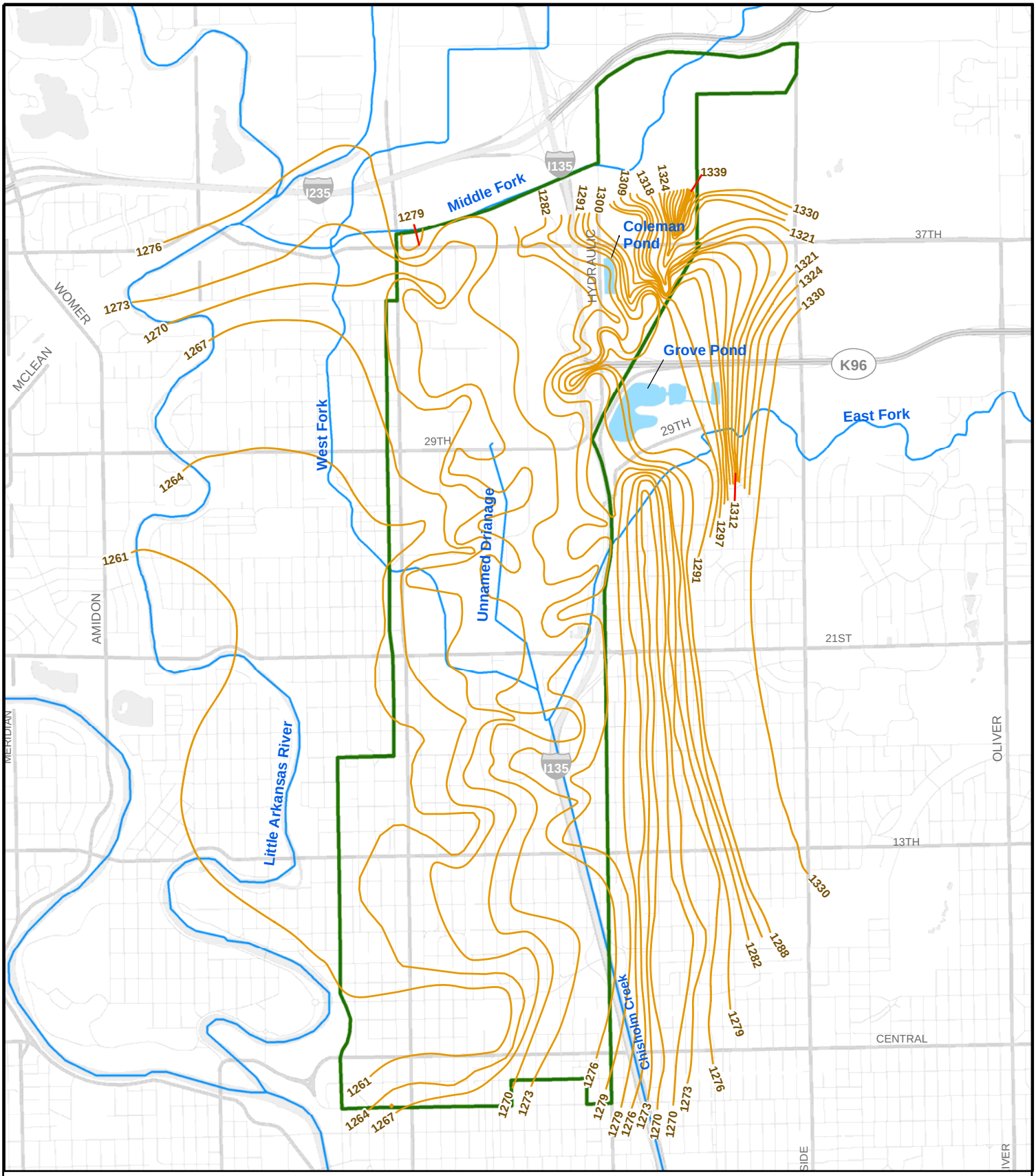
TerraTech, 1999. *Final Report, Phase II Sampling Investigation-Love Box Company Inc., June 1999.* Prepared for Love Box Company, Inc., 700 E 37th Street North, Wichita, Kansas.

United States Environmental Protection Agency (USEPA). 1985. *After Action Report, Superfund Immediate Removal – Johns' Refinery, Wichita, Kansas, - Site No. P-6.* United States Environmental Protection Agency Region VII, Emergency Planning and Response Branch, May 30, 1985.



CDM

Figure 1
Site Map
North Industrial Corridor (NIC)
Wichita, Kansas



Legend

- Bottom of Aquifer Elevation Contours (Contour Interval = 3.0 ft)
- NIC Project Boundary
- Rivers
- Water Bodies

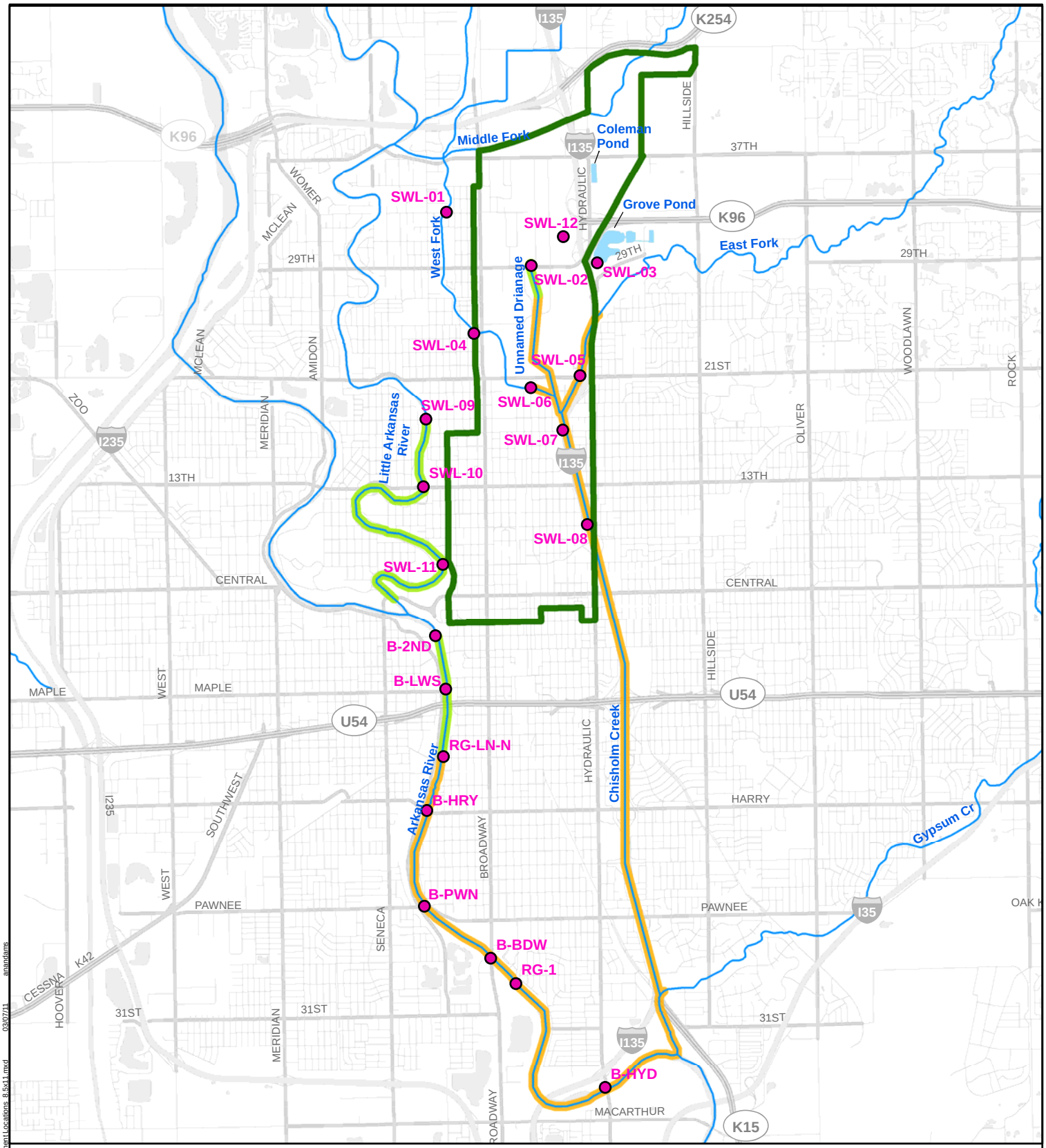
N

0 1,750 3,500 Feet

J:\2395-NIC\GIS\mxd\030211\Fig 2_Aquifer Base_8.5x11.mxd 03/03/11 anandams

CDM

Figure 2
Base of Aquifer Surface Map
North Industrial Corridor (NIC)
Wichita, Kansas



Legend

- Surface Water Station
- NIC Project Boundary
- Rivers
- Water Bodies
- Losing Stream
- Gaining Stream

Note:
Gaining and losing stretches identified in this figure are approximate and are based upon evaluations of potentiometric surface maps, surface water measurements, and visual observations at the Site.

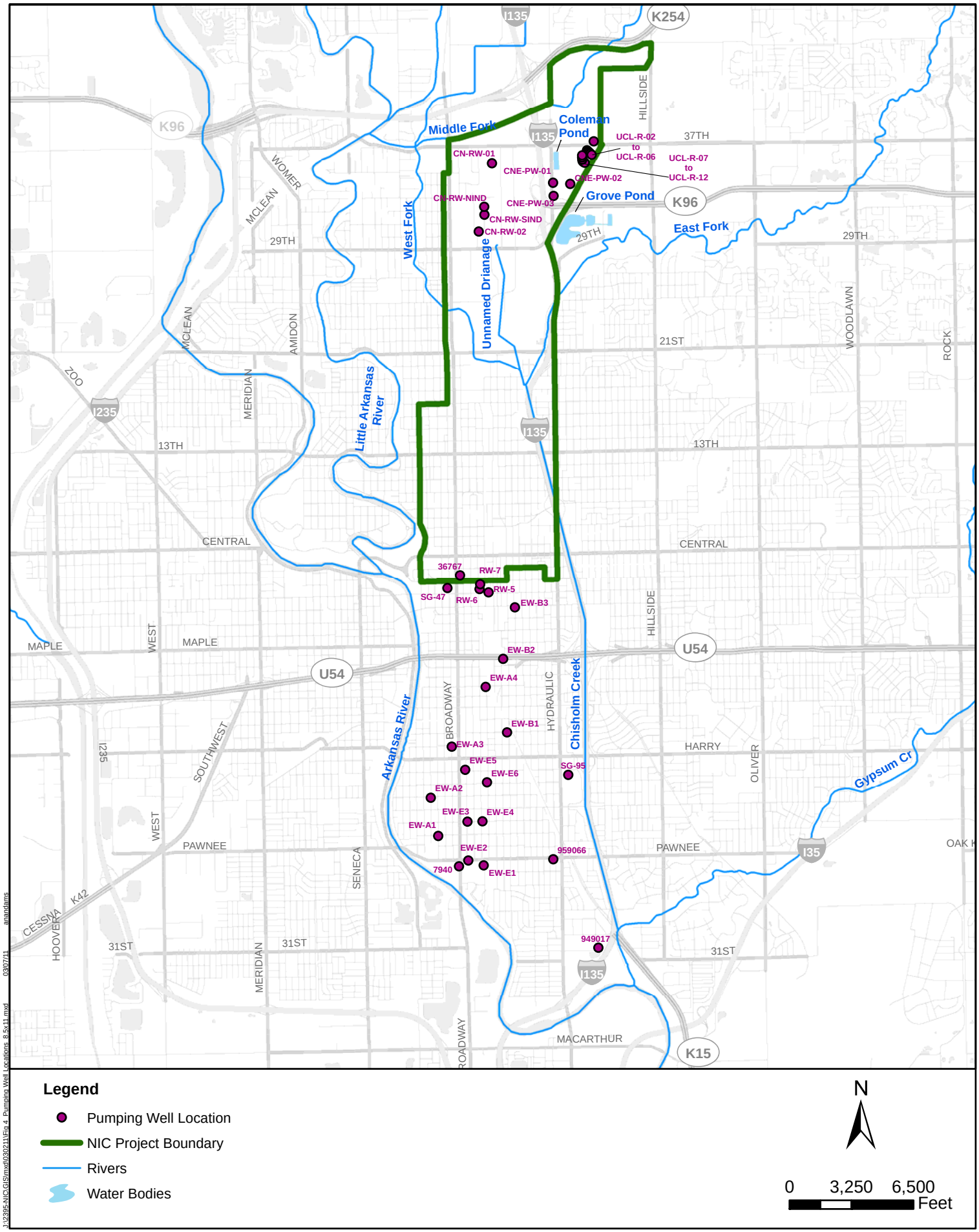
N

0 3,250 6,500 Feet

J:\2395-NIC\GIS\mxd\030211\Fig 3 SW Measurement Locations 8.5x11.mxd 03/07/11 anandians

CDM

Figure 3
Locations of Surface Water Level Measurements
North Industrial Corridor (NIC)
Wichita, Kansas



CDM

Figure 4
Locations of Pumping Wells Used in the Model
North Industrial Corridor (NIC)
Wichita, Kansas

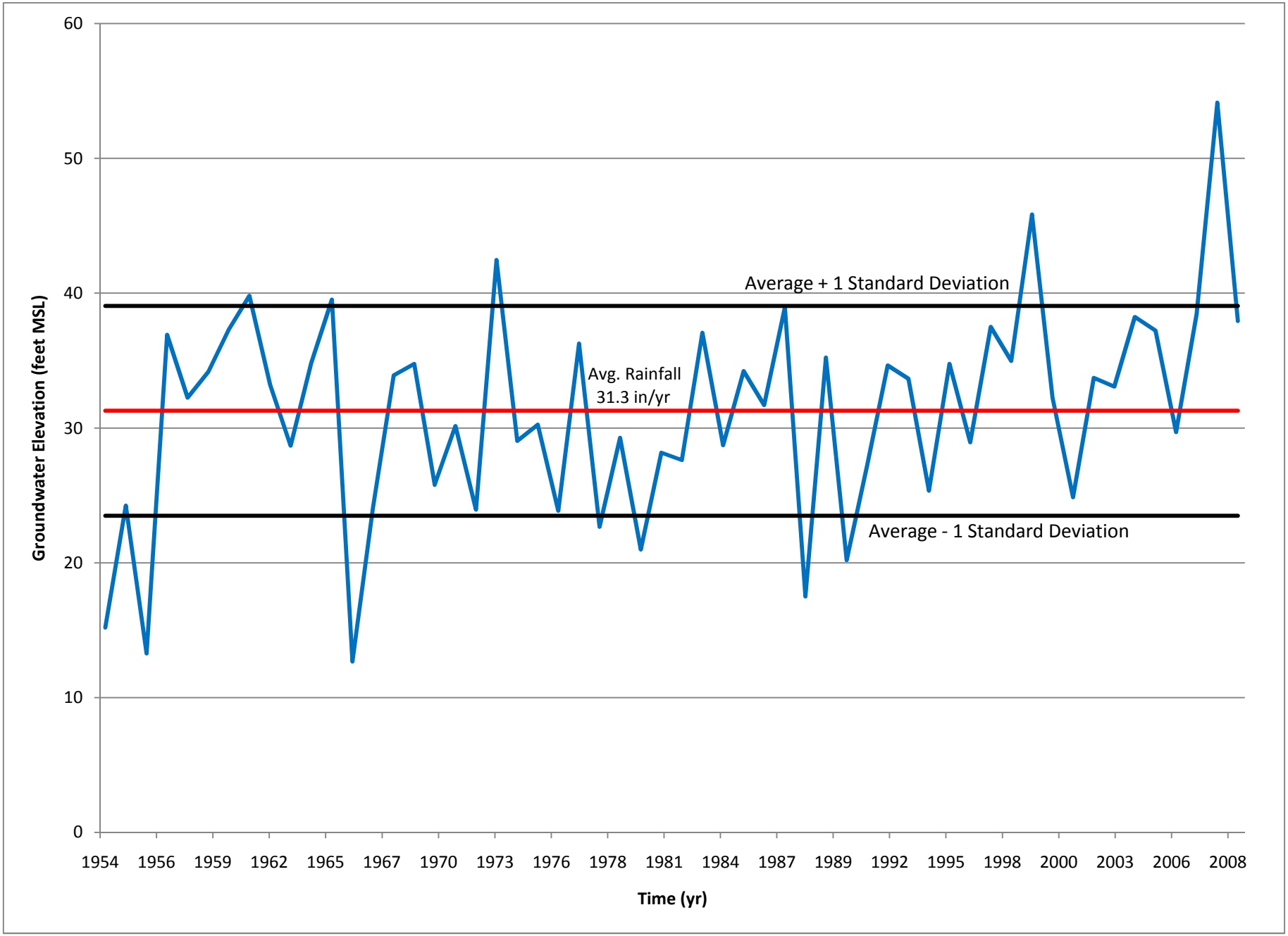
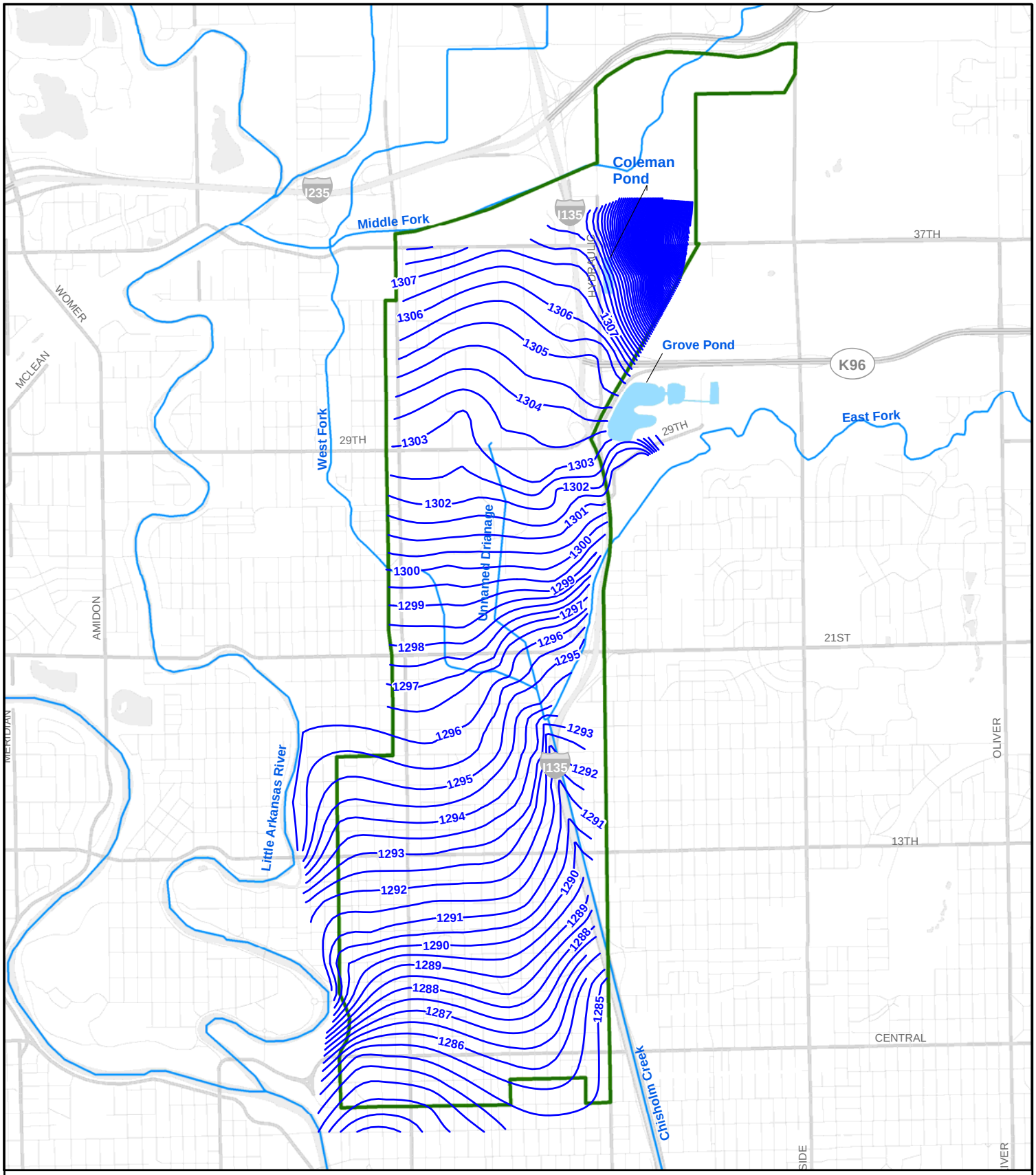


Figure 5
Long-Term Annual Precipitation at NOAA Station Wichita Mid-Continent
North Industrial Corridor (NIC)
Wichita, Kansas

CDM

J:\2395-NIC\Data\Water Levels\
WL Trends_with_Rainfall.xlsx



Legend

- August 2001 Groundwater Level Contours (Contour Interval = 0.5 ft)
- NIC Project Boundary
- Rivers
- Water Bodies

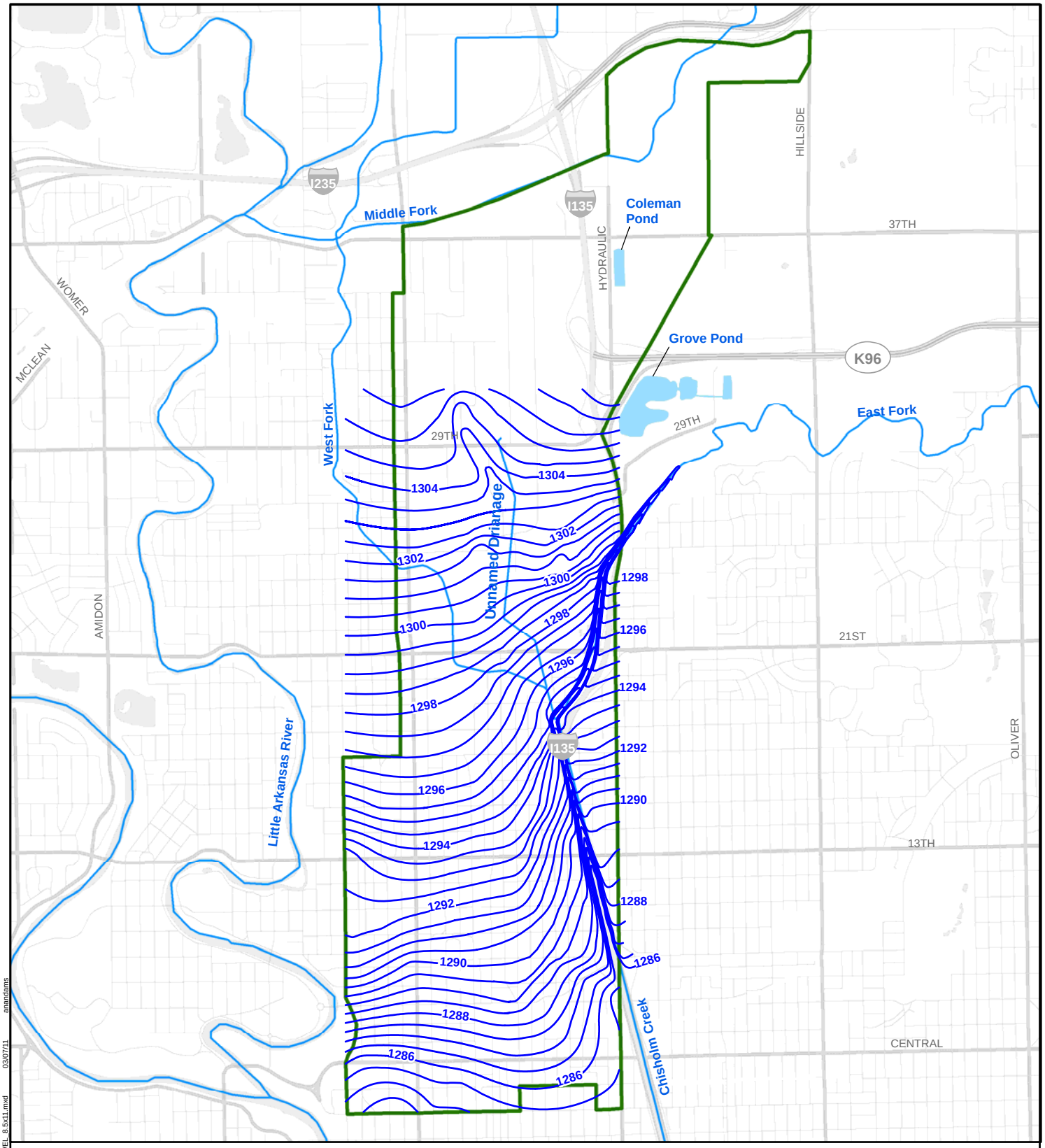
N

0 1,750 3,500 Feet

J:\2395-NIC\GIS\mxd\030211\Fig 5_Aug 2001_GWEL.mxd 03/03/11 anandams

CDM

Figure 6
Potentiometric Surface Map for August 2001
North Industrial Corridor (NIC)
Wichita, Kansas



Legend

- August 2004 Groundwater Level Contours (Contour Interval = 0.5 ft)
- NIC Project Boundary
- Rivers
- Water Bodies selection

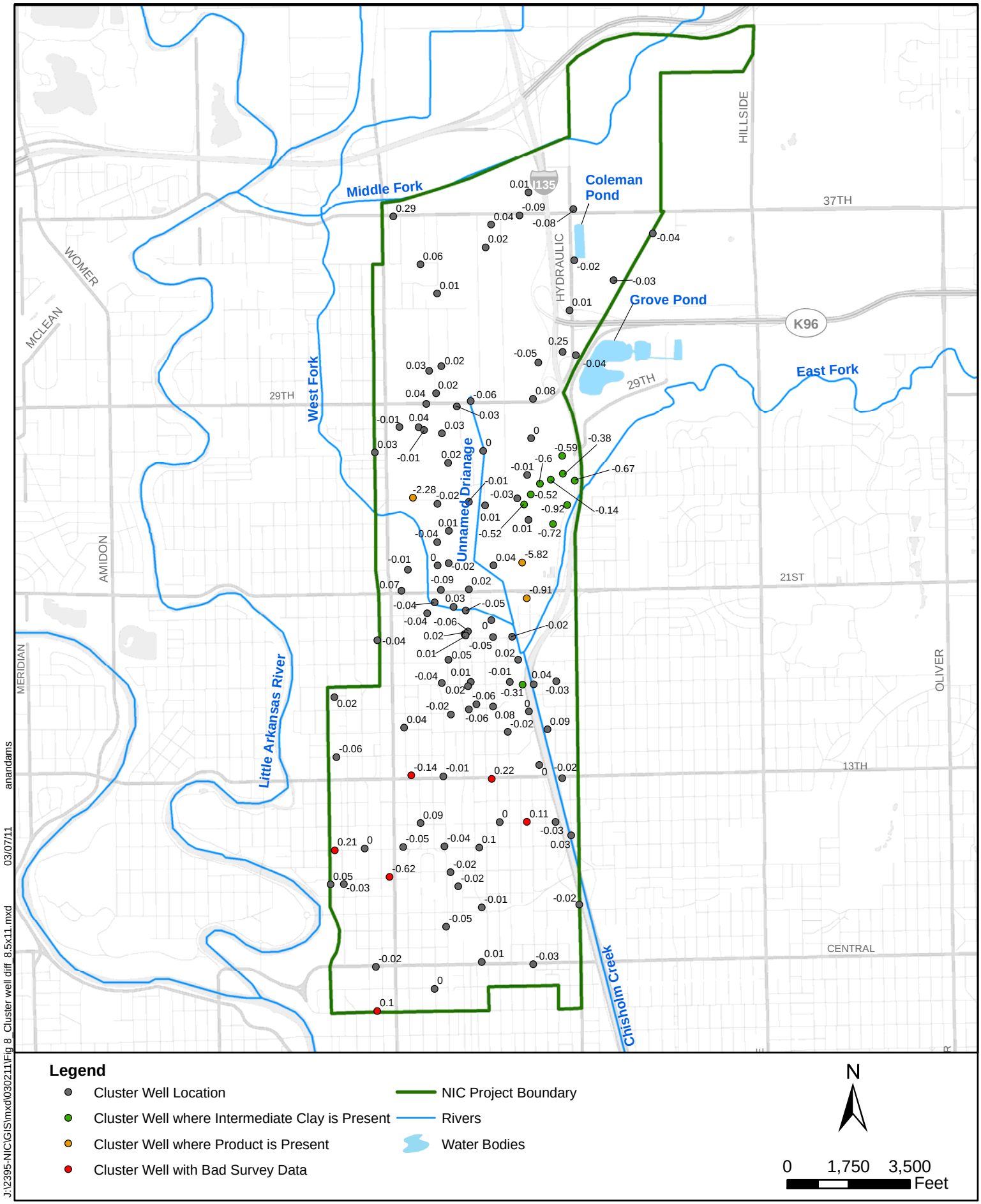
N

0 1,750 3,500 Feet

J:\2395-NIC\GIS\mxd\030211\Fig 7 Aug 2004 GWEL 8.5x11.mxd 03/07/11 anandams

CDM

Figure 7
Potentiometric Surface Map for August 2004
North Industrial Corridor (NIC)
Wichita, Kansas



J:\2395-NIC\GIS\mxd\030211\Fig 8_Cluster well diff_8.5x11.mxd 03/07/11 anandams

CDM

Figure 8
Vertical Head Differences at Nested Well in August 2001
North Industrial Corridor (NIC)
Wichita, Kansas

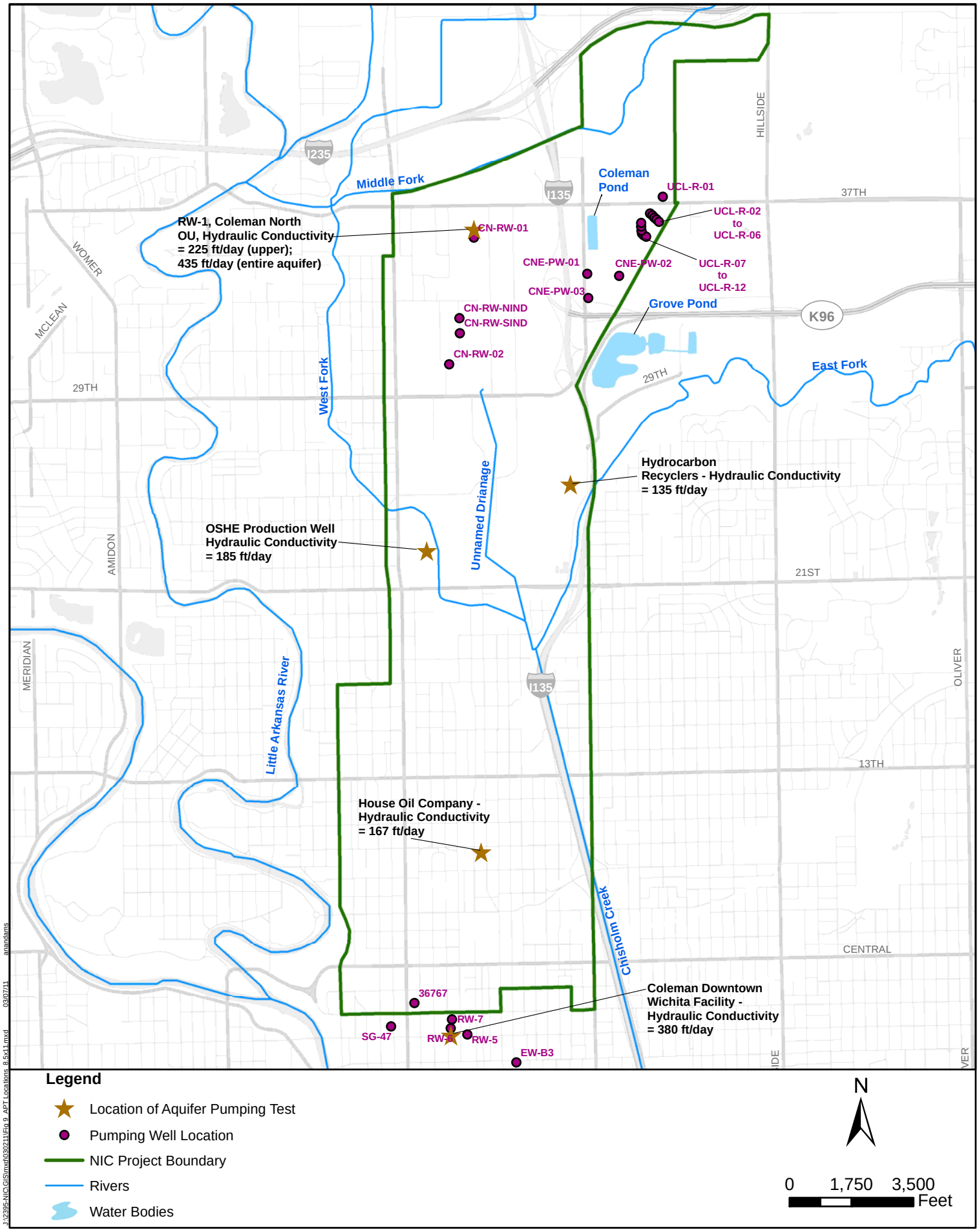


Figure 9
Location of Aquifer Pumping Test Conducted at NIC Site
North Industrial Corridor (NIC)
Wichita, Kansas

CDM

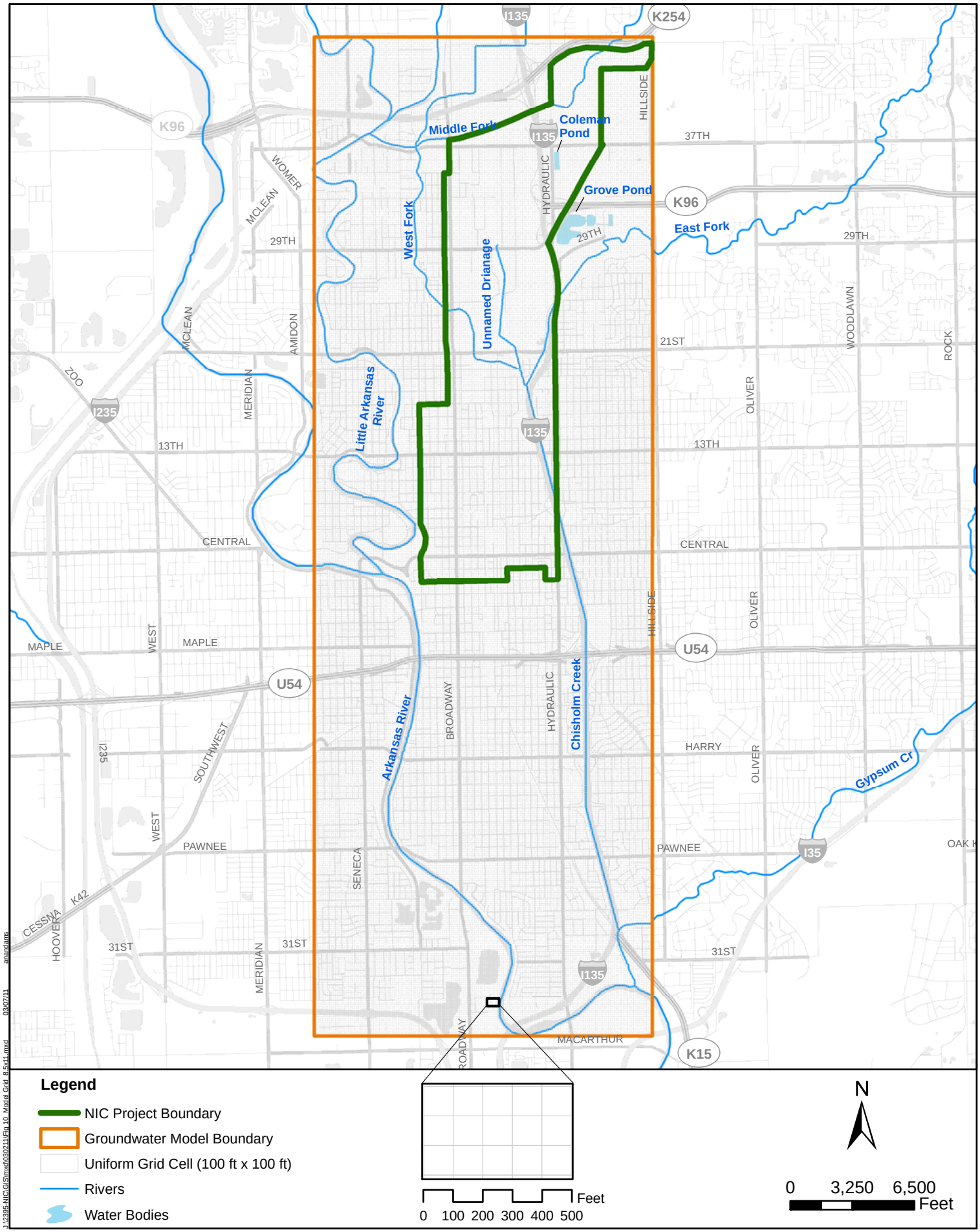
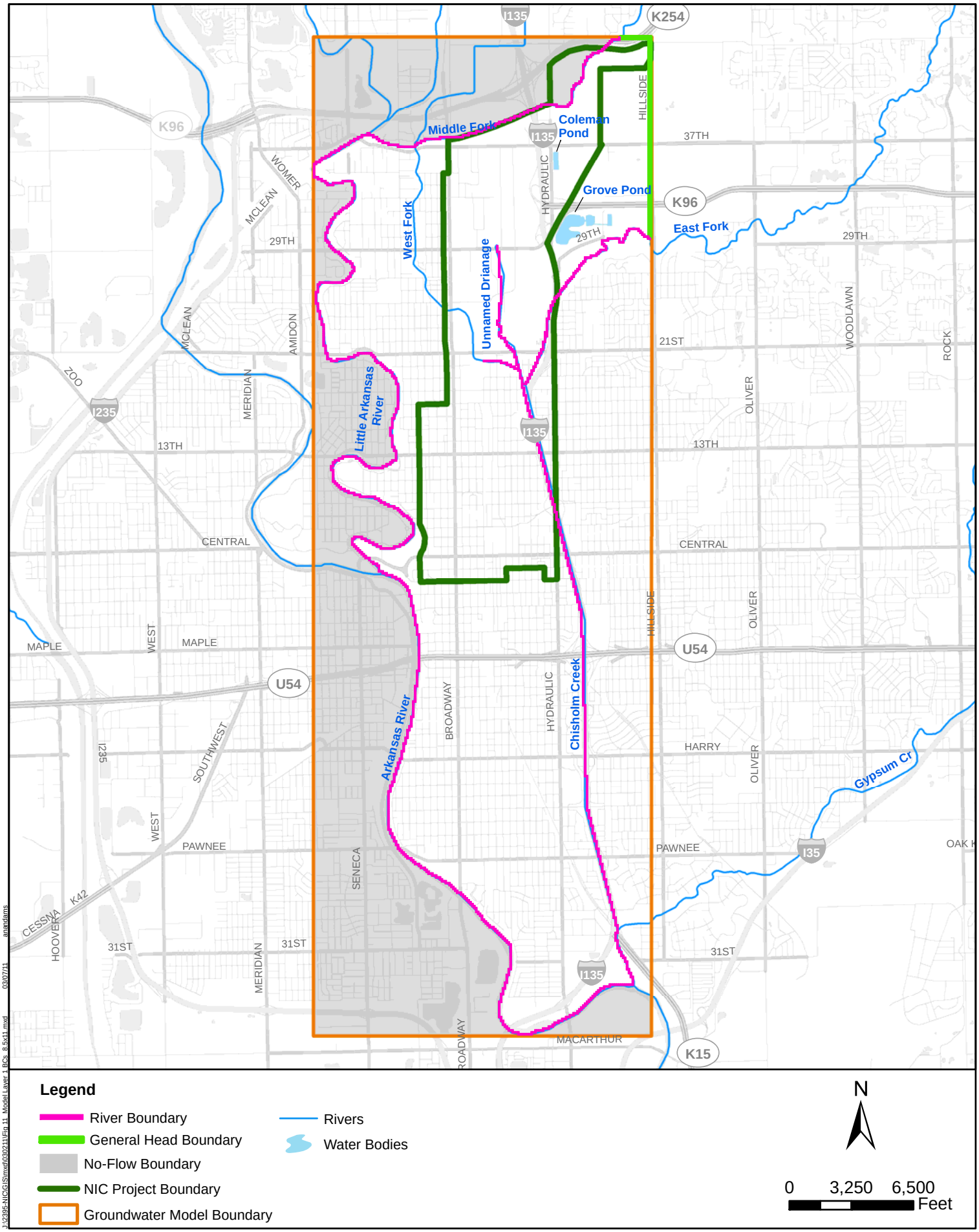


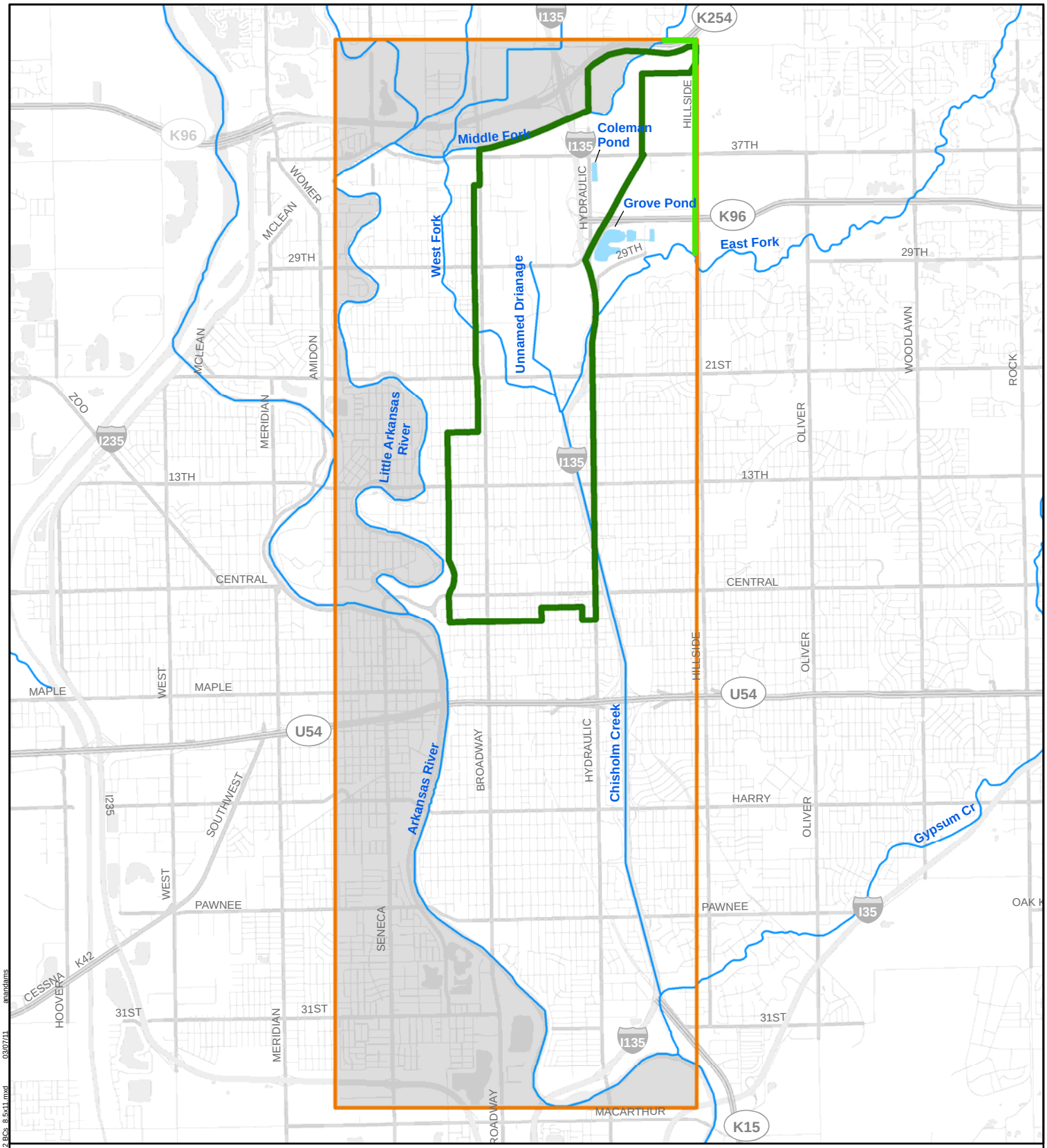
Figure 10
Model Extent and Model Grid
North Industrial Corridor (NIC)
Wichita, Kansas

CDM



CDM

Figure 11
Boundary Conditions in Model Layer 1
North Industrial Corridor (NIC)
Wichita, Kansas



Legend

- General Head Boundary
- No-Flow Boundary
- Groundwater Model Boundary
- Rivers
- Water Bodies

N

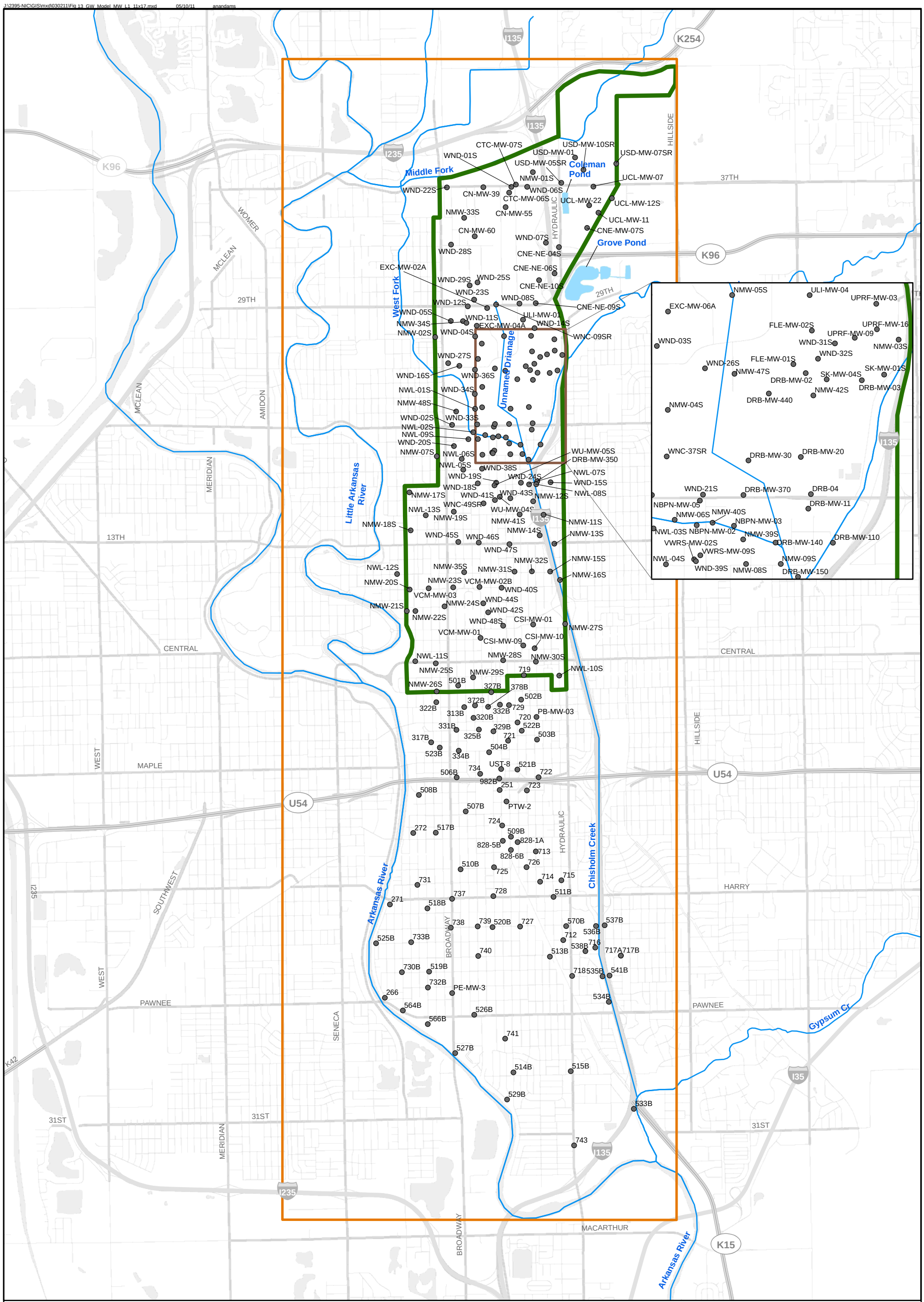
0 3,250 6,500 Feet

J:\2395-NIC\GIS\mxd\030211\Fig 12_Model Layer 2 BCs_8.5x11.mxd 03/07/11 amandams

CDM

Figure 12
Boundary Conditions in Model Layer 2
North Industrial Corridor (NIC)
Wichita, Kansas

J:\2395-NIC\GIS\mxd\030211\Fig 13_GW_Model_MW_L1_11x17.mxd 05/10/11 anandams



Legend

- Monitoring Wells in Model Layer 1
- Groundwater Model Boundary
- NIC Project Boundary
- Rivers
- Water Bodies

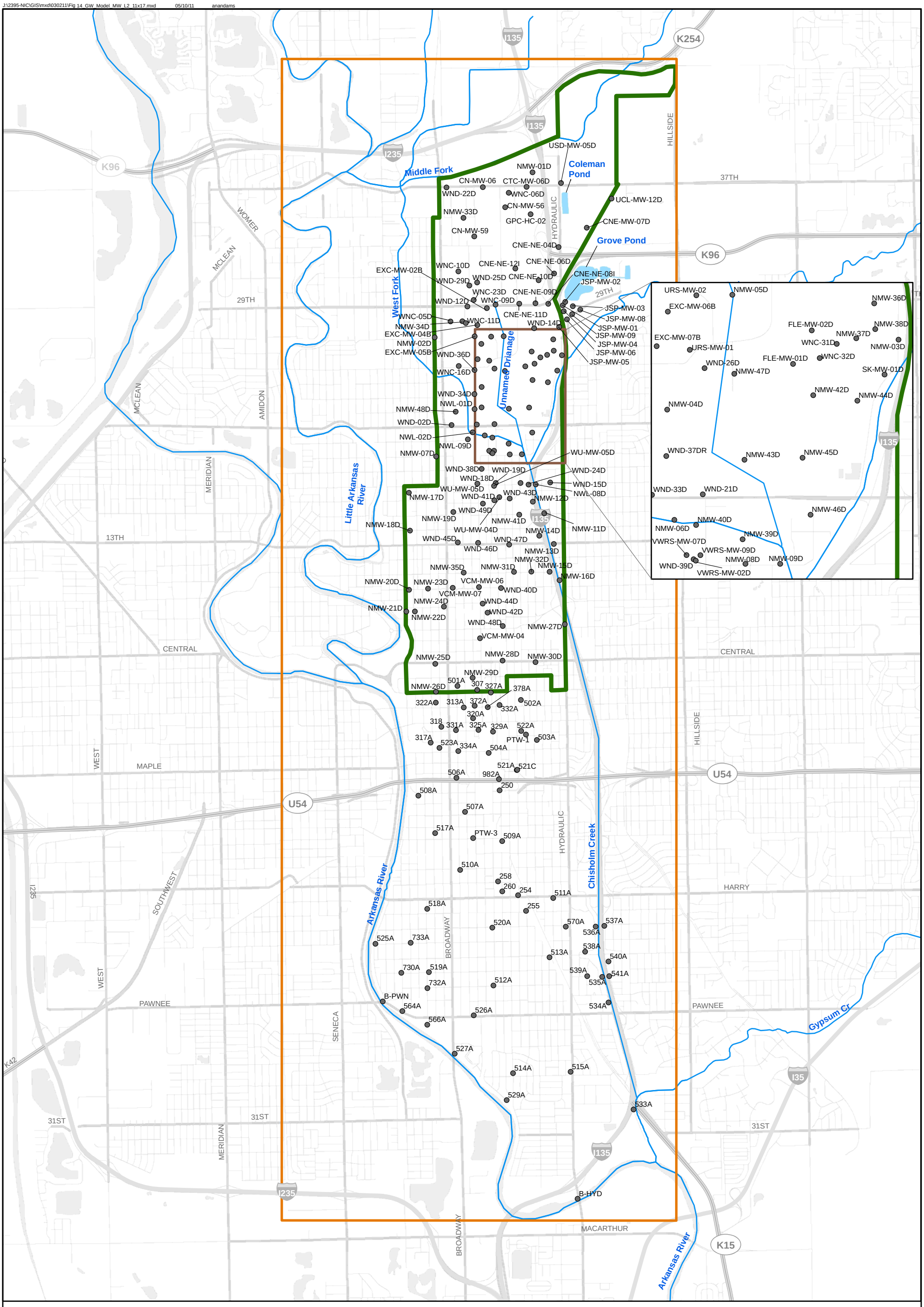
N

0 2,000 4,000 Feet

CDM

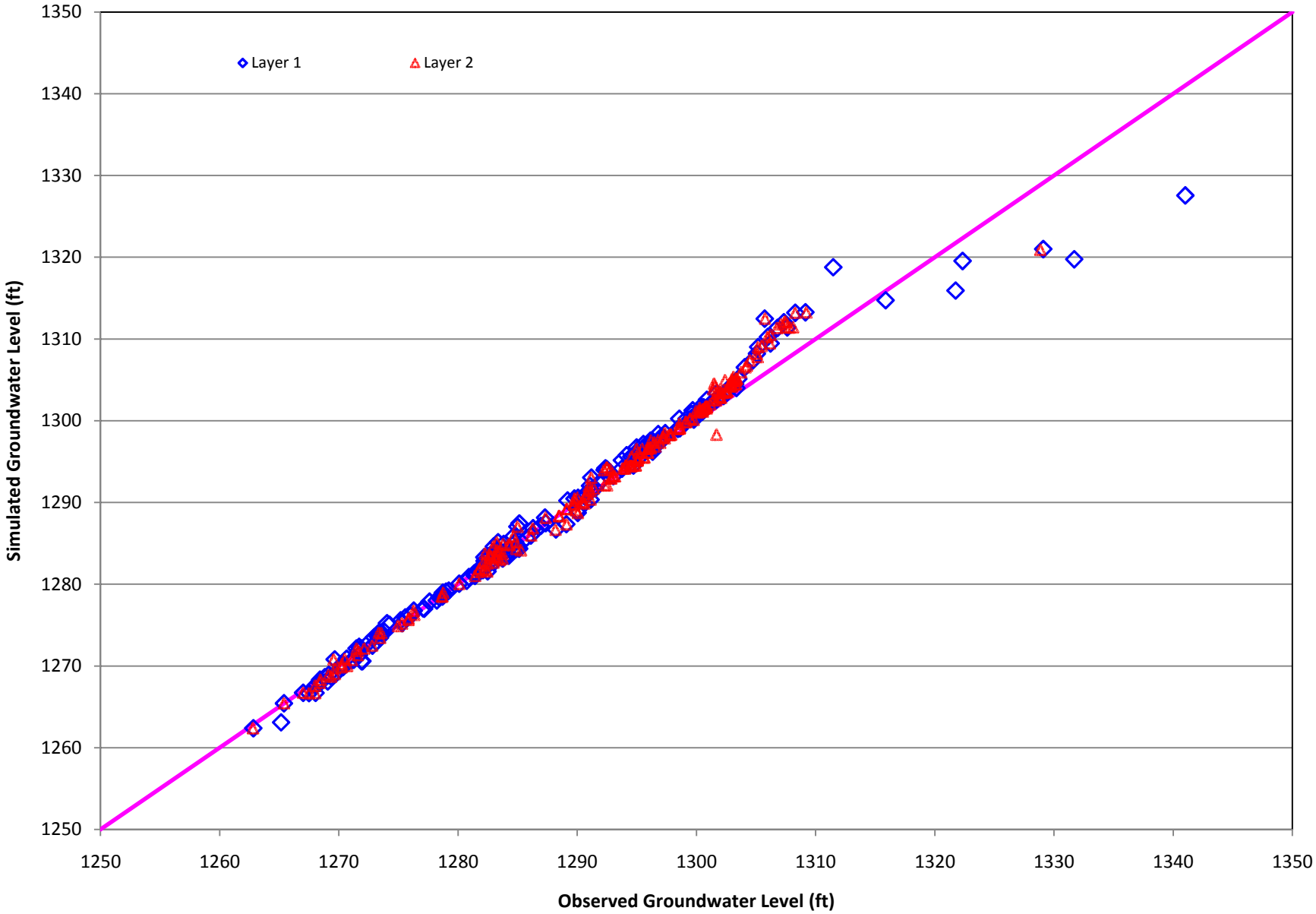
Figure 13
Monitoring Well Locations Used for Model Calibration in Layer 1
North Industrial Corridor (NIC)
Wichita, Kansas

J:\2395-NIC\GIS\mxd\030211\Fig 14_GW_Model_MW_L2_11x17.mxd 05/10/11 anandams



CDM

Figure 14
Monitoring Well Locations Used for Model Calibration in Layer 2
North Industrial Corridor (NIC)
Wichita, Kansas



CDM

E:\Projects\NIC\Model\Calib\Test23_45Line.xls

Figure 15

Comparison of Simulated versus Observed Groundwater Levels, August 2001

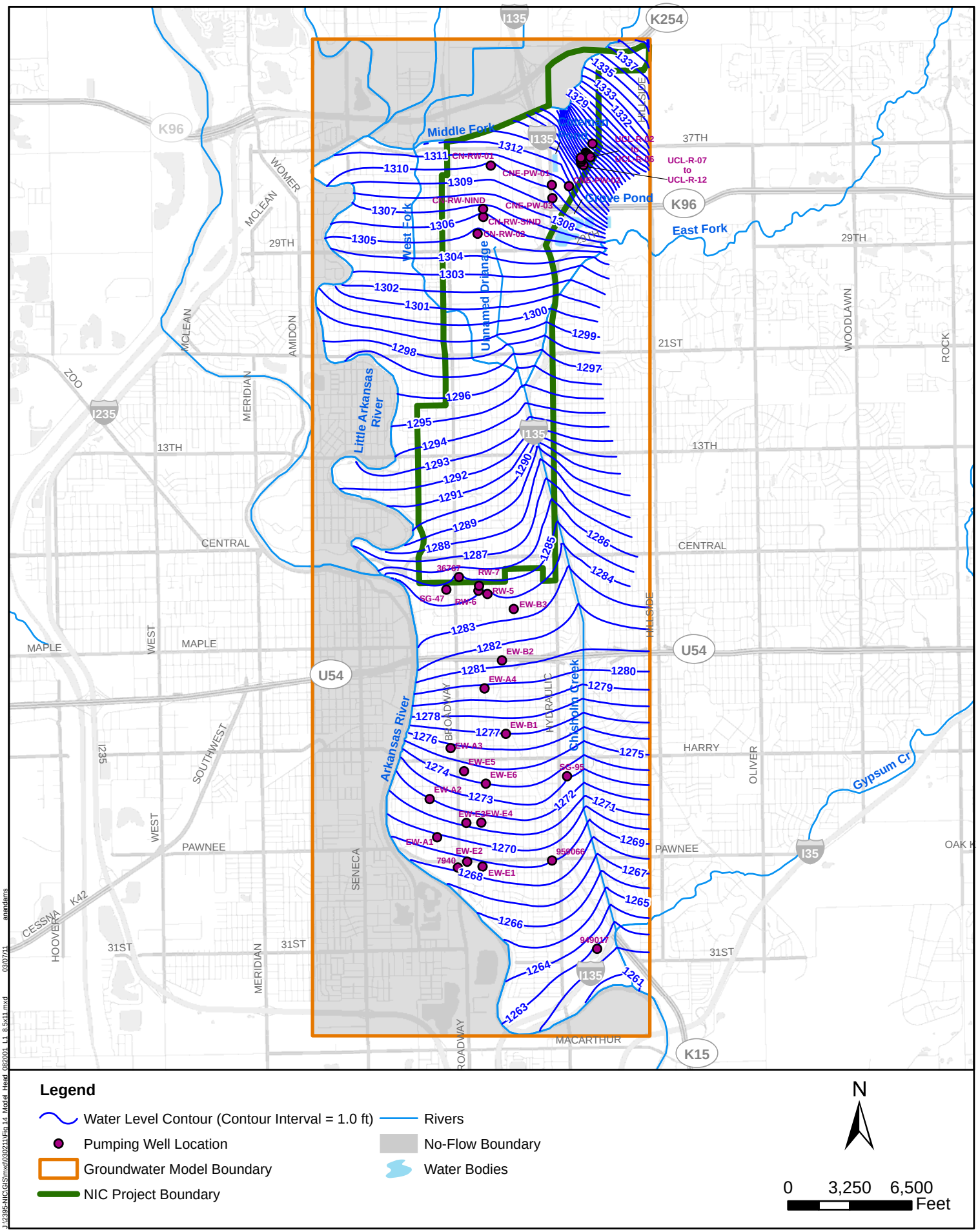


Figure 16
Simulated Water Levels in Model Layer 1, August 2001
North Industrial Corridor (NIC)
Wichita, Kansas

CDM

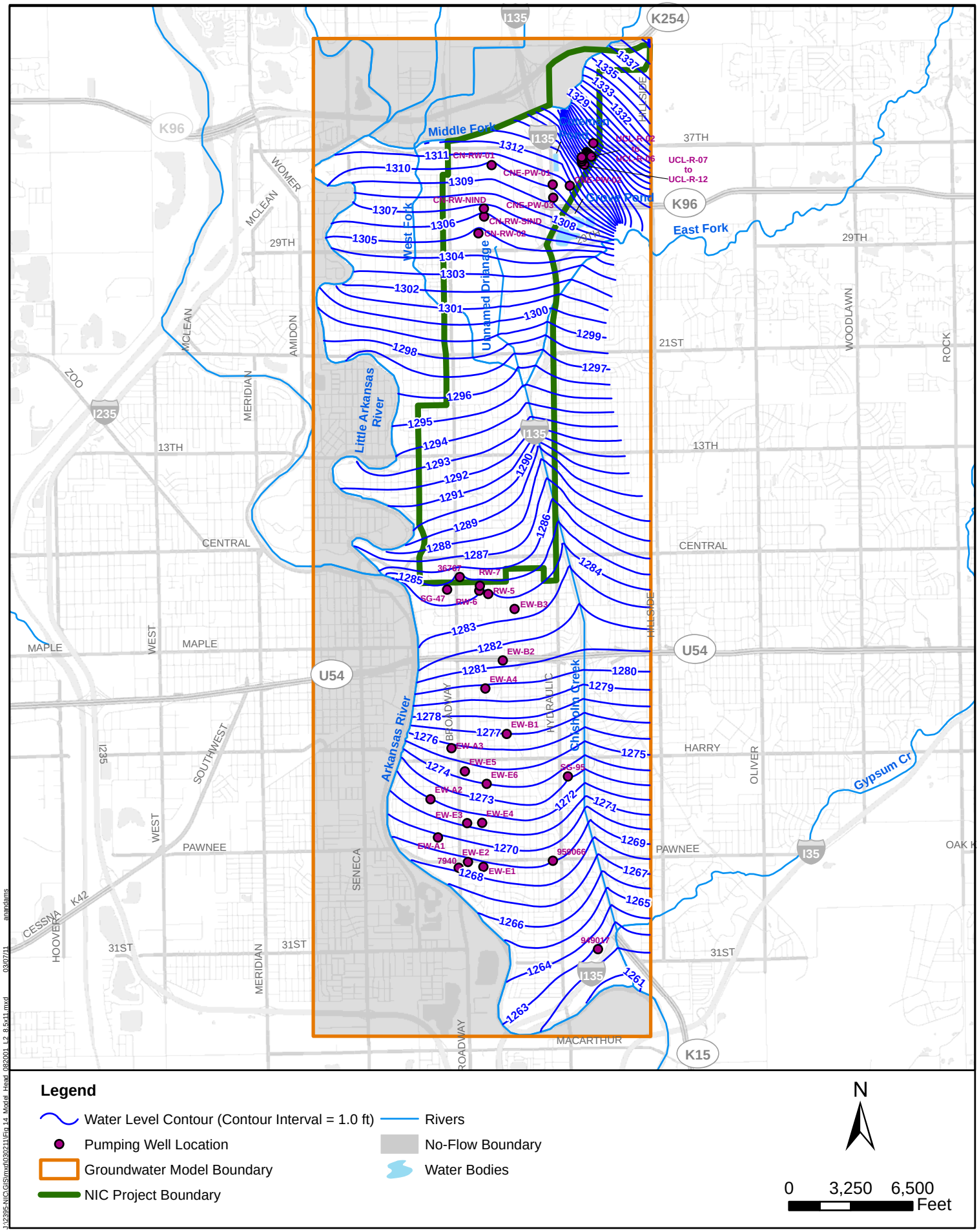


Figure 17
Simulated Water Levels in Model Layer 2, August 2001
North Industrial Corridor (NIC)
Wichita, Kansas

CDM

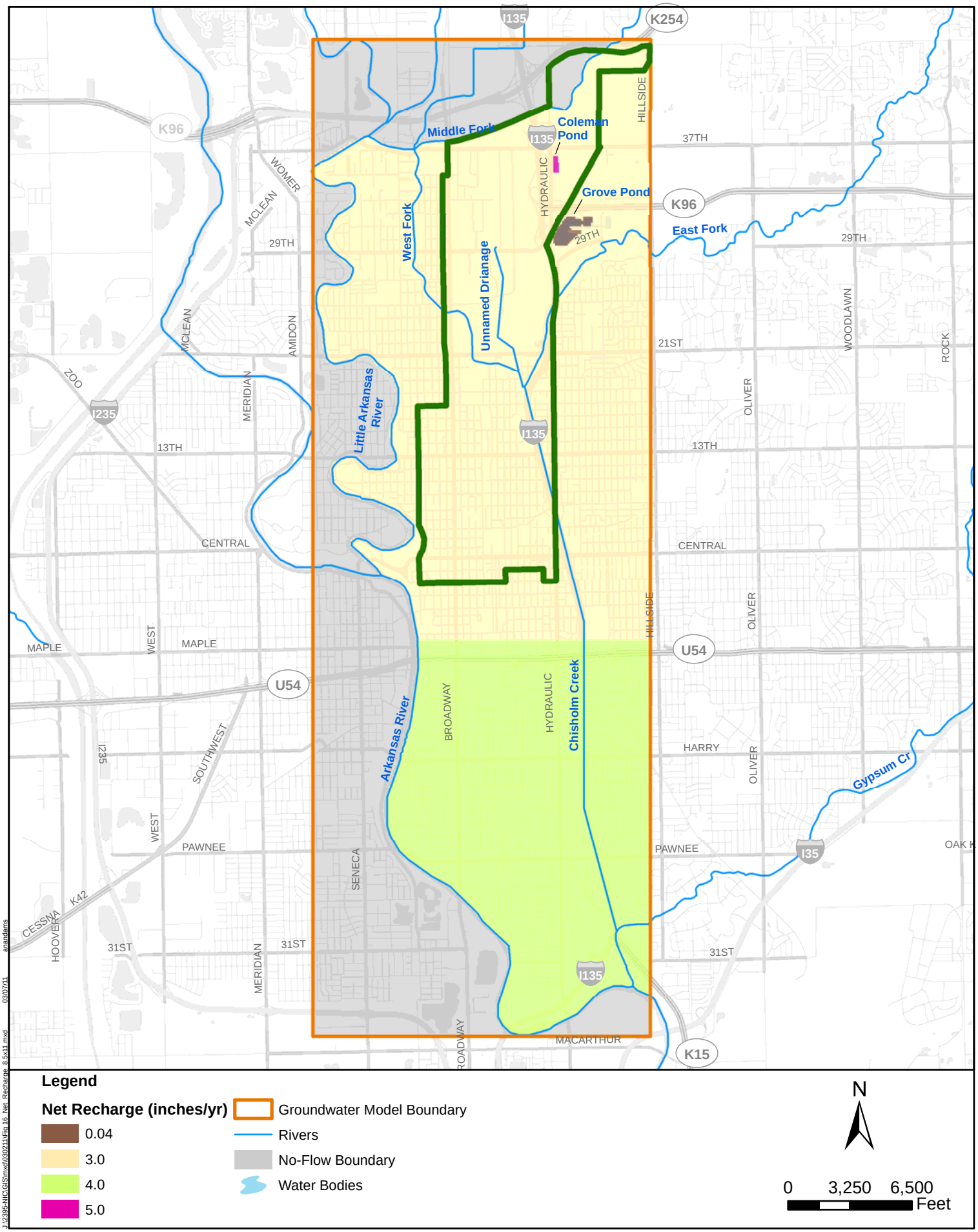
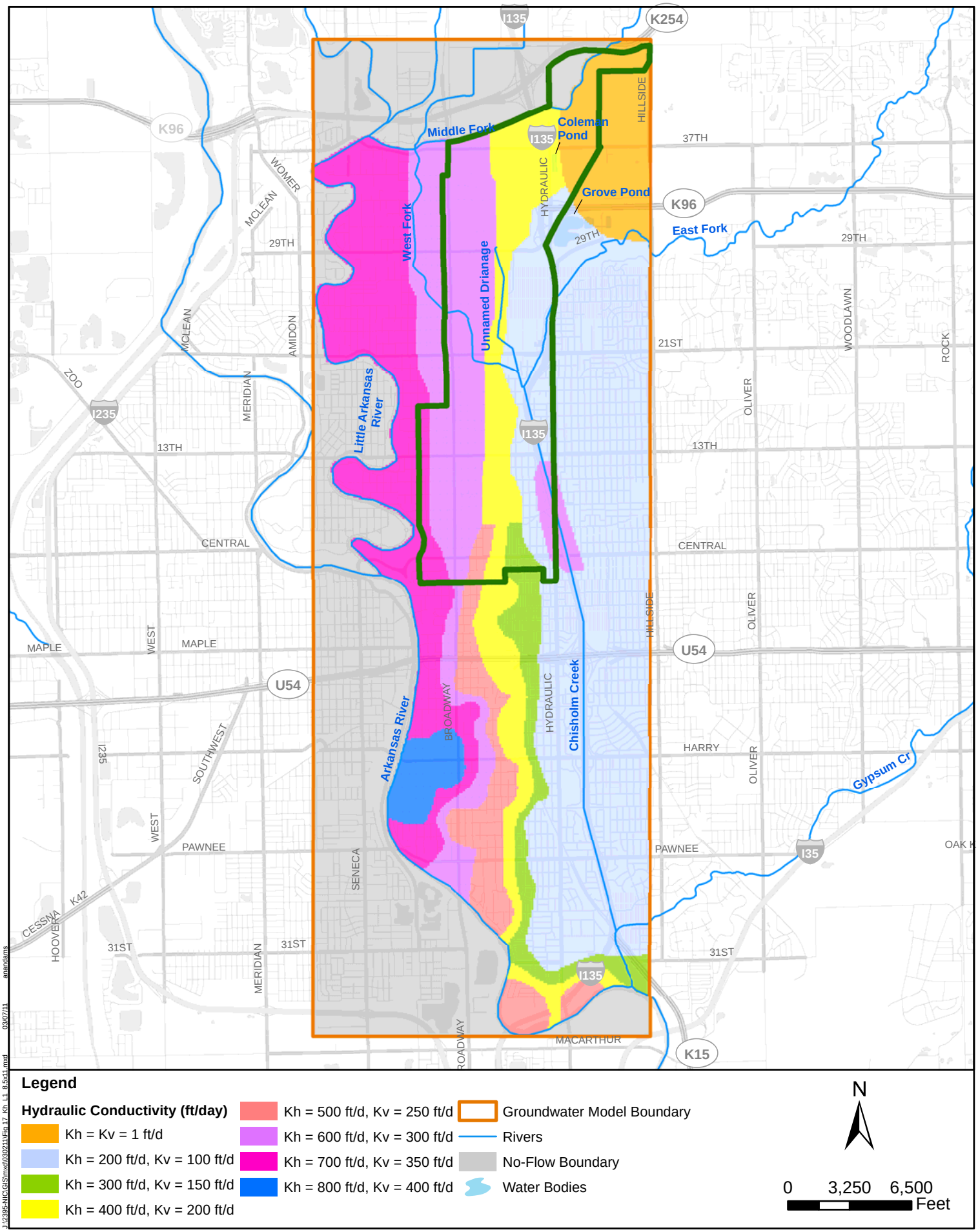


Figure 18
Calibrated Net Recharge Distribution
North Industrial Corridor (NIC)
Wichita, Kansas

CDM



Legend

Hydraulic Conductivity (ft/day)

- Kh = Kv = 1 ft/d
- Kh = 200 ft/d, Kv = 100 ft/d
- Kh = 300 ft/d, Kv = 150 ft/d
- Kh = 400 ft/d, Kv = 200 ft/d
- Kh = 500 ft/d, Kv = 250 ft/d
- Kh = 600 ft/d, Kv = 300 ft/d
- Kh = 700 ft/d, Kv = 350 ft/d
- Kh = 800 ft/d, Kv = 400 ft/d
- Groundwater Model Boundary
- Rivers
- No-Flow Boundary
- Water Bodies

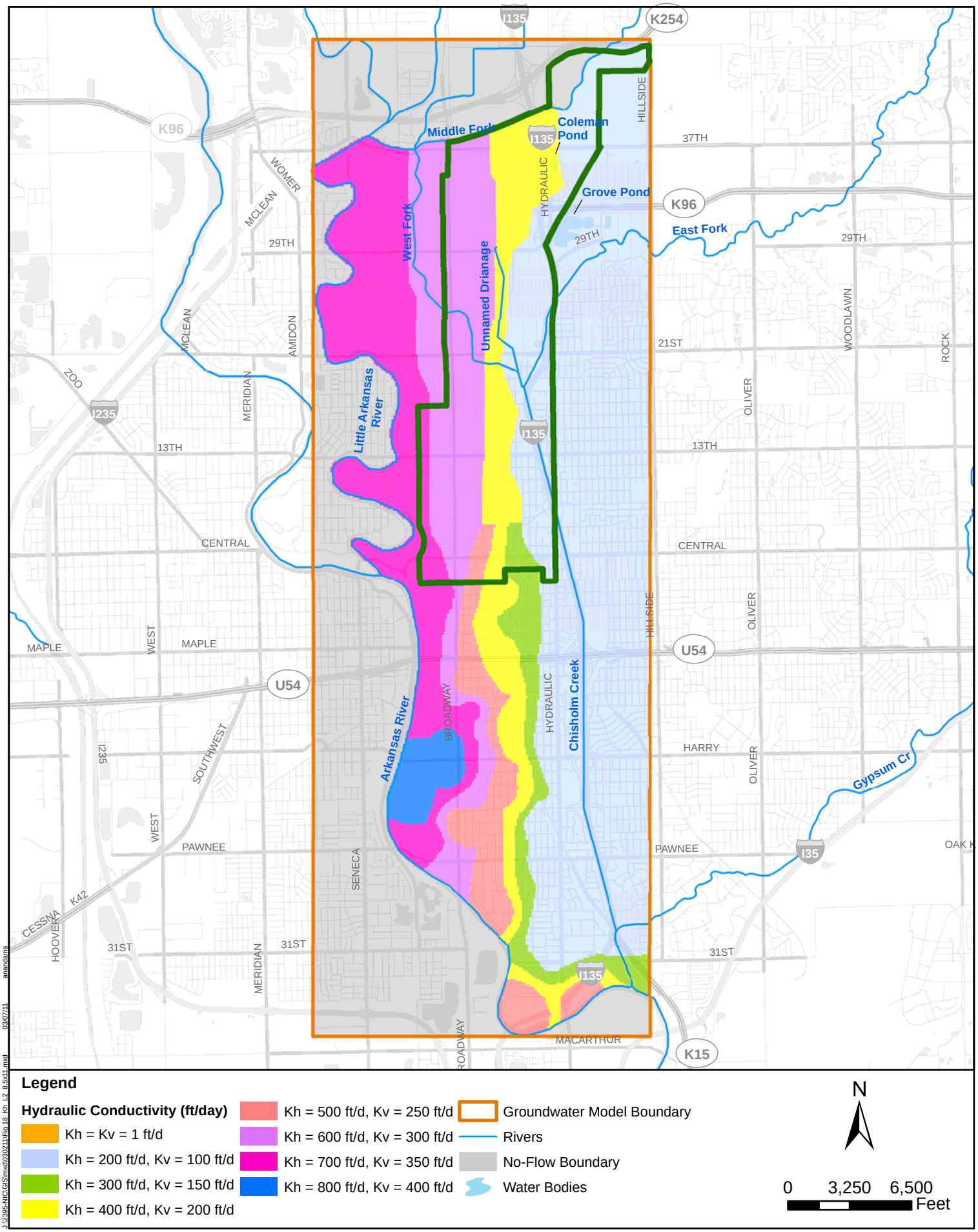
N

0 3,250 6,500 Feet

J:\2395-NIC\GIS\mxd\030211\Fig 17 Kh L1 8.5x11.mxd 03/07/11 anandams

CDM

Figure 19
Calibrated Hydraulic Conductivity Distribution in Model Layer 1
North Industrial Corridor (NIC)
Wichita, Kansas



CDM

Figure 20
Calibrated Hydraulic Conductivity Distribution in Model Layer 2
North Industrial Corridor (NIC)
Wichita, Kansas

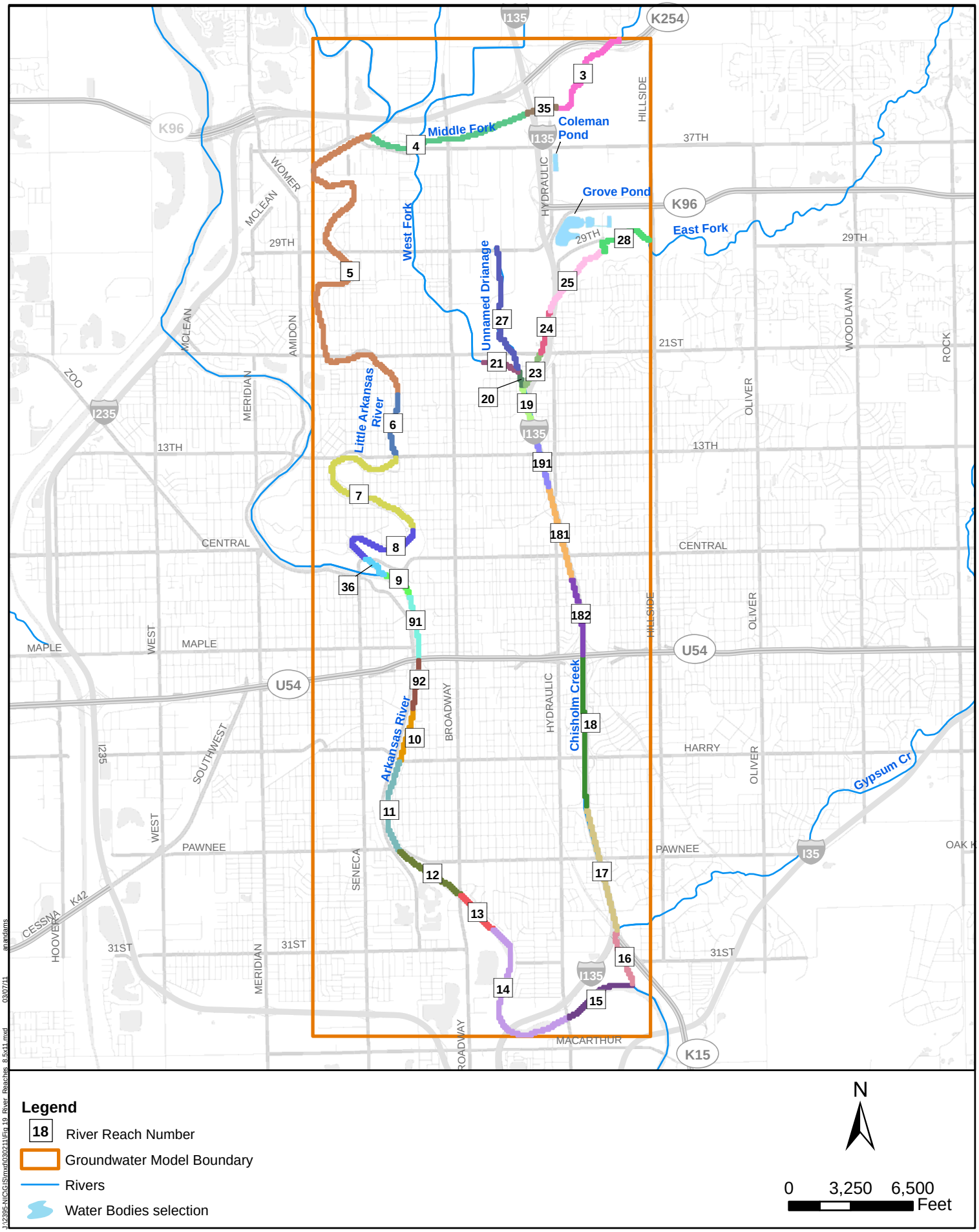
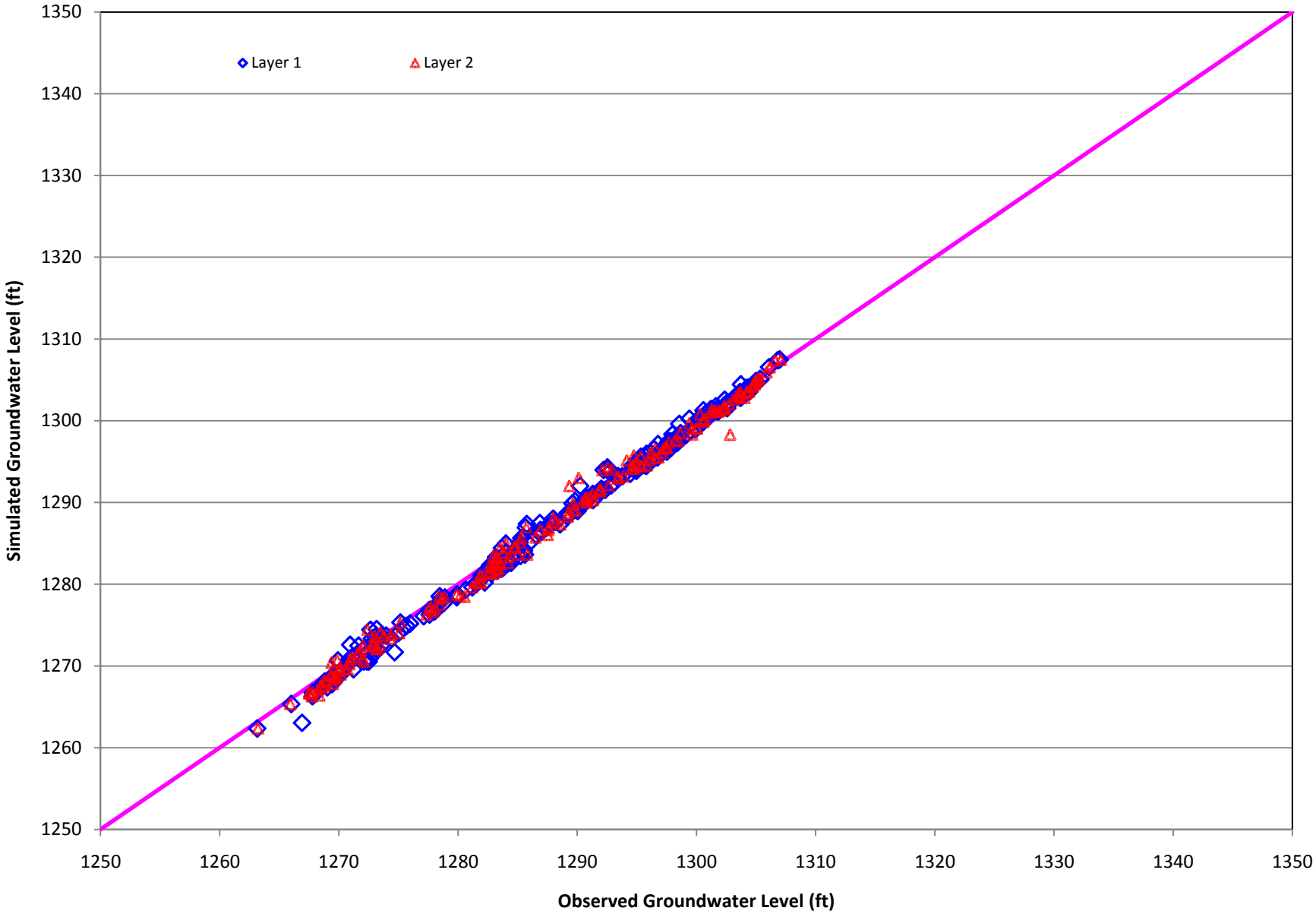


Figure 21
Calibrated Boundary Reaches in Model Layer 1
North Industrial Corridor (NIC)
Wichita, Kansas

CDM



CDM

E:\Projects\NIC\Model\Calib\Test23_45Line.xls

Figure 22

Comparison of Simulated versus Observed Groundwater Levels, August 2004

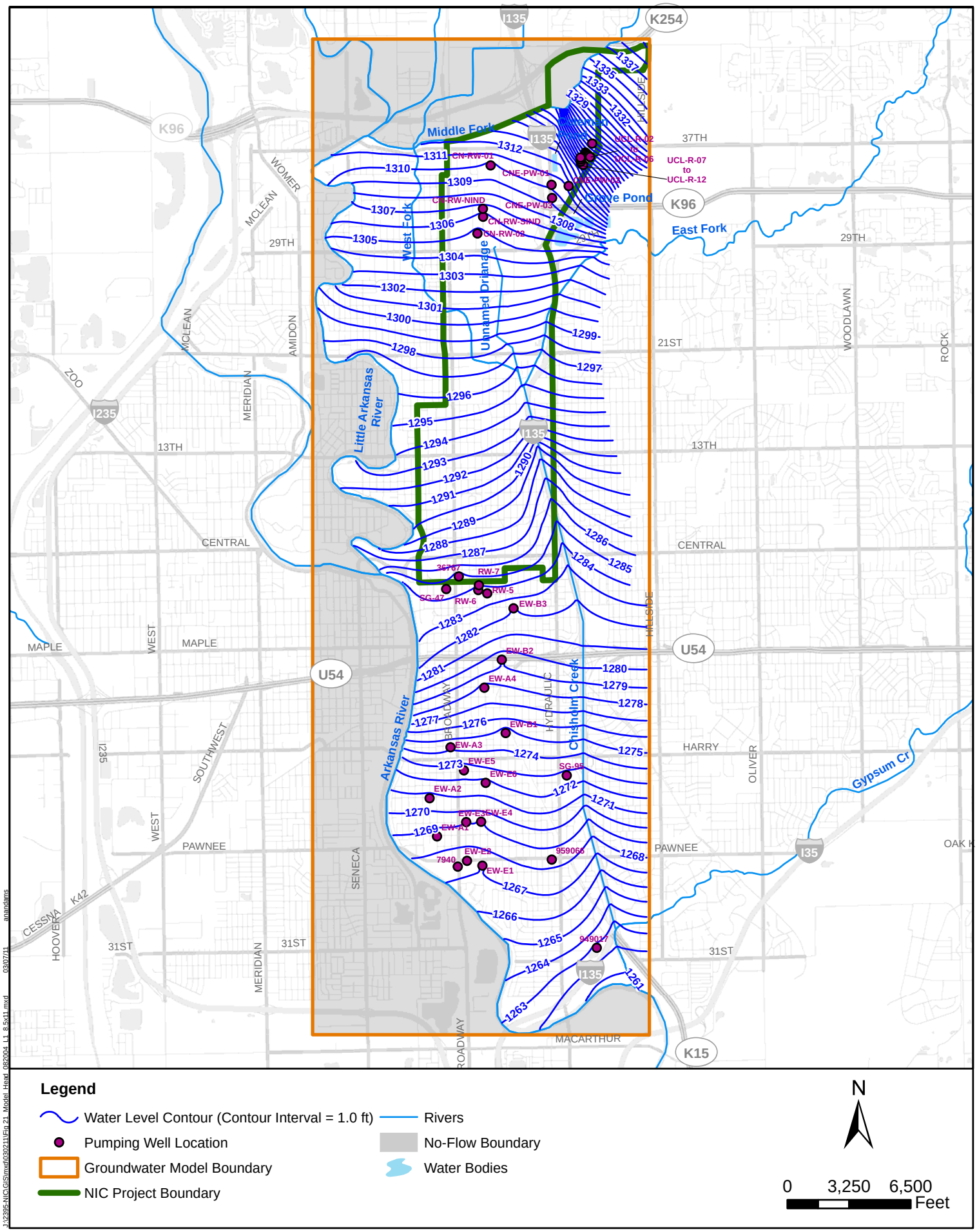
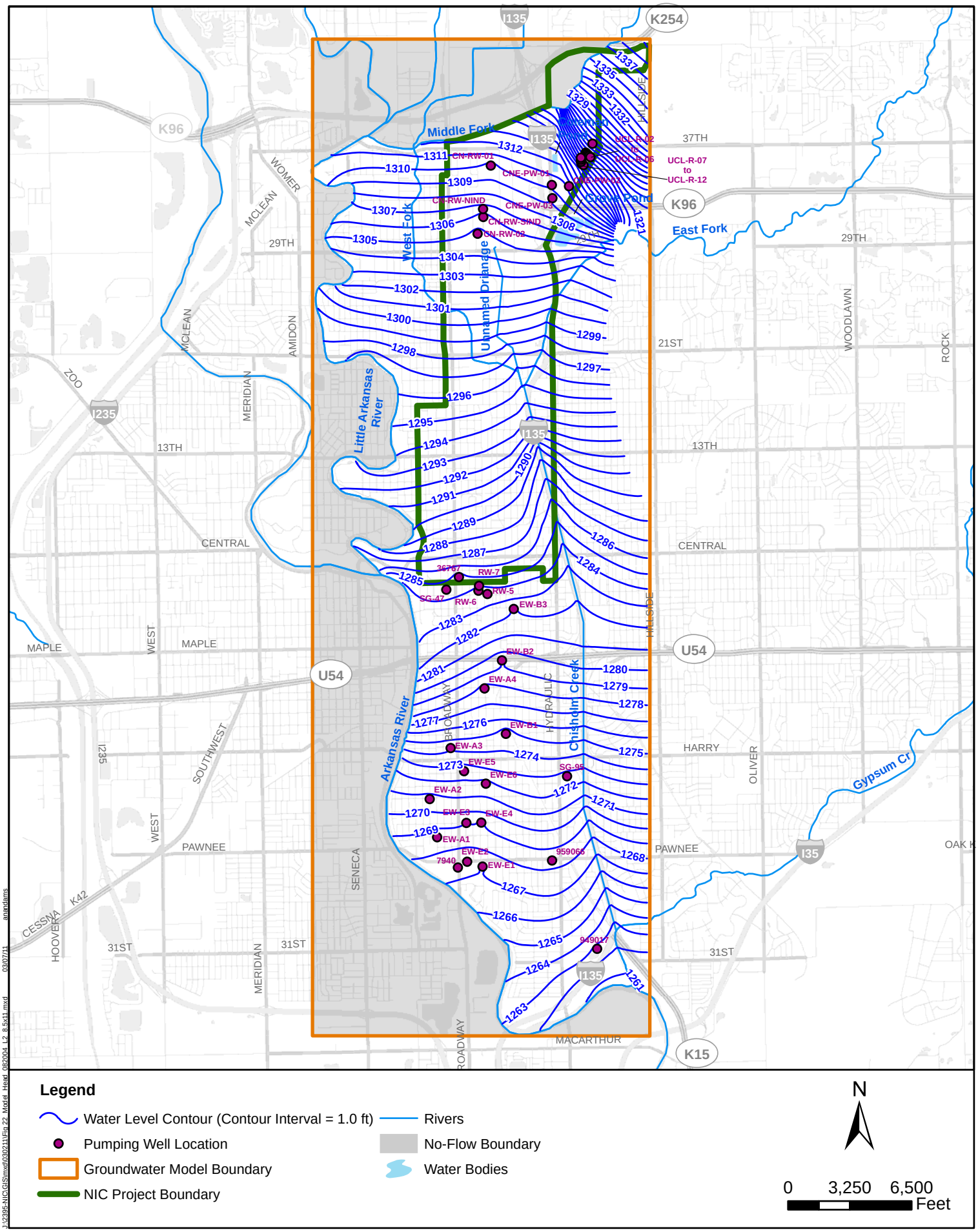


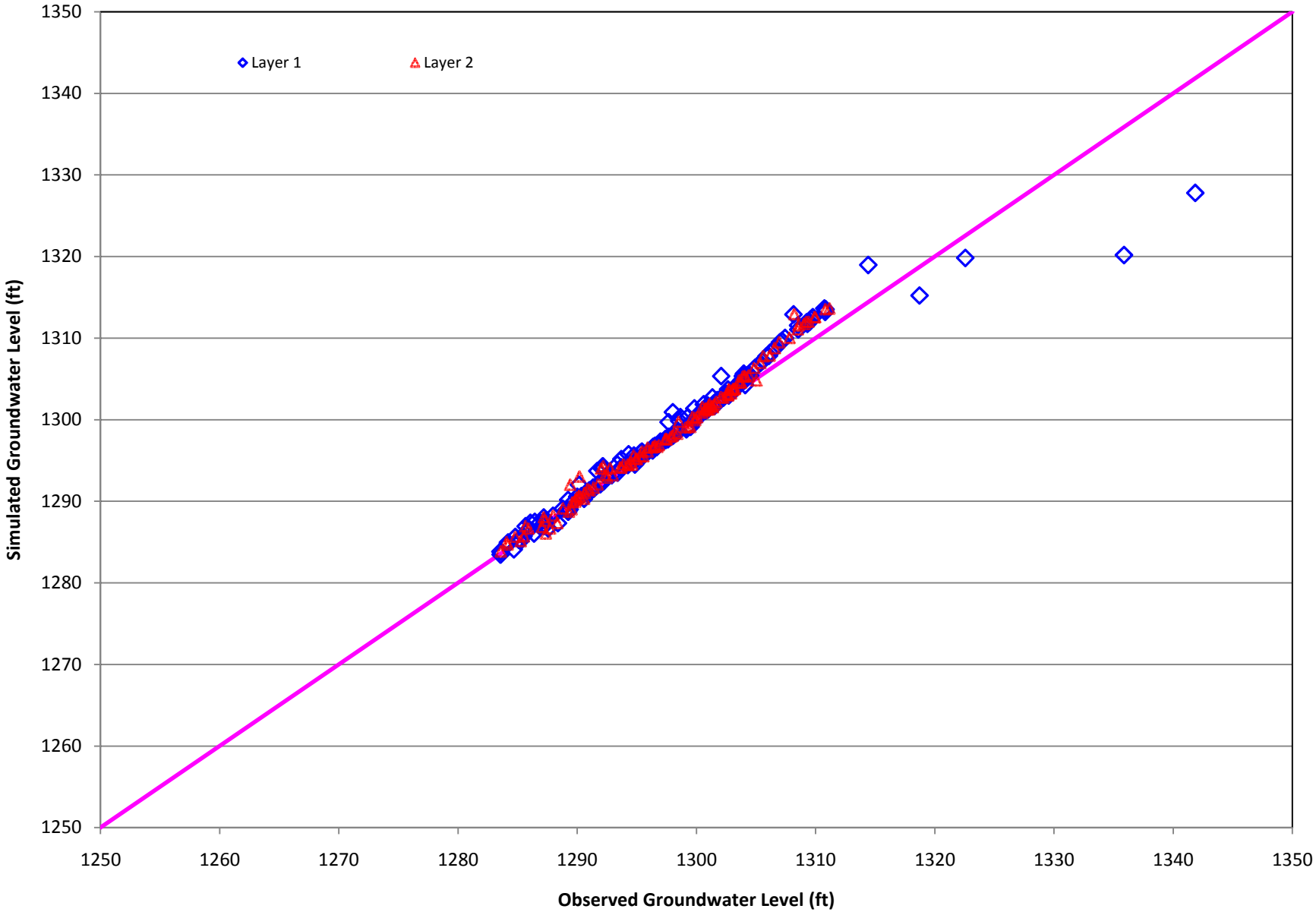
Figure 23
Simulated Water Levels in Model Layer 1, August 2004
North Industrial Corridor (NIC)
Wichita, Kansas

CDM



CDM

Figure 24
Simulated Water Levels in Model Layer 2, August 2004
North Industrial Corridor (NIC)
Wichita, Kansas

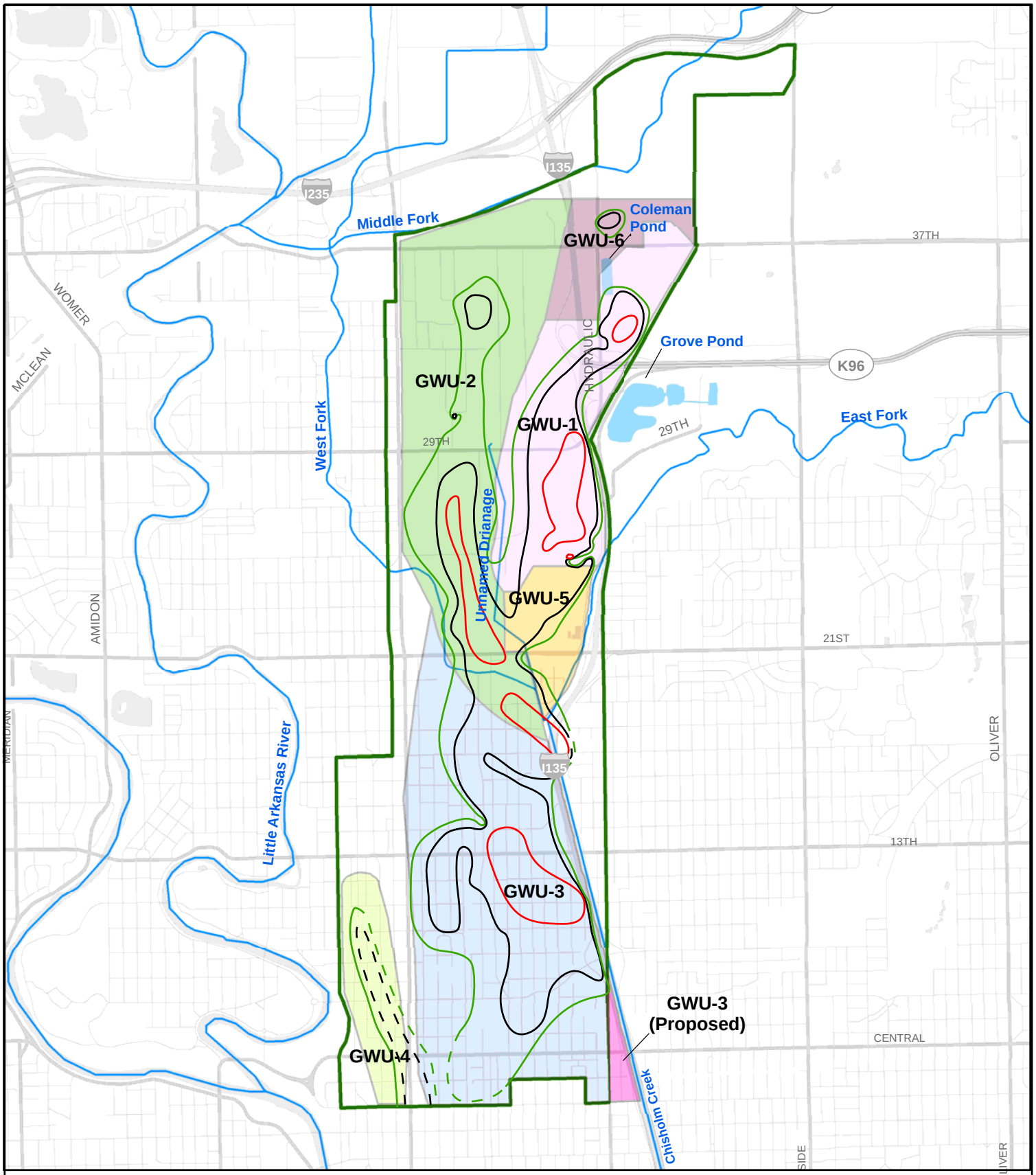


CDM

E:\Projects\NIC\Model\Calib\Test23_45Line.xls

Figure 25

Comparison of Simulated versus Observed Groundwater Levels, January 2008



Legend

- 100 ug/L TCE Isoconcentration Line
- 20 ug/L TCE Isoconcentration Line
- 5 ug/L TCE Isoconcentration Line
  Note: Dashed Lines Indicate Inferred Isoconcentration Lines
- NIC Project Boundary
- Rivers
- Water Bodies

N

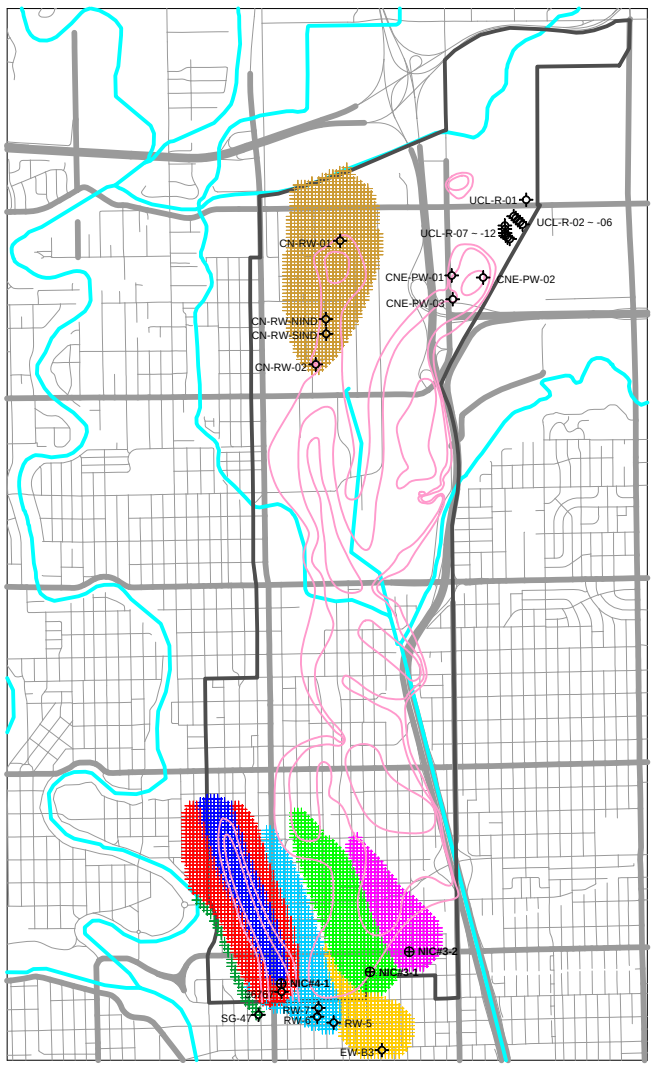
0 1,750 3,500 Feet

J:\2395-NICGIS\mxd\030211\Fig 24_OUs_8.5x11.mxd 03/03/11 anandams

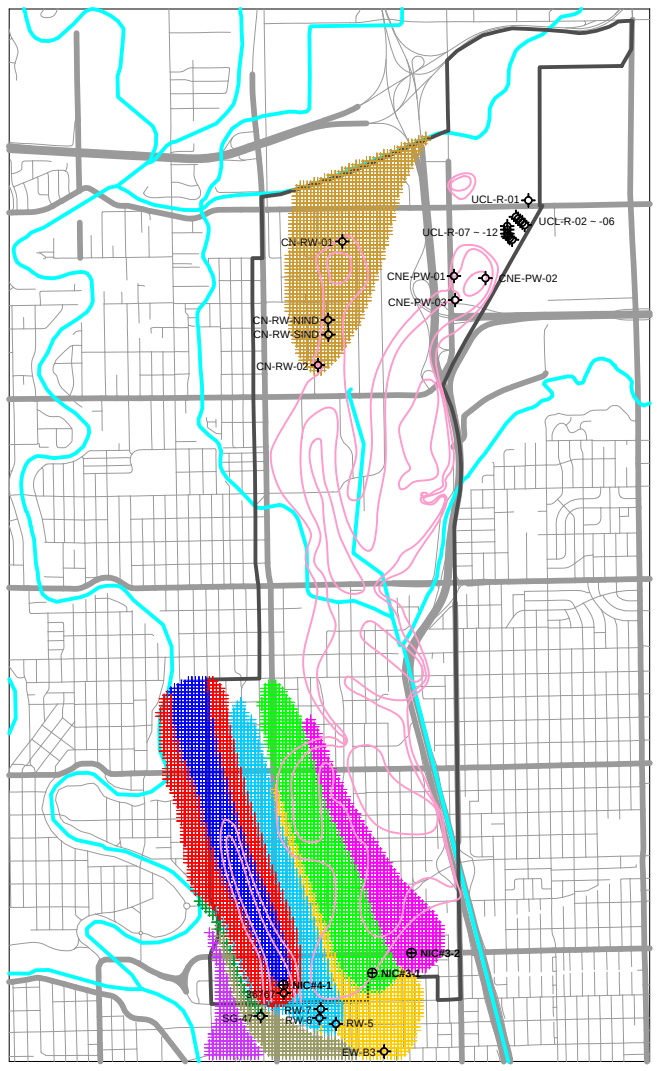
CDM

Figure 26
Proposed Groundwater Units and TCE Plume in Deep Aquifer
North Industrial Corridor (NIC)
Wichita, Kansas

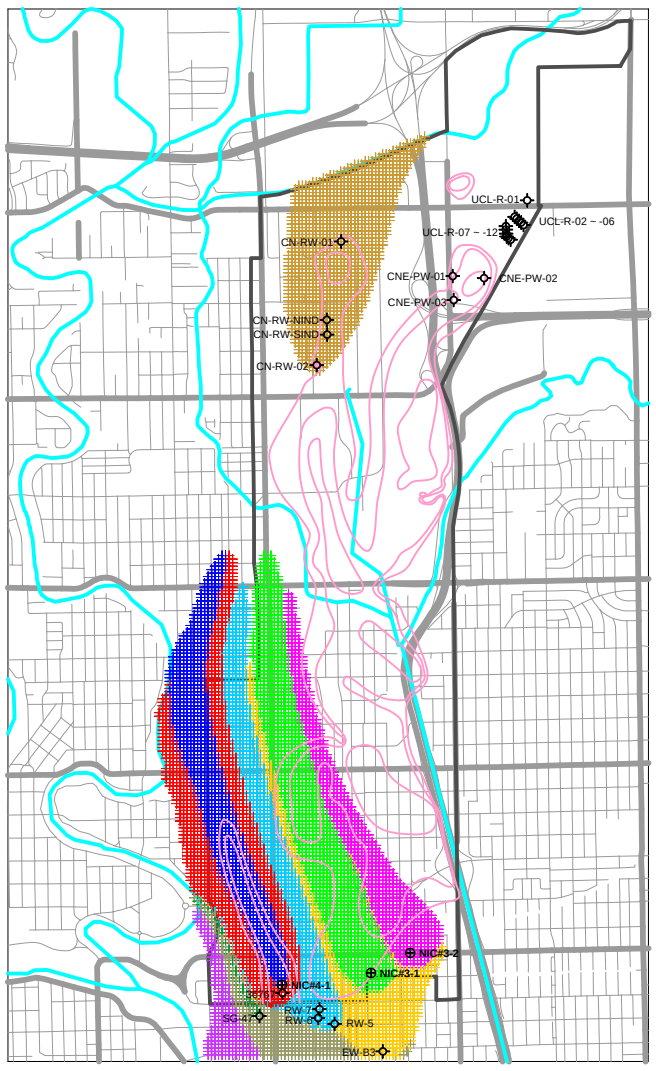
5-Year Capture Zones



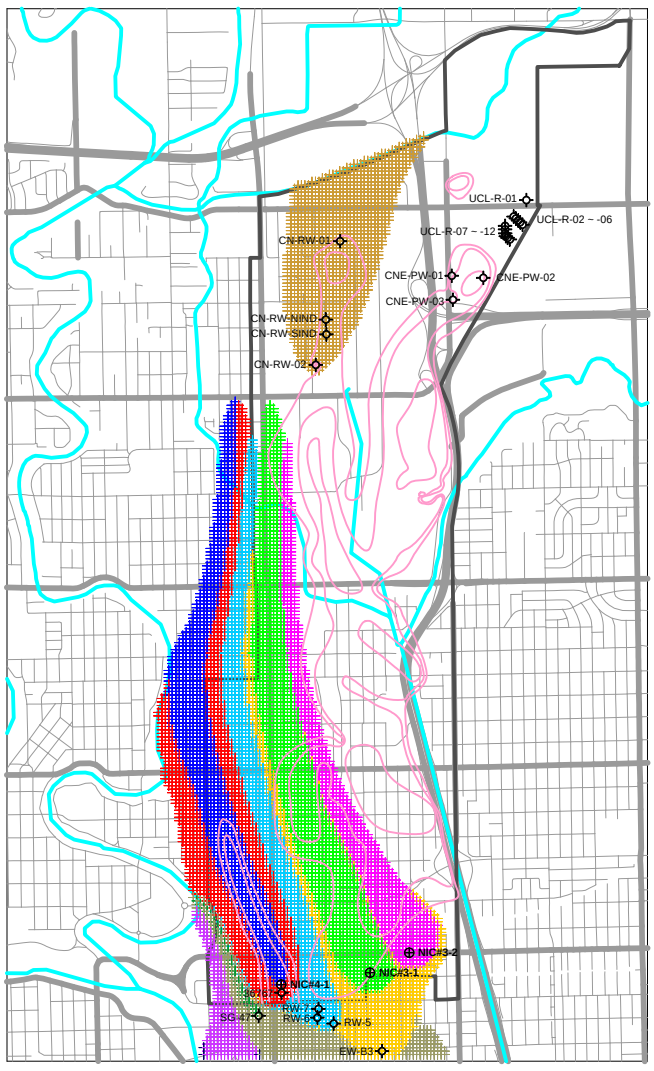
10-Year Capture Zones



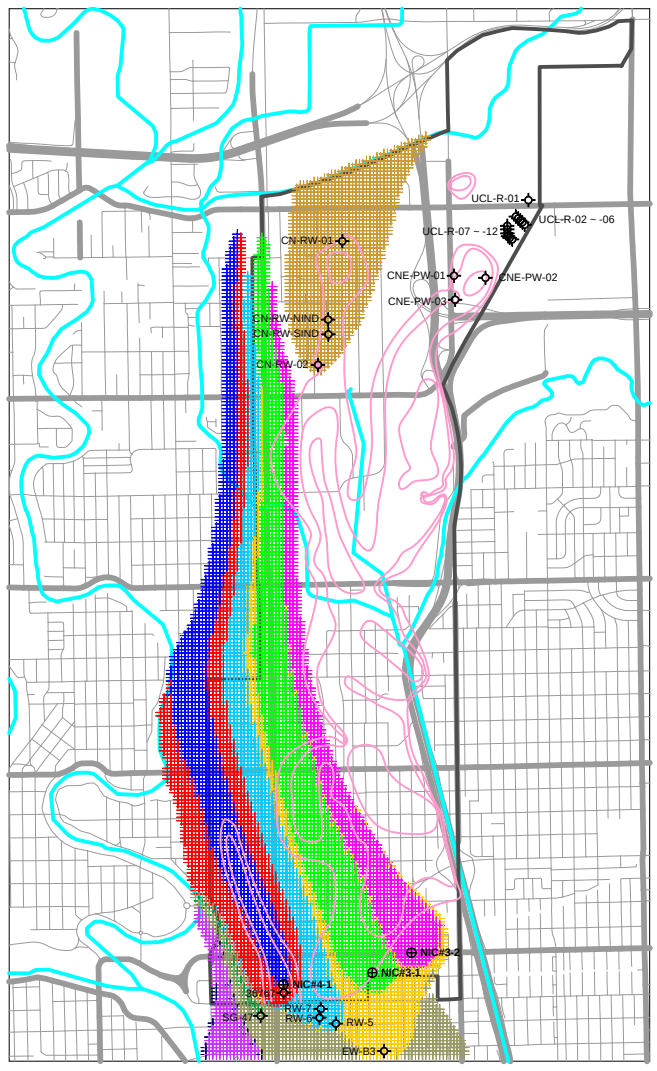
15-Year Capture Zones



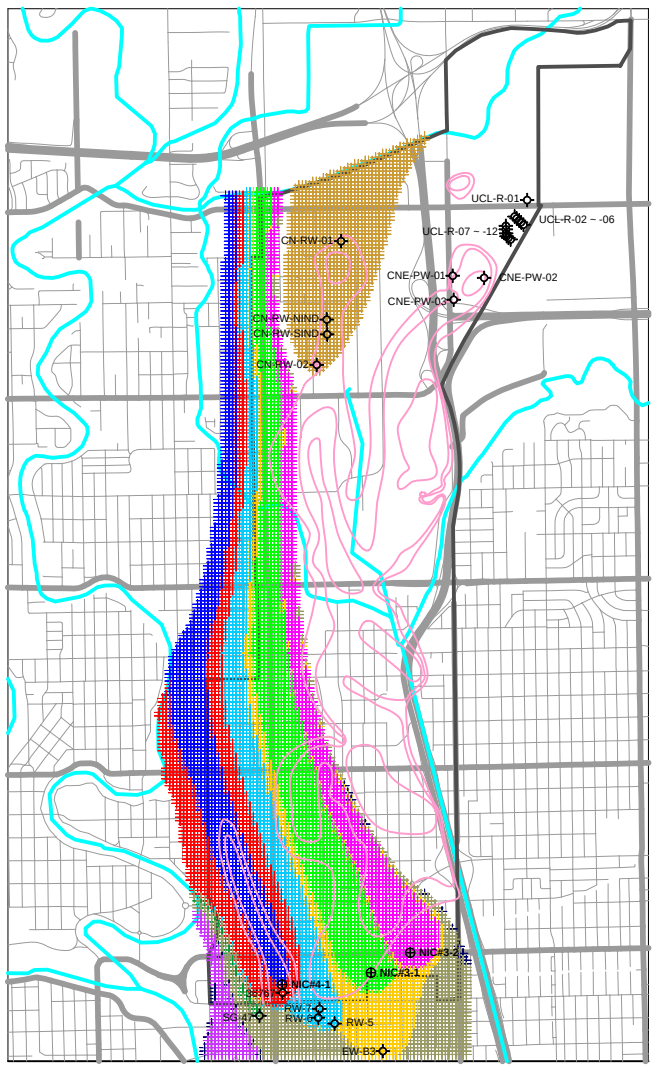
20 Year Capture Zones



25 Year Capture Zones



Final Capture Zones



LEGEND

- Existing Well
- Proposed Well
- Rivers
- NIC Site Boundary
- TCE Plume

Particle Tracking Legend

- Particles Captured by Wells RW-5 to RW-7
- Particles Captured by Well 36767
- Particles Captured by SG-47
- Particles Captured by EW-A1 to EW-A4
- Particles Captured by EW-B1 to EW-B2
- Particles Captured by EW-B3
- Particles Captured by EW-E1 to EW-E6
- Particles Captured by CN-RW-02 and CN-RW-SIND
- Particles Captured by Proposed Well NIC#3-1
- Particles Captured by Proposed Well NIC#3-2
- Particles Captured by Proposed Well NIC#4-1

N
W E
S

Scale in FT

0 4000 8000 12000 16000

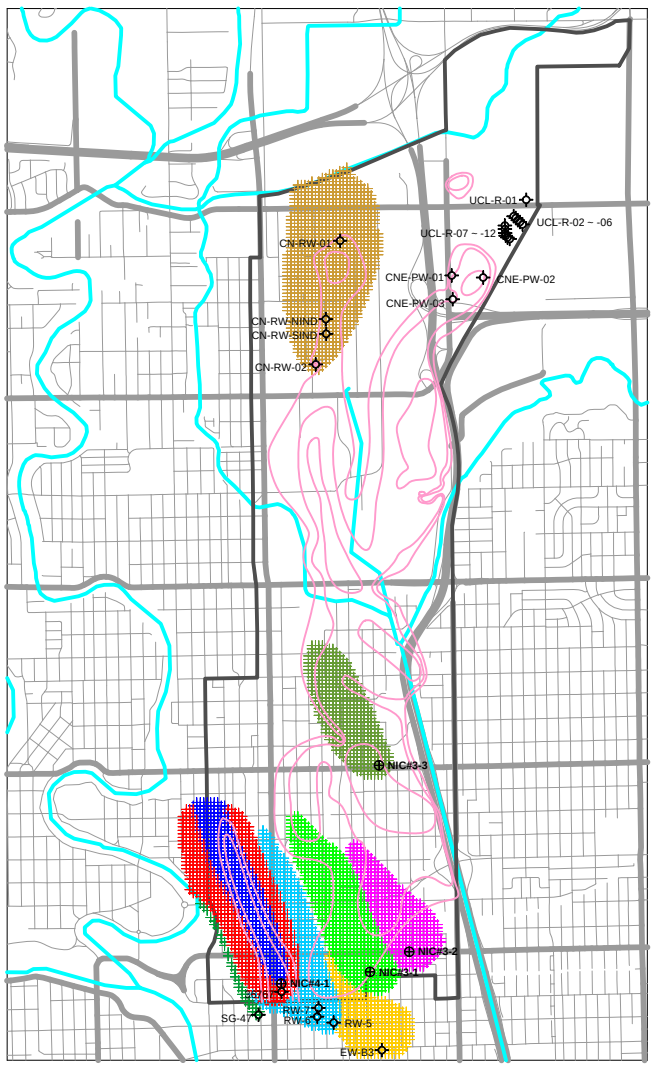
Pumping Rates for Proposed Wells

NIC#3-1 140 gpm NIC#3-2 65 gpm
NIC#4-1 120 gpm

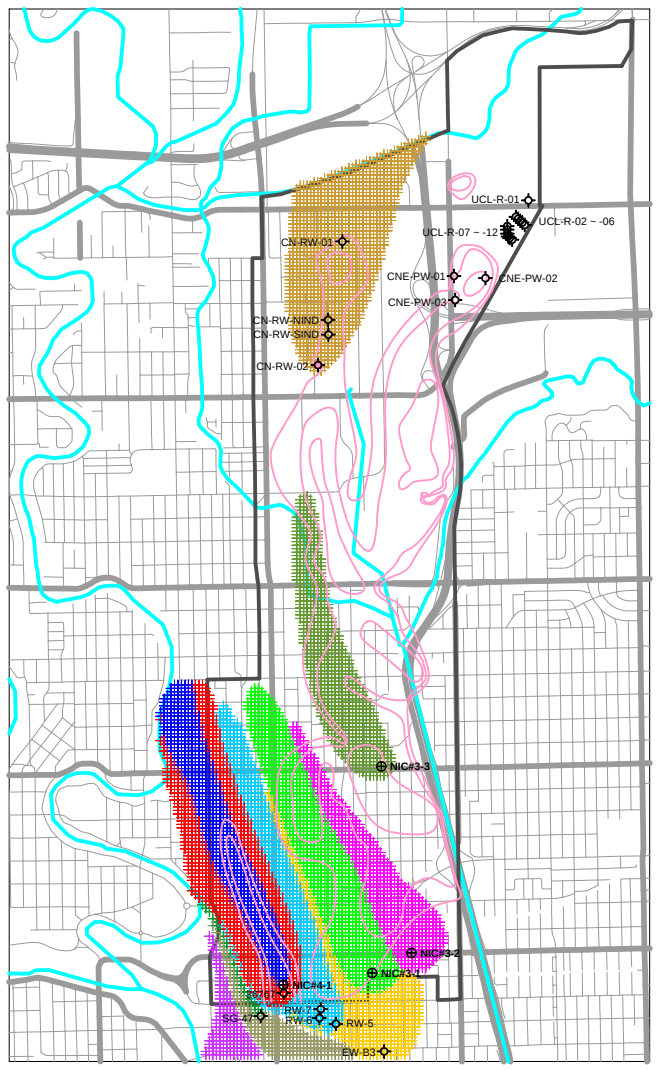
E:\Projects\NIC\Model\Simulations\CapZon_Sim54.srf

Figure 27
Simulated Capture Zones, Alternative 1

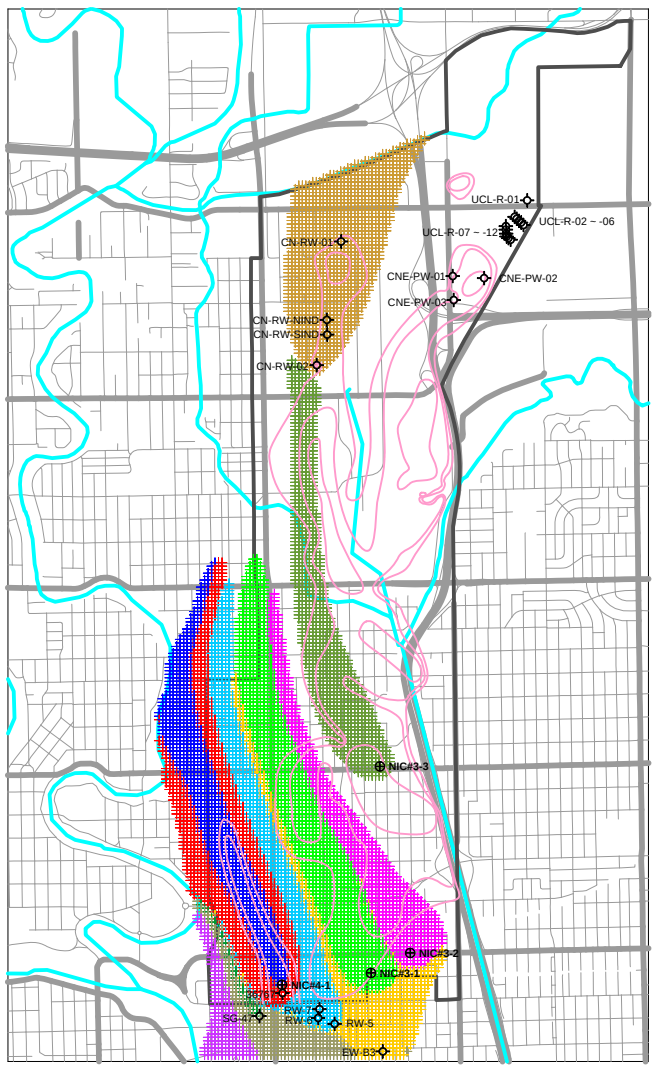
5-Year Capture Zones



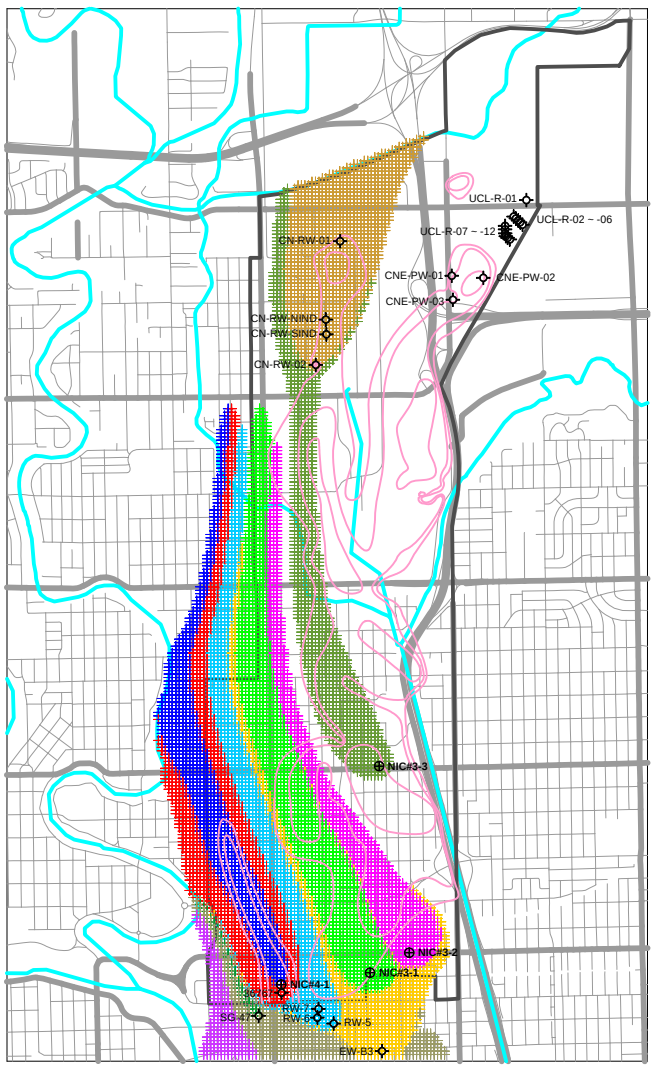
10-Year Capture Zones



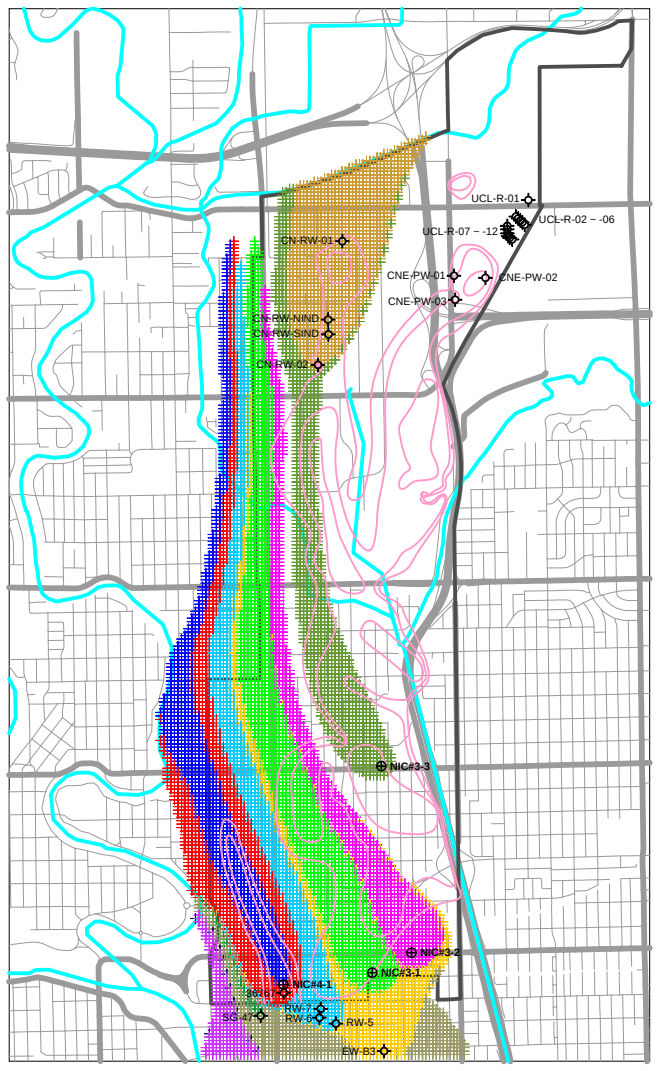
15-Year Capture Zones



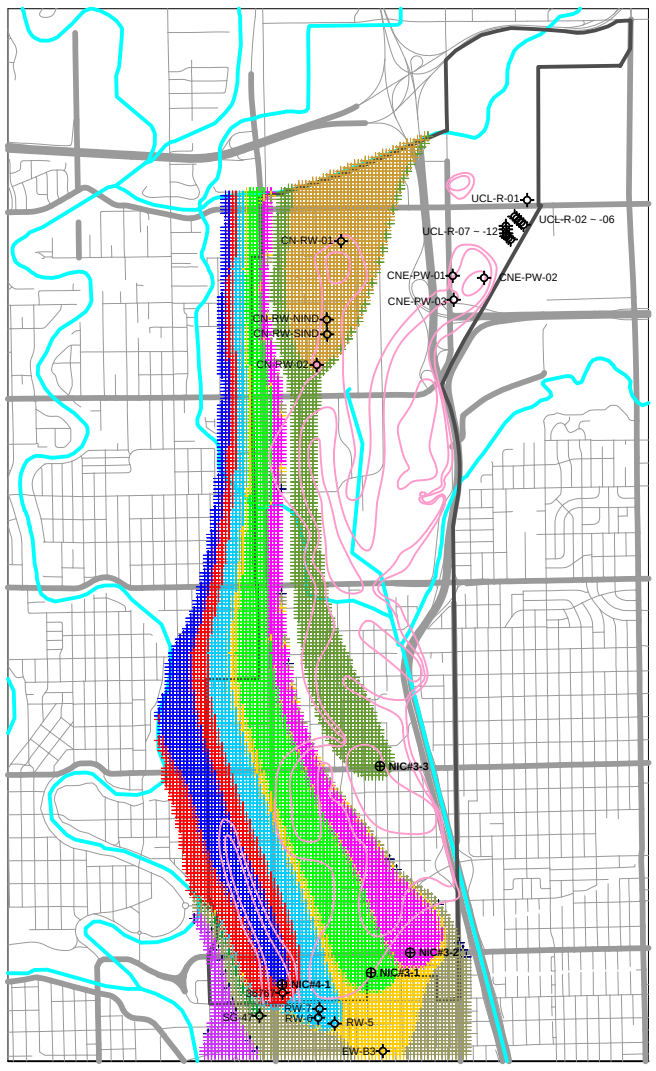
20 Year Capture Zones



25 Year Capture Zones



Final Capture Zones



LEGEND

- Existing Well
- Proposed Well
- Rivers
- NIC Site Boundary
- TCE Plume

Particle Tracking Legend

- Particles Captured by Wells RW-5 to RW-7
- Particles Captured by Well 36767
- Particles Captured by SG-47
- Particles Captured by EW-A1 to EW-A4
- Particles Captured by EW-B1 to EW-B2
- Particles Captured by EW-B3
- Particles Captured by EW-E1 to EW-E6
- Particles Captured by CN-RW-02 and CN-RW-SIND
- Particles Captured by Proposed Well NIC#3-1
- Particles Captured by Proposed Well NIC#3-2
- Particles Captured by Proposed Well NIC#3-3
- Particles Captured by Proposed Well NIC#4-1

N
W E
S

Scale in FT

0 4000 8000 12000 16000

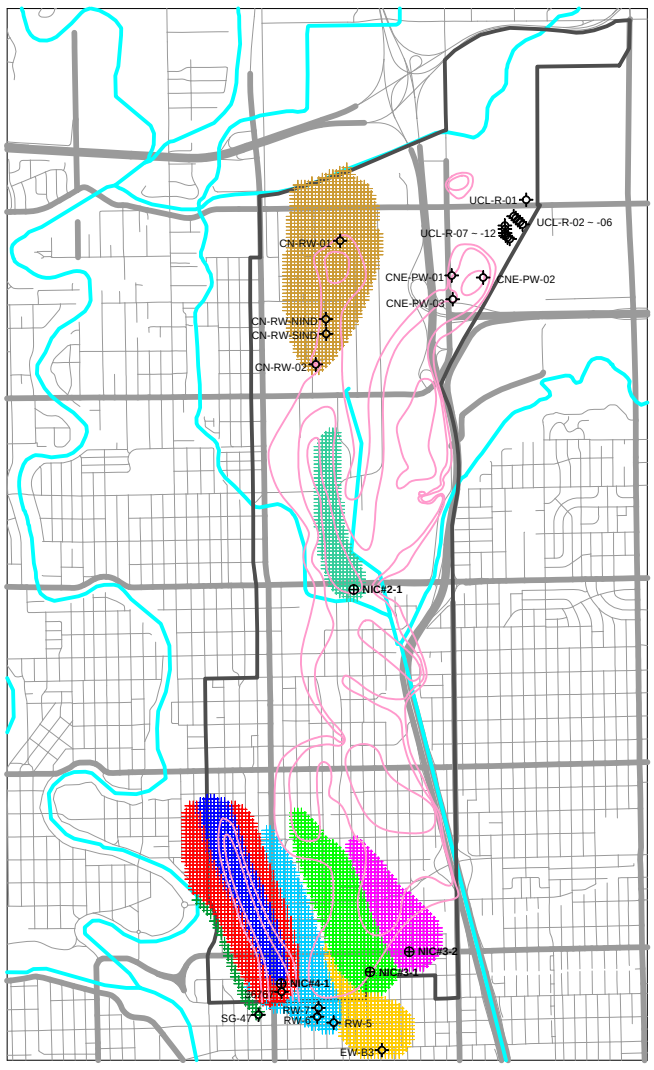
Pumping Rates for Proposed Wells

NIC#3-1	140 gpm	NIC#3-2	65 gpm
NIC#3-3	110 gpm	NIC#4-1	120 gpm

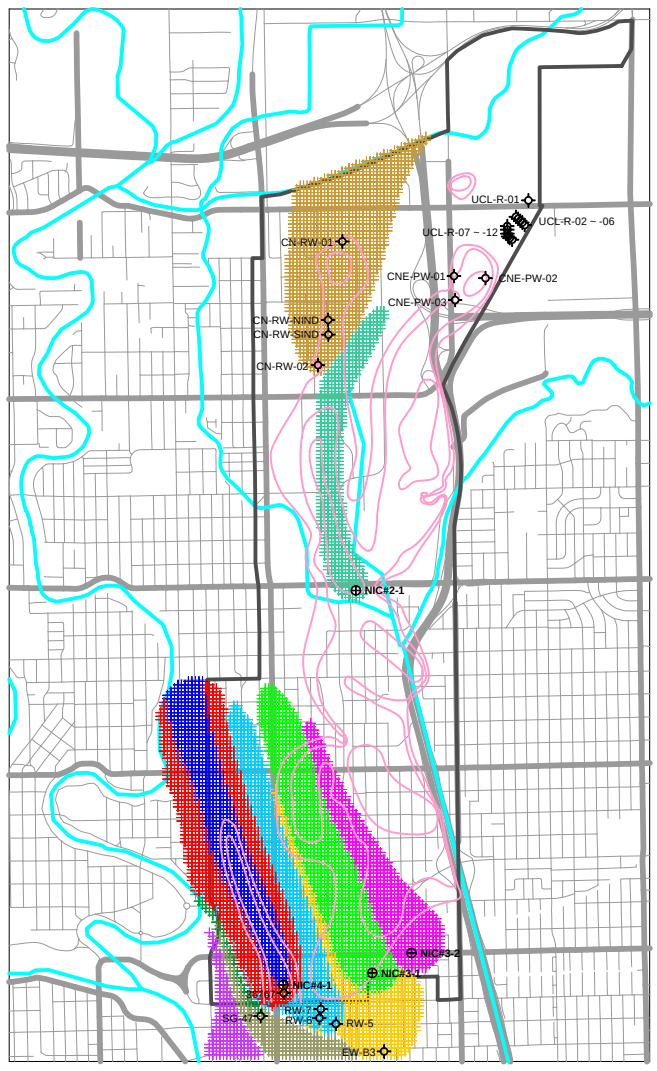
E:\Projects\NIC\Model\Simulations\CapZon_Sim55.srf

Figure 28
Simulated Capture Zones, Alternative 2

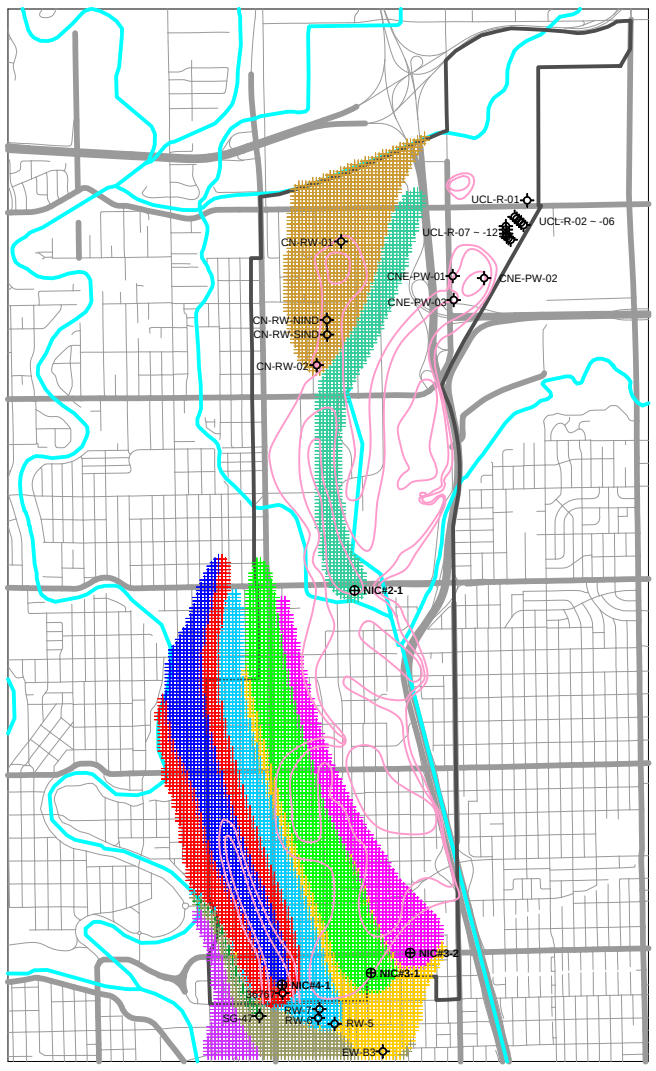
5-Year Capture Zones



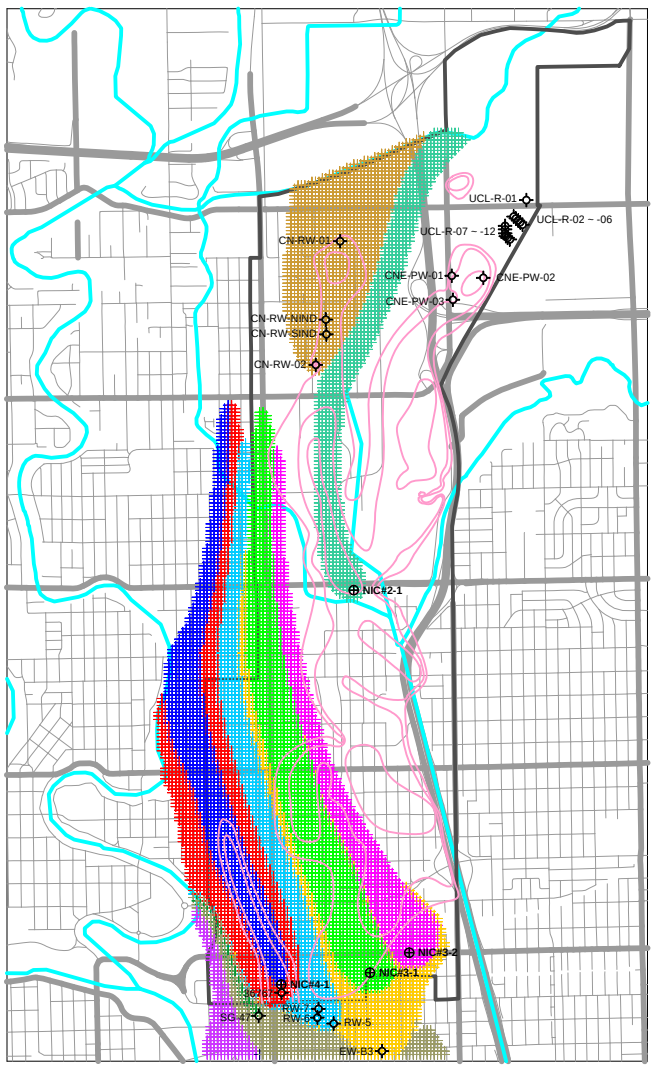
10-Year Capture Zones



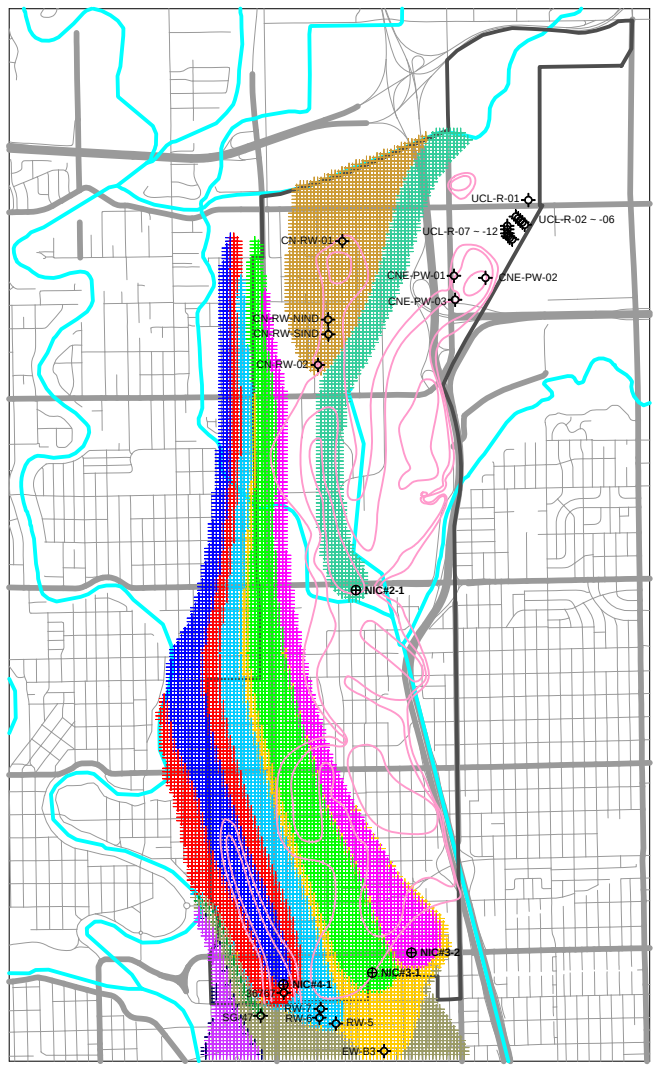
15-Year Capture Zones



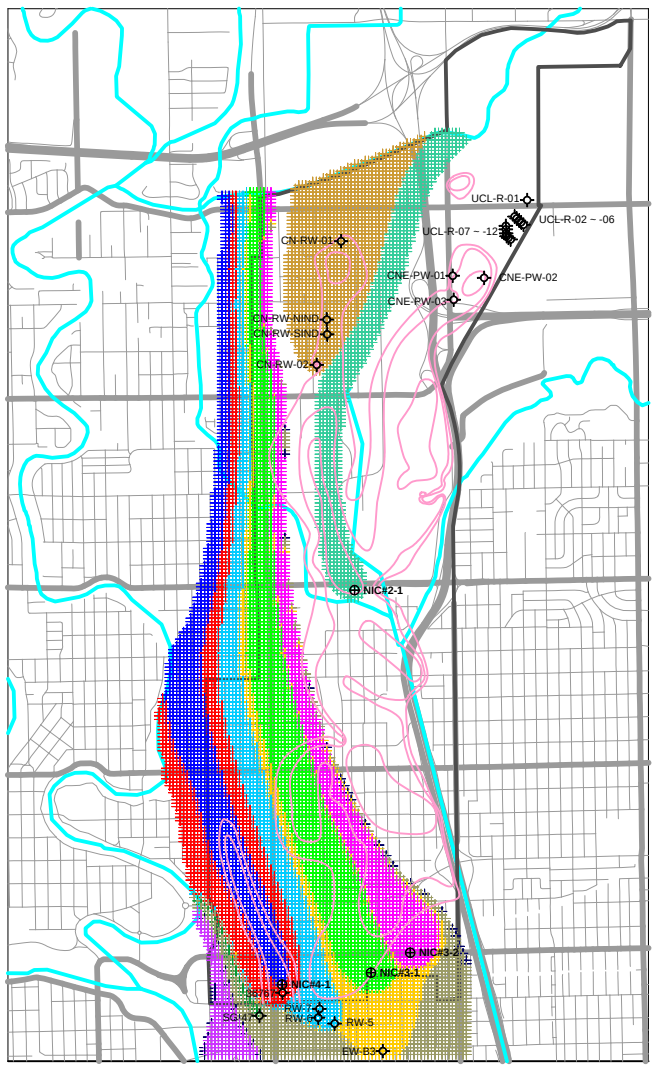
20 Year Capture Zones



25 Year Capture Zones



Final Capture Zones



LEGEND

- Existing Well
- Proposed Well
- Rivers
- NIC Site Boundary
- TCE Plume

Particle Tracking Legend

- Particles Captured by Wells RW-5 to RW-7
- Particles Captured by Well 36767
- Particles Captured by SG-47
- Particles Captured by EW-A1 to EW-A4
- Particles Captured by EW-B1 to EW-B2
- Particles Captured by EW-B3
- Particles Captured by EW-E1 to EW-E6
- Particles Captured by CN-RW-02 and CN-RW-SIND
- Particles Captured by Proposed Well NIC#3-1
- Particles Captured by Proposed Well NIC#3-2
- Particles Captured by Proposed Well NIC#2-1
- Particles Captured by Proposed Well NIC#4-1

N
W E
S

Scale in FT

0 4000 8000 12000 16000

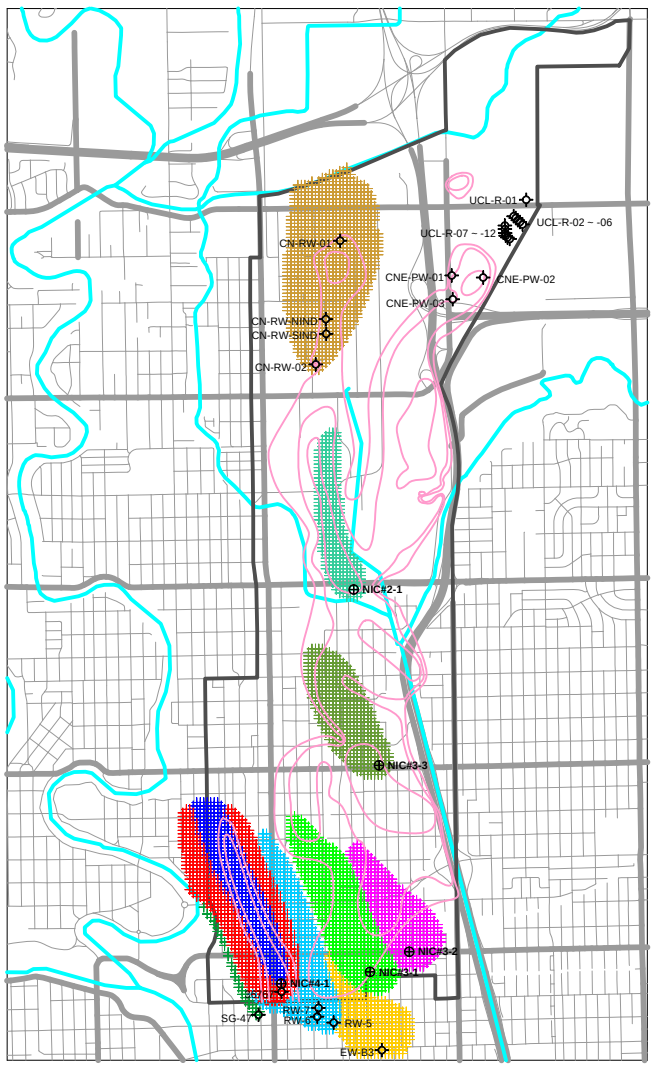
Pumping Rates for Proposed Wells

NIC#2-1	100 gpm	NIC#3-1	140 gpm
NIC#3-2	65 gpm	NIC#4-1	120 gpm

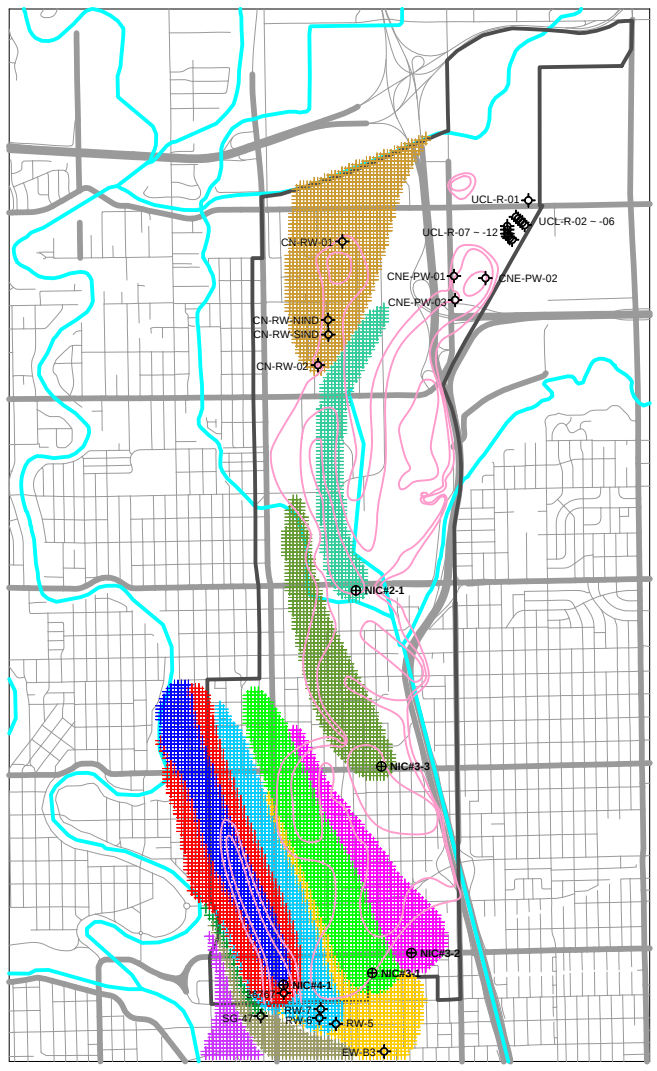
E:\Projects\NIC\Model\Simulations\CapZon_Sim56.srf

Figure 29
Simulated Capture Zones, Alternative 3a

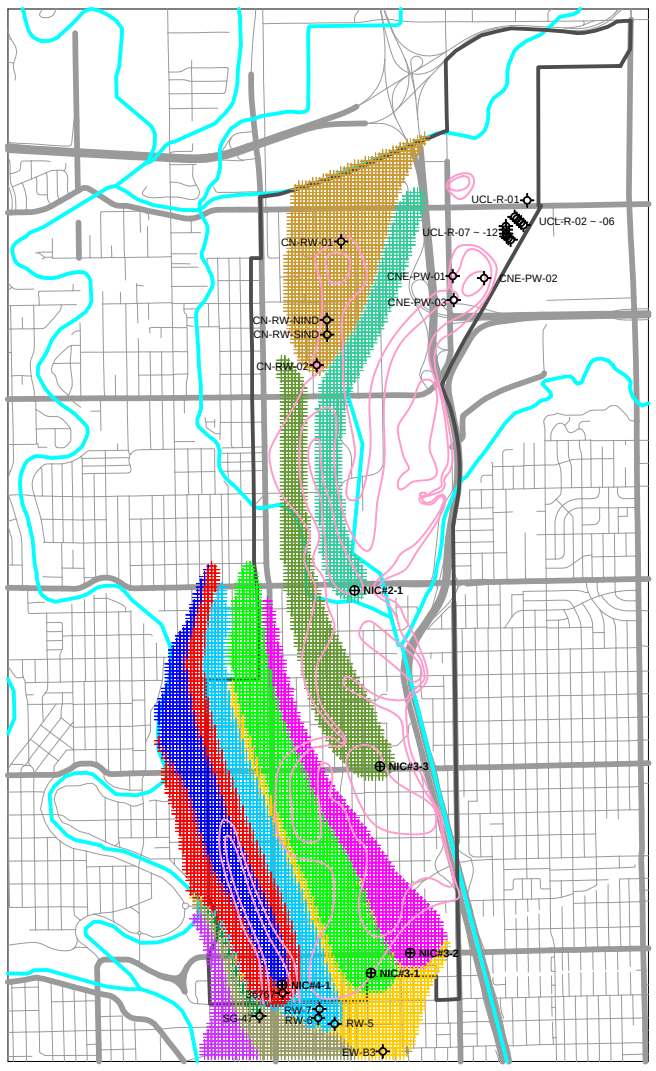
5-Year Capture Zones



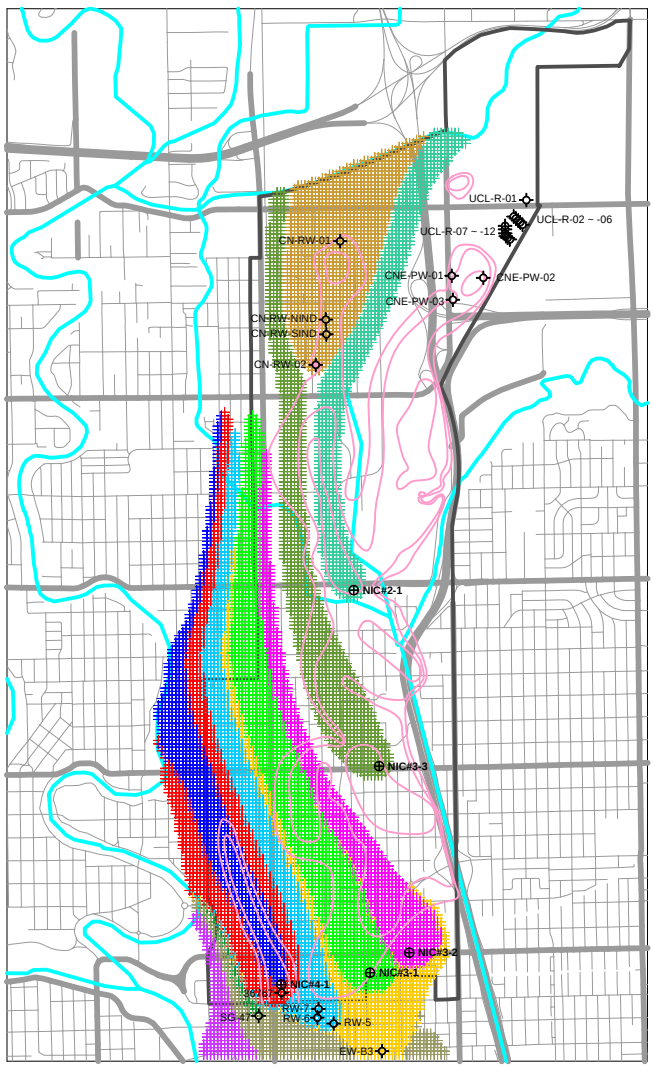
10-Year Capture Zones



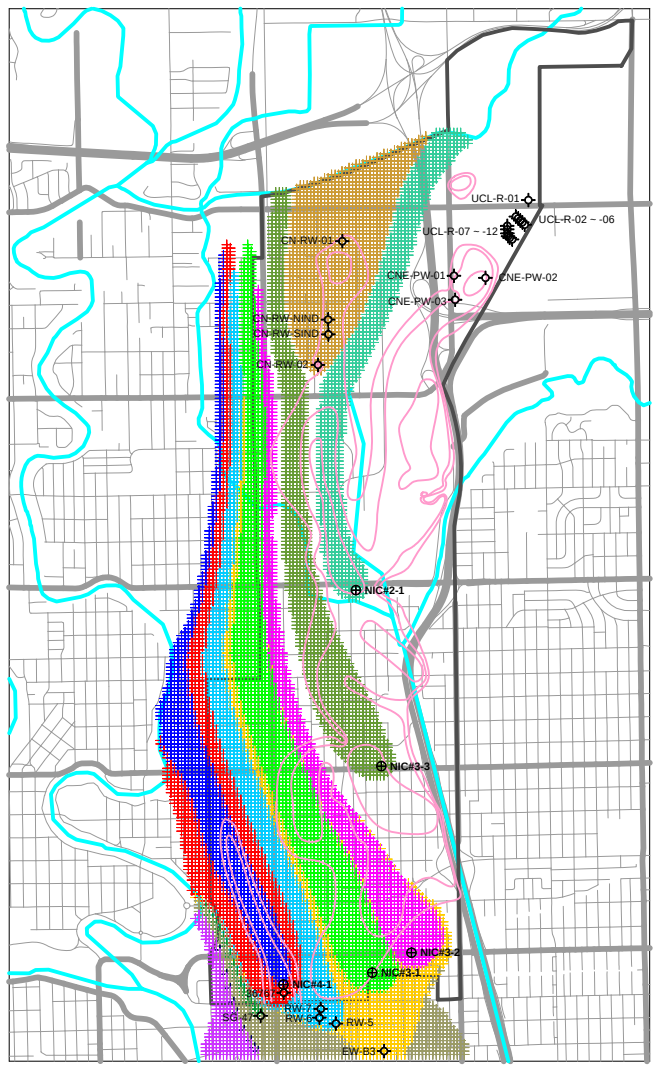
15-Year Capture Zones



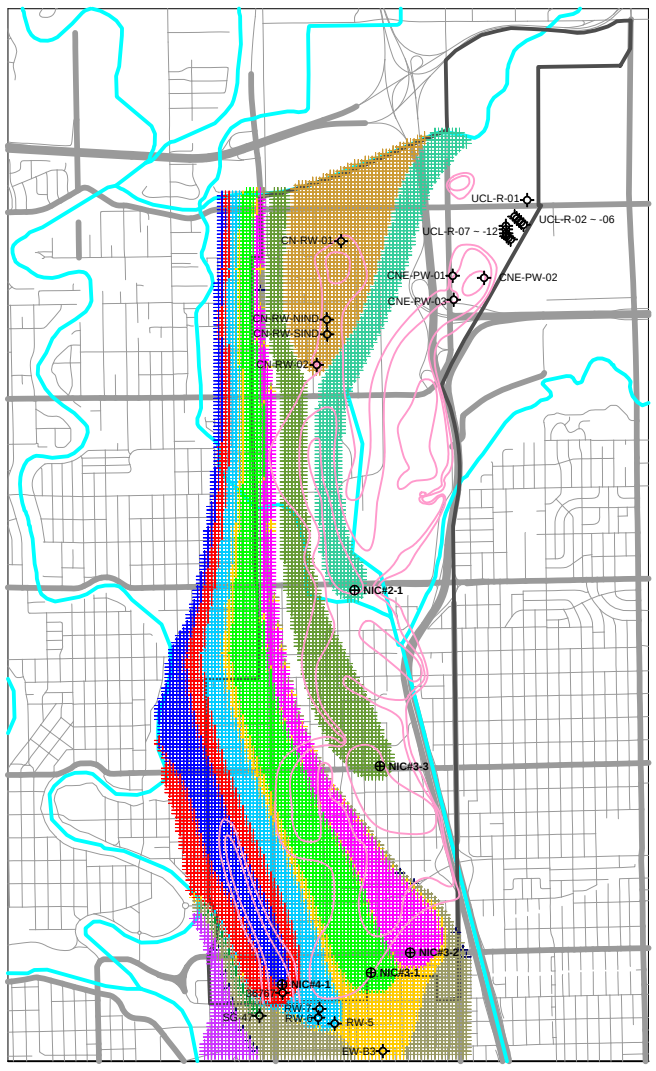
20 Year Capture Zones



25 Year Capture Zones



Final Capture Zones



LEGEND

- Existing Well
- Proposed Well
- Rivers
- NIC Site Boundary
- TCE Plume

Particle Tracking Legend

- Particles Captured by Wells RW-5 to RW-7
- Particles Captured by Well 36767
- Particles Captured by SG-47
- Particles Captured by EW-A1 to EW-A4
- Particles Captured by EW-B1 to EW-B2
- Particles Captured by EW-B3
- Particles Captured by EW-E1 to EW-E6
- Particles Captured by CN-RW-02 and CN-RW-SIND
- Particles Captured by Proposed Well NIC#3-1
- Particles Captured by Proposed Well NIC#3-2
- Particles Captured by Proposed Well NIC#3-3
- Particles Captured by Proposed Well NIC#2-1
- Particles Captured by Proposed Well NIC#4-1

N
W E
S

Scale in FT

0 4000 8000 12000 16000

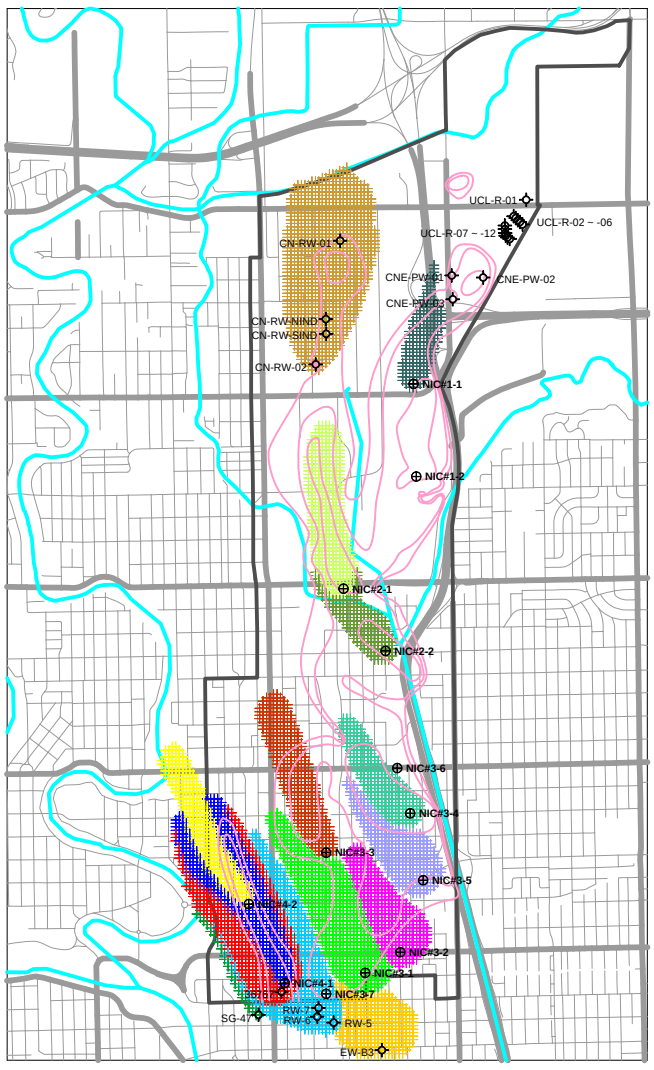
Pumping Rates for Proposed Wells

NIC#2-1	100 gpm	NIC#3-1	140 gpm
NIC#3-2	65 gpm	NIC#3-3	110 gpm
NIC#4-1	120 gpm		

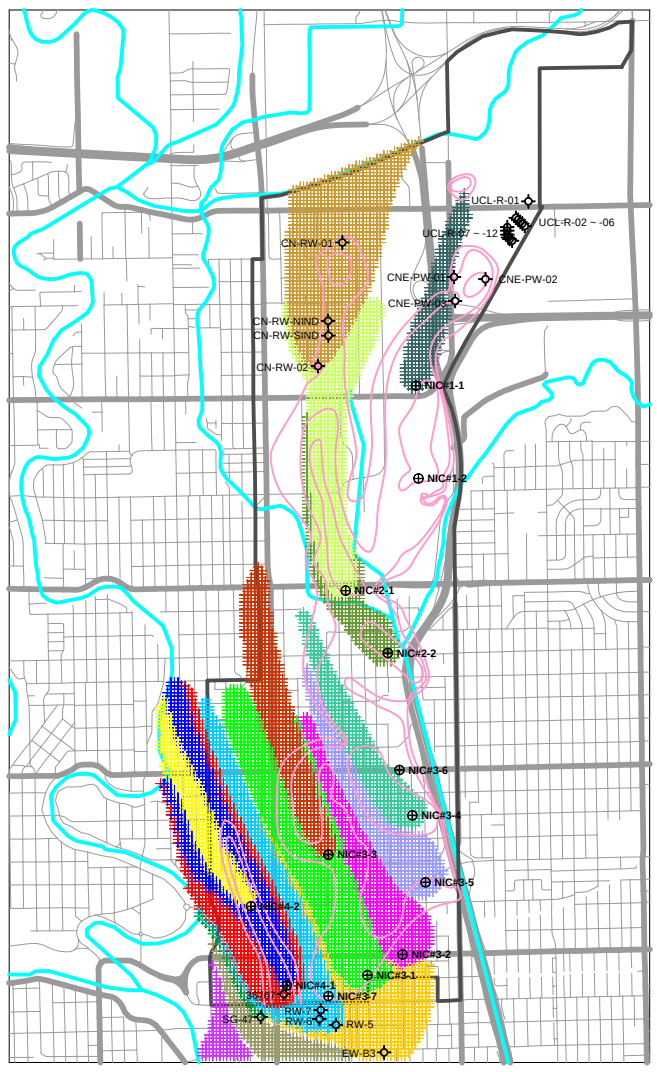
E:\Projects\NIC\Model\Simulations\CapZon_Sim57.srf

Figure 30
Simulated Capture Zones, Alternative 3b

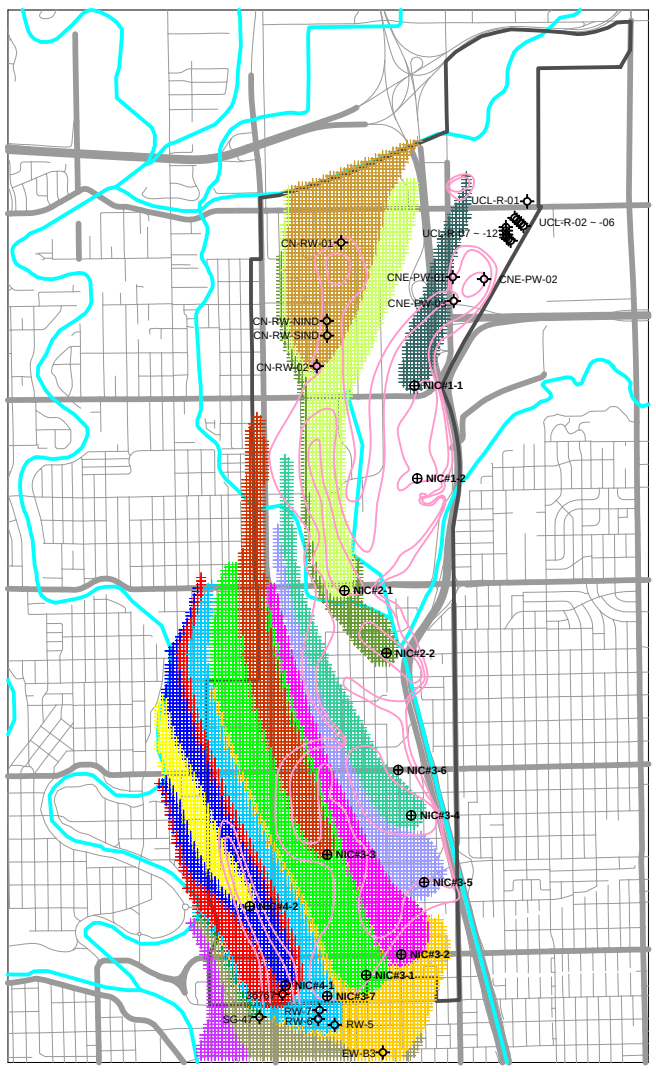
5-Year Capture Zones



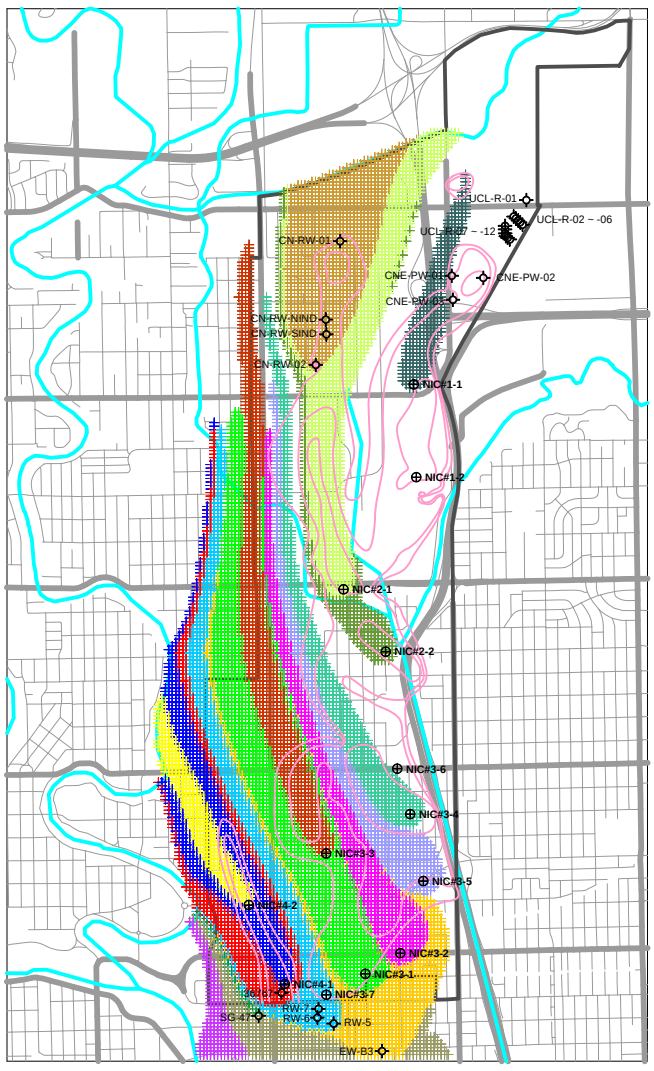
10-Year Capture Zones



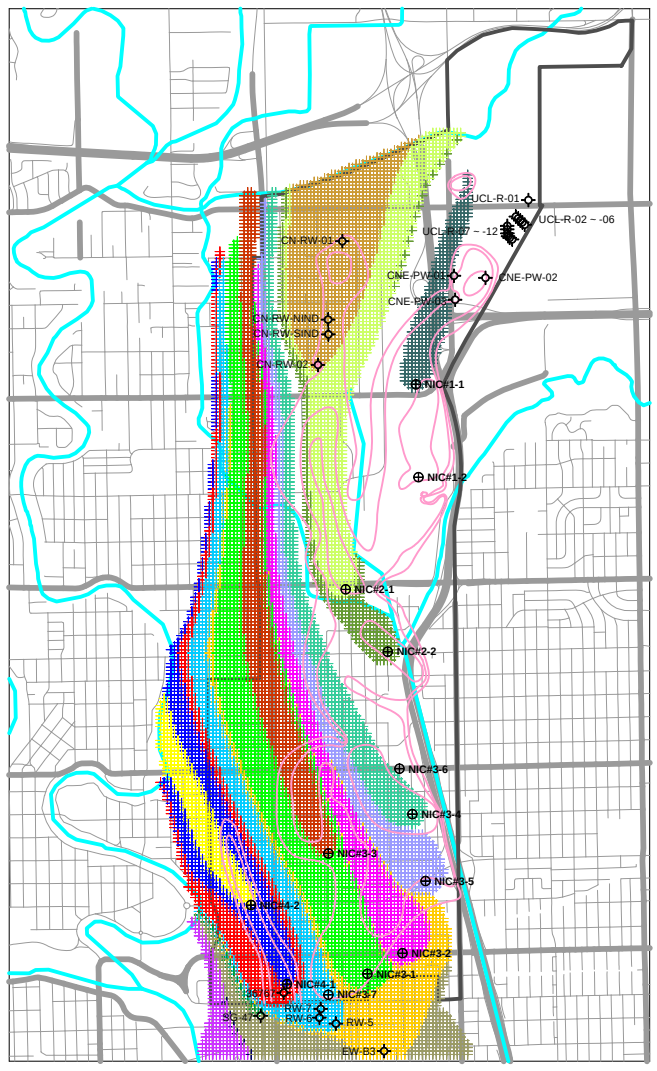
15-Year Capture Zones



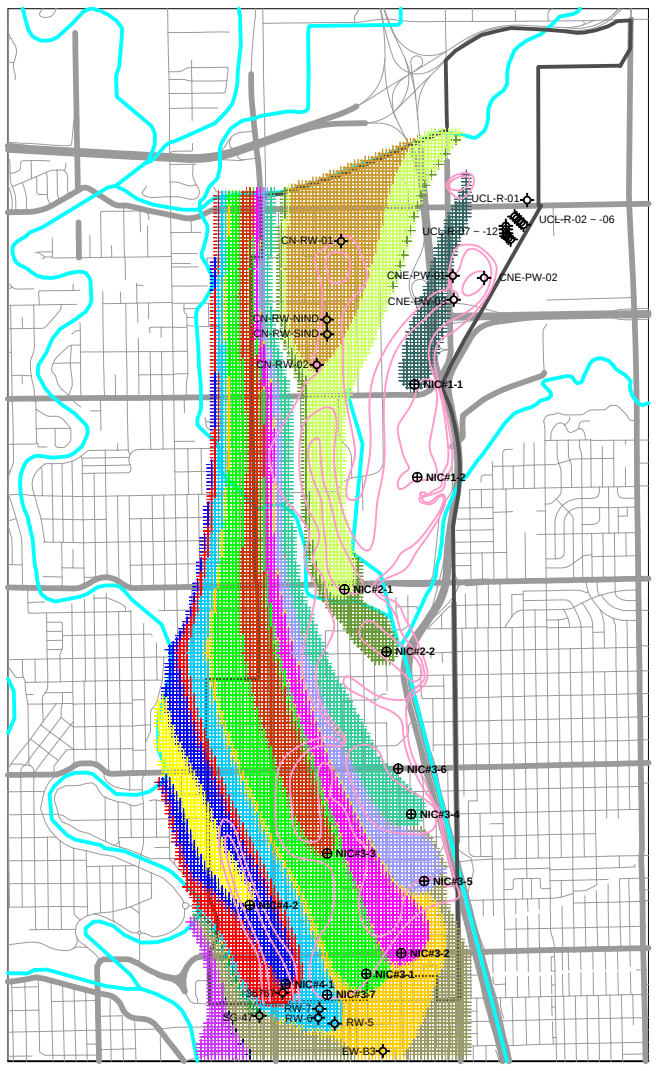
20 Year Capture Zones



25 Year Capture Zones



Final Capture Zones



LEGEND

- Existing Well
- Proposed Well
- Rivers
- NIC Site Boundary
- TCE Plume

Particle Tracking Legend

- Particles Captured by Wells RW-5 to RW-7
- Particles Captured by Well 36767
- Particles Captured by EW-B3
- Particles Captured by EW-A1 to EW-A4
- Particles Captured by EW-B1 to EW-B2
- Particles Captured by EW-E1 to EW-E6
- Particles Captured by SG-47
- Particles Captured by CN-RW-02 and CN-RW-SIND
- Particles Captured by Proposed Well NIC#1-1
- Particles Captured by Proposed Well NIC#1-2
- Particles Captured by Proposed Well NIC#2-1
- Particles Captured by Proposed Well NIC#2-2
- Particles Captured by Proposed Well NIC#3-1
- Particles Captured by Proposed Well NIC#3-2
- Particles Captured by Proposed Well NIC#3-3
- Particles Captured by Proposed Well NIC#3-4
- Particles Captured by Proposed Well NIC#3-5
- Particles Captured by Proposed Well NIC#3-6
- Particles Captured by Proposed Well NIC#3-7
- Particles Captured by Proposed Well NIC#4-1
- Particles Captured by Proposed Well NIC#4-2

N
W E
S

Scale in FT

0 4000 8000 12000 16000

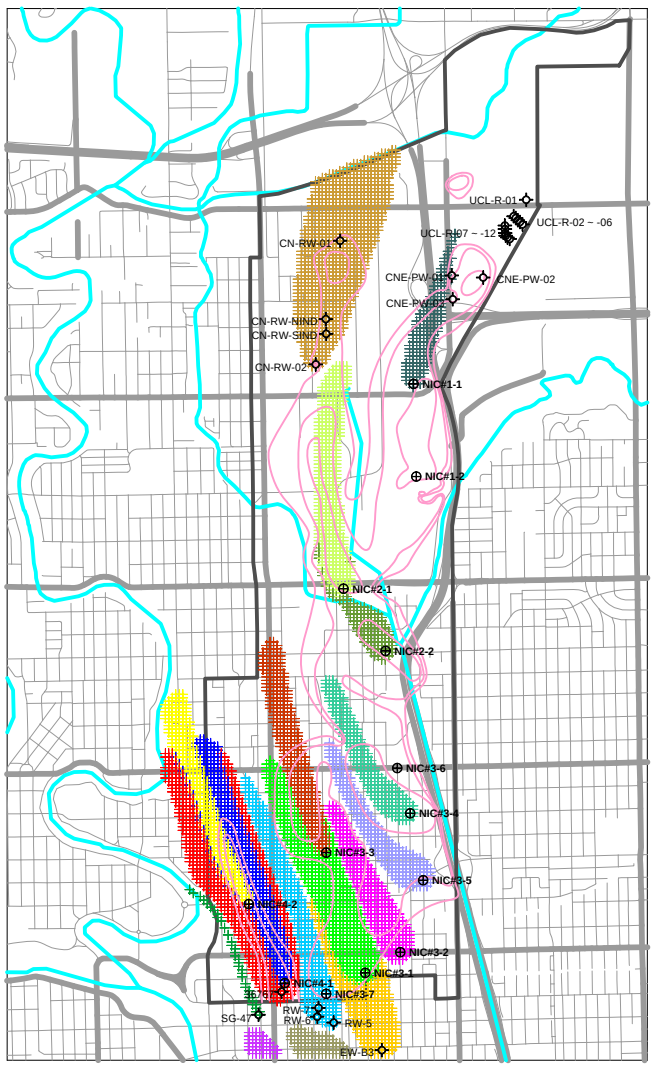
Pumping Rates for Proposed Wells

NIC#1-1	50 gpm	NIC#1-2	0 gpm
NIC#2-1	130 gpm	NIC#2-2	50 gpm
NIC#3-1	140 gpm	NIC#3-2	60 gpm
NIC#3-3	100 gpm	NIC#3-4	50 gpm
NIC#3-5	50 gpm	NIC#3-6	0 gpm
NIC#3-7	0 gpm		
NIC#4-1	120 gpm	NIC#4-2	100 gpm

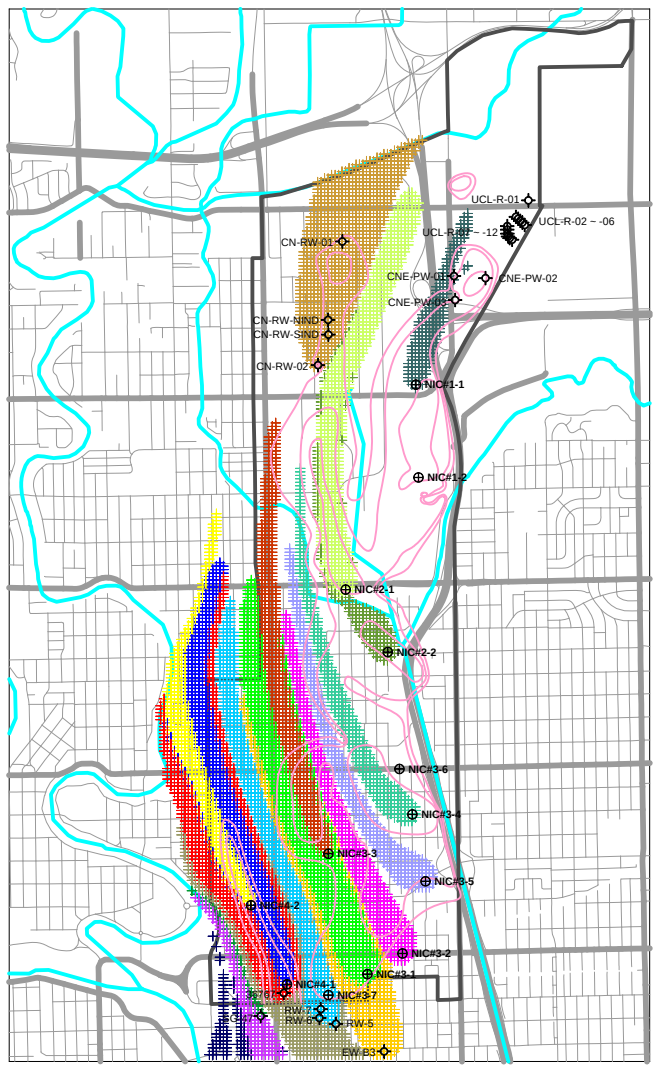
E:\Projects\NIC\Model\Simulations\CapZon_Sim58.srf

Figure 31
Simulated Capture Zones, Alternative 4

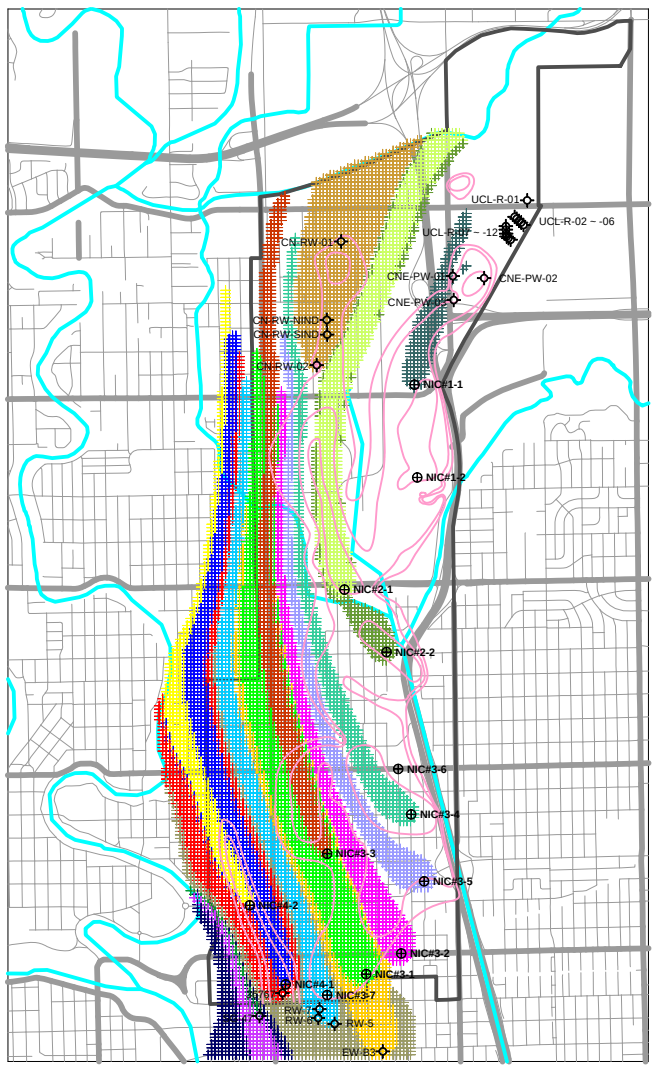
5-Year Capture Zones



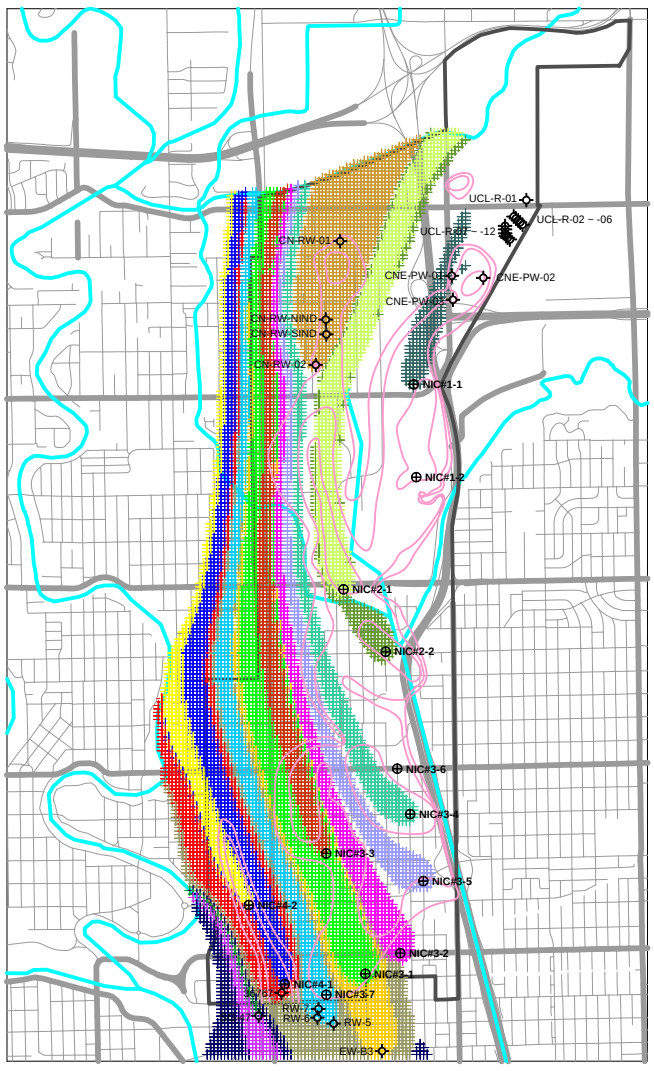
10-Year Capture Zones



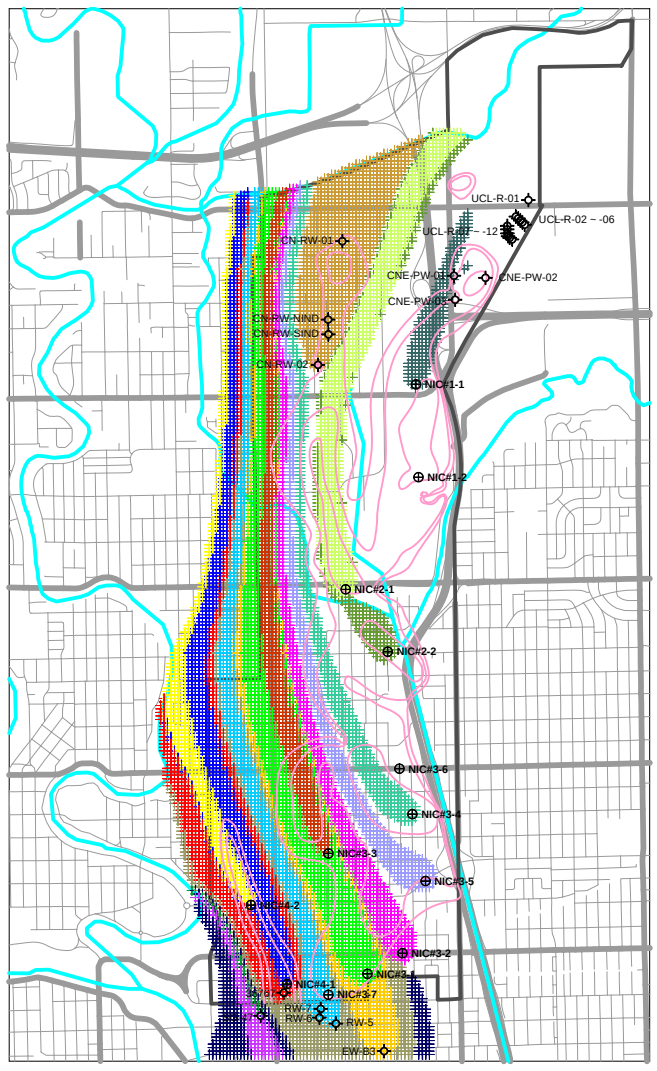
15-Year Capture Zones



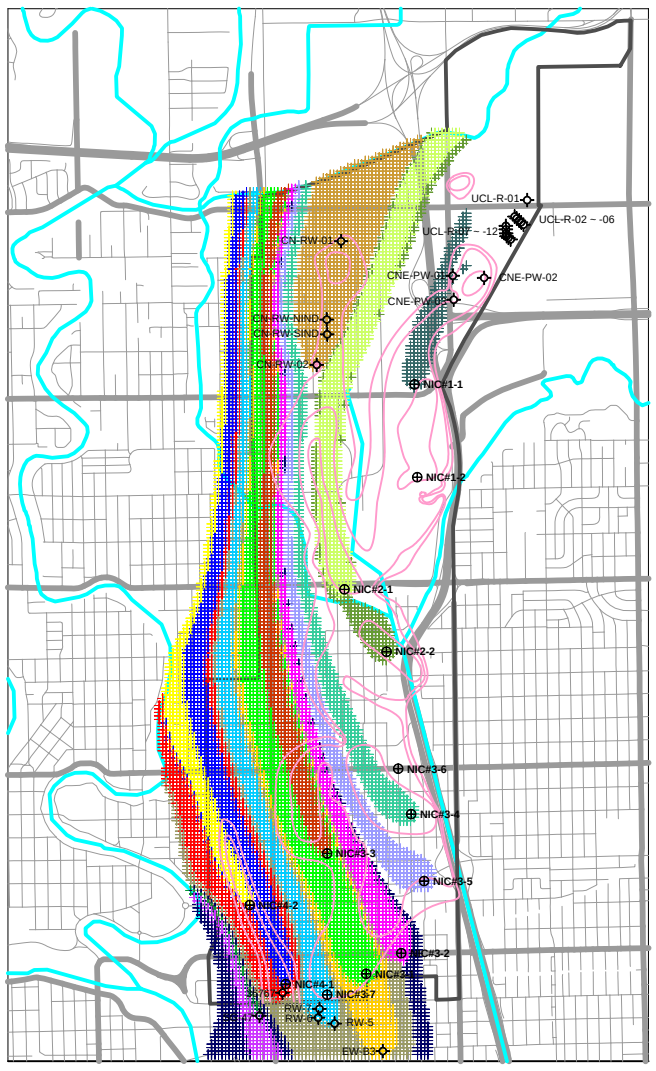
20 Year Capture Zones



25 Year Capture Zones



Final Capture Zones



LEGEND

- Existing Well
- Proposed Well
- Rivers
- NIC Site Boundary
- TCE Plume

Particle Tracking Legend

- Particles Captured by Wells RW-5 to RW-7
- Particles Captured by Well 36767
- Particles Captured by EW-B3
- Particles Captured by EW-A1 to EW-A4
- Particles Captured by EW-B1 to EW-B2
- Particles Captured by EW-E1 to EW-E6
- Particles Captured by SG-47
- Particles Captured by CN-RW-02 and CN-RW-SIND
- Particles Captured by Proposed Well NIC#1-1
- Particles Captured by Proposed Well NIC#1-2
- Particles Captured by Proposed Well NIC#2-1
- Particles Captured by Proposed Well NIC#2-2
- Particles Captured by Proposed Well NIC#3-1
- Particles Captured by Proposed Well NIC#3-2
- Particles Captured by Proposed Well NIC#3-3
- Particles Captured by Proposed Well NIC#3-4
- Particles Captured by Proposed Well NIC#3-5
- Particles Captured by Proposed Well NIC#3-6
- Particles Captured by Proposed Well NIC#3-7
- Particles Captured by Proposed Well NIC#4-1
- Particles Captured by Proposed Well NIC#4-2

N
W E
S

Scale in FT

0 4000 8000 12000 16000

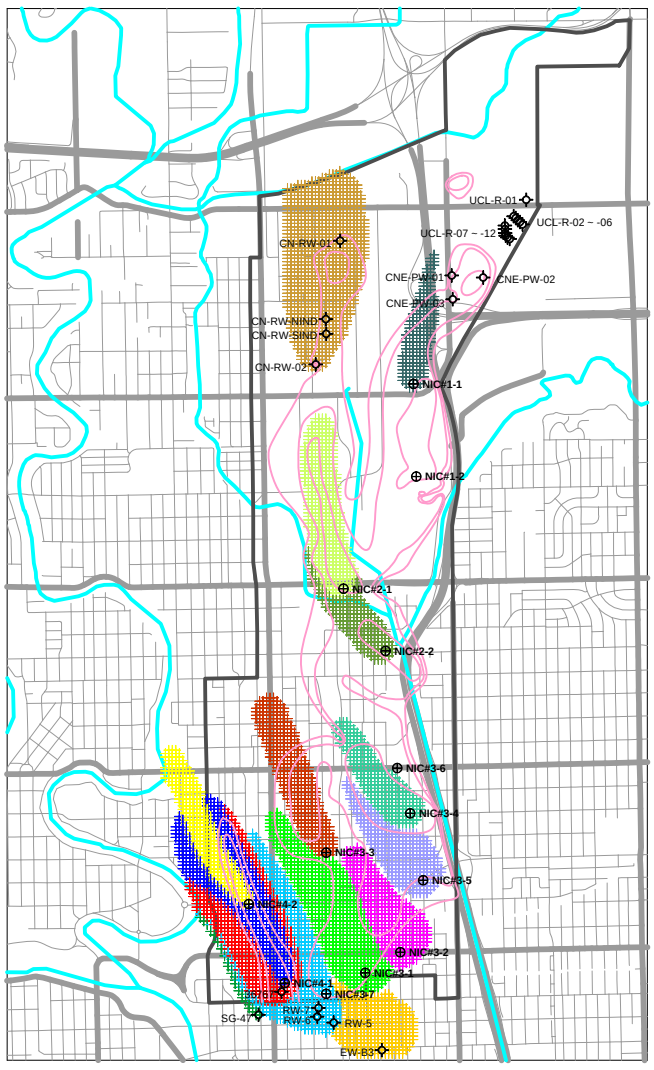
Pumping Rates for Proposed Wells

NIC#1-1	50 gpm	NIC#1-2	0 gpm
NIC#2-1	130 gpm	NIC#2-2	50 gpm
NIC#3-1	140 gpm	NIC#3-2	60 gpm
NIC#3-3	100 gpm	NIC#3-4	50 gpm
NIC#3-5	50 gpm	NIC#3-6	0 gpm
NIC#3-7	0 gpm		
NIC#4-1	120 gpm	NIC#4-2	100 gpm

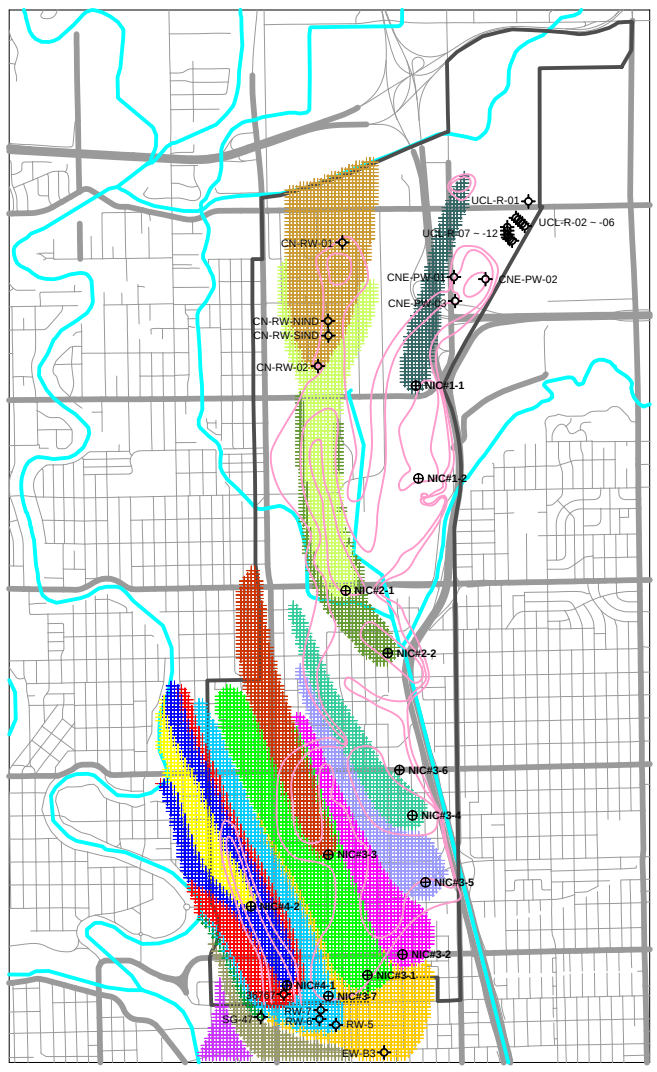
E:\Projects\NIC\Model\Simulations\CapZon_Sim51.srf

Figure 32
Simulated Capture Zones
with Higher Hydraulic Conductivity and Higher Net Recharge

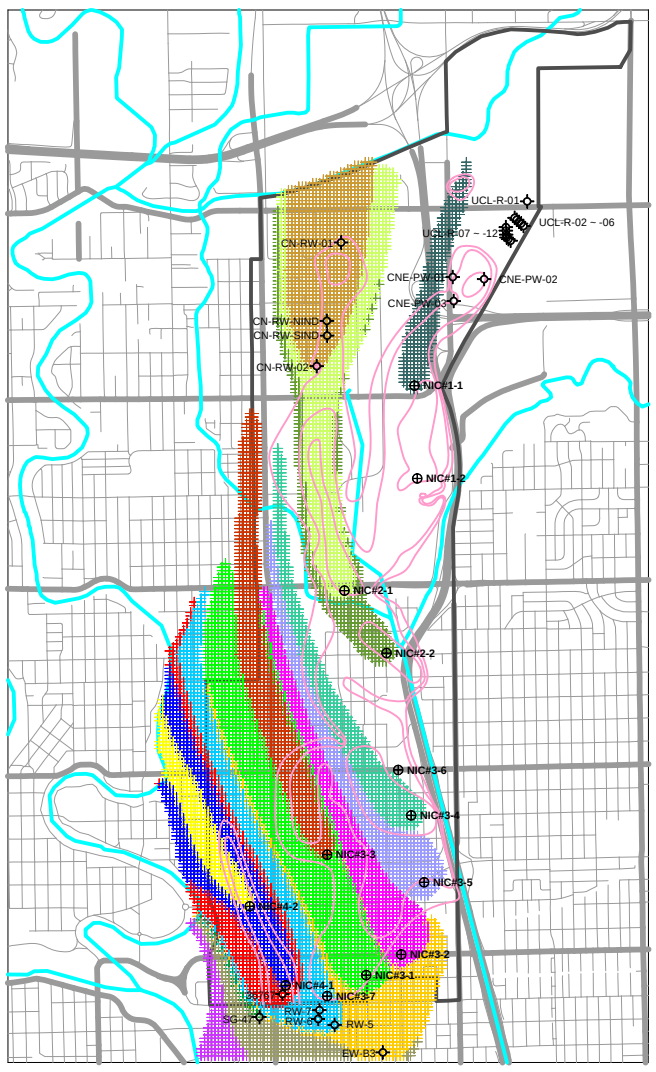
5-Year Capture Zones



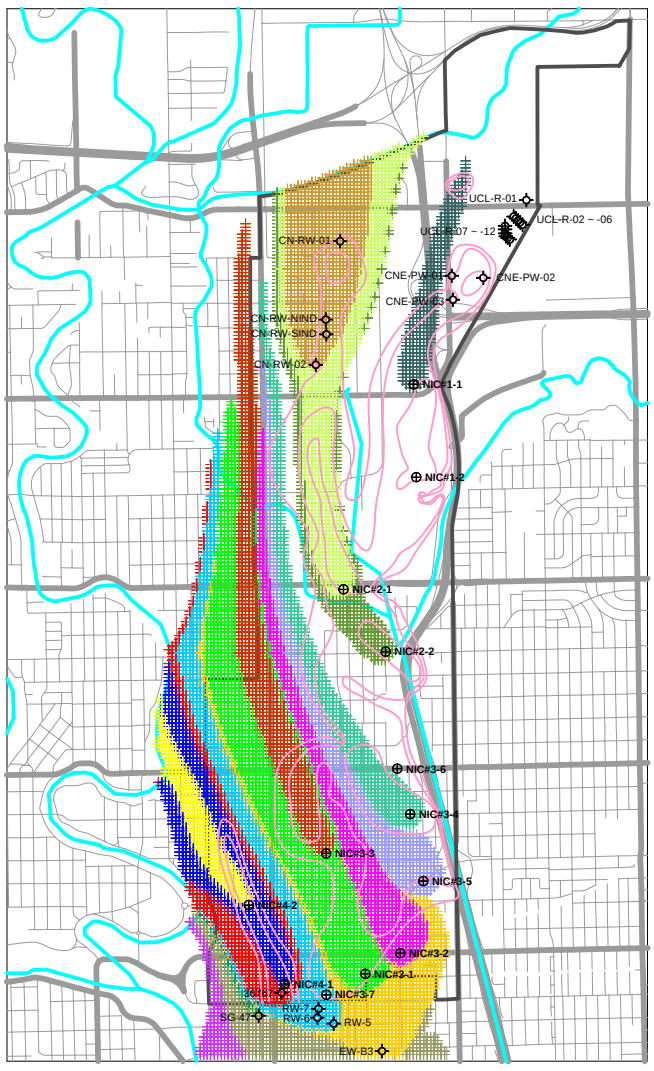
10-Year Capture Zones



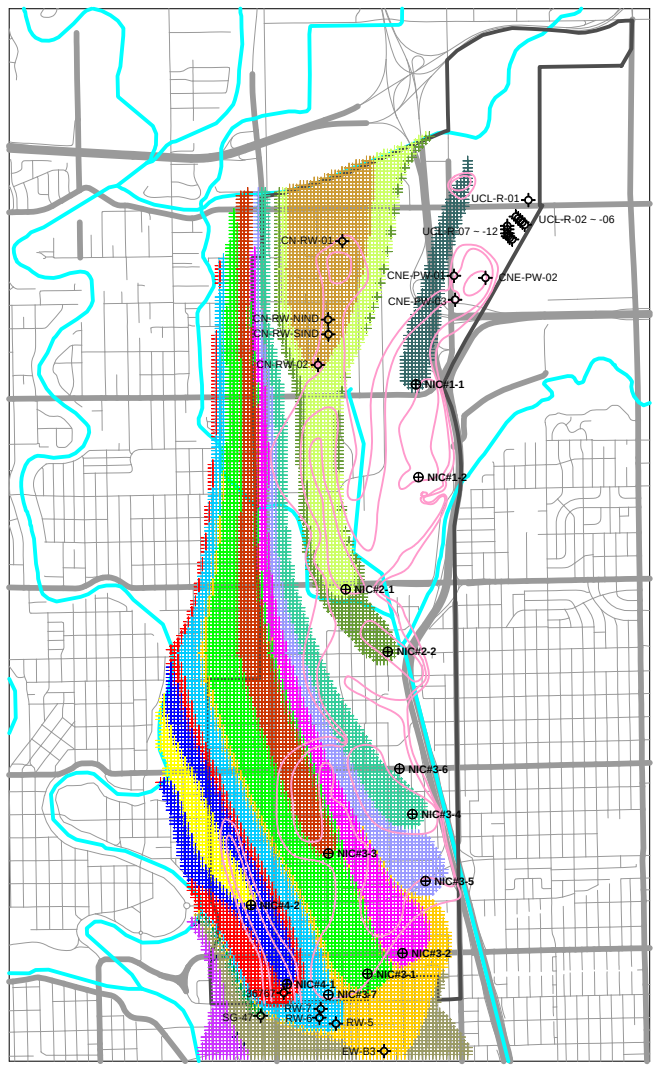
15-Year Capture Zones



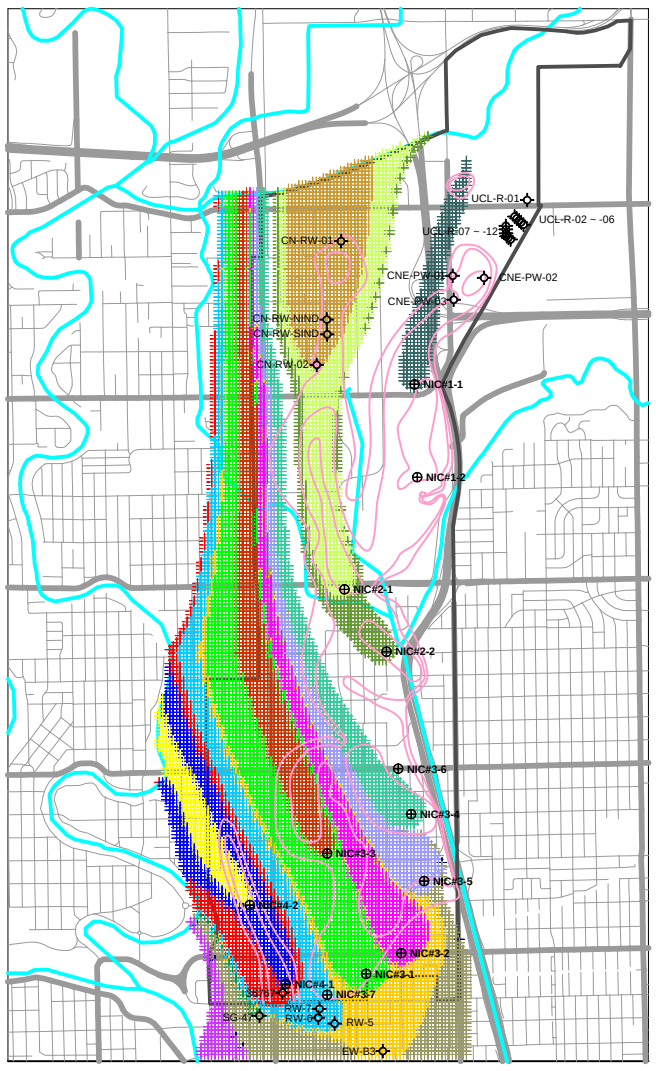
20 Year Capture Zones



25 Year Capture Zones



Final Capture Zones



LEGEND

- Existing Well
- Proposed Well
- Rivers
- NIC Site Boundary
- TCE Plume

Particle Tracking Legend

- Particles Captured by Wells RW-5 to RW-7
- Particles Captured by Well 36767
- Particles Captured by EW-B3
- Particles Captured by EW-A1 to EW-A4
- Particles Captured by EW-B1 to EW-B2
- Particles Captured by EW-E1 to EW-E6
- Particles Captured by SG-47
- Particles Captured by CN-RW-02 and CN-RW-SIND
- Particles Captured by Proposed Well NIC#1-1
- Particles Captured by Proposed Well NIC#1-2
- Particles Captured by Proposed Well NIC#2-1
- Particles Captured by Proposed Well NIC#2-2
- Particles Captured by Proposed Well NIC#3-1
- Particles Captured by Proposed Well NIC#3-2
- Particles Captured by Proposed Well NIC#3-3
- Particles Captured by Proposed Well NIC#3-4
- Particles Captured by Proposed Well NIC#3-5
- Particles Captured by Proposed Well NIC#3-6
- Particles Captured by Proposed Well NIC#3-7
- Particles Captured by Proposed Well NIC#4-1
- Particles Captured by Proposed Well NIC#4-2

N
W E
S

Scale in FT

0 4000 8000 12000 16000

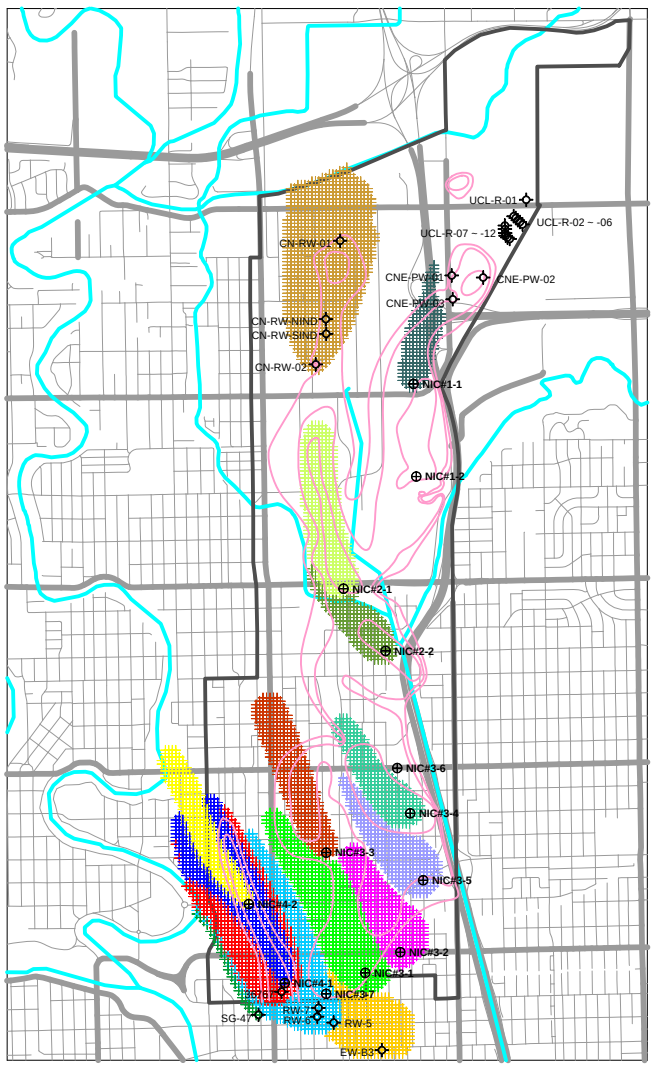
Pumping Rates for Proposed Wells

NIC#1-1	50 gpm	NIC#1-2	0 gpm
NIC#2-1	130 gpm	NIC#2-2	50 gpm
NIC#3-1	140 gpm	NIC#3-2	60 gpm
NIC#3-3	100 gpm	NIC#3-4	50 gpm
NIC#3-5	50 gpm	NIC#3-6	0 gpm
NIC#3-7	0 gpm		
NIC#4-1	120 gpm	NIC#4-2	100 gpm

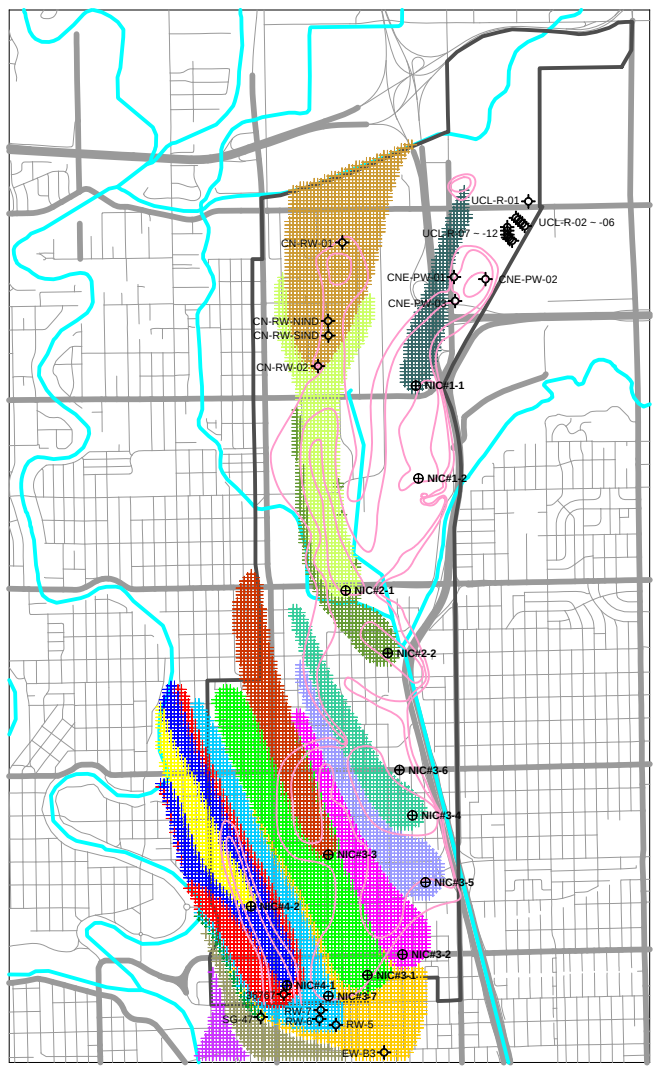
E:\Projects\NIC\Model\Simulations\CapZon_Sim52.srf

Figure 33
Simulated Capture Zones
with Higher River Conductances

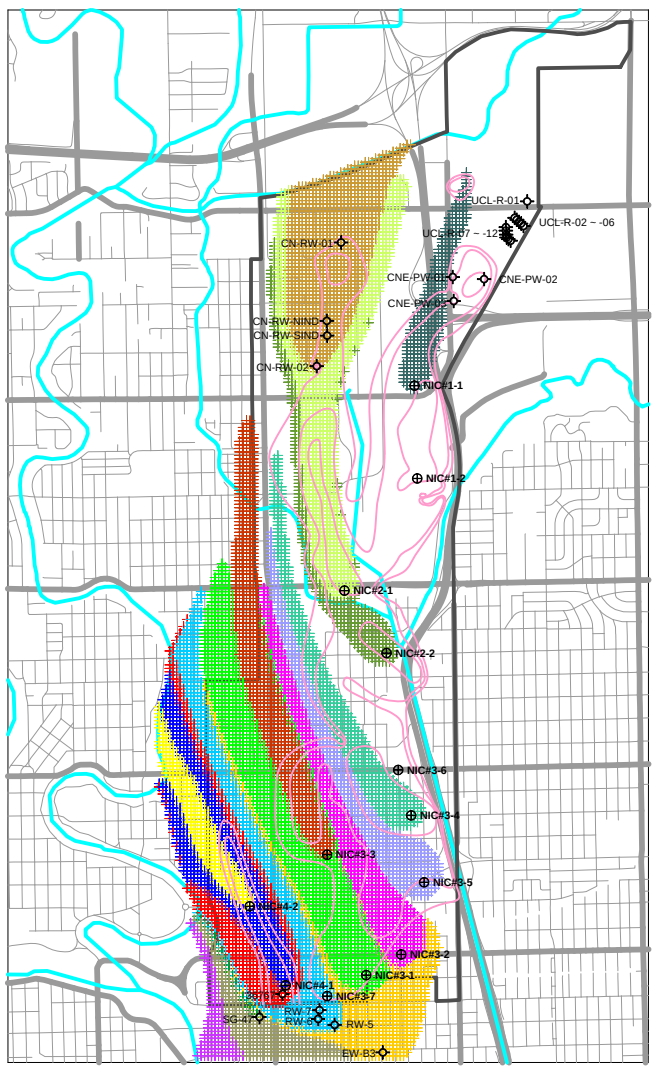
5-Year Capture Zones



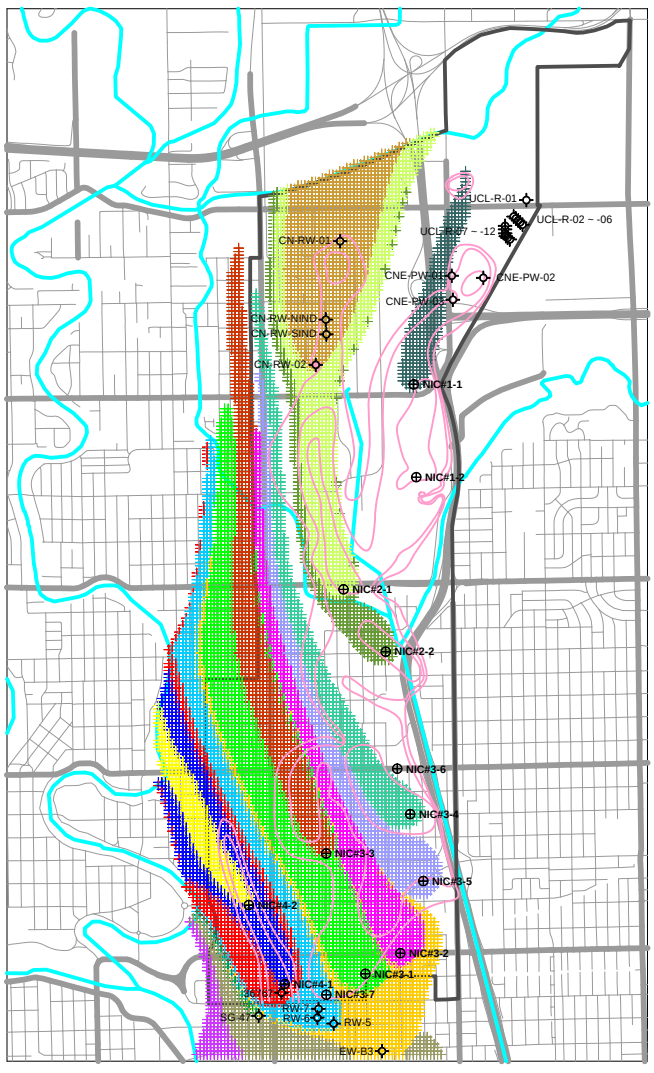
10-Year Capture Zones



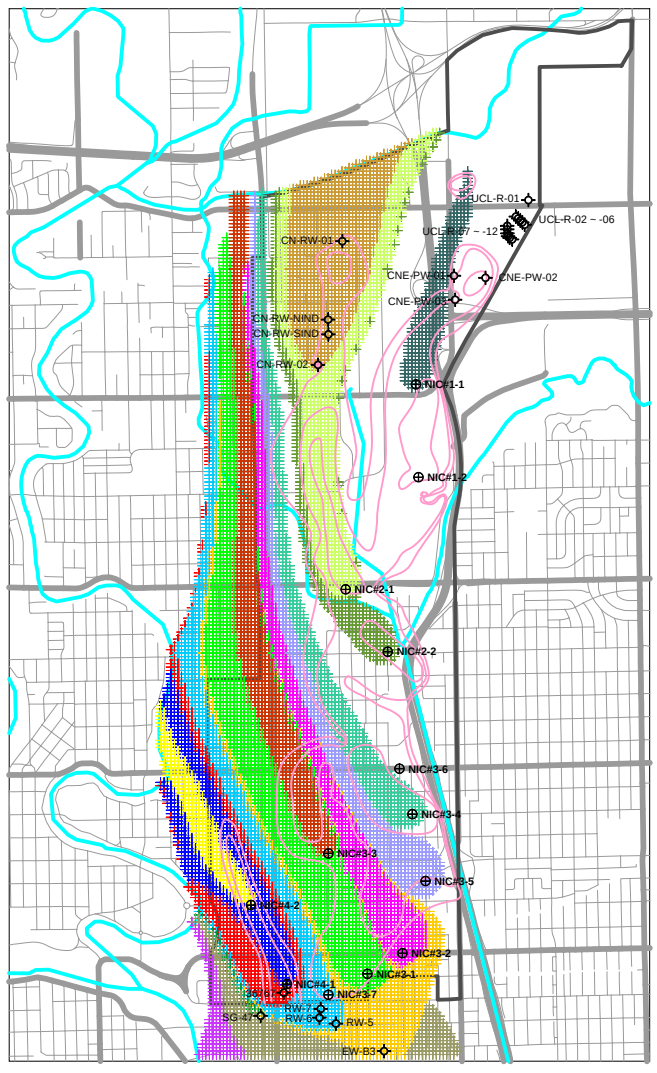
15-Year Capture Zones



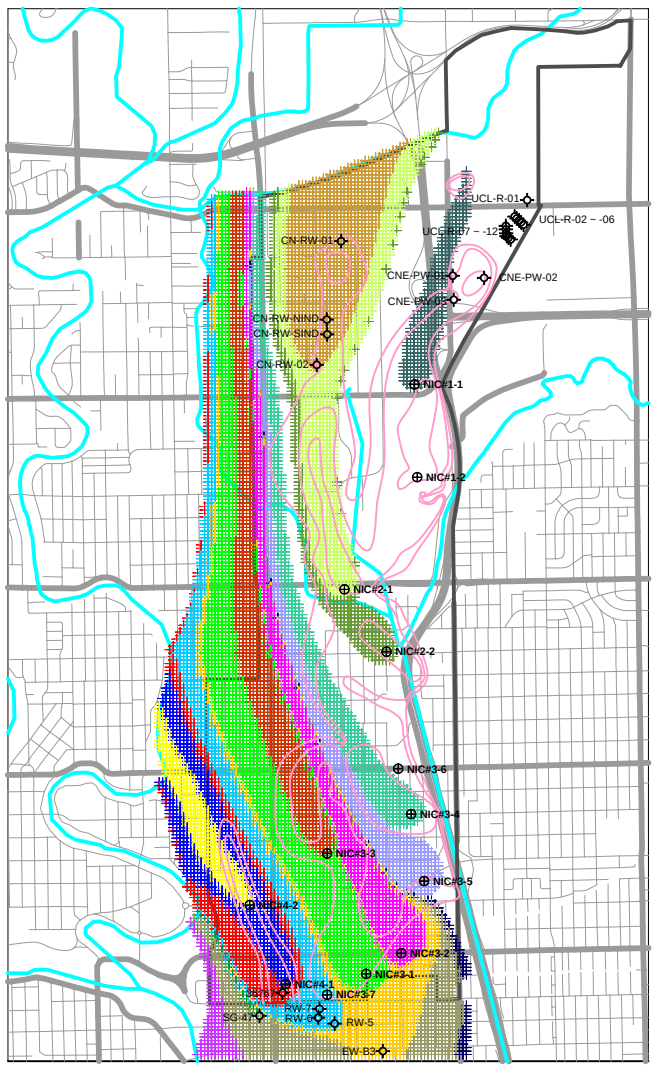
20 Year Capture Zones



25 Year Capture Zones



Final Capture Zones



LEGEND

- Existing Well
- Proposed Well
- Rivers
- NIC Site Boundary
- TCE Plume

Particle Tracking Legend

- Particles Captured by Wells RW-5 to RW-7
- Particles Captured by Well 36767
- Particles Captured by EW-B3
- Particles Captured by EW-A1 to EW-A4
- Particles Captured by EW-B1 to EW-B2
- Particles Captured by EW-E1 to EW-E6
- Particles Captured by SG-47
- Particles Captured by CN-RW-02 and CN-RW-SIND
- Particles Captured by Proposed Well NIC#1-1
- Particles Captured by Proposed Well NIC#1-2
- Particles Captured by Proposed Well NIC#2-1
- Particles Captured by Proposed Well NIC#2-2
- Particles Captured by Proposed Well NIC#3-1
- Particles Captured by Proposed Well NIC#3-2
- Particles Captured by Proposed Well NIC#3-3
- Particles Captured by Proposed Well NIC#3-4
- Particles Captured by Proposed Well NIC#3-5
- Particles Captured by Proposed Well NIC#3-6
- Particles Captured by Proposed Well NIC#3-7
- Particles Captured by Proposed Well NIC#4-1
- Particles Captured by Proposed Well NIC#4-2

N
W E
S

Scale in FT

0 4000 8000 12000 16000

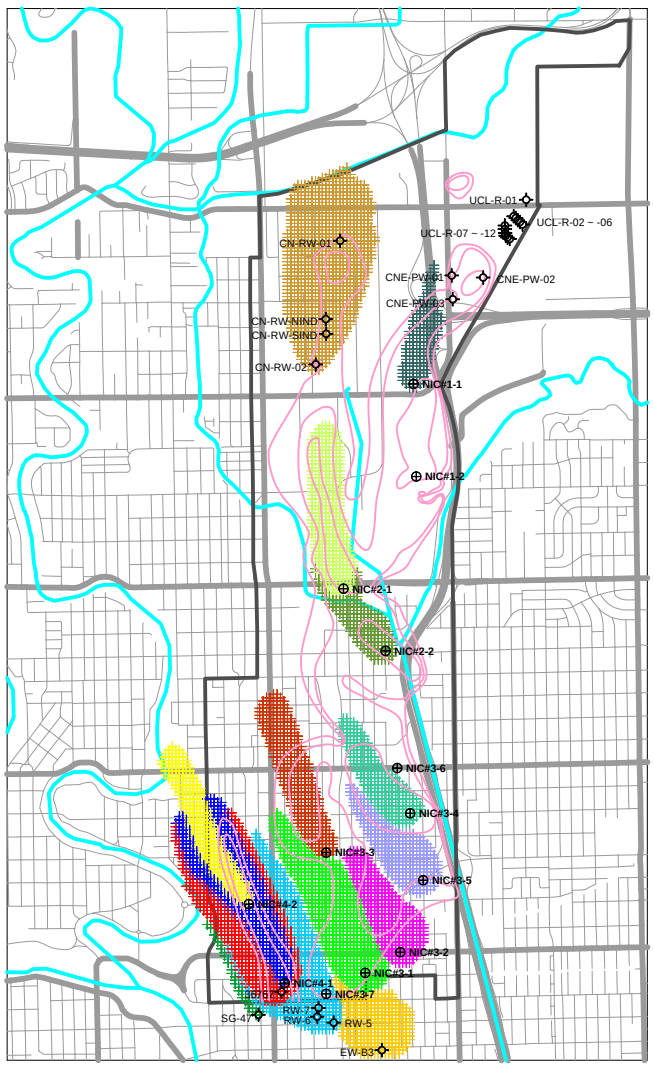
Pumping Rates for Proposed Wells

NIC#1-1	50 gpm	NIC#1-2	0 gpm
NIC#2-1	130 gpm	NIC#2-2	50 gpm
NIC#3-1	140 gpm	NIC#3-2	60 gpm
NIC#3-3	100 gpm	NIC#3-4	50 gpm
NIC#3-5	50 gpm	NIC#3-6	0 gpm
NIC#3-7	0 gpm		
NIC#4-1	120 gpm	NIC#4-2	100 gpm

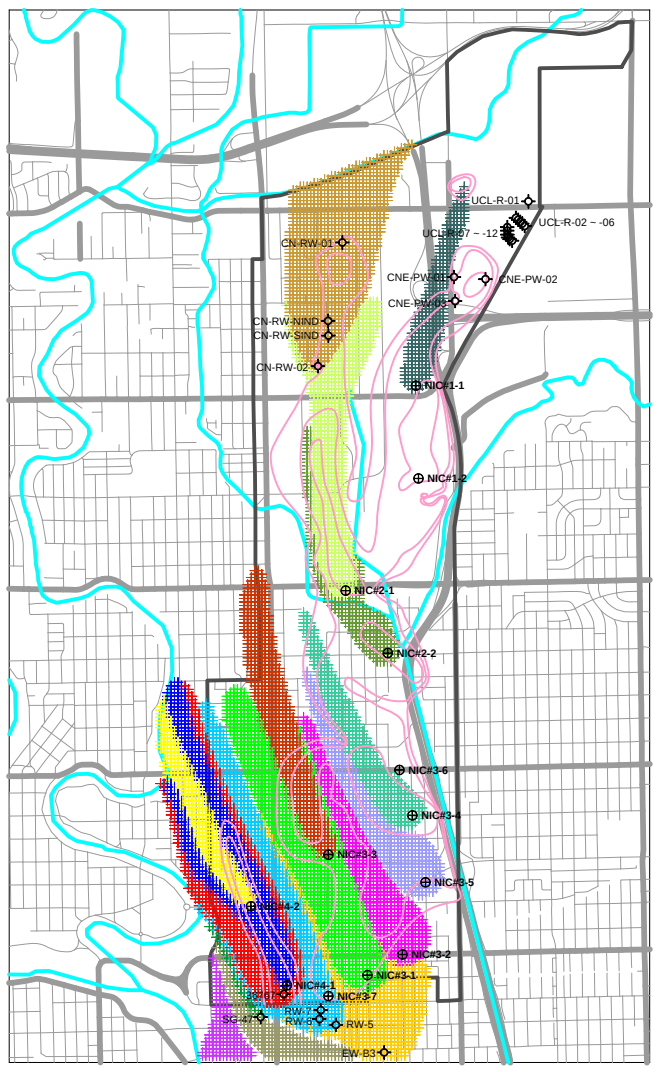
E:\Projects\NIC\Model\Simulations\CapZon_Sim53.srf

Figure 34
Simulated Capture Zones
with Lower River Stages at Chisholm Creek and its Branches

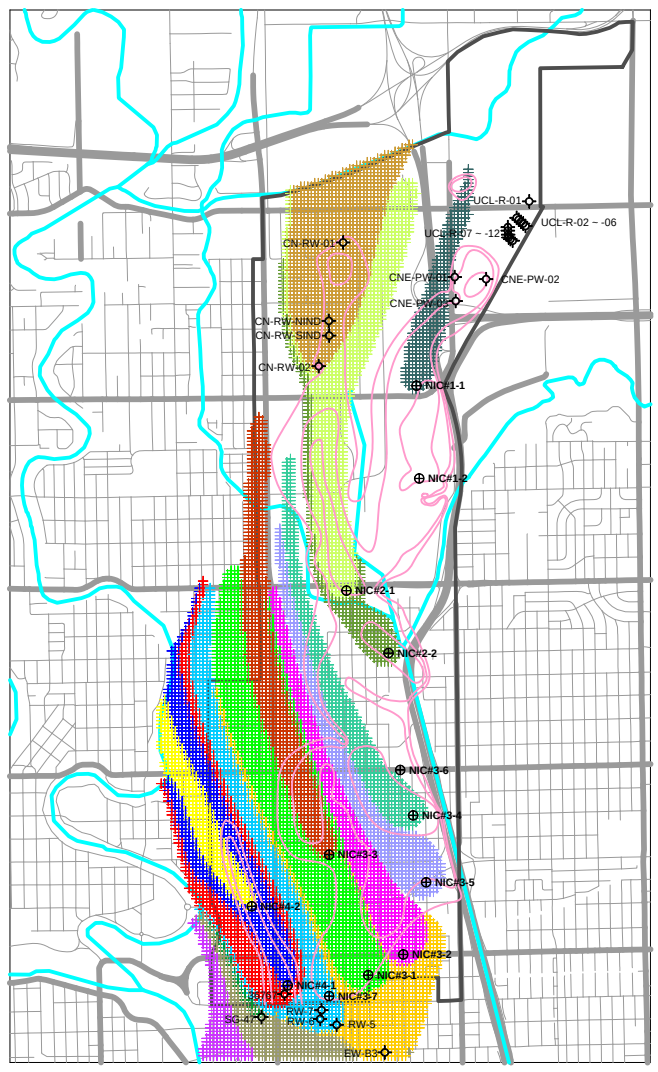
5-Year Capture Zones



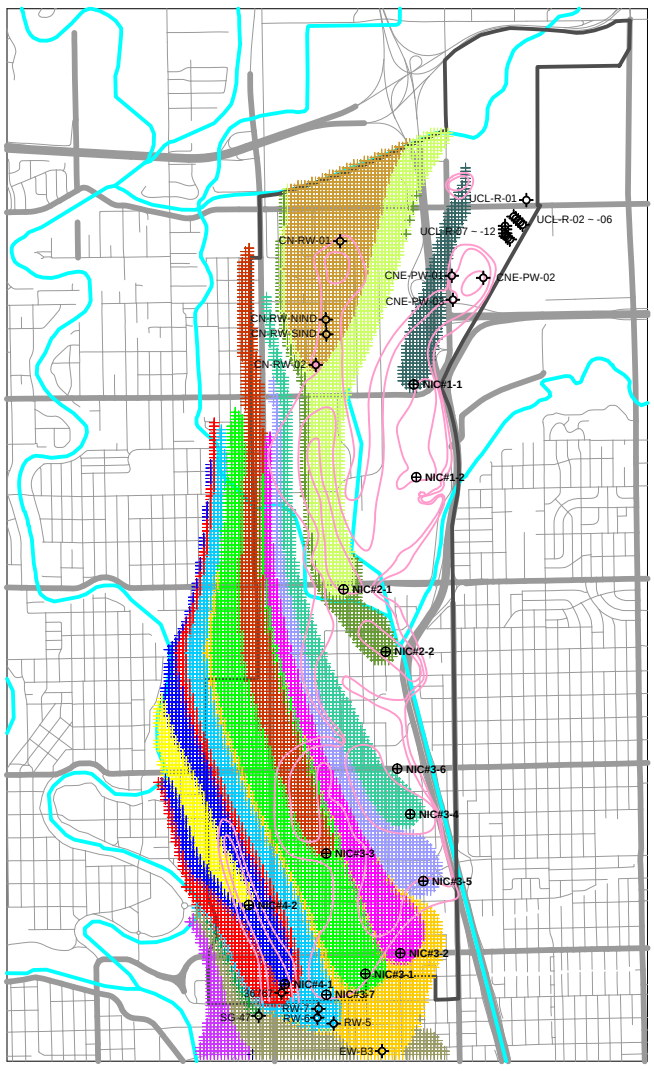
10-Year Capture Zones



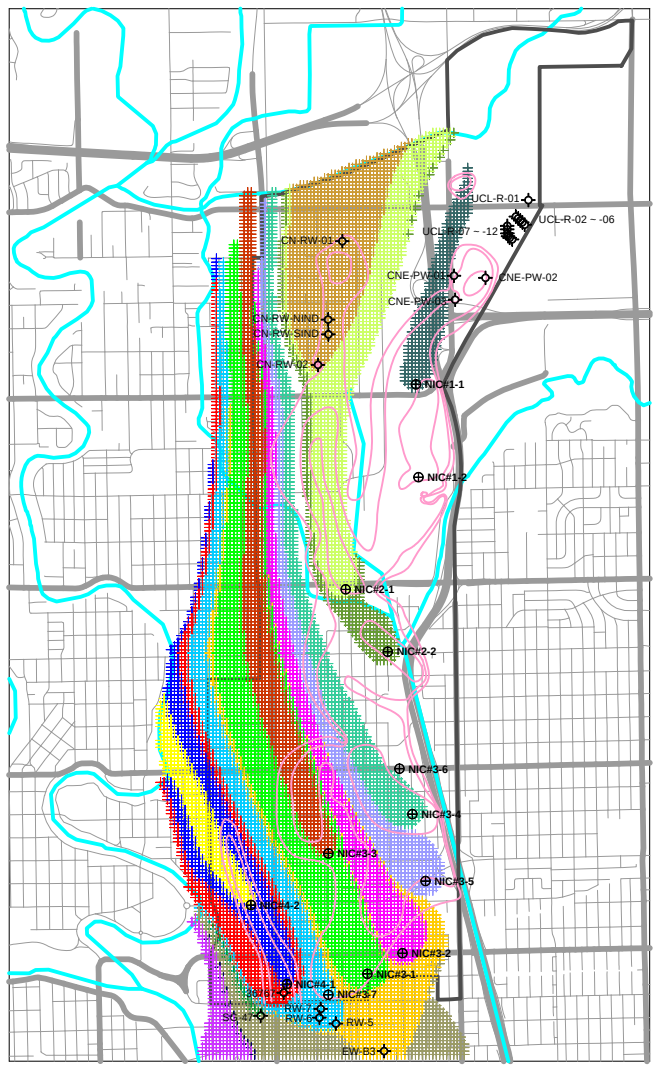
15-Year Capture Zones



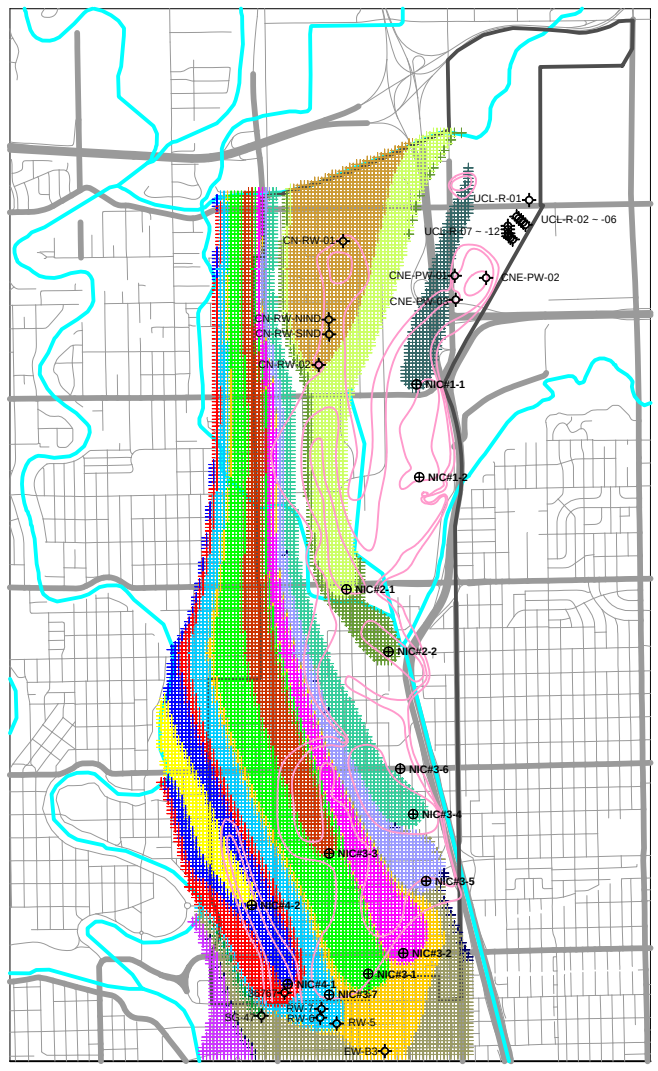
20 Year Capture Zones



25 Year Capture Zones



Final Capture Zones



LEGEND

- Existing Well
- Proposed Well
- Rivers
- NIC Site Boundary
- TCE Plume

Particle Tracking Legend

- Particles Captured by Wells RW-5 to RW-7
- Particles Captured by Well 36767
- Particles Captured by EW-B3
- Particles Captured by EW-A1 to EW-A4
- Particles Captured by EW-B1 to EW-B2
- Particles Captured by EW-E1 to EW-E6
- Particles Captured by SG-47
- Particles Captured by CN-RW-02 and CN-RW-SIND
- Particles Captured by Proposed Well NIC#1-1
- Particles Captured by Proposed Well NIC#1-2
- Particles Captured by Proposed Well NIC#2-1
- Particles Captured by Proposed Well NIC#2-2
- Particles Captured by Proposed Well NIC#3-1
- Particles Captured by Proposed Well NIC#3-2
- Particles Captured by Proposed Well NIC#3-3
- Particles Captured by Proposed Well NIC#3-4
- Particles Captured by Proposed Well NIC#3-5
- Particles Captured by Proposed Well NIC#3-6
- Particles Captured by Proposed Well NIC#3-7
- Particles Captured by Proposed Well NIC#4-1
- Particles Captured by Proposed Well NIC#4-2

N
W E
S

Scale in FT

0 4000 8000 12000 16000

Pumping Rates for Proposed Wells

NIC#1-1	50 gpm	NIC#1-2	0 gpm
NIC#2-1	130 gpm	NIC#2-2	50 gpm
NIC#3-1	140 gpm	NIC#3-2	60 gpm
NIC#3-3	100 gpm	NIC#3-4	50 gpm
NIC#3-5	50 gpm	NIC#3-6	0 gpm
NIC#3-7	0 gpm		
NIC#4-1	120 gpm	NIC#4-2	100 gpm

E:\Projects\NIC\Model\Simulations\CapZon_Sim59.srf

Figure 35
Simulated Capture Zones with Higher River Stages

Table 1. Surface Water Level Measurements, August 2001

Station ID	X	Y	Measuring Point Elevation (feet msl)	Date	Depth to Water (ft)	Water Level Elevation (feet msl)
B-2ND	1646753	1686308	1304.20	8/22/2001	19.69	1284.51
B-BDW	1649462	1670525	1294.37	8/13/2001	27.76	1266.61
B-HRY	1646329	1677758	1298.06	8/13/2001	27.86	1270.2
B-HYD	1655072	1664202	1285.01	8/13/2001	23.78	1261.23
B-LWS	1647257	1683696	1305.02	8/13/2001	20.58	1284.44
B-PWN	1646212	1673072	1291.28	8/13/2001	22.94	1268.34
RG-1	1650694	1669283	1265.64	8/13/2001	0.2	1265.44
RG-LN-N	1647142	1680395	1280.56	8/13/2001	-3.9	1284.46
SWL-01	1647293	1707040	1322.76	8/22/2001	--	<1307.31
SWL-02	1651447	1704423	1316.39	8/22/2001	11.44	1304.95
SWL-03	1654682	1704562	1313.10	8/22/2001	3.39	1309.71
SWL-04	1648638	1701103	1315.82	8/22/2001	--	<1304.47
SWL-05	1653839	1699039	1316.85	8/22/2001	22.24	1294.61
SWL-06	1651429	1698448	1314.84*	8/22/2001	--	<1295.71*
SWL-07	1652995	1696372	1309.71	8/22/2001	18.54	1291.17
SWL-08	1654193	1691755	1306.43	8/22/2001	18.22	1288.21
SWL-09	1646286	1696912	1316.63	8/22/2001	20.50	1296.13
SWL-10	1646162	1693599	1312.37	8/22/2001	16.25	1296.12
SWL-11	1647112	1689801	1310.16	8/22/2001	18.01	1292.15
SWL-12	1653022	1705841	1307.93	8/22/2001	3.33	<1304.60

** Measuring point believed to be incorrect since a water level elevation significantly below the local water table results. This survey measuring point will be re-evaluated.*

Table 2. Pumping Rates of Extraction Wells Used in the Model

Well ID	X	Y	Pumping Rate (gpm)			
			August 2001	August 2004	January 2008	Future Condition[4]
CNE-PW-01	1654358	1707799	35.00	35.00	35.00	35.00
CNE-PW-02	1655259	1707739	15.00	15.00	15.00	15.00
CNE-PW-03	1654387	1707114	45.00	45.00	45.00	45.00
CN-RW-01[1]	1651158	1708816	178.55	178.55	0.00	0.00
CN-RW-02	1650462	1705248	150.50	150.50	110.00	150.50
CN-RW-SIND	1650761	1706124	240.00	240.00	240.00	240.00
CN-RW-NIND	1650751	1706545	0.00	0.00	0.00	0.00
UCL-R-01 [2]	1656490	1709968	0.525	0.53	0.00	0.00
UCL-R-02 [2]	1656132	1709495	0.53	0.53	0.00	0.00
UCL-R-03 [2]	1656194	1709442	0.53	0.53	0.00	0.00
UCL-R-04 [2]	1656254	1709378	0.53	0.53	0.00	0.00
UCL-R-05 [2]	1656314	1709329	0.53	0.53	0.00	0.00
UCL-R-06 [2]	1656383	1709262	0.53	0.53	0.00	0.00
UCL-R-07 [2]	1655905	1708933	0.53	0.53	0.00	0.00
UCL-R-08 [2]	1655954	1708884	0.53	0.53	0.00	0.00
UCL-R-09 [2]	1656019	1708842	0.53	0.53	0.00	0.00
UCL-R-10 [2]	1655888	1709013	0.53	0.53	0.00	0.00
UCL-R-11 [2]	1655881	1709127	0.53	0.53	0.00	0.00
UCL-R-12 [2]	1655881	1709229	0.53	0.53	0.00	0.00
7940	1649428	1672049	5.66	5.66	5.66	5.66
36767	1649480	1687261	160.00	160.00	160.00	160.00
949017	1656735	1667786	10.90	7.18	7.18	7.18
959066	1654367	1672413	6.00	5.40	5.40	5.40
RW-5	1650975	1686375	53.37	32.56	32.56	32.56
RW-6	1650504	1686548	17.72	29.19	29.19	29.19
RW-7	1650540	1686800	33.09	26.22	26.22	26.22
SG-47	1648822	1686603	7.54	7.54	7.54	7.54
SG-95	1655156	1676831	16.97	10.75	10.75	10.75
EW-A1 [3]	1648341	1673635	-	76.70	76.70	76.70
EW-A2 [3]	1647950	1675634	-	72.94	72.94	72.94
EW-A3 [3]	1649051	1678305	-	58.40	58.40	58.40
EW-A4 [3]	1650826	1681430	-	90.43	90.43	90.43
EW-B1 [3]	1651948	1679053	-	78.54	78.54	78.54
EW-B2 [3]	1651742	1682897	-	86.63	86.63	86.63
EW-B3 [3]	1652356	1685588	-	49.97	49.97	49.97
EW-E1 [3]	1650721	1672096	-	62.41	62.41	62.41
EW-E2 [3]	1649918	1672350	-	58.16	58.16	58.16
EW-E3 [3]	1649874	1674379	-	39.97	39.97	39.97
EW-E4 [3]	1650655	1674397	-	67.08	67.08	67.08
EW-E5 [3]	1649754	1677094	-	68.23	68.23	68.23
EW-E6 [3]	1650896	1676440	-	53.81	53.81	53.81

Note:

1. *CN-RW-01 was shut down in June 2006.*
2. *UCL remedial system was shut down in August 2006.*
3. *City of Wichita Gilbert & Mosley remediation wells (EW wells) started operation in December 2002.*
4. *Future Condition pumping is used for evaluating the remedial alternatives.*

Table 3. Simulated versus Observed Water Levels, August 2001

Well ID	X	Y	Model Layer	Observed Water Level (ft)	Simulated Water Level (ft)	Residual (ft)
251	1651553	1682564	1	1281.41	1281.01	0.40
266	1646397	1673216	1	1268.82	1268.61	0.21
271	1646625	1677415	1	1272.46	1272.78	-0.32
272	1647675	1680627	1	1278.99	1279.09	-0.10
712	1654409	1675810	1	1273.15	1272.94	0.21
713	1653178	1679798	1	1277.60	1277.84	-0.24
714	1653372	1678438	1	1276.03	1276.16	-0.13
715	1654328	1678500	1	1275.57	1275.92	-0.35
716	1655847	1675474	1	1270.65	1270.88	-0.23
718	1654809	1674201	1	1271.25	1270.75	0.50
719	1652641	1687727	1	1285.73	1285.63	0.10
720	1652358	1685600	1	1284.02	1283.49	0.53
721	1651934	1684782	1	1283.12	1282.80	0.32
722	1653299	1683137	1	1281.36	1281.32	0.04
723	1652778	1682543	1	1280.90	1280.85	0.05
724	1651668	1680967	1	1279.22	1279.21	0.01
725	1651300	1679086	1	1277.16	1276.99	0.17
726	1652761	1679089	1	1277.08	1277.03	0.05
727	1652475	1676422	1	1273.84	1274.15	-0.31
728	1651269	1677786	1	1275.18	1275.56	-0.38
729	1651975	1686380	1	1284.66	1284.17	0.49
731	1647860	1678293	1	1274.03	1275.21	-1.18
734	1650676	1683292	1	1281.89	1281.81	0.08
737	1649418	1677667	1	1274.25	1275.03	-0.78
738	1649362	1676369	1	1272.95	1273.49	-0.54
739	1650568	1676426	1	1273.28	1273.91	-0.63
740	1650590	1675097	1	1271.70	1272.32	-0.62
741	1651802	1671378	1	1269.06	1268.09	0.97
743	1654896	1666576	1	1265.15	1263.09	2.06
313B	1649964	1686290	1	1283.29	1284.17	-0.88
317B	1648476	1684708	1	1282.20	1283.29	-1.09
320B	1650380	1685806	1	1283.26	1283.75	-0.49
322B	1648708	1686512	1	1283.00	1284.60	-1.60
325B	1650622	1685280	1	1283.15	1283.38	-0.23
327B	1651177	1686960	1	1284.56	1284.76	-0.20
329B	1651274	1685202	1	1283.33	1283.24	0.09
331B	1649614	1685268	1	1282.69	1283.55	-0.86
332B	1651568	1686402	1	1284.70	1284.14	0.56
334B	1649718	1684331	1	1282.22	1282.84	-0.62
372B	1650446	1686366	1	1283.53	1284.01	-0.48
378B	1651034	1686305	1	1283.77	1283.69	0.08
501B	1649690	1687262	1	1283.82	1284.91	-1.09
502B	1652520	1686628	1	1284.89	1284.33	0.56
503B	1653230	1684831	1	1282.98	1282.67	0.31
504B	1651079	1684261	1	1282.53	1282.54	-0.01
506B	1649625	1683132	1	1281.78	1281.86	-0.08
507B	1650030	1681601	1	1280.10	1280.04	0.06
508B	1647927	1682339	1	1282.47	1281.56	0.91
509B	1651697	1680273	1	1278.69	1278.46	0.23
510B	1649800	1678994	1	1276.28	1276.75	-0.47
511B	1653974	1677753	1	1275.30	1275.22	0.08

Table 3. Simulated versus Observed Water Levels, August 2001

Well ID	X	Y	Model Layer	Observed Water Level (ft)	Simulated Water Level (ft)	Residual (ft)
513B	1653812	1675068	1	1272.81	1272.48	0.33
514B	1652174	1669860	1	1267.49	1266.66	0.83
515B	1654746	1669914	1	1268.04	1266.69	1.35
517B	1648684	1680642	1	1278.72	1278.95	-0.23
518B	1648307	1677237	1	1273.35	1274.03	-0.68
519B	1648385	1674395	1	1271.10	1270.71	0.39
520B	1651234	1676394	1	1273.57	1274.01	-0.44
521B	1652351	1683483	1	1282.09	1281.71	0.38
522B	1652548	1685232	1	1283.74	1283.13	0.61
523B	1648863	1684471	1	1282.52	1283.09	-0.57
525B	1646001	1675667	1	1269.65	1270.78	-1.13
526B	1650414	1672450	1	1269.71	1269.01	0.70
527B	1649558	1670728	1	1267.00	1266.70	0.30
529B	1651887	1668640	1	1265.39	1265.42	-0.03
533B	1657579	1668222	1	1262.82	1262.37	0.45
534B	1656456	1673029	1	1268.03	1267.59	0.44
535B	1656173	1674180	1	1269.15	1268.90	0.25
536B	1655879	1676444	1	1271.47	1272.12	-0.65
537B	1656272	1676477	1	1271.86	1272.14	-0.28
538B	1655404	1675315	1	1271.69	1271.32	0.37
541B	1656490	1674216	1	1269.34	1268.69	0.65
564B	1647206	1672643	1	1268.42	1268.30	0.12
566B	1648323	1672030	1	1268.40	1267.92	0.48
570B	1654542	1676440	1	1273.44	1273.45	-0.01
717A	1657000	1675114	1	1271.97	1270.57	1.40
717B	1657002	1675114	1	1271.89	1270.57	1.32
730B	1647163	1674367	1	1270.29	1270.22	0.07
732B	1648332	1673677	1	1270.22	1269.85	0.37
733B	1647582	1675718	1	1271.63	1271.84	-0.21
828-1A	1652065	1680462	1	1278.77	1278.68	0.09
828-5B	1652060	1679864	1	1278.21	1277.99	0.22
828-6B	1652362	1680218	1	1278.43	1278.39	0.04
982B	1651537	1683080	1	1281.80	1281.51	0.29
CNE-MW-07S	1655479	1707848	1	1305.73	1312.47	-6.74
CNE-NE-04S	1654217	1706985	1	1305.18	1309.00	-3.82
CNE-NE-06S	1654020	1705801	1	1304.73	1307.36	-2.63
CNE-NE-09S	1653173	1704463	1	1303.51	1305.10	-1.59
CNE-NE-10S	1653325	1705496	1	1304.06	1306.52	-2.46
CN-MW-39	1650821	1709678	1	1307.62	1311.40	-3.78
CN-MW-55	1651821	1708781	1	1305.99	1310.24	-4.25
CN-MW-60	1650435	1707471	1	1305.07	1308.19	-3.12
CSI-MW-01	1653058	1690006	1	1287.36	1287.45	-0.09
CSI-MW-09	1652613	1689069	1	1286.94	1287.12	-0.18
CSI-MW-10	1653124	1688940	1	1286.50	1286.55	-0.05
CTC-MW-06S	1651979	1709436	1	1306.81	1311.35	-4.54
CTC-MW-07S	1652285	1709797	1	1307.34	1312.03	-4.69
DRB-04	1653033	1699060	1	1295.56	1297.13	-1.57
DRB-MW-02	1652921	1701449	1	1299.60	1300.80	-1.20
DRB-MW-03	1653802	1701320	1	1299.17	1300.23	-1.06
DRB-MW-11	1652995	1698773	1	1294.98	1296.72	-1.74
DRB-MW-110	1653390	1698104	1	1294.15	1295.75	-1.60

Table 3. Simulated versus Observed Water Levels, August 2001

Well ID	X	Y	Model Layer	Observed Water Level (ft)	Simulated Water Level (ft)	Residual (ft)
DRB-MW-140	1652492	1698095	1	1294.83	1295.96	-1.13
DRB-MW-150	1652851	1697424	1	1293.75	1295.15	-1.40
DRB-MW-20	1652865	1699792	1	1296.79	1298.34	-1.55
DRB-MW-30	1652046	1699713	1	1297.38	1298.46	-1.08
DRB-MW-350	1653243	1696450	1	1292.36	1294.15	-1.79
DRB-MW-370	1651976	1699028	1	1296.32	1297.48	-1.16
DRB-MW-440	1652349	1701039	1	1299.65	1300.38	-0.73
EXC-MW-02A	1650989	1704245	1	1302.89	1304.20	-1.31
EXC-MW-04A	1650523	1703449	1	1301.70	1303.34	-1.64
EXC-MW-06A	1650749	1702640	1	1301.64	1302.50	-0.86
FLE-MW-01S	1652726	1701625	1	1300.51	1301.11	-0.60
FLE-MW-02S	1653008	1702291	1	1301.16	1302.02	-0.86
NBPN-MW-02	1651499	1698476	1	1296.34	1297.27	-0.93
NBPN-MW-03	1651834	1698420	1	1296.21	1296.95	-0.74
NBPN-MW-05	1651295	1698909	1	1296.97	1297.86	-0.89
NMW-01S	1653045	1710353	1	1308.30	1313.19	-4.89
NMW-02S	1648657	1702933	1	1301.80	1302.79	-0.99
NMW-03S	1654368	1702130	1	1299.68	1301.26	-1.58
NMW-04S	1650770	1700696	1	1299.50	1300.21	-0.71
NMW-05S	1651750	1702978	1	1301.99	1302.94	-0.95
NMW-06S	1650905	1698526	1	1296.82	1297.60	-0.78
NMW-07S	1648726	1697576	1	1296.52	1296.85	-0.33
NMW-08S	1652034	1697667	1	1295.07	1296.07	-1.00
NMW-09S	1652578	1697675	1	1294.53	1295.59	-1.06
NMW-11S	1653588	1695035	1	1291.07	1292.02	-0.95
NMW-12S	1653058	1695546	1	1291.18	1293.03	-1.85
NMW-13S	1654009	1693640	1	1290.04	1288.72	1.32
NMW-14S	1653350	1694016	1	1290.61	1289.89	0.72
NMW-15S	1653820	1692392	1	1289.08	1287.32	1.76
NMW-16S	1654264	1692011	1	1288.21	1286.68	1.53
NMW-17S	1647499	1695950	1	1295.20	1295.47	-0.27
NMW-18S	1647556	1694242	1	1293.75	1294.13	-0.38
NMW-19S	1649494	1695081	1	1294.71	1294.51	0.20
NMW-20S	1647511	1691582	1	1291.15	1291.53	-0.38
NMW-21S	1647389	1690611	1	1290.07	1290.57	-0.50
NMW-22S	1647769	1690615	1	1289.76	1290.46	-0.70
NMW-23S	1648363	1691635	1	1291.11	1291.37	-0.26
NMW-24S	1649076	1690824	1	1289.18	1290.22	-1.04
NMW-25S	1648685	1688258	1	1284.98	1287.03	-2.05
NMW-26S	1648723	1686998	1	1283.36	1285.12	-1.76
NMW-27S	1654496	1690035	1	1284.79	1285.13	-0.34
NMW-28S	1651710	1688397	1	1286.29	1286.83	-0.54
NMW-29S	1650362	1687629	1	1284.66	1285.86	-1.20
NMW-30S	1653179	1688333	1	1286.11	1285.95	0.16
NMW-31S	1652224	1692387	1	1291.12	1290.34	0.78
NMW-32S	1653000	1692397	1	1290.02	1289.03	0.99
NMW-33S	1649959	1708301	1	1306.22	1309.45	-3.23
NMW-34S	1649909	1703653	1	1302.54	1303.55	-1.01
NMW-35S	1649961	1692361	1	1291.49	1291.70	-0.21
NMW-39S	1651982	1698151	1	1295.45	1296.54	-1.09
NMW-40S	1651251	1698424	1	1296.42	1297.34	-0.92

Table 3. Simulated versus Observed Water Levels, August 2001

Well ID	X	Y	Model Layer	Observed Water Level (ft)	Simulated Water Level (ft)	Residual (ft)
NMW-41S	1652455	1694962	1	1293.03	1293.21	-0.18
NMW-42S	1653047	1701010	1	1299.78	1300.11	-0.33
NMW-47S	1651805	1701422	1	1300.16	1300.99	-0.83
NMW-48S	1649600	1699589	1	1298.44	1298.98	-0.54
NWL-01S	1650449	1699711	1	1298.61	1299.06	-0.45
NWL-02S	1650366	1698656	1	1297.29	1297.86	-0.57
NWL-03S	1650576	1698350	1	1296.89	1297.49	-0.60
NWL-04S	1650779	1697644	1	1296.24	1296.70	-0.46
NWL-05S	1649920	1696971	1	1296.32	1296.20	0.12
NWL-06S	1649851	1697457	1	1296.39	1296.67	-0.28
NWL-07S	1652875	1696311	1	1292.48	1294.03	-1.55
NWL-08S	1653195	1696318	1	1292.29	1293.97	-1.68
NWL-09S	1650152	1698345	1	1296.15	1297.55	-1.40
NWL-10S	1654230	1687708	1	1285.12	1284.34	0.78
NWL-11S	1647764	1688356	1	1285.14	1287.42	-2.28
NWL-12S	1646948	1692277	1	1291.84	1292.38	-0.54
NWL-13S	1648235	1694918	1	1294.42	1294.59	-0.17
PB-MW-03	1653207	1685848	1	1284.26	1283.47	0.79
PE-MW-3	1649420	1673427	1	1270.34	1269.85	0.49
PTW-2	1651861	1682046	1	1280.73	1280.42	0.31
SK-MW-01S	1654150	1701435	1	1298.56	1300.23	-1.67
SK-MW-04S	1653252	1701330	1	1299.91	1300.50	-0.59
UCL-MW-07	1655764	1709704	1	1331.70	1319.74	11.96
UCL-MW-11	1655991	1708531	1	1321.74	1315.91	5.83
UCL-MW-12S	1656598	1709182	1	1329.10	1320.99	8.11
UCL-MW-22	1655573	1708863	1	1315.87	1314.72	1.15
ULI-MW-01	1652605	1703719	1	1303.35	1303.98	-0.63
ULI-MW-04	1652963	1702991	1	1302.27	1303.01	-0.74
UPRF-MW-03	1654009	1702833	1	1300.87	1302.54	-1.67
UPRF-MW-09	1653681	1702158	1	1300.61	1301.62	-1.01
UPRF-MW-16	1654027	1702329	1	1300.40	1301.74	-1.34
USD-MW-01	1654940	1711013	1	1311.48	1318.76	-7.28
USD-MW-05SR	1654326	1709874	1	1309.14	1313.26	-4.12
USD-MW-07SR	1656792	1710738	1	1341.02	1327.54	13.48
USD-MW-10SR	1655319	1710460	1	1322.33	1319.53	2.80
UST-8	1651620	1683506	1	1282.13	1281.85	0.28
VCM-MW-01	1650693	1689403	1	1287.30	1288.13	-0.83
VCM-MW-02B	1650646	1691696	1	1290.64	1290.70	-0.06
VCM-MW-03	1649467	1691676	1	1290.74	1291.07	-0.33
VWRS-MW-02S	1651218	1697748	1	1296.19	1296.63	-0.44
VWRS-MW-09S	1651315	1697830	1	1295.95	1296.67	-0.72
WNC-09SR	1651394	1704400	1	1303.25	1304.46	-1.21
WNC-37SR	1650764	1699776	1	1298.59	1299.09	-0.50
WNC-49SR	1650829	1695454	1	1294.89	1294.53	0.36
WND-01S	1652081	1709690	1	1307.11	1311.79	-4.68
WND-02S	1649418	1698989	1	1297.88	1298.31	-0.43
WND-03S	1650582	1701955	1	1300.87	1301.73	-0.86
WND-04S	1650454	1702965	1	1301.94	1302.84	-0.90
WND-05S	1649360	1703659	1	1302.58	1303.58	-1.00
WND-06S	1652789	1709695	1	1307.41	1312.10	-4.69
WND-07S	1653632	1707180	1	1305.48	1309.16	-3.68

Table 3. Simulated versus Observed Water Levels, August 2001

Well ID	X	Y	Model Layer	Observed Water Level (ft)	Simulated Water Level (ft)	Residual (ft)
WND-08S	1652444	1704444	1	1303.32	1304.91	-1.59
WND-11S	1650063	1703574	1	1302.47	1303.46	-0.99
WND-12S	1650125	1704319	1	1302.80	1304.20	-1.40
WND-14S	1653121	1703339	1	1302.04	1303.49	-1.45
WND-15S	1653839	1696407	1	1292.48	1294.27	-1.79
WND-16S	1649742	1701641	1	1300.56	1301.40	-0.84
WND-18S	1650570	1696357	1	1295.60	1295.51	0.09
WND-19S	1651397	1696387	1	1295.07	1295.23	-0.16
WND-20S	1649501	1698033	1	1296.96	1297.28	-0.32
WND-21S	1651342	1699028	1	1297.23	1297.98	-0.75
WND-22S	1649183	1709668	1	1308.11	1311.42	-3.31
WND-23S	1650407	1704622	1	1302.93	1304.43	-1.50
WND-24S	1652511	1696387	1	1294.08	1294.51	-0.43
WND-25S	1650556	1705396	1	1303.00	1304.79	-1.79
WND-26S	1651342	1701524	1	1300.33	1301.17	-0.84
WND-27S	1649240	1701760	1	1300.74	1301.52	-0.78
WND-28S	1649371	1707096	1	1305.15	1307.78	-2.63
WND-29S	1650208	1705262	1	1303.02	1304.82	-1.80
WND-31S	1653372	1702042	1	1300.29	1301.55	-1.26
WND-32S	1653110	1701735	1	1299.98	1301.17	-1.19
WND-33S	1650542	1699011	1	1297.72	1298.23	-0.51
WND-34S	1650438	1700377	1	1299.11	1299.85	-0.74
WND-36S	1650445	1701466	1	1300.26	1301.18	-0.92
WND-38S	1650760	1697018	1	1295.95	1296.10	-0.15
WND-39S	1651249	1697712	1	1295.96	1296.58	-0.62
WND-40S	1651640	1691661	1	1290.51	1290.01	0.50
WND-41S	1651342	1695603	1	1294.52	1294.44	0.08
WND-42S	1651038	1690555	1	1289.12	1289.18	-0.06
WND-43S	1652035	1695685	1	1294.03	1294.15	-0.12
WND-44S	1650818	1690959	1	1289.72	1289.74	-0.02
WND-45S	1649698	1693722	1	1293.04	1293.21	-0.17
WND-46S	1650614	1693689	1	1292.84	1292.94	-0.10
WND-47S	1651995	1693620	1	1292.51	1292.11	0.40
WND-48S	1651711	1689954	1	1288.48	1288.34	0.14
WU-MW-04S	1651559	1695751	1	1294.42	1294.48	-0.06
WU-MW-05S	1651320	1696267	1	1295.08	1295.14	-0.06
250	1651572	1682566	2	1281.43	1281.01	0.42
254	1652400	1677852	2	1275.84	1275.63	0.21
255	1652756	1677148	2	1274.97	1274.90	0.07
258	1651500	1678470	2	1276.34	1276.25	0.09
260	1651690	1678023	2	1275.85	1275.79	0.06
307	1650565	1687080	2	1284.24	1284.88	-0.64
318	1648956	1685420	2	1282.27	1283.74	-1.47
313A	1649965	1686289	2	1283.28	1284.17	-0.89
317A	1648476	1684709	2	1282.73	1283.29	-0.56
320A	1650380	1685807	2	1283.24	1283.75	-0.51
322A	1648708	1686511	2	1282.95	1284.60	-1.65
325A	1650622	1685281	2	1283.11	1283.38	-0.27
327A	1651177	1686962	2	1284.35	1284.77	-0.42
329A	1651273	1685203	2	1283.30	1283.24	0.06
331A	1649614	1685269	2	1282.66	1283.55	-0.89

Table 3. Simulated versus Observed Water Levels, August 2001

Well ID	X	Y	Model Layer	Observed Water Level (ft)	Simulated Water Level (ft)	Residual (ft)
332A	1651568	1686402	2	1285.29	1284.15	1.14
334A	1649718	1684331	2	1282.18	1282.84	-0.66
372A	1650452	1686366	2	1283.49	1284.01	-0.52
378A	1651036	1686305	2	1283.75	1283.70	0.05
501A	1649681	1687258	2	1283.79	1284.89	-1.10
502A	1652528	1686628	2	1284.89	1284.32	0.57
503A	1653241	1684831	2	1283.00	1282.66	0.34
504A	1651080	1684248	2	1282.50	1282.52	-0.02
506A	1649635	1683132	2	1281.80	1281.86	-0.06
507A	1650020	1681601	2	1280.11	1280.05	0.06
508A	1647927	1682328	2	1282.46	1281.55	0.91
509A	1651687	1680279	2	1278.69	1278.47	0.22
510A	1649799	1678986	2	1276.29	1276.74	-0.45
511A	1653978	1677724	2	1275.30	1275.18	0.12
512A	1651294	1673794	2	1270.50	1270.83	-0.33
513A	1653809	1675060	2	1272.80	1272.47	0.33
514A	1652174	1669852	2	1267.50	1266.65	0.85
515A	1654756	1669914	2	1268.02	1266.69	1.33
517A	1648676	1680641	2	1278.76	1278.95	-0.19
518A	1648319	1677237	2	1273.36	1274.04	-0.68
519A	1648396	1674395	2	1271.12	1270.72	0.40
520A	1651243	1676395	2	1273.56	1274.02	-0.46
521A	1652342	1683482	2	1282.13	1281.72	0.41
521C	1652364	1683486	2	1282.32	1281.72	0.60
522A	1652539	1685233	2	1283.73	1283.13	0.60
523A	1648872	1684473	2	1282.51	1283.09	-0.58
525A	1645998	1675667	2	1269.56	1270.78	-1.22
526A	1650412	1672450	2	1269.67	1269.00	0.67
527A	1649557	1670728	2	1267.02	1266.70	0.32
529A	1651887	1668639	2	1265.40	1265.42	-0.02
533A	1657579	1668220	2	1262.80	1262.37	0.43
534A	1656456	1673027	2	1268.02	1267.58	0.44
535A	1656175	1674181	2	1269.13	1268.90	0.23
536A	1655879	1676441	2	1271.49	1272.12	-0.63
537A	1656272	1676475	2	1272.13	1272.13	0.00
538A	1655407	1675315	2	1271.59	1271.31	0.28
539A	1655500	1674215	2	1270.70	1269.99	0.71
540A	1656456	1674874	2	1269.68	1269.66	0.02
541A	1656491	1674213	2	1269.35	1268.68	0.67
564A	1647206	1672640	2	1268.46	1268.30	0.16
566A	1648325	1672028	2	1268.41	1267.92	0.49
570A	1654542	1676437	2	1273.47	1273.44	0.03
730A	1647162	1674364	2	1270.27	1270.22	0.05
732A	1648332	1673674	2	1270.25	1269.84	0.41
733A	1647582	1675715	2	1271.63	1271.84	-0.21
982A	1651542	1683071	2	1281.67	1281.50	0.17
CNE-MW-07D	1655480	1707856	2	1305.76	1312.49	-6.73
CNE-NE-04D	1654217	1706989	2	1305.17	1309.01	-3.84
CNE-NE-06D	1654017	1705802	2	1304.48	1307.36	-2.88
CNE-NE-08I	1653753	1704437	2	1303.36	1305.15	-1.79
CNE-NE-09D	1653178	1704463	2	1303.43	1305.10	-1.67

Table 3. Simulated versus Observed Water Levels, August 2001

Well ID	X	Y	Model Layer	Observed Water Level (ft)	Simulated Water Level (ft)	Residual (ft)
CNE-NE-10D	1653321	1705496	2	1304.11	1306.52	-2.41
CNE-NE-11D	1652453	1704444	2	1303.30	1304.92	-1.62
CNE-NE-12I	1652279	1706023	2	1304.24	1306.73	-2.49
CN-MW-06	1650818	1709681	2	1307.53	1311.41	-3.88
CN-MW-56	1651821	1708778	2	1305.97	1310.23	-4.26
CN-MW-59	1650435	1707467	2	1305.06	1308.19	-3.13
CTC-MW-06D	1651980	1709427	2	1306.77	1311.34	-4.57
EXC-MW-02B	1650997	1704245	2	1302.92	1304.20	-1.28
EXC-MW-04B	1650572	1703481	2	1301.72	1303.38	-1.66
EXC-MW-05B	1650452	1702974	2	1301.93	1302.85	-0.92
EXC-MW-06B	1650750	1702633	2	1301.66	1302.49	-0.83
EXC-MW-07B	1650583	1701946	2	1300.90	1301.72	-0.82
FLE-MW-01D	1652722	1701625	2	1300.54	1301.11	-0.57
FLE-MW-02D	1653008	1702289	2	1301.17	1302.02	-0.85
GPC-HC-02	1652960	1708466	2	1306.22	1310.48	-4.26
JSP-MW-01	1654409	1704371	2	1302.99	1305.07	-2.08
JSP-MW-02	1654516	1704524	2	1303.12	1305.35	-2.23
JSP-MW-03	1654856	1704332	2	1302.40	1304.94	-2.54
JSP-MW-04	1654451	1704103	2	1302.81	1304.56	-1.75
JSP-MW-05	1654246	1703396	2	1302.22	1303.39	-1.17
JSP-MW-06	1654594	1703742	2	1301.41	1303.86	-2.45
JSP-MW-08	1655188	1704176	2	1301.48	1304.53	-3.05
JSP-MW-09	1654829	1703973	2	1301.56	1304.21	-2.65
NMW-01D	1653047	1710347	2	1308.29	1313.18	-4.89
NMW-02D	1648657	1702928	2	1302.07	1302.78	-0.71
NMW-03D	1654368	1702123	2	1300.35	1301.25	-0.90
NMW-04D	1650764	1700697	2	1299.49	1300.21	-0.72
NMW-05D	1651755	1702978	2	1301.99	1302.94	-0.95
NMW-06D	1650905	1698521	2	1296.79	1297.59	-0.80
NMW-07D	1648720	1697575	2	1296.56	1296.85	-0.29
NMW-08D	1652026	1697667	2	1295.12	1296.07	-0.95
NMW-09D	1652571	1697675	2	1294.55	1295.59	-1.04
NMW-11D	1653581	1695035	2	1290.98	1292.02	-1.04
NMW-12D	1653059	1695539	2	1291.18	1293.02	-1.84
NMW-13D	1654003	1693640	2	1290.06	1288.71	1.35
NMW-14D	1653352	1694010	2	1290.61	1289.87	0.74
NMW-15D	1653814	1692392	2	1289.11	1287.33	1.78
NMW-16D	1654261	1692009	2	1288.18	1286.67	1.51
NMW-17D	1647499	1695944	2	1295.18	1295.47	-0.29
NMW-18D	1647549	1694242	2	1293.81	1294.13	-0.32
NMW-19D	1649494	1695076	2	1294.67	1294.50	0.17
NMW-20D	1647506	1691581	2	1290.94	1291.53	-0.59
NMW-21D	1647389	1690603	2	1290.02	1290.56	-0.54
NMW-22D	1647770	1690608	2	1289.79	1290.45	-0.66
NMW-23D	1648356	1691635	2	1291.11	1291.37	-0.26
NMW-24D	1649069	1690824	2	1289.80	1290.22	-0.42
NMW-25D	1648685	1688252	2	1285.00	1287.02	-2.02
NMW-26D	1648715	1686998	2	1283.26	1285.12	-1.86
NMW-27D	1654497	1690030	2	1284.81	1285.13	-0.32
NMW-28D	1651704	1688397	2	1286.28	1286.83	-0.55
NMW-29D	1650361	1687623	2	1284.66	1285.85	-1.19

Table 3. Simulated versus Observed Water Levels, August 2001

Well ID	X	Y	Model Layer	Observed Water Level (ft)	Simulated Water Level (ft)	Residual (ft)
NMW-30D	1653179	1688328	2	1286.14	1285.94	0.20
NMW-31D	1652217	1692387	2	1291.12	1290.35	0.77
NMW-32D	1652994	1692396	2	1289.91	1289.04	0.87
NMW-33D	1649952	1708301	2	1306.16	1309.45	-3.29
NMW-34D	1649902	1703653	2	1302.50	1303.55	-1.05
NMW-35D	1649962	1692355	2	1291.40	1291.69	-0.29
NMW-36D	1653978	1702837	2	1301.46	1302.56	-1.10
NMW-37D	1653705	1702142	2	1300.75	1301.58	-0.83
NMW-38D	1654001	1702327	2	1300.78	1301.75	-0.97
NMW-39D	1651976	1698152	2	1295.45	1296.54	-1.09
NMW-40D	1651245	1698425	2	1296.47	1297.34	-0.87
NMW-41D	1652454	1694957	2	1293.05	1293.21	-0.16
NMW-42D	1653047	1701010	2	1299.77	1300.11	-0.34
NMW-43D	1651986	1699722	2	1297.34	1298.49	-1.15
NMW-44D	1653738	1700911	2	1298.59	1299.64	-1.05
NMW-45D	1652895	1699774	2	1301.69	1298.30	3.39
NMW-46D	1653034	1698650	2	1294.98	1296.54	-1.56
NMW-47D	1651806	1701418	2	1300.15	1300.99	-0.84
NMW-48D	1649600	1699589	2	1298.45	1298.98	-0.53
NWL-01D	1650449	1699705	2	1298.61	1299.05	-0.44
NWL-02D	1650360	1698659	2	1297.33	1297.86	-0.53
NWL-07D	1652869	1696311	2	1292.79	1294.04	-1.25
NWL-08D	1653189	1696317	2	1292.25	1293.97	-1.72
NWL-09D	1650147	1698344	2	1296.19	1297.55	-1.36
PTW-1	1652755	1685075	2	1283.52	1282.96	0.56
PTW-3	1650383	1680416	2	1278.64	1278.52	0.12
SK-MW-01D	1654158	1701433	2	1299.48	1300.22	-0.74
UCL-MW-12D	1656593	1709169	2	1328.86	1320.91	7.95
URS-MW-01	1651102	1701882	2	1300.77	1301.62	-0.85
URS-MW-02	1651191	1702960	2	1301.89	1302.87	-0.98
USD-MW-05D	1654326	1709868	2	1309.22	1313.24	-4.02
VCM-MW-04	1650689	1689403	2	1287.35	1288.14	-0.79
VCM-MW-06	1650645	1691704	2	1290.68	1290.70	-0.02
VCM-MW-07	1649467	1691671	2	1290.79	1291.07	-0.28
VWRS-MW-02D	1651214	1697748	2	1296.18	1296.63	-0.45
VWRS-MW-07D	1651103	1697829	2	1296.13	1296.77	-0.64
VWRS-MW-09D	1651320	1697830	2	1296.01	1296.67	-0.66
WNC-05D	1649368	1703643	2	1302.59	1303.56	-0.97
WNC-06D	1652781	1709695	2	1307.50	1312.09	-4.59
WNC-09D	1651387	1704400	2	1303.31	1304.46	-1.15
WNC-10D	1649722	1705894	2	1303.75	1305.91	-2.16
WNC-11D	1650055	1703572	2	1302.48	1303.46	-0.98
WNC-16D	1649736	1701641	2	1300.57	1301.40	-0.83
WNC-23D	1650406	1704610	2	1302.91	1304.42	-1.51
WNC-31D	1653401	1702028	2	1300.89	1301.52	-0.63
WNC-32D	1653138	1701744	2	1300.50	1301.17	-0.67
WND-02D	1649415	1698989	2	1297.81	1298.31	-0.50
WND-12D	1650126	1704319	2	1303.00	1304.20	-1.20
WND-14D	1653122	1703336	2	1302.04	1303.49	-1.45
WND-15D	1653841	1696407	2	1292.51	1294.27	-1.76
WND-18D	1650570	1696355	2	1295.64	1295.51	0.13

Table 3. Simulated versus Observed Water Levels, August 2001

Well ID	X	Y	Model Layer	Observed Water Level (ft)	Simulated Water Level (ft)	Residual (ft)
WND-19D	1651396	1696384	2	1295.06	1295.22	-0.16
WND-21D	1651342	1699030	2	1297.21	1297.98	-0.77
WND-22D	1649186	1709668	2	1307.82	1311.42	-3.60
WND-24D	1652512	1696383	2	1294.09	1294.50	-0.41
WND-25D	1650559	1705396	2	1302.98	1304.80	-1.82
WND-26D	1651339	1701524	2	1300.34	1301.17	-0.83
WND-29D	1650214	1705261	2	1302.99	1304.82	-1.83
WND-33D	1650546	1699010	2	1297.81	1298.23	-0.42
WND-34D	1650441	1700376	2	1299.15	1299.85	-0.70
WND-36D	1650445	1701461	2	1300.28	1301.17	-0.89
WND-37DR	1650762	1699781	2	1298.61	1299.09	-0.48
WND-38D	1650763	1697018	2	1295.90	1296.10	-0.20
WND-39D	1651249	1697720	2	1295.94	1296.59	-0.65
WND-40D	1651633	1691661	2	1290.41	1290.02	0.39
WND-41D	1651333	1695603	2	1294.58	1294.44	0.14
WND-42D	1651029	1690555	2	1289.14	1289.18	-0.04
WND-43D	1652025	1695684	2	1293.95	1294.16	-0.21
WND-44D	1650809	1690960	2	1289.74	1289.75	-0.01
WND-45D	1649698	1693709	2	1293.18	1293.20	-0.02
WND-46D	1650605	1693690	2	1292.85	1292.94	-0.09
WND-47D	1651999	1693610	2	1292.29	1292.09	0.20
WND-48D	1651711	1689954	2	1288.49	1288.34	0.15
WND-49D	1650822	1695455	2	1294.91	1294.53	0.38
WU-MW-04D	1651558	1695743	2	1294.48	1294.47	0.01
WU-MW-05D	1651321	1696252	2	1295.06	1295.13	-0.07
Residual Mean				-0.57		
Residual Standard Deviation				1.72		
Sum of Squares				1417.27		
Absolute Residual Mean				1.08		
Minimum Residual				-7.28		
Maximum Residual				13.48		
Range in Target Values				78.22		
Standard Deviation/Range				0.02		

Table 4. Calibrated Parameter Values

Parameter Zone	Value (ft/day)	Figure
Net Recharge		
Northern portion (NIC Site)	0.000685	Figure 18
Southern portion (Gilbert-Mosley site)	0.000913	
Coleman pond	0.00114	
Grove pond	0.00001	
K for Shallow Aquifer		
Northeast of NIC site	Kh = Kv = 1	Figure 19
Northern portion (majority of NIC Site)	Kh = 200 - 700; Kh:Kv = 2:1	
Southern portion (Gilbert-Mosley site & south part of NIC site)	Kh = 200 - 800; Kh:Kv = 2:1	
K for Deep Aquifer		
Northern portion (majority of NIC Site)	Kh = 200 - 700; Kh:Kv = 2:1	Figure 20
Southern portion (Gilbert-Mosley site & south part of NIC site)	Kh = 200 - 800; Kh:Kv = 2:1	

Table 5. Calibrated Boundary Heads and Conductances

Boundary	Model Reach No.	Boundary Head (ft)	Conductance (ft^2/d)	Bottom Elevation (ft)
River Boundary				
Little Arkansas River	5	1312.00 - 1296.00	31500	1307.00 - 1291.00
	6	1295.95 - 1294.02	50000	1290.95 - 1289.02
	7	1293.98 - 1290.21	50000	1288.98 - 1285.21
	8	1290.15 - 1286.21	10000	1285.15 - 1283.21
	36	1286.00	10000	1281.00
Arkansas River	9	1283.50	10000	1278.50
	91	1283.50 - 1283.00	10000	1278.50 - 1278.50
	92	1282.91 - 1278.85	10000	1277.91 - 1273.85
	10	1278.69 - 1272.55	50000	1273.69 - 1267.55
	11	1272.44 - 1268.30	50000	1267.44 - 1263.30
	12	1268.28 - 1266.61	50000	1263.28 - 1261.61
	13	1266.58 - 1265.41	50000	1261.58 - 1260.41
	14	1265.38 - 1261.21	50000	1260.38 - 1256.21
	15	1261.20 - 1260.50	50000	1256.20 - 1255.50
Middle Fork	3	1345.00 - 1318.00	15	1335.70 - 1315.00
	35	1318.00 - 1315.20	4000	1315.00 - 1312.20
	4	1315.00 - 1312.50	1000	1312.00 - 1309.50
East Fork	28	1325.50 - 1303.48	10	1323.50 - 1301.48
	25	1301.20 - 1297.54	150	1299.20 - 1295.54
	24	1297.49 - 1294.68	250	1295.49 - 1292.68
	23	1294.58 - 1293.55	200	1292.58 - 1291.55
West Fork	21	1297.85 - 1294.64	100	1297.35 - 1294.14
Unnamed Drainage	27	1304.97 - 1294.65	600	1302.97 - 1292.65
Chisholm Creek	20	1294.57 - 1293.53	100	1292.57 - 1291.53
	19	1291.47 - 1288.53	150	1288.47 - 1285.53
	191	1288.42 - 1286.05	2000	1285.42 - 1283.05
	181	1285.95 - 1282.18	2000	1282.95 - 1279.18
	182	1282.09 - 1280.93	1500	1277.09 - 1275.93
	18	1280.91 - 1270.11	2500	1275.91 - 1265.10
	17	1269.67 - 1262.57	50000	1264.67 - 1257.57
	16	1262.48 - 1260.54	2500	1257.48 - 1255.54
GHB Boundary for Northeast				
Model Layer 1	111	1325.50 - 1349.25	30	-
Model Layer 2	111	1325.50 - 1345.00	20	-

Note: The reach numbers and the boudnary heads for rivers are in the order of upstream to downstream

Table 6. Simulated versus Observed Water Levels, August 2004

Well ID	X	Y	Model Layer	Observed Water Level (ft)	Simulated Water Level (ft)	Residual (ft)
271	1646625	1677415	1	1270.96	1272.60	-1.64
712	1654409	1675810	1	1273.28	1271.97	1.31
714	1653372	1678438	1	1275.43	1274.63	0.80
715	1654328	1678500	1	1275.69	1274.90	0.79
716	1655847	1675474	1	1270.93	1270.69	0.24
719	1652641	1687727	1	1286.16	1285.29	0.87
722	1653299	1683137	1	1281.52	1280.06	1.46
723	1652778	1682543	1	1280.66	1279.32	1.34
726	1652761	1679089	1	1275.99	1275.19	0.80
728	1651269	1677786	1	1273.62	1273.68	-0.06
729	1651975	1686380	1	1285.25	1283.46	1.79
731	1647860	1678293	1	1273.18	1274.50	-1.32
737	1649418	1677667	1	1272.78	1273.37	-0.59
739	1650568	1676426	1	1274.69	1271.69	3.00
743	1654896	1666576	1	1266.92	1263.05	3.87
313B	1649964	1686290	1	1284.01	1283.84	0.17
320B	1650380	1685806	1	1283.19	1283.29	-0.10
322B	1648708	1686512	1	1283.69	1284.42	-0.73
325B	1650622	1685280	1	1283.60	1282.75	0.85
327B	1651177	1686960	1	1285.03	1284.40	0.63
329B	1651274	1685202	1	1283.53	1282.40	1.13
331B	1649614	1685268	1	1283.25	1283.14	0.11
334B	1649718	1684331	1	1282.68	1282.27	0.41
372B	1650446	1686366	1	1285.62	1283.63	1.99
378B	1651034	1686305	1	1284.45	1283.33	1.12
501B	1649690	1687262	1	1285.16	1284.70	0.46
502B	1652520	1686628	1	1284.97	1283.64	1.33
503B	1653230	1684831	1	1283.27	1281.65	1.62
504B	1651079	1684261	1	1282.56	1281.50	1.06
506B	1649625	1683132	1	1281.98	1281.12	0.86
507B	1650030	1681601	1	1279.93	1278.75	1.18
509B	1651697	1680273	1	1277.99	1276.65	1.34
510B	1649800	1678994	1	1275.18	1275.32	-0.14
514B	1652174	1669860	1	1267.80	1266.29	1.51
517B	1648684	1680642	1	1278.64	1278.26	0.38
519B	1648385	1674395	1	1270.18	1269.39	0.79
521B	1652351	1683483	1	1282.24	1280.21	2.03
522B	1652548	1685232	1	1283.63	1281.87	1.76
523B	1648863	1684471	1	1283.07	1282.75	0.32
525B	1646001	1675667	1	1269.93	1270.67	-0.74
526B	1650414	1672450	1	1269.04	1267.40	1.64
527B	1649558	1670728	1	1267.86	1266.64	1.22
529B	1651887	1668640	1	1266.01	1265.35	0.66
533B	1657579	1668222	1	1263.16	1262.36	0.80
534B	1656456	1673029	1	1268.49	1267.52	0.97
535B	1656173	1674180	1	1269.49	1268.82	0.67
536B	1655879	1676444	1	1272.02	1271.95	0.07
537B	1656272	1676477	1	1272.12	1272.07	0.05
538B	1655404	1675315	1	1272.58	1270.88	1.70
539B	1655497	1674215	1	1271.24	1269.60	1.64
541B	1656490	1674216	1	1269.61	1268.68	0.93

Table 6. Simulated versus Observed Water Levels, August 2004

Well ID	X	Y	Model Layer	Observed Water Level (ft)	Simulated Water Level (ft)	Residual (ft)
547B	1653207	1685848	1	1284.45	1282.61	1.84
548B	1651721	1684339	1	1282.79	1281.28	1.51
549B	1650186	1683242	1	1282.02	1280.88	1.14
550B	1648209	1683372	1	1283.14	1282.21	0.93
551B	1653595	1681472	1	1278.90	1278.39	0.51
552B	1651947	1681009	1	1278.26	1277.47	0.79
553B	1651696	1677812	1	1273.98	1273.72	0.26
554B	1649766	1680061	1	1277.61	1276.85	0.76
555B	1647130	1678324	1	1272.66	1274.44	-1.78
556B	1649461	1675740	1	1271.08	1271.04	0.04
557B	1652089	1676417	1	1272.96	1272.34	0.62
558B	1653117	1674516	1	1272.10	1270.54	1.56
559B	1650970	1675046	1	1270.76	1270.21	0.55
560B	1653065	1671793	1	1269.44	1267.80	1.64
564B	1647206	1672643	1	1268.82	1268.10	0.72
565B	1649421	1673425	1	1269.61	1268.32	1.29
566B	1648323	1672030	1	1268.63	1267.56	1.07
567B	1650794	1670879	1	1267.81	1266.74	1.07
570B	1654542	1676440	1	1273.58	1272.53	1.05
571B	1653814	1675842	1	1273.22	1272.12	1.10
573B	1647743	1676982	1	1271.66	1272.49	-0.83
574B	1648252	1680648	1	1278.47	1278.52	-0.05
575B	1653962	1677766	1	1275.01	1274.02	0.99
576B	1650555	1677776	1	1273.05	1273.61	-0.56
577B	1653180	1679802	1	1277.62	1276.28	1.34
578B	1654501	1677175	1	1274.44	1273.34	1.10
717A	1657000	1675114	1	1272.36	1270.54	1.82
717B	1657002	1675114	1	1272.52	1270.54	1.98
730B	1647163	1674367	1	1270.25	1269.56	0.69
733B	1647582	1675718	1	1270.85	1270.77	0.08
828-5B	1652060	1679864	1	1277.13	1276.09	1.04
901B	1652781	1685293	1	1283.78	1281.98	1.80
910B	1652109	1680316	1	1278.09	1276.73	1.36
915B	1652446	1685860	1	1284.16	1282.54	1.62
925B	1650649	1684449	1	1282.73	1281.93	0.80
935B	1650761	1681508	1	1278.79	1277.67	1.12
946B	1651654	1681889	1	1279.90	1278.41	1.49
950B	1651534	1673603	1	1270.09	1268.89	1.20
956B	1651119	1677157	1	1272.88	1272.93	-0.05
962B	1651272	1676881	1	1272.84	1272.62	0.22
970B	1651800	1684992	1	1283.32	1281.94	1.38
980B	1651210	1683208	1	1281.59	1280.13	1.46
981B	1651484	1683369	1	1281.55	1280.18	1.37
982B	1651537	1683080	1	1281.21	1279.63	1.58
CNE-NE-06S	1654020	1705801	1	1306.83	1307.39	-0.56
CNE-NE-07S	1654398	1705706	1	1307.00	1307.47	-0.47
CNE-NE-09S	1653173	1704463	1	1305.35	1305.11	0.24
CNE-NE-10S	1653325	1705496	1	1306.10	1306.54	-0.44
CSI-MW-01	1653058	1690006	1	1287.83	1287.36	0.47
CSI-MW-09	1652613	1689069	1	1287.48	1286.96	0.52
CSI-MW-10	1653124	1688940	1	1287.00	1286.39	0.61

Table 6. Simulated versus Observed Water Levels, August 2004

Well ID	X	Y	Model Layer	Observed Water Level (ft)	Simulated Water Level (ft)	Residual (ft)
DRB-04	1653033	1699060	1	1296.79	1297.13	-0.34
DRB-MW-02	1652921	1701449	1	1300.73	1300.80	-0.07
DRB-MW-03	1653802	1701320	1	1300.19	1300.23	-0.04
DRB-MW-140	1652492	1698095	1	1295.83	1295.96	-0.13
DRB-MW-20	1652865	1699792	1	1298.00	1298.34	-0.34
DRB-MW-250	1653747	1700892	1	1298.57	1299.62	-1.05
DRB-MW-30	1652046	1699713	1	1298.68	1298.46	0.22
DRB-MW-370	1651976	1699028	1	1297.68	1297.48	0.20
DRB-MW-440	1652349	1701039	1	1300.94	1300.39	0.55
EXC-MW-04A	1650523	1703449	1	1304.14	1303.35	0.79
EXC-MW-08A	1650843	1701691	1	1301.22	1301.41	-0.19
FLE-MW-01S	1652726	1701625	1	1301.83	1301.12	0.71
FLE-MW-02S	1653008	1702291	1	1302.75	1302.02	0.73
NBPN-MW-01	1651483	1698652	1	1297.85	1297.48	0.37
NBPN-MW-02	1651499	1698476	1	1297.62	1297.27	0.35
NBPN-MW-04	1651448	1698806	1	1298.30	1297.67	0.63
NBPN-MW-05	1651295	1698909	1	1298.36	1297.86	0.50
NMW-02S	1648657	1702933	1	1303.74	1302.79	0.95
NMW-03S	1654368	1702130	1	1300.60	1301.26	-0.66
NMW-04S	1650770	1700696	1	1300.73	1300.21	0.52
NMW-05S	1651750	1702978	1	1303.26	1302.94	0.32
NMW-06S	1650905	1698526	1	1298.23	1297.59	0.64
NMW-08S	1652034	1697667	1	1296.14	1296.07	0.07
NMW-09S	1652578	1697675	1	1295.35	1295.59	-0.24
NMW-10S	1652750	1697018	1	1295.01	1294.78	0.23
NMW-11S	1653588	1695035	1	1290.25	1292.01	-1.76
NMW-13S	1654009	1693640	1	1289.21	1288.72	0.49
NMW-14S	1653350	1694016	1	1289.62	1289.88	-0.26
NMW-15S	1653820	1692392	1	1288.57	1287.32	1.25
NMW-17S	1647499	1695950	1	1296.51	1295.47	1.04
NMW-19S	1649494	1695081	1	1295.75	1294.50	1.25
NMW-20S	1647511	1691582	1	1292.05	1291.51	0.54
NMW-21S	1647389	1690611	1	1290.78	1290.55	0.23
NMW-22S	1647769	1690615	1	1290.71	1290.43	0.28
NMW-23S	1648363	1691635	1	1291.86	1291.34	0.52
NMW-24S	1649076	1690824	1	1289.81	1290.17	-0.36
NMW-25S	1648685	1688258	1	1285.69	1286.93	-1.24
NMW-26S	1648723	1686998	1	1284.02	1284.96	-0.94
NMW-27S	1654496	1690035	1	1285.18	1285.11	0.07
NMW-28S	1651710	1688397	1	1286.92	1286.63	0.29
NMW-29S	1650362	1687629	1	1285.32	1285.65	-0.33
NMW-31S	1652224	1692387	1	1291.34	1290.30	1.04
NMW-32S	1653000	1692397	1	1289.99	1289.00	0.99
NMW-34S	1649909	1703653	1	1304.37	1303.55	0.82
NMW-35S	1649961	1692361	1	1292.03	1291.66	0.37
NMW-39S	1651982	1698151	1	1296.46	1296.53	-0.07
NMW-40S	1651251	1698424	1	1297.68	1297.33	0.35
NMW-41S	1652455	1694962	1	1293.43	1293.20	0.23
NMW-42S	1653047	1701010	1	1300.60	1300.12	0.48
NMW-47S	1651805	1701422	1	1301.24	1301.00	0.24
NMW-48S	1649600	1699589	1	1299.90	1298.98	0.92

Table 6. Simulated versus Observed Water Levels, August 2004

Well ID	X	Y	Model Layer	Observed Water Level (ft)	Simulated Water Level (ft)	Residual (ft)
NMW-49S	1654158	1690899	1	1286.55	1286.03	0.52
NMW-50S	1653530	1690535	1	1287.34	1286.85	0.49
NMW-51S	1652512	1689681	1	1288.19	1287.63	0.56
NWL-01S	1650449	1699711	1	1300.00	1299.06	0.94
NWL-04S	1650779	1697644	1	1297.60	1296.69	0.91
NWL-05S	1649920	1696971	1	1297.53	1296.19	1.34
NWL-06S	1649851	1697457	1	1297.86	1296.67	1.19
NWL-07S	1652875	1696311	1	1292.53	1294.03	-1.50
NWL-08S	1653195	1696318	1	1292.22	1293.97	-1.75
NWL-09S	1650152	1698345	1	1298.46	1297.55	0.91
NWL-10S	1654230	1687708	1	1285.55	1284.10	1.45
NWL-11S	1647764	1688356	1	1285.78	1287.36	-1.58
NWL-13S	1648235	1694918	1	1295.54	1294.58	0.96
NWL-14S	1648895	1704957	1	1305.39	1305.06	0.33
NWL-15S	1649509	1704304	1	1304.75	1304.25	0.50
NWL-16S	1652343	1703007	1	1303.43	1303.04	0.39
NWL-17S	1651481	1702413	1	1302.64	1302.25	0.39
NWL-18S	1652072	1702083	1	1302.32	1301.83	0.49
NWL-19S	1651435	1700721	1	1300.40	1300.11	0.29
NWL-21S	1651082	1699589	1	1299.53	1298.76	0.77
NWL-22S	1650605	1694690	1	1294.96	1293.85	1.11
NWL-23S	1651489	1694695	1	1294.46	1293.49	0.97
NWL-24S	1651425	1693585	1	1293.13	1292.42	0.71
NWL-25S	1651430	1692330	1	1291.73	1290.93	0.80
NWL-26S	1652148	1691050	1	1290.05	1288.97	1.08
NWL-27S	1649782	1688799	1	1286.87	1287.47	-0.60
NWL-29S	1651755	1693014	1	1292.35	1291.53	0.82
NWL-30S	1651973	1703690	1	1304.33	1303.84	0.49
SK-MW-01S	1654150	1701435	1	1299.42	1300.23	-0.81
SK-MW-04S	1653252	1701330	1	1301.09	1300.51	0.58
ULI-MW-01	1652605	1703719	1	1304.38	1303.99	0.39
ULI-MW-02	1652828	1703741	1	1304.26	1304.05	0.21
ULI-MW-03	1652823	1703291	1	1303.68	1303.43	0.25
UPRF-MW-03	1654009	1702833	1	1302.38	1302.55	-0.17
UPRF-MW-16	1654027	1702329	1	1301.64	1301.74	-0.10
UST-02	1647364	1693712	1	1292.71	1293.70	-0.99
UST-8	1651620	1683506	1	1281.74	1280.31	1.43
VCM-MW-01	1650693	1689403	1	1287.99	1288.02	-0.03
VCM-MW-02B	1650646	1691696	1	1291.07	1290.65	0.42
VCM-MW-03	1649467	1691676	1	1291.33	1291.03	0.30
VWRS-MW-02S	1651218	1697748	1	1297.54	1296.63	0.91
VWRS-MW-07S	1651108	1697829	1	1297.46	1296.76	0.70
VWRS-MW-09S	1651315	1697830	1	1297.26	1296.67	0.59
WNC-09SR	1651394	1704400	1	1304.89	1304.47	0.42
WNC-37SR	1650764	1699776	1	1300.02	1299.09	0.93
WNC-49SR	1650829	1695454	1	1295.84	1294.52	1.32
WND-03S	1650582	1701955	1	1302.36	1301.73	0.63
WND-04S	1650454	1702965	1	1303.66	1302.84	0.82
WND-05S	1649360	1703659	1	1304.46	1303.58	0.88
WND-11S	1650063	1703574	1	1304.25	1303.47	0.78
WND-12S	1650125	1704319	1	1304.70	1304.21	0.49

Table 6. Simulated versus Observed Water Levels, August 2004

Well ID	X	Y	Model Layer	Observed Water Level (ft)	Simulated Water Level (ft)	Residual (ft)
WND-14S	1653121	1703339	1	1303.68	1303.50	0.18
WND-15S	1653839	1696407	1	1292.54	1294.27	-1.73
WND-18S	1650570	1696357	1	1296.75	1295.50	1.25
WND-19S	1651397	1696387	1	1296.07	1295.22	0.85
WND-20S	1649501	1698033	1	1298.40	1297.28	1.12
WND-21S	1651342	1699028	1	1298.51	1297.98	0.53
WND-23S	1650407	1704622	1	1303.74	1304.44	-0.70
WND-24S	1652511	1696387	1	1294.63	1294.50	0.13
WND-25S	1650556	1705396	1	1305.02	1304.80	0.22
WND-26S	1651342	1701524	1	1301.53	1301.17	0.36
WND-27S	1649240	1701760	1	1302.59	1301.52	1.07
WND-29S	1650208	1705262	1	1304.99	1304.83	0.16
WND-31S	1653372	1702042	1	1301.83	1301.55	0.28
WND-32S	1653110	1701735	1	1301.40	1301.17	0.23
WND-33S	1650542	1699011	1	1299.12	1298.23	0.89
WND-34S	1650438	1700377	1	1300.59	1299.85	0.74
WND-36S	1650445	1701466	1	1301.63	1301.18	0.45
WND-38S	1650760	1697018	1	1297.15	1296.09	1.06
WND-39S	1651249	1697712	1	1297.24	1296.58	0.66
WND-40S	1651640	1691661	1	1290.65	1289.96	0.69
WND-41S	1651342	1695603	1	1295.34	1294.43	0.91
WND-42S	1651038	1690555	1	1289.67	1289.10	0.57
WND-43S	1652035	1695685	1	1294.67	1294.14	0.53
WND-44S	1650818	1690959	1	1290.21	1289.68	0.53
WND-45S	1649698	1693722	1	1293.79	1293.19	0.60
WND-46S	1650614	1693689	1	1293.42	1292.92	0.50
WND-47S	1651995	1693620	1	1292.85	1292.09	0.76
WND-48S	1651711	1689954	1	1289.17	1288.23	0.94
WU-MW-04S	1651559	1695751	1	1295.20	1294.47	0.73
307	1650565	1687080	2	1284.79	1284.61	0.18
318	1648956	1685420	2	1282.98	1283.47	-0.49
313A	1649965	1686289	2	1283.83	1283.83	0.00
320A	1650380	1685807	2	1283.24	1283.29	-0.05
322A	1648708	1686511	2	1283.54	1284.42	-0.88
325A	1650622	1685281	2	1283.44	1282.75	0.69
327A	1651177	1686962	2	1284.73	1284.41	0.32
329A	1651273	1685203	2	1283.50	1282.40	1.10
331A	1649614	1685269	2	1283.23	1283.15	0.08
334A	1649718	1684331	2	1282.66	1282.27	0.39
372A	1650452	1686366	2	1285.82	1283.63	2.19
378A	1651036	1686305	2	1284.23	1283.33	0.90
502A	1652528	1686628	2	1285.04	1283.64	1.40
503A	1653241	1684831	2	1283.26	1281.65	1.61
504A	1651080	1684248	2	1282.61	1281.48	1.13
506A	1649635	1683132	2	1281.90	1281.11	0.79
507A	1650020	1681601	2	1279.89	1278.76	1.13
509A	1651687	1680279	2	1277.92	1276.66	1.26
510A	1649799	1678986	2	1275.17	1275.31	-0.14
512A	1651294	1673794	2	1270.15	1268.96	1.19
514A	1652174	1669852	2	1267.73	1266.29	1.44
515A	1654756	1669914	2	1268.36	1266.38	1.98

Table 6. Simulated versus Observed Water Levels, August 2004

Well ID	X	Y	Model Layer	Observed Water Level (ft)	Simulated Water Level (ft)	Residual (ft)
517A	1648676	1680641	2	1278.67	1278.27	0.40
519A	1648396	1674395	2	1270.03	1269.39	0.64
521A	1652342	1683482	2	1281.91	1280.21	1.70
521C	1652364	1683486	2	1281.87	1280.21	1.66
522A	1652539	1685233	2	1283.38	1281.87	1.51
523A	1648872	1684473	2	1283.06	1282.74	0.32
525A	1645998	1675667	2	1269.86	1270.67	-0.81
526A	1650412	1672450	2	1268.77	1267.40	1.37
527A	1649557	1670728	2	1267.51	1266.65	0.86
529A	1651887	1668639	2	1265.93	1265.35	0.58
533A	1657579	1668220	2	1263.22	1262.36	0.86
534A	1656456	1673027	2	1268.46	1267.52	0.94
535A	1656175	1674181	2	1269.41	1268.82	0.59
536A	1655879	1676441	2	1271.89	1271.94	-0.05
537A	1656272	1676475	2	1273.16	1272.07	1.09
538A	1655407	1675315	2	1272.01	1270.88	1.13
539A	1655500	1674215	2	1270.73	1269.60	1.13
540A	1656456	1674874	2	1270.05	1269.65	0.40
541A	1656491	1674213	2	1269.62	1268.68	0.94
547A	1653211	1685842	2	1284.19	1282.60	1.59
548A	1651724	1684339	2	1282.73	1281.28	1.45
549A	1650188	1683238	2	1281.85	1280.88	0.97
550A	1648210	1683368	2	1283.04	1282.20	0.84
551A	1653598	1681472	2	1278.88	1278.39	0.49
552A	1651949	1681009	2	1278.50	1277.47	1.03
553A	1651696	1677809	2	1273.76	1273.71	0.05
554A	1649767	1680064	2	1277.55	1276.86	0.69
555A	1647130	1678322	2	1272.40	1274.43	-2.03
556A	1649455	1675738	2	1271.10	1271.04	0.06
557A	1652089	1676420	2	1272.88	1272.34	0.54
558A	1653117	1674514	2	1272.11	1270.54	1.57
559A	1650970	1675042	2	1270.89	1270.20	0.69
560A	1653068	1671793	2	1269.48	1267.80	1.68
564A	1647206	1672640	2	1268.93	1268.10	0.83
565A	1649418	1673426	2	1269.63	1268.32	1.31
566A	1648325	1672028	2	1268.58	1267.56	1.02
567A	1650794	1670876	2	1267.81	1266.74	1.07
570A	1654542	1676437	2	1273.45	1272.52	0.93
571A	1653816	1675842	2	1273.24	1272.11	1.13
573A	1647746	1676982	2	1272.04	1272.49	-0.45
574A	1648256	1680648	2	1278.43	1278.52	-0.09
575A	1653962	1677762	2	1275.05	1274.02	1.03
576A	1650555	1677772	2	1272.99	1273.60	-0.61
577A	1653184	1679801	2	1277.37	1276.28	1.09
578A	1654504	1677175	2	1274.33	1273.34	0.99
730A	1647162	1674364	2	1270.53	1269.55	0.98
733A	1647582	1675715	2	1270.96	1270.77	0.19
956A	1651119	1677153	2	1272.96	1272.93	0.03
962A	1651269	1676881	2	1272.83	1272.61	0.22
970A	1651800	1684987	2	1283.30	1281.94	1.36
980A	1651211	1683202	2	1281.55	1280.12	1.43

Table 6. Simulated versus Observed Water Levels, August 2004

Well ID	X	Y	Model Layer	Observed Water Level (ft)	Simulated Water Level (ft)	Residual (ft)
981A	1651488	1683369	2	1281.59	1280.17	1.42
982A	1651542	1683071	2	1281.15	1279.60	1.55
CNE-NE-06D	1654017	1705802	2	1306.60	1307.39	-0.79
CNE-NE-07D	1654398	1705710	2	1307.09	1307.48	-0.39
CNE-NE-08I	1653753	1704437	2	1305.26	1305.17	0.09
CNE-NE-09D	1653178	1704463	2	1305.28	1305.11	0.17
CNE-NE-10D	1653321	1705496	2	1306.16	1306.54	-0.38
CNE-NE-11D	1652453	1704444	2	1305.08	1304.93	0.15
DRB-MW-110	1653390	1698104	2	1294.75	1295.75	-1.00
DRB-MW-150	1652851	1697424	2	1294.16	1295.14	-0.98
EXC-MW-02B	1650997	1704245	2	1304.72	1304.21	0.51
EXC-MW-04B	1650572	1703481	2	1304.20	1303.38	0.82
EXC-MW-05B	1650452	1702974	2	1303.68	1302.85	0.83
EXC-MW-08B	1650843	1701691	2	1301.31	1301.41	-0.10
FLE-MW-01D	1652722	1701625	2	1301.85	1301.12	0.73
FLE-MW-02D	1653008	1702289	2	1302.74	1302.02	0.72
JSP-MW-05	1654246	1703396	2	1303.59	1303.40	0.19
NMW-02D	1648657	1702928	2	1304.02	1302.79	1.23
NMW-04D	1650764	1700697	2	1300.75	1300.21	0.54
NMW-05D	1651755	1702978	2	1303.50	1302.94	0.56
NMW-06D	1650905	1698521	2	1298.23	1297.59	0.64
NMW-08D	1652026	1697667	2	1296.19	1296.07	0.12
NMW-09D	1652571	1697675	2	1295.33	1295.59	-0.26
NMW-10D	1652751	1697013	2	1294.88	1294.77	0.11
NMW-11D	1653581	1695035	2	1289.34	1292.01	-2.67
NMW-12D	1653059	1695539	2	1290.14	1293.02	-2.88
NMW-13D	1654003	1693640	2	1289.26	1288.70	0.56
NMW-14D	1653352	1694010	2	1289.66	1289.86	-0.20
NMW-15D	1653814	1692392	2	1288.57	1287.33	1.24
NMW-16D	1654261	1692009	2	1287.57	1286.67	0.90
NMW-17D	1647499	1695944	2	1296.53	1295.46	1.07
NMW-18D	1647549	1694242	2	1294.81	1294.12	0.69
NMW-20D	1647506	1691581	2	1291.88	1291.51	0.37
NMW-21D	1647389	1690603	2	1290.80	1290.55	0.25
NMW-22D	1647770	1690608	2	1290.71	1290.43	0.28
NMW-23D	1648356	1691635	2	1291.91	1291.34	0.57
NMW-24D	1649069	1690824	2	1290.52	1290.18	0.34
NMW-25D	1648685	1688252	2	1285.72	1286.92	-1.20
NMW-26D	1648715	1686998	2	1284.04	1284.97	-0.93
NMW-27D	1654497	1690030	2	1285.22	1285.11	0.11
NMW-28D	1651704	1688397	2	1286.91	1286.63	0.28
NMW-29D	1650361	1687623	2	1285.30	1285.64	-0.34
NMW-30D	1653179	1688328	2	1286.51	1285.71	0.80
NMW-31D	1652217	1692387	2	1291.35	1290.31	1.04
NMW-32D	1652994	1692396	2	1289.89	1289.02	0.87
NMW-34D	1649902	1703653	2	1304.32	1303.55	0.77
NMW-35D	1649962	1692355	2	1291.95	1291.66	0.29
NMW-36D	1653978	1702837	2	1303.12	1302.57	0.55
NMW-37D	1653705	1702142	2	1302.31	1301.59	0.72
NMW-38D	1654001	1702327	2	1302.34	1301.75	0.59
NMW-39D	1651976	1698152	2	1296.55	1296.54	0.01

Table 6. Simulated versus Observed Water Levels, August 2004

Well ID	X	Y	Model Layer	Observed Water Level (ft)	Simulated Water Level (ft)	Residual (ft)
NMW-40D	1651245	1698425	2	1297.70	1297.34	0.36
NMW-41D	1652454	1694957	2	1293.45	1293.19	0.26
NMW-42D	1653047	1701010	2	1300.59	1300.12	0.47
NMW-43D	1651986	1699722	2	1298.66	1298.49	0.17
NMW-44D	1653738	1700911	2	1299.40	1299.65	-0.25
NMW-45D	1652895	1699774	2	1302.83	1298.30	4.53
NMW-47D	1651806	1701418	2	1301.24	1300.99	0.25
NMW-48D	1649600	1699589	2	1299.61	1298.98	0.63
NMW-49D	1654157	1690899	2	1287.52	1286.03	1.49
NMW-50D	1653529	1690534	2	1287.61	1286.85	0.76
NMW-51D	1652511	1689681	2	1288.24	1287.63	0.61
NWL-01D	1650449	1699705	2	1300.02	1299.05	0.97
NWL-07D	1652869	1696311	2	1292.90	1294.04	-1.14
NWL-08D	1653189	1696317	2	1292.12	1293.96	-1.84
NWL-09D	1650147	1698344	2	1298.49	1297.54	0.95
OW-A1	1648336	1673650	2	1268.77	1268.18	0.59
OW-A2	1647946	1675654	2	1269.39	1270.39	-1.00
OW-A3	1649046	1678329	2	1273.49	1274.07	-0.58
OW-A4	1650825	1681442	2	1277.72	1277.16	0.56
OW-B1	1651934	1679058	2	1274.39	1273.80	0.59
OW-B2	1651730	1682895	2	1280.54	1278.47	2.07
OW-B3	1652358	1685583	2	1282.97	1281.32	1.65
OW-E1	1650720	1672084	2	1267.51	1266.69	0.82
OW-E2	1649934	1672350	2	1268.24	1267.02	1.22
OW-E3	1649888	1674385	2	1269.31	1268.86	0.45
OW-E4	1650642	1674401	2	1269.83	1268.55	1.28
OW-E6	1650915	1676454	2	1271.59	1271.56	0.03
PTW-2	1651861	1682046	2	1280.19	1278.61	1.58
PTW-3	1650383	1680416	2	1278.07	1277.02	1.05
ULI-MW-04	1652963	1702991	2	1303.45	1303.02	0.43
VCM-MW-04	1650689	1689403	2	1288.01	1288.02	-0.01
VCM-MW-06	1650645	1691704	2	1291.09	1290.66	0.43
VCM-MW-07	1649467	1691671	2	1291.31	1291.03	0.28
VWRS-MW-02D	1651214	1697748	2	1297.55	1296.63	0.92
VWRS-MW-07D	1651103	1697829	2	1297.47	1296.76	0.71
VWRS-MW-09D	1651320	1697830	2	1297.49	1296.66	0.83
WNC-05D	1649368	1703643	2	1304.44	1303.56	0.88
WNC-09D	1651387	1704400	2	1304.91	1304.46	0.45
WNC-10D	1649722	1705894	2	1305.89	1305.92	-0.03
WNC-11D	1650055	1703572	2	1304.21	1303.47	0.74
WNC-16D	1649736	1701641	2	1302.26	1301.40	0.86
WNC-23D	1650406	1704610	2	1304.80	1304.43	0.37
WNC-31D	1653401	1702028	2	1302.43	1301.52	0.91
WNC-32D	1653138	1701744	2	1301.92	1301.18	0.74
WND-02D	1649415	1698989	2	1299.64	1298.31	1.33
WND-12D	1650126	1704319	2	1304.71	1304.21	0.50
WND-14D	1653122	1703336	2	1303.72	1303.49	0.23
WND-15D	1653841	1696407	2	1292.55	1294.27	-1.72
WND-18D	1650570	1696355	2	1296.80	1295.50	1.30
WND-19D	1651396	1696384	2	1296.07	1295.22	0.85
WND-24D	1652512	1696383	2	1294.68	1294.50	0.18

Table 6. Simulated versus Observed Water Levels, August 2004

Well ID	X	Y	Model Layer	Observed Water Level (ft)	Simulated Water Level (ft)	Residual (ft)
WND-25D	1650559	1705396	2	1305.03	1304.80	0.23
WND-26D	1651339	1701524	2	1301.52	1301.17	0.35
WND-29D	1650214	1705261	2	1304.93	1304.82	0.11
WND-30D	1652936	1701434	2	1300.31	1300.78	-0.47
WND-34D	1650441	1700376	2	1300.60	1299.85	0.75
WND-36D	1650445	1701461	2	1301.60	1301.17	0.43
WND-37DR	1650762	1699781	2	1300.03	1299.09	0.94
WND-38D	1650763	1697018	2	1297.12	1296.09	1.03
WND-39D	1651249	1697720	2	1297.24	1296.58	0.66
WND-40D	1651633	1691661	2	1290.84	1289.97	0.87
WND-41D	1651333	1695603	2	1295.40	1294.43	0.97
WND-42D	1651029	1690555	2	1289.69	1289.10	0.59
WND-43D	1652025	1695684	2	1294.58	1294.15	0.43
WND-45D	1649698	1693709	2	1293.88	1293.18	0.70
WND-46D	1650605	1693690	2	1293.42	1292.92	0.50
WND-47D	1651999	1693610	2	1292.63	1292.07	0.56
WND-48D	1651711	1689954	2	1289.21	1288.23	0.98
WND-49D	1650822	1695455	2	1295.84	1294.52	1.32
WU-MW-04D	1651558	1695743	2	1295.29	1294.46	0.83
Residual Mean				0.55		
Residual Standard Deviation				0.81		
Sum of Squares				409.86		
Absolute Residual Mean				0.80		
Minimum Residual				-2.88		
Maximum Residual				4.53		
Range in Target Values				43.93		
Standard Deviation/Range				0.02		

Table 7. Simulated versus Observed Water Levels, January 2008

Well ID	X	Y	Model Layer	Observed Water Level (ft)	Simulated Water Level (ft)	Residual (ft)
719	1652641	1687727	1	1285.10	1285.29	-0.19
729	1651975	1686380	1	1283.58	1283.47	0.11
313B	1649964	1686290	1	1283.57	1283.84	-0.27
501B	1649690	1687262	1	1284.15	1284.71	-0.56
CNE-MW-07S	1655479	1707848	1	1308.15	1312.92	-4.77
CNE-MW-12S	1654353	1708417	1	1308.53	1311.58	-3.05
CNE-NE-04S	1654217	1706985	1	1307.01	1309.50	-2.49
CNE-NE-06S	1654020	1705801	1	1305.88	1307.78	-1.90
CNE-NE-07S	1654398	1705706	1	1306.08	1307.84	-1.76
CNE-NE-08I	1653753	1704437	1	1304.33	1305.48	-1.15
CNE-NE-09S	1653173	1704463	1	1304.52	1305.45	-0.93
CNE-NE-10S	1653325	1705496	1	1305.36	1306.95	-1.59
CNE-NE-12I	1652279	1706023	1	1305.57	1307.23	-1.66
CN-MW-39	1650821	1709678	1	1309.49	1312.01	-2.52
CN-MW-55	1651821	1708781	1	1308.55	1311.06	-2.51
CN-MW-60	1650435	1707471	1	1306.62	1308.79	-2.17
CSI-MW-01	1653058	1690006	1	1286.89	1287.37	-0.48
CSI-MW-09	1652613	1689069	1	1287.23	1286.97	0.26
CSI-MW-10	1653124	1688940	1	1285.86	1286.39	-0.53
CTC-MW-03	1652134	1710386	1	1310.81	1313.23	-2.42
CTC-MW-06S	1651979	1709436	1	1309.27	1311.99	-2.72
CTC-MW-07S	1652285	1709797	1	1309.78	1312.54	-2.76
DRB-MW-02	1652921	1701449	1	1298.03	1300.92	-2.89
DRB-MW-03	1653802	1701320	1	1299.29	1300.33	-1.04
DRB-MW-110	1653390	1698104	1	1294.32	1295.78	-1.46
DRB-MW-140	1652492	1698095	1	1295.33	1295.98	-0.65
DRB-MW-150	1652851	1697424	1	1293.71	1295.17	-1.46
DRB-MW-250	1653747	1700892	1	1297.67	1299.70	-2.03
DRB-MW-30	1652046	1699713	1	1298.45	1298.51	-0.06
DRB-MW-370	1651976	1699028	1	1297.43	1297.52	-0.09
DRB-MW-450	1652039	1700563	1	1298.57	1299.85	-1.28
EXC-MW-02A	1650989	1704245	1	1303.67	1304.54	-0.87
EXC-MW-04A	1650523	1703449	1	1303.07	1303.60	-0.53
EXC-MW-06A	1650749	1702640	1	1302.26	1302.69	-0.43
FLE-MW-01S	1652726	1701625	1	1300.95	1301.24	-0.29
FLE-MW-02S	1653008	1702291	1	1301.68	1302.19	-0.51
JSP-MW-01	1654409	1704371	1	1303.90	1305.36	-1.46
JSP-MW-02	1654516	1704524	1	1303.98	1305.65	-1.67
NBPN-MW-02	1651499	1698476	1	1296.98	1297.31	-0.33
NBPN-MW-03	1651834	1698420	1	1296.85	1296.99	-0.14
NBPN-MW-05	1651295	1698909	1	1297.67	1297.91	-0.24
NMW-01S	1653045	1710353	1	1310.84	1313.55	-2.71
NMW-02S	1648657	1702933	1	1302.72	1302.98	-0.26
NMW-03S	1654368	1702130	1	1299.83	1301.39	-1.56
NMW-04S	1650770	1700696	1	1300.05	1300.31	-0.26
NMW-05S	1651751	1702975	1	1302.55	1303.13	-0.58
NMW-06S	1650905	1698526	1	1297.41	1297.64	-0.23
NMW-06S	1650905	1698526	1	1297.45	1297.64	-0.19
NMW-08S	1652034	1697667	1	1295.44	1296.10	-0.66
NMW-09S	1652578	1697675	1	1294.77	1295.61	-0.84
NMW-10S	1652750	1697018	1	1294.53	1294.80	-0.27

Table 7. Simulated versus Observed Water Levels, January 2008

Well ID	X	Y	Model Layer	Observed Water Level (ft)	Simulated Water Level (ft)	Residual (ft)
NMW-11S	1653588	1695035	1	1290.15	1292.03	-1.88
NMW-13S	1654009	1693640	1	1289.25	1288.72	0.53
NMW-14S	1653350	1694016	1	1289.67	1289.89	-0.22
NMW-15S	1653820	1692392	1	1288.39	1287.32	1.07
NMW-16S	1654264	1692011	1	1287.57	1286.67	0.90
NMW-17S	1647499	1695950	1	1295.33	1295.48	-0.15
NMW-18S	1647556	1694242	1	1293.72	1294.13	-0.41
NMW-19S	1649494	1695081	1	1294.85	1294.51	0.34
NMW-20S	1647511	1691582	1	1291.33	1291.51	-0.18
NMW-21S	1647389	1690611	1	1290.01	1290.56	-0.55
NMW-23S	1648363	1691635	1	1291.03	1291.34	-0.31
NMW-24S	1649076	1690824	1	1289.24	1290.18	-0.94
NMW-25S	1648685	1688258	1	1285.68	1286.93	-1.25
NMW-26S	1648723	1686998	1	1284.20	1284.96	-0.76
NMW-27S	1654496	1690035	1	1285.24	1285.11	0.13
NMW-28S	1651710	1688397	1	1285.96	1286.63	-0.67
NMW-29S	1650362	1687629	1	1284.82	1285.65	-0.83
NMW-30S	1653179	1688333	1	1285.50	1285.72	-0.22
NMW-31S	1652224	1692387	1	1290.58	1290.31	0.27
NMW-32S	1653000	1692397	1	1289.38	1289.01	0.37
NMW-33S	1649959	1708301	1	1307.44	1310.03	-2.59
NMW-34S	1649909	1703653	1	1303.28	1303.82	-0.54
NMW-35S	1649961	1692361	1	1291.34	1291.67	-0.33
NMW-41S	1652455	1694962	1	1292.50	1293.22	-0.72
NMW-42S	1653047	1701010	1	1299.90	1300.21	-0.31
NMW-47S	1651805	1701422	1	1300.75	1301.10	-0.35
NMW-48S	1649600	1699589	1	1299.22	1299.06	0.16
NMW-49S	1654158	1690899	1	1286.39	1286.03	0.36
NMW-50S	1653530	1690535	1	1286.93	1286.85	0.08
NMW-51S	1652512	1689681	1	1287.30	1287.63	-0.33
NWL-01S	1650449	1699711	1	1299.52	1299.13	0.39
NWL-02S	1650366	1698656	1	1297.87	1297.91	-0.04
NWL-04S	1650779	1697644	1	1296.68	1296.73	-0.05
NWL-05S	1649920	1696971	1	1296.33	1296.22	0.11
NWL-06S	1649851	1697457	1	1296.54	1296.70	-0.16
NWL-07S	1652875	1696311	1	1292.13	1294.05	-1.92
NWL-08S	1653195	1696318	1	1292.09	1293.99	-1.90
NWL-09S	1650152	1698345	1	1297.62	1297.59	0.03
NWL-10S	1654230	1687708	1	1284.69	1284.10	0.59
NWL-11S	1647764	1688356	1	1286.08	1287.36	-1.28
NWL-12S	1646940	1692280	1	1291.94	1292.38	-0.44
NWL-14S	1648895	1704957	1	1304.24	1305.36	-1.12
NWL-15S	1649509	1704304	1	1303.67	1304.56	-0.89
NWL-16S	1652339	1703003	1	1302.45	1303.24	-0.79
NWL-17S	1651478	1702410	1	1301.76	1302.40	-0.64
NWL-18S	1652069	1702079	1	1301.44	1301.97	-0.53
NWL-19S	1651435	1700721	1	1299.92	1300.19	-0.27
NWL-21S	1651082	1699589	1	1299.17	1298.82	0.35
NWL-23S	1651489	1694695	1	1293.39	1293.51	-0.12
NWL-24S	1651425	1693585	1	1292.21	1292.43	-0.22
NWL-25S	1651430	1692330	1	1290.88	1290.93	-0.05

Table 7. Simulated versus Observed Water Levels, January 2008

Well ID	X	Y	Model Layer	Observed Water Level (ft)	Simulated Water Level (ft)	Residual (ft)
NWL-26S	1652148	1691050	1	1289.12	1288.97	0.15
NWL-27S	1649782	1688799	1	1286.44	1287.47	-1.03
NWL-29S	1651755	1693014	1	1291.41	1291.54	-0.13
NWL-30S	1651970	1703687	1	1303.34	1304.09	-0.75
SK-MW-01S	1654150	1701435	1	1298.66	1300.33	-1.67
SK-MW-04S	1653252	1701330	1	1300.13	1300.61	-0.48
UCL-MW-07	1655764	1709704	1	1335.87	1320.20	15.67
UCL-MW-22	1655573	1708863	1	1318.72	1315.23	3.49
ULI-MW-01	1652605	1703719	1	1304.09	1304.26	-0.17
UPRF-MW-03	1654009	1702833	1	1301.35	1302.73	-1.38
UPRF-MW-09	1653681	1702158	1	1300.95	1301.77	-0.82
UPRF-MW-16	1654027	1702329	1	1300.62	1301.89	-1.27
URS-MW-01	1651102	1701882	1	1301.35	1301.77	-0.42
URS-MW-02	1651191	1702960	1	1302.47	1303.07	-0.60
USD-MW-01	1654940	1711013	1	1314.42	1318.98	-4.56
USD-MW-05S	1654326	1709874	1	1310.74	1313.65	-2.91
USD-MW-07R	1656792	1710738	1	1341.85	1327.82	14.03
USD-MW-10R	1655319	1710460	1	1322.56	1319.84	2.72
UST-02	1647364	1693712	1	1291.69	1293.71	-2.02
VCM-MW-01	1650693	1689403	1	1287.20	1288.02	-0.82
VCM-MW-02B	1650646	1691696	1	1290.36	1290.65	-0.29
VCM-MW-03	1649467	1691676	1	1290.73	1291.04	-0.31
VWRS-MW-02S	1651218	1697748	1	1296.68	1296.66	0.02
VWRS-MW-07S	1651108	1697829	1	1296.53	1296.80	-0.27
VWRS-MW-09S	1651315	1697830	1	1296.39	1296.70	-0.31
WNC-09SR	1651394	1704400	1	1304.01	1304.80	-0.79
WNC-37SR	1650764	1699776	1	1299.37	1299.16	0.21
WND-01S	1652081	1709690	1	1309.60	1312.34	-2.74
WND-02S	1649418	1698989	1	1298.21	1298.37	-0.16
WND-03S	1650582	1701955	1	1301.47	1301.88	-0.41
WND-04S	1650454	1702965	1	1302.51	1303.06	-0.55
WND-05S	1649360	1703659	1	1303.15	1303.83	-0.68
WND-06S	1652789	1709695	1	1309.77	1312.58	-2.81
WND-07S	1653632	1707180	1	1307.18	1309.68	-2.50
WND-08S	1652444	1704444	1	1303.94	1305.27	-1.33
WND-10S	1649622	1705893	1	1304.93	1306.38	-1.45
WND-11S	1650063	1703574	1	1303.09	1303.73	-0.64
WND-12S	1650125	1704319	1	1303.59	1304.55	-0.96
WND-14S	1653121	1703339	1	1302.65	1303.73	-1.08
WND-15S	1653839	1696407	1	1292.15	1294.29	-2.14
WND-18S	1650570	1696357	1	1295.50	1295.53	-0.03
WND-19S	1651397	1696387	1	1294.98	1295.24	-0.26
WND-20S	1649501	1698033	1	1297.20	1297.32	-0.12
WND-21S	1651342	1699028	1	1298.03	1298.03	0.00
WND-22S	1649183	1709668	1	1309.31	1311.76	-2.45
WND-23S	1650407	1704622	1	1303.79	1304.83	-1.04
WND-24S	1652511	1696387	1	1293.38	1294.52	-1.14
WND-25S	1650556	1705396	1	1302.08	1305.35	-3.27
WND-26S	1651342	1701524	1	1300.87	1301.29	-0.42
WND-27S	1649240	1701760	1	1301.50	1301.67	-0.17
WND-28S	1649371	1707096	1	1306.18	1308.22	-2.04

Table 7. Simulated versus Observed Water Levels, January 2008

Well ID	X	Y	Model Layer	Observed Water Level (ft)	Simulated Water Level (ft)	Residual (ft)
WND-29S	1650208	1705262	1	1304.02	1305.33	-1.31
WND-31S	1653372	1702042	1	1301.37	1301.70	-0.33
WND-32S	1653110	1701735	1	1300.94	1301.30	-0.36
WND-34S	1650438	1700377	1	1299.91	1299.95	-0.04
WND-36S	1650445	1701466	1	1300.87	1301.31	-0.44
WND-38S	1650760	1697018	1	1295.97	1296.12	-0.15
WND-39S	1651249	1697712	1	1296.36	1296.61	-0.25
WND-41S	1651342	1695603	1	1294.26	1294.45	-0.19
WND-42S	1651038	1690555	1	1288.80	1289.10	-0.30
WND-43S	1652035	1695685	1	1293.71	1294.16	-0.45
WND-45S	1649698	1693722	1	1292.91	1293.20	-0.29
WND-46S	1650614	1693689	1	1292.52	1292.93	-0.41
WND-47S	1651995	1693620	1	1291.95	1292.10	-0.15
WND-48S	1651711	1689954	1	1287.98	1288.23	-0.25
WU-MW-04S	1651559	1695751	1	1294.12	1294.49	-0.37
WU-MW-05S	1651320	1696267	1	1295.00	1295.16	-0.16
313A	1649965	1686289	2	1283.60	1283.84	-0.24
501A	1649681	1687258	2	1284.18	1284.69	-0.51
CNE-MW-07D	1655480	1707856	2	1308.22	1312.93	-4.71
CNE-MW-12D	1654353	1708422	2	1308.59	1311.58	-2.99
CNE-NE-04D	1654217	1706989	2	1306.96	1309.50	-2.54
CNE-NE-06D	1654017	1705802	2	1305.62	1307.78	-2.16
CNE-NE-07D	1654398	1705710	2	1306.16	1307.84	-1.68
CNE-NE-09D	1653178	1704463	2	1304.41	1305.45	-1.04
CNE-NE-10D	1653321	1705496	2	1305.37	1306.95	-1.58
CNE-NE-11D	1652453	1704444	2	1304.14	1305.28	-1.14
CN-MW-06	1650818	1709681	2	1309.42	1312.01	-2.59
CN-MW-56	1651821	1708778	2	1308.51	1311.06	-2.55
CN-MW-59	1650435	1707467	2	1306.57	1308.79	-2.22
CTC-MW-01	1652291	1709797	2	1309.97	1312.54	-2.57
CTC-MW-06D	1651980	1709427	2	1309.22	1311.98	-2.76
EXC-MW-02B	1650997	1704245	2	1303.76	1304.54	-0.78
EXC-MW-04B	1650572	1703481	2	1303.06	1303.64	-0.58
EXC-MW-05B	1650452	1702974	2	1302.57	1303.07	-0.50
EXC-MW-06B	1650750	1702633	2	1302.27	1302.69	-0.42
EXC-MW-07B	1650583	1701946	2	1301.52	1301.87	-0.35
EXC-MW-08B	1650843	1701691	2	1300.52	1301.55	-1.03
FLE-MW-01D	1652722	1701625	2	1300.96	1301.24	-0.28
FLE-MW-02D	1653008	1702289	2	1301.67	1302.18	-0.51
JSP-MW-05	1654246	1703396	2	1302.80	1303.61	-0.81
NMW-01D	1653047	1710347	2	1310.84	1313.54	-2.70
NMW-02D	1648657	1702928	2	1302.69	1302.97	-0.28
NMW-03D	1654368	1702123	2	1300.78	1301.38	-0.60
NMW-04D	1650764	1700697	2	1300.08	1300.31	-0.23
NMW-05D	1651746	1702975	2	1302.65	1303.13	-0.48
NMW-06D	1650905	1698521	2	1297.41	1297.64	-0.23
NMW-06D	1650905	1698521	2	1297.45	1297.64	-0.19
NMW-07D	1648720	1697575	2	1296.86	1296.88	-0.02
NMW-08D	1652026	1697667	2	1295.45	1296.10	-0.65
NMW-09D	1652571	1697675	2	1294.75	1295.62	-0.87
NMW-10D	1652751	1697013	2	1294.53	1294.80	-0.27

Table 7. Simulated versus Observed Water Levels, January 2008

Well ID	X	Y	Model Layer	Observed Water Level (ft)	Simulated Water Level (ft)	Residual (ft)
NMW-11D	1653581	1695035	2	1289.42	1292.03	-2.61
NMW-12D	1653059	1695539	2	1290.20	1293.03	-2.83
NMW-13D	1654003	1693640	2	1289.31	1288.71	0.60
NMW-14D	1653352	1694010	2	1289.61	1289.87	-0.26
NMW-15D	1653814	1692392	2	1288.35	1287.33	1.02
NMW-16D	1654261	1692009	2	1287.74	1286.67	1.07
NMW-17D	1647499	1695944	2	1295.29	1295.47	-0.18
NMW-18D	1647549	1694242	2	1293.72	1294.13	-0.41
NMW-19D	1649494	1695076	2	1294.62	1294.51	0.11
NMW-20D	1647506	1691581	2	1290.89	1291.51	-0.62
NMW-21D	1647389	1690603	2	1290.26	1290.55	-0.29
NMW-22D	1647770	1690608	2	1289.98	1290.43	-0.45
NMW-23D	1648356	1691635	2	1291.06	1291.35	-0.29
NMW-24D	1649069	1690824	2	1289.88	1290.18	-0.30
NMW-25D	1648685	1688252	2	1285.67	1286.92	-1.25
NMW-26D	1648715	1686998	2	1284.09	1284.97	-0.88
NMW-27D	1654497	1690030	2	1285.27	1285.11	0.16
NMW-28D	1651704	1688397	2	1285.94	1286.63	-0.69
NMW-29D	1650361	1687623	2	1284.81	1285.64	-0.83
NMW-30D	1653179	1688328	2	1285.53	1285.71	-0.18
NMW-31D	1652217	1692387	2	1290.59	1290.31	0.28
NMW-32D	1652994	1692396	2	1289.53	1289.02	0.51
NMW-33D	1649952	1708301	2	1307.82	1310.03	-2.21
NMW-34D	1649902	1703653	2	1303.26	1303.82	-0.56
NMW-35D	1649962	1692355	2	1291.39	1291.66	-0.27
NMW-36D	1653978	1702837	2	1302.07	1302.75	-0.68
NMW-37D	1653705	1702142	2	1301.10	1301.73	-0.63
NMW-38D	1654001	1702327	2	1301.11	1301.90	-0.79
NMW-39D	1651976	1698152	2	1295.92	1296.57	-0.65
NMW-41D	1652454	1694957	2	1292.35	1293.21	-0.86
NMW-42D	1653047	1701010	2	1299.90	1300.21	-0.31
NMW-44D	1653738	1700911	2	1298.52	1299.73	-1.21
NMW-47D	1651806	1701418	2	1300.69	1301.10	-0.41
NMW-48D	1649600	1699589	2	1299.13	1299.06	0.07
NMW-49D	1654157	1690899	2	1287.38	1286.03	1.35
NMW-50D	1653529	1690534	2	1287.05	1286.86	0.19
NMW-51D	1652511	1689681	2	1287.30	1287.63	-0.33
NWL-01D	1650449	1699705	2	1299.50	1299.13	0.37
NWL-02D	1650360	1698659	2	1297.86	1297.92	-0.06
NWL-07D	1652869	1696311	2	1292.76	1294.06	-1.30
NWL-08D	1653189	1696317	2	1292.01	1293.98	-1.97
NWL-09D	1650147	1698344	2	1297.53	1297.59	-0.06
SK-MW-01D	1654158	1701433	2	1299.68	1300.32	-0.64
ULI-MW-04	1652963	1702991	2	1302.92	1303.23	-0.31
USD-MW-05D	1654326	1709868	2	1311.17	1313.64	-2.47
VCM-MW-04	1650689	1689403	2	1287.21	1288.02	-0.81
VCM-MW-06	1650645	1691704	2	1290.16	1290.66	-0.50
VCM-MW-07	1649467	1691671	2	1290.63	1291.03	-0.40
VWRS-MW-02D	1651214	1697748	2	1296.73	1296.67	0.06
VWRS-MW-07D	1651103	1697829	2	1296.54	1296.80	-0.26
VWRS-MW-09D	1651320	1697830	2	1296.46	1296.70	-0.24

Table 7. Simulated versus Observed Water Levels, January 2008

Well ID	X	Y	Model Layer	Observed Water Level (ft)	Simulated Water Level (ft)	Residual (ft)
WNC-05D	1649368	1703643	2	1303.10	1303.81	-0.71
WNC-06D	1652781	1709695	2	1309.93	1312.58	-2.65
WNC-09D	1651387	1704400	2	1305.05	1304.80	0.25
WNC-10D	1649722	1705894	2	1304.86	1306.35	-1.49
WNC-11D	1650055	1703572	2	1303.16	1303.73	-0.57
WNC-16D	1649736	1701641	2	1301.39	1301.55	-0.16
WNC-23D	1650406	1704610	2	1303.60	1304.82	-1.22
WNC-31D	1653401	1702028	2	1301.33	1301.67	-0.34
WNC-32D	1653138	1701744	2	1301.11	1301.31	-0.20
WND-02D	1649415	1698989	2	1298.16	1298.37	-0.21
WND-12D	1650126	1704319	2	1303.61	1304.55	-0.94
WND-14D	1653122	1703336	2	1302.73	1303.73	-1.00
WND-15D	1653841	1696407	2	1292.19	1294.29	-2.10
WND-18D	1650570	1696355	2	1295.54	1295.52	0.02
WND-19D	1651396	1696384	2	1294.96	1295.24	-0.28
WND-21D	1651342	1699030	2	1298.01	1298.03	-0.02
WND-22D	1649186	1709668	2	1309.06	1311.76	-2.70
WND-24D	1652512	1696383	2	1293.89	1294.52	-0.63
WND-25D	1650559	1705396	2	1304.05	1305.36	-1.31
WND-26D	1651339	1701524	2	1300.87	1301.29	-0.42
WND-29D	1650214	1705261	2	1303.91	1305.32	-1.41
WND-30D	1652936	1701434	2	1300.50	1300.89	-0.39
WND-33D	1650546	1699010	2	1298.41	1298.29	0.12
WND-34D	1650441	1700376	2	1299.91	1299.95	-0.04
WND-36D	1650445	1701461	2	1300.78	1301.31	-0.53
WND-37DR	1650762	1699781	2	1299.33	1299.17	0.16
WND-38D	1650763	1697018	2	1295.92	1296.12	-0.20
WND-39D	1651249	1697720	2	1296.35	1296.62	-0.27
WND-40D	1651633	1691661	2	1289.84	1289.97	-0.13
WND-41D	1651333	1695603	2	1294.31	1294.45	-0.14
WND-42D	1651029	1690555	2	1288.81	1289.11	-0.30
WND-43D	1652025	1695684	2	1293.63	1294.17	-0.54
WND-45D	1649698	1693709	2	1292.99	1293.19	-0.20
WND-46D	1650605	1693690	2	1292.50	1292.93	-0.43
WND-47D	1651999	1693610	2	1291.74	1292.08	-0.34
WND-48D	1651711	1689954	2	1287.99	1288.23	-0.24
WU-MW-04D	1651558	1695743	2	1294.23	1294.49	-0.26
WU-MW-05D	1651321	1696252	2	1294.99	1295.14	-0.15
Residual Mean				-0.64		
Residual Standard Deviation				1.64		
Sum of Squares				903.44		
Absolute Residual Mean				0.97		
Minimum Residual				-4.77		
Maximum Residual				15.67		
Range in Target Values				58.28		
Standard Deviation/Range				0.03		

Appendix F
NIC FS Model Report
Attachment F1 – NIC Groundwater Model Work Plan

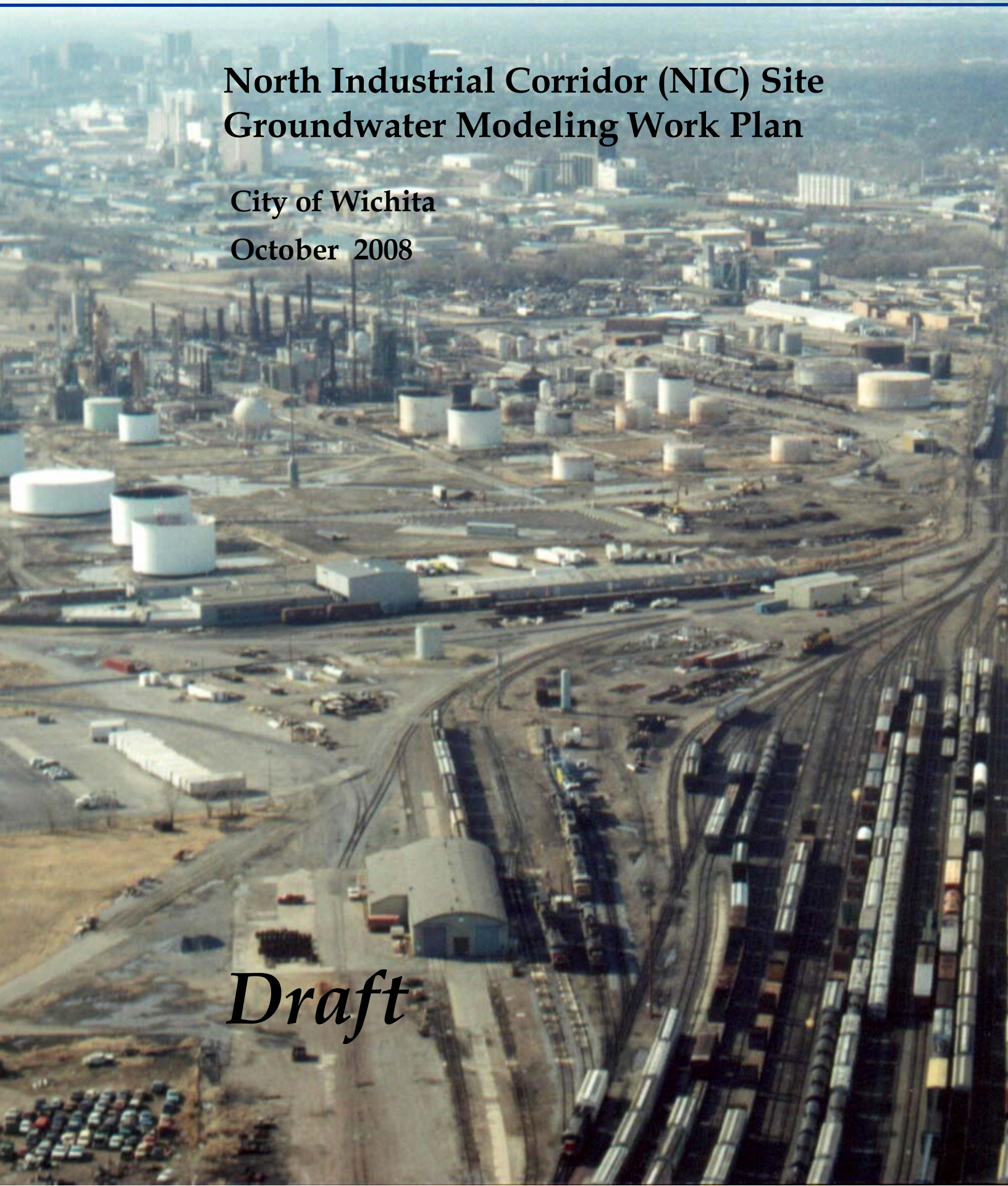
Appendix F
NIC FS Model Report
Attachment F1 – NIC Groundwater Model Work Plan

CDM

North Industrial Corridor (NIC) Site Groundwater Modeling Work Plan

City of Wichita

October 2008



Draft

Table of Contents

1.0 Purpose and Objectives 1-1
2.0 Site Overview and Support for Model Use 2-1
2.1 Site Overview 2-1
2.2 Support for Model Use 2-2
3.0 Previous Investigations and Data Availability 3-1
4.0 NIC Site Conceptual Model 4-1
4.1 Surface Features 4-1
4.2 Surface Water Hydrology 4-1
4.3 Geology and Hydrogeology 4-1
4.3.1 Geological Cross-Sections 4-2
4.3.2 Hydrostratigraphic Units 4-2
4.3.2.1 Hydrostratigraphic Unit 1 4-2
4.3.2.2 Hydrostratigraphic Unit 2 4-2
4.3.2.3 Hydrostratigraphic Unit 3 4-3
4.3.2.4 Hydrostratigraphic Unit 4 4-3
4.3.3 Bottom of Aquifer 4-3
4.3.4 Groundwater Flow 4-3
4.3.4.1 Phase I Water Level Measurements 4-4
4.3.4.2 Phase 2 Water Level Measurements 4-4
4.3.4.3 Horizontal Gradients 4-5
4.3.4.4 Vertical Gradients 4-5
4.3.4.5 Hydraulic Conductivity 4-6
4.3.5 Aquifer Stresses 4-6
5.0 The Mathematical Model 5-1
5.1 Selection of Model and Code 5-1
5.2 Modeling Environment 5-1
5.3 Model Framework 5-1
5.4 Model Extent 5-2
5.5 Model Layering 5-2
5.6 Hydraulic Properties 5-3
5.7 Boundary Conditions 5-3
5.8 Aquifer Stresses 5-3
5.9 Calibration Approach 5-4
5.10 Alternatives Assessment 5-4
6.0 Schedule 6-1
7.0 References 7-1

List of Figures

2-1 Site Map
4-1 Wichita East Quadrangle 7.5 Minute Topographic Map
4-2 Geologic Cross-Sections of NIC Site
4-3 Bottom of Aquifer Map at Site
4-4 Potentiometric Surface Map for October 1997 and April/May 1998
4-5 Potentiometric Surface Map for March 2001
4-6 Potentiometric Surface Map for August 2001
4-7 Potentiometric Surface Map for August 2004
5-1 Map Showing Boundaries of Area to be Modeled

Section 1
Purpose and Objectives

The purpose and objective of this work plan is to present the technical approach and schedule for development, calibration, and application of a groundwater flow model to support analysis of remedial alternatives for the North Industrial Corridor (NIC) Site Feasibility Study (FS). The model will be developed by incorporating data from the NIC site investigations and information from the adjacent Gilbert-Mosley site. The work will consist of development and calibration of a groundwater flow model in accordance with the Minimum Standards for Model Use, issued by the Kansas Department of Environmental Health (KDHE) Bureau of Environmental Remediation (BER) on December 14, 2005 (KDHE BER-RS-007). Remedial alternatives assessment will focus on hydraulic issues, and will evaluate flushing volumes and capture zones using particle tracking techniques for up to six alternatives.

The model will serve as a framework that can be expanded in the future to address issues related to source area remedial alternatives, contaminant fate and transport, allocation of remedial costs among responsible parties, or final design of the remedial alternative(s).

Section 2
Site Overview and Support for Model Use

2.1 Site Overview

The NIC is located in the north-central portion of the City of Wichita, Kansas. The Site consists of approximately six (6) square miles of urban industrial, commercial, recreational, and residential property that has been developed from agricultural land over the past century. With industrialization, environmental impacts to groundwater and soils at the Site have occurred. In 1983, a U.S. Environmental Protection Agency (EPA) investigation revealed the presence of volatile organic compounds (VOCs) in groundwater produced from two industrial wells in the area (USEPA, 1984). Subsequent investigations throughout the 1980s and early 1990s revealed widespread VOC contamination in groundwater in the NIC Site.

The NIC Site can be divided into three main subsections: the Northeast Investigation Area, the 29th and Mead Site, and the 13th and Washington Site **(Figure 2-1)**. The 29th and Mead Site is a former National Priorities List (NPL) site and has been officially delisted. The 13th and Washington Site is adjacent to the southern extent of the 29th and Mead Site area and was investigated by KDHE after VOCs were detected in groundwater wells located on the St. Francis Hospital property (9th and Santa Fe area) in 1991.

The names of the 29th and Mead and the 13th and Washington sites were taken from street intersections near the center of the two sites. The Northeast Investigation Area is located north and northeast of the 29th and Mead Site. The Northeast Investigation Area is primarily comprised of five industrial facilities that are conducting their own groundwater investigations. Remedial actions are also being conducted at some of these facilities. A list of reports associated with investigations and/or remedial actions conducted by others at facilities or areas within the NIC Site is provided in the reference section of this work plan. The three subareas of the NIC Site were discussed in the NIC Work Plan (CDM 1997).

The NIC site was formally established when the KDHE and City of Wichita finalized the NIC Settlement Agreement on November 14, 1995. One of the requirements of the settlement agreement was to conduct an RI/FS for the NIC site. CDM conducted RI activities between 1997 and 2005. The general objectives of the RI were to define the degree and extent of contamination, characterize contaminant fate and transport, identify potential receptors, and identify and characterize significant source areas. The RI activities are summarized in the NIC Site Final Remedial Investigation Report (CDM 2004) and the NIC Site Final Remedial Investigation Report Addendum (CDM 2005).

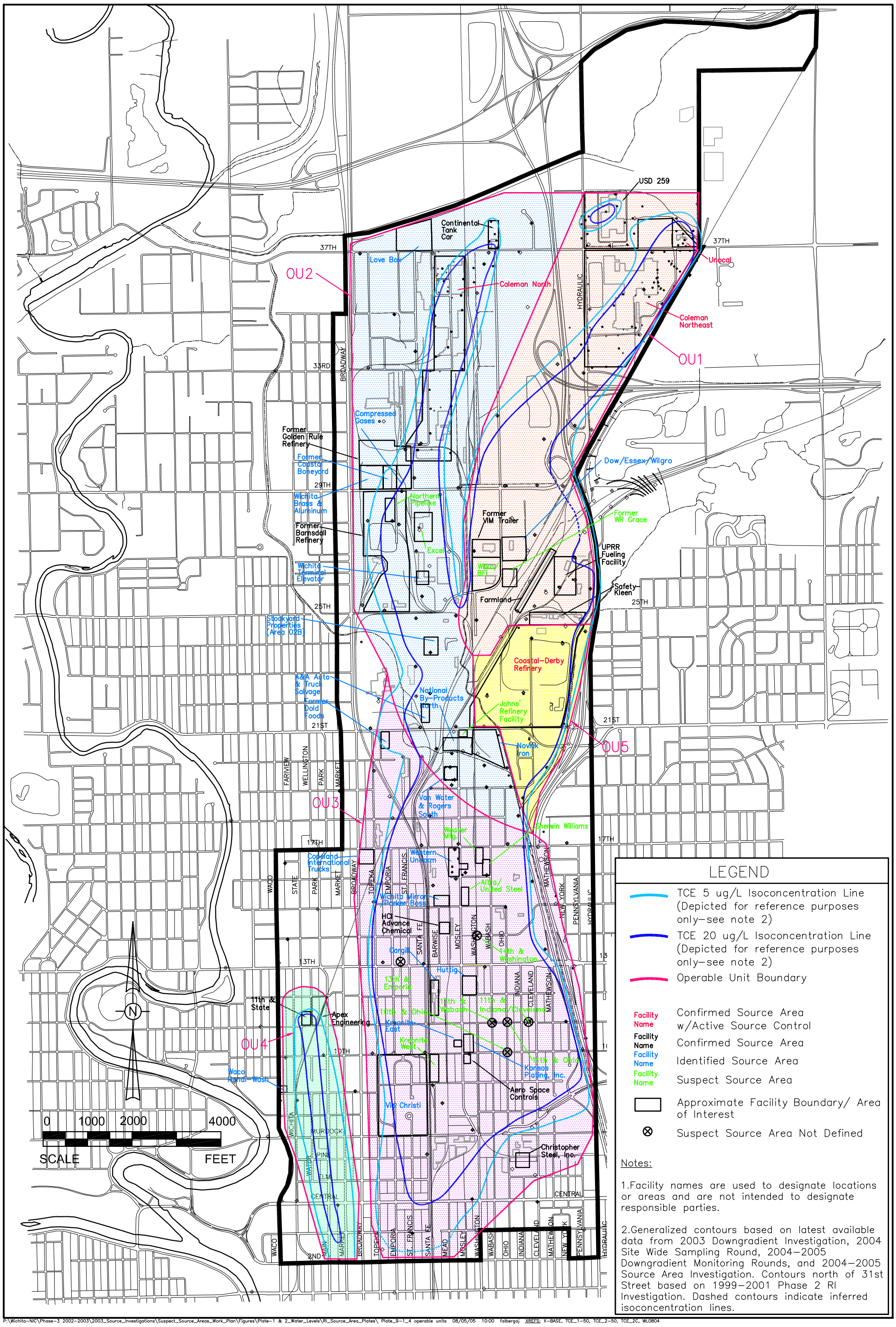
The Site hydrogeology consists of silts and clays, mostly unsaturated, overlying a fining-upward sequence of alluvial sand and gravel that comprises the main aquifer. The aquifer is underlain by relatively impermeable weathered shale. The alluvial sand and

gravel unit has a saturated thickness of 25 to 30 feet (ft) and comprises the main aquifer at the NIC Site. Groundwater generally flows from the north to south, with localized southeast and southwest flows in the southern portion of the Site due to the influence of surface water bodies to the west and east. The average annual rainfall in Wichita is about 28.6 inches resulting in recharge of approximately 2 to 4 inches per year. The location of the Site and its subareas are shown in Figure 2-1.

Groundwater Operable Units (OUs) in the NIC Site were developed to facilitate the development of feasible remediation strategies for areas with similar contaminants of concern and/or physical limitations. The OUs are shown on Figure 2-1. The OUs were developed in 2006 and 2007 during conversations between the City, CDM, TAC, and KDHE. During the FS different remedial alternatives may be selected for each OU as appropriate. Modifications to the OU boundaries may be proposed if supported by the model results.

2.2 Support for Model Use

The regional characteristics of the aquifer beneath the NIC Site are relatively homogeneous. However, the existence of nearby boundaries (such as rivers) and various stresses in the system make the required simulations too complex for simpler models or spreadsheet models, or hand calculations. A numerical model is the most effective tool for the analyses needed. For the purpose of the NIC Project, the evaluation and relative comparison of groundwater remedial alternatives can be accomplished by capture zone analysis and particle tracking simulations using a calibrated numerical steady- state three-dimensional groundwater flow model. These analyses can be conducted using available three-dimensional numerical modeling software capable of simulating complex boundary conditions and the various stresses in the aquifer. Three-dimensional numerical models allow increased sophistication over analytical models by allowing multiple complex boundary conditions and system stresses to be imposed.



P:\Wichita-NIC\Phase-3 2002-2003\2003_Source_Investigations\Suspect_Source_Areas_Work_Plan\Figures\Plate-1 & 2_Water_Levels\RI_Source_Area_Plates\ Plate_9-1_4 operable units 08/05/05 10:00 falbergaj XREFS: X-BASE, TCE_1-50, TCE_2-50, TCE_2C, WL0804

CDM

Figure 2-1
North Industrial Corridor (NIC) Site
Site Location Map Including Proposed Operable Units

Section 3
Previous Investigations and Data Availability

The NIC Site has been investigated extensively. The entire NIC Site is discussed in the NIC RI report (CDM 2004) and the NIC RI Addendum (CDM 2005). The level of detail of these studies ranges from simple one-point groundwater sampling in support of real-estate transactions to extensive RCRA Facility Investigations (RFIs) conducted at large industrial facilities. Several EPA Superfund removal actions have been conducted in the NIC Site. Leaking underground storage tank (LUST) investigations at retail gasoline facilities have been conducted at many locations in the NIC Site and several LUST sites have active or completed remedial activities. LUST facility investigation results will generally not be utilized except to fill data gaps. The Northeast Investigation Areas contains five industrial facilities with ongoing groundwater remedial actions.

At least six significant aquifer tests have been conducted in and adjacent to the NIC Site, hundreds of monitoring wells have been installed, and hundreds of boring logs have been examined. Several rounds of site-wide water level monitoring were conducted for the NIC RI field program and water level monitoring have been conducted at individual facilities within the NIC Site.

Section 4
NIC Site Conceptual Model

4.1 Surface Features

The Site is generally flat. The surface dips gently to the west and southwest. A topographic high is present east of Chisholm Creek (U. S. Geological Survey, Valley Center/Wichita East Quadrangle 7.5 Minute topographic maps) **Figure 4-1**. This topographic high is located outside the eastern boundary of the Site and intersects the northeast corner of the Site. This topographic high is due to the presence of the alluvial valley wall. The alluvial valley wall also represents the eastern limit of significant sand deposits.

4.2 Surface Water Hydrology

The Little Arkansas River is located between approximately 200 and 6,500 feet outside the western boundary of the Site and flows to the south in the area. The branches of Chisholm Creek in the immediate vicinity of the NIC Site include the main fork, the East Fork, the Middle Fork, the West Fork, and an unnamed middle drainage. The main fork of Chisholm Creek is located near the eastern boundary of the Site. The confluences of the East and West Forks of Chisholm Creek and an unnamed middle drainage are located between 18th Street and 20th Street and between Ohio Street and I-135.

The Middle Fork of Chisholm Creek defines a portion of the northern boundary of the NIC Site. As depicted on Figure 2-1, the Middle Fork currently flows into the Little Arkansas River. Formerly, this drainage flowed via the unnamed middle drainage into Chisholm Creek. Therefore, the unnamed middle drainage can be referred to as the former lower reach of the Middle Fork.

No major bodies of water exist in the NIC Site; however, several small surface water bodies exist in and around the Site. A large pond is located along the eastern boundary of the Site just south of K-96 highway in Grove Park (hereafter referred to as Grove Pond). Two other ponds exist within the Site. One pond is located along the western boundary of Coleman's property (hereafter referred to as Coleman Pond) in front of their main office building, south of 37th Street. The other pond is located southwest of the I-135 and K-96 interchange. The pond was utilized by Cornejo Construction Company (hereafter referred to as Cornejo pond) and was backfilled with construction debris in 1999. All surface water bodies existing in and around the Site are depicted on Figure 2-1.

4.3 Geology and Hydrogeology

The geology of the Site is based upon CDM's data collection and observations during all Phase I/Ia and Phase II RI field investigations, as well as investigations performed by

others at facilities in the Site. In order to evaluate the local geology within the Site, CDM reviewed over 300 lithologic logs from the Site. Selected logs were used to compile six geologic cross-sections, a bottom of aquifer map, and a saturated thickness map that represents the subsurface conditions at the Site.

The basal geologic unit of the Site is the Wellington Shale. This bedrock surface slopes gently to the west. Locally, the Wellington Shale is overlain by clays that represent the weathered portions of the bedrock. The bedrock and weathered clays are overlain by alluvium from the Arkansas River. These alluvial deposits are characterized by fining-upward sequences of sands and gravels that include intermediate and locally discontinuous clay lenses within the Site. These alluvial deposits are overlain by sandy to silty clays throughout much of the Site. The sandy to silty clays comprise the surficial units across the Site.

4.3.1 Geological Cross-Sections

Upon review of all available lithologic data, electrical conductivity (EC) log data, grain size analyses, a bottom of aquifer map, saturated thickness map, six geologic cross-sections were generated to depict the geology and hydrogeology discussed above. **Figure 4-2** presents the six cross-sectional representations of the lithology of the Site. These cross-sections also include the depth to water encountered at each of these locations.

4.3.2 Hydrostratigraphic Units

During the geologic investigation, four discreet hydrostratigraphic units were differentiated within the subsurface materials underlying the Site. The characterization for each hydrostratigraphic unit was based on the physical characteristics and hydrogeologic properties of the subsurface materials. Following is a discussion of each individual hydrostratigraphic unit. These hydrostratigraphic units are depicted on Figure 4-2.

4.3.2.1 Hydrostratigraphic Unit 1

The uppermost lithologic unit is comprised primarily of clays that are locally sandy or silty. These clays are of relatively low permeability. Saturation of the base of this unit occurs locally. Saturation also occurs in the upper clay units within an area restricted to the upland terrace deposits in the northeast corner of the Site. These clays range in colors and are black, brown, gray, and green. Unit 1 is encountered throughout the site and is typically capped by asphalt, concrete, and/or fill. This clay layer thins near the lower southwestern corner of the Site. Unit 1 ranges from 0 to approximately 20 feet with an average of approximately 8 to 10 feet in thickness.

4.3.2.2 Hydrostratigraphic Unit 2

This unit is the principal aquifer present in the study area. Unit 2 consists of fine to coarse-grained sands, fining-upwards, which can be locally silty. Generally, Unit 2 is saturated throughout the Site. This unit is generally continuous throughout the Site

with the exception of the northeast corner where the sands thin to the east and become laterally discontinuous. The thickness of these sands across the Site range from approximately 10 to 45 feet thick with an average of approximately 28 to 30 feet thick. Clay lenses are also present locally within the Site. These lenses can range from silty to sandy with minor gravel and are generally less than six feet in thickness. There appears to be no significant correlation of these clay lenses between boreholes, which is an indication they are laterally discontinuous horizons of lower permeability throughout this hydrostratigraphic unit.

4.3.2.3 Hydrostratigraphic Unit 3

Unit 3 is comprised of stiff, moist, low permeability clays that represent the weathered bedrock surface. These clays can be locally sandy or silty and range in color from olive greens to medium and dark grays. This clay unit ranges from less than 0.5 feet to approximately 10 feet in thickness and averages approximately 5 feet thick. Unit 3 is laterally discontinuous throughout the Site.

4.3.2.4 Hydrostratigraphic Unit 4

This unit consists of competent shale bedrock (Wellington Shale) and is the basal geologic unit considered in this investigation. Unit 4 is composed of medium to dark gray claystones and shales and is the basal aquitard for the overlying alluvial sediments. Olive-green shale was observed locally in the weathered portions of the bedrock. Thin beds of gypsum were also encountered locally within this unit. The bedrock within the Site was encountered at depths ranging from 0.5 to approximately 45 feet below ground surface and averages about 40 feet bgs.

4.3.3 Bottom of Aquifer

Data from approximately 200 lithologic borehole logs that reached the top of clay or the competent bedrock was compiled to produce a map representing the bottom of the aquifer. The bottom of the aquifer was designated as either top of bedrock or the top of the low permeable clay overlying the bedrock surface. The bottom of aquifer map is depicted on **Figure 4-3**.

The bottom of aquifer/bedrock surface slopes to the west and southwest with a high in the northeast corner of the Site. The bottom of aquifer elevations vary significantly, ranging from and elevation of 1260.9 in the southeast corner to upwards of 1343.5 feet in the northeast corner. The overall general trend in elevation of the bottom of the aquifer is a gentle slope from the east toward the west. There are several erosional features present on the bedrock surface. These erosional features originate from the topographic high east of the Site boundary and trend east to west across the Site. The average change in elevation across the erosional bedrock features is approximately six to ten feet.

4.3.4 Groundwater Flow

Water level elevations and groundwater flow directions have remained fairly consistent within the Site since the Phase I/Ia investigations were conducted. Phase I and Phase II

water level measurements, groundwater flow directions, water level time trends, horizontal and vertical gradients, and hydraulic conductivity are discussed below:

4.3.4.1 Phase I Water Level Measurements

Site-wide water level measurements were collected twice during the Phase I/Ia investigations, in October 1997 and April/May 1998. Potentiometric surface maps for the October 1997 and April/May 1998 water level rounds are included in **Figure 4-4**. The water level contours on the Phase I potentiometric surface maps should be considered approximate because 1) significantly fewer wells were gauged than during the Phase II water level rounds, 2) water level elevations from others may have utilized different survey datums, and 3) water level measurements took place over an extended period of time relative to the Phase II water level rounds.

The October 1997 water level round included measurements between October 2 and October 30, 1997. Most measurements were made by CDM between October 6 and October 8, 1997. Measurements were also taken from Unocal (UCL) on October 2, 1997, and from Coastal Derby (DRB) on October 30, 1997.

The April/May 1998 water level round included water level measurements between April 21 and May 13, 1998. Most measurements were taken by CDM between April 30 and May 2, 1998. Measurements were also taken from DRB on April 21, 1998, from Unocal on April 29, 1998, from Coleman North (CN) between May 4 and May 6, 1998, and Coleman Northeast (CNE) on May 13, 1998. Not all measurements taken by others are depicted on the potentiometric surface maps in Figure 4-4.

During the Phase I/Ia investigations, water level elevations increased from approximately two feet near the northern boundary of the Site to approximately 0.70 feet near the southern boundary of the Site between October 1997 and April/May 1998. Water level elevation increases over the same time period were generally less in the middle of the Site (less than 0.5 feet). Water level elevations within the Northeast Investigation Area increased from between 1.5 feet to 2.25 feet between October 1997 and April/May 1998. The water level elevation increases between Fall 1997 and Spring 1998 are consistent with increased precipitation in the Spring.

4.3.4.2 Phase 2 Water Level Measurements

During the Phase II investigations, water level measurements were collected in March and August 2001. In March 2001, water levels were measured by CDM between March 19 and March 21, 2001 and at DRB between March 25, and March 27, 2001. In August, water levels were measured by CDM between August 20 and August 23, 2001.

Potentiometric surface maps for the March 2001 and August 2001 water level rounds are presented in **Figure 4-5** and **Figure 4-6**, respectively. Subsequent to the Phase I/Ia investigations, several new water level wells and monitoring wells were installed. These additional water level and monitoring wells provide additional detail for Site-wide water level measurement rounds. Therefore, the August 2001 water level measurements

and potentiometric surface map are the most current and detailed potentiometric data for the Site.

Based on the August 2001 water levels and potentiometric surface map, the overall groundwater flow direction in the Site is toward the south. With the exception of the northeast corner, groundwater generally flows south to southwest in the upper portion of the Site. The groundwater flow direction in the northeast corner of the Site is nearly due west to southwest. Near the middle of the Site, the flow direction is south to southeast. Groundwater flows south to southeast in the southern portion of the Site with nearly due east flow in the very southeastern portion of the Site near Chisholm Creek at the eastern Site boundary. Groundwater also flows to the southwest within localized areas of the southwestern portion of the Site.

With the exception of the northeast corner, groundwater occurs at approximately 15 feet bgs. Groundwater occurs at depths of less than 10 feet bgs within the northeast corner of the Site, where groundwater occurs in upland terrace deposits (as opposed to the alluvial sand aquifer underlying the majority of the Site).

Between March and August 2001, water level elevations decreased across the Site from approximately three feet in the northern portion of the Site to approximately 0.5 feet in the southern portion of the Site. Water level elevations in the middle of the Site decreased from approximately 0.5 feet to 1.0 feet. The water level elevations in the Northeast Investigation Area decreased approximately four feet between the March and August 2001 water level measurements.

The four water level measurement rounds during Phase 1 and 2 investigations and the water level measurements taken in August 2004 indicate a general seasonal decrease in overall water level elevations from the spring to the fall and a general seasonal increase from fall to spring. **Figure 4-7** shows the potentiometric surface map for water levels measured in August 2004.

4.3.4.3 Horizontal Gradients

Groundwater gradients have also remained relatively constant since the Phase 1/1a investigations. Upon evaluation of the August 2001 potentiometric surface map, two predominant gradients exist within the Site. The predominant gradient across the Site is 0.001 feet/feet (ft/ft) with a change in the gradient between 33rd Street and 37th Street. The gradient between 33rd Street and 37th Street changes to 0.0008 ft/ft and resumes a gradient of 0.001 ft/ft to the south of 33rd Street. Due to rapid changes in elevation and low permeability soils within the northeast portion of the Site, the horizontal gradient is 0.023 ft/ft in this area.

4.3.4.4 Vertical Gradients

Nested well water level differences were calculated for the Site. These nested well elevation differences correspond directly to vertical gradients. The vertical gradient is calculated by dividing the nested well water level elevation difference by the distance

between the middle of the shallow well screen and the middle of the deep well screen. A positive difference between the wells indicates a downward gradient whereas a negative difference between the wells indicates an upward gradient.

The August 2001 water levels were utilized to evaluate the vertical gradients of the nested well pairs. The difference in the nested well water level elevations for the majority of the Site is less than 0.1 feet. Differences less that 0.1 feet are considered insignificant and are not representative vertical gradients.

4.3.4.5 Hydraulic Conductivity

The following hydraulic conductivities were reported for the NIC Site based on aquifer pumping tests.

Location	Hydraulic Conductivity	Reference
Coleman North Plant Operable Unit-upper part of the aquifer	225 ft/day	GTI 1992
Coleman North Plant Operable Unit-entire aquifer	435 ft/day	GTI 1992
Hydrocarbon Recyclers (near 25th St. No. and New York)	135 ft/day	HWS Technologies, Inc. 1990
OHSE production wells (near 22nd St. N. and Broadway)	185 ft/day	Groundwater Associates, Inc. June 27, 1987 (see Appendix K of GTI 1996)
Coleman Downtown Wichita Facility	380 ft/day	GTI 1993
House Oil Company	167 ft/day	Terra Tech 1994

4.3.5 Aquifer Stresses

More than 80 wells exist in the Site and within one mile of the Site boundaries that have pumping permits issued by the Water Resources Division of the State Board of Agriculture with specified groundwater allocations. The wells permitted for pumping include groundwater extraction wells, park irrigation wells, and industrial supply wells.

A public water supply (PWS) well exists on the west side of the Little Arkansas River, north of the Arkansas River and west of the southwest boundary of the Site. Impacts from the PWS wells to the NIC Site (or visa versa) currently appear unlikely since potentiometric data indicate that groundwater flows from the Little Arkansas River into

the NIC Site. It is expected that the Little Arkansas River would be losing in the vicinity of the NIC Site, since it is dammed upstream of the confluence with the Arkansas River.

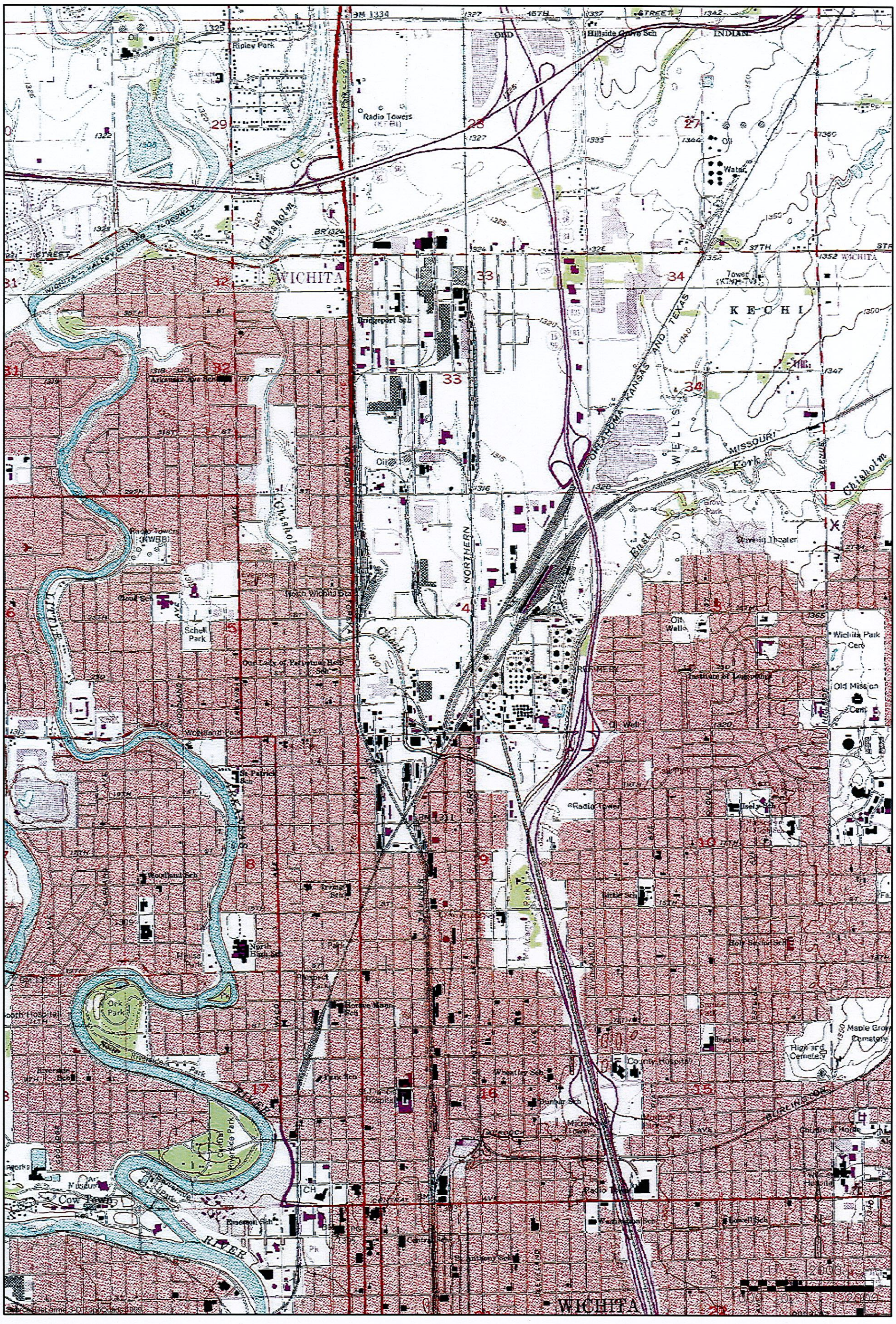
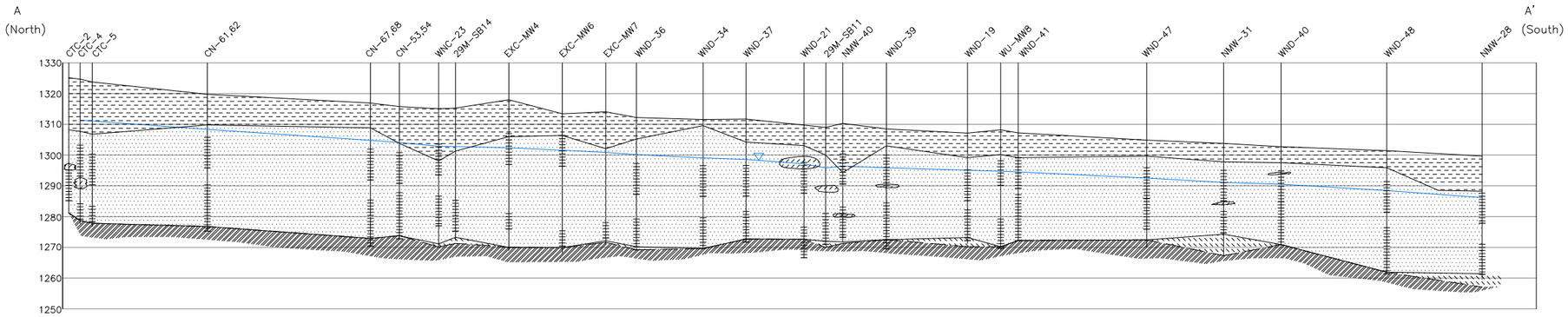
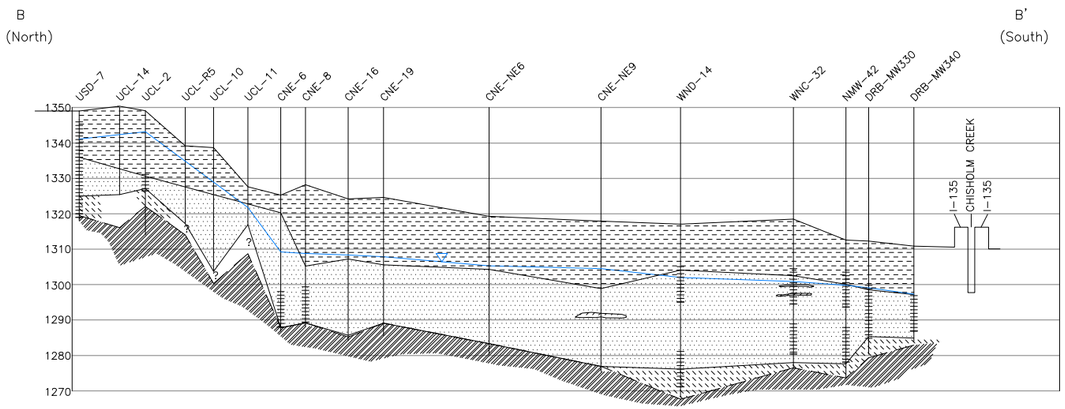
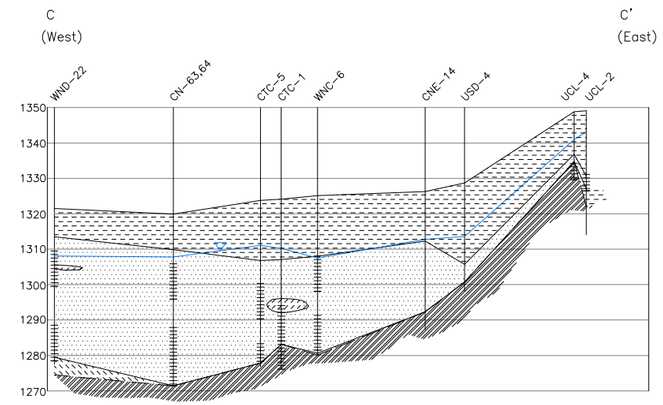


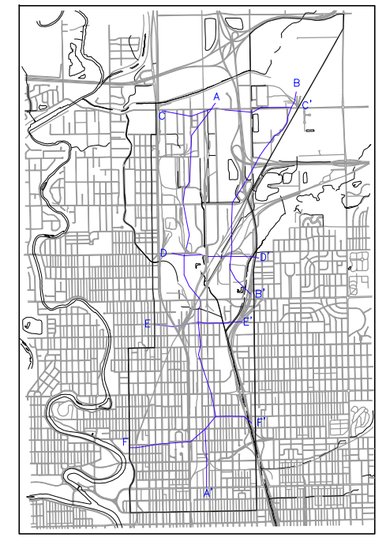
Figure 4-1
North Industrial Corridor (NIC) Site
Wichita East Quadrangle 7.5 Minute Topographic Map

CDM



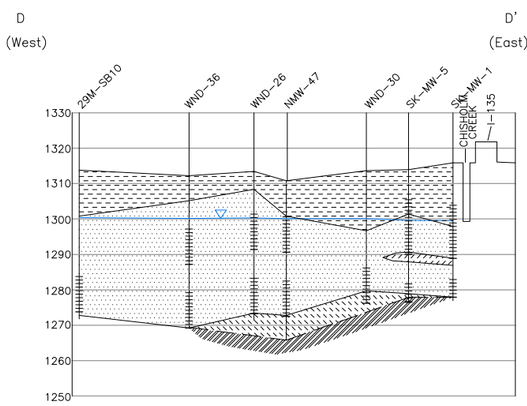


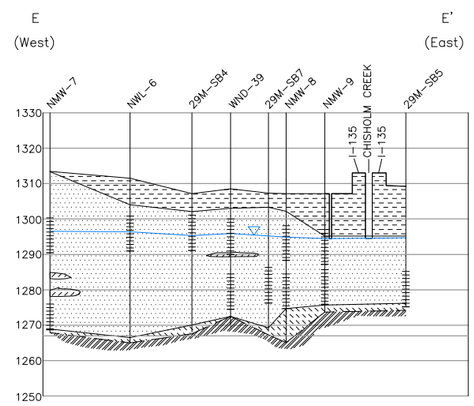


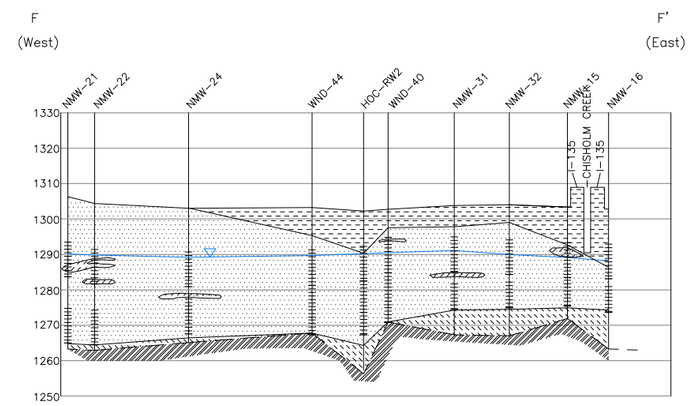


HORIZONTAL SCALE 1" = 100' (50 0 100)

VERTICAL SCALE 1" = 20' (10 0 20)







LEGEND

- Clay – Locally Sandy or Silty Hydrostratigraphic Unit 1
- Sand – Fine to Coarse Grained, Locally Silty Hydrostratigraphic Unit 2
- Clay – Locally Sandy or Silty and Laterally Discontinuous (Contained within Hydrostratigraphic Unit 2)
- Clay – Locally Sandy or Silty Hydrostratigraphic Unit 3
- Bedrock – Wellington Shale, Weathered to Competent, Blue-Gray Color Hydrostratigraphic Unit 4
- Shallow Well Screened Interval
- Deep Well Screened Interval
- Top of Groundwater Surface

Figure 4-2
North Industrial Corridor (NIC) Site
Hydrogeological Cross Sections A-A' - F-F'

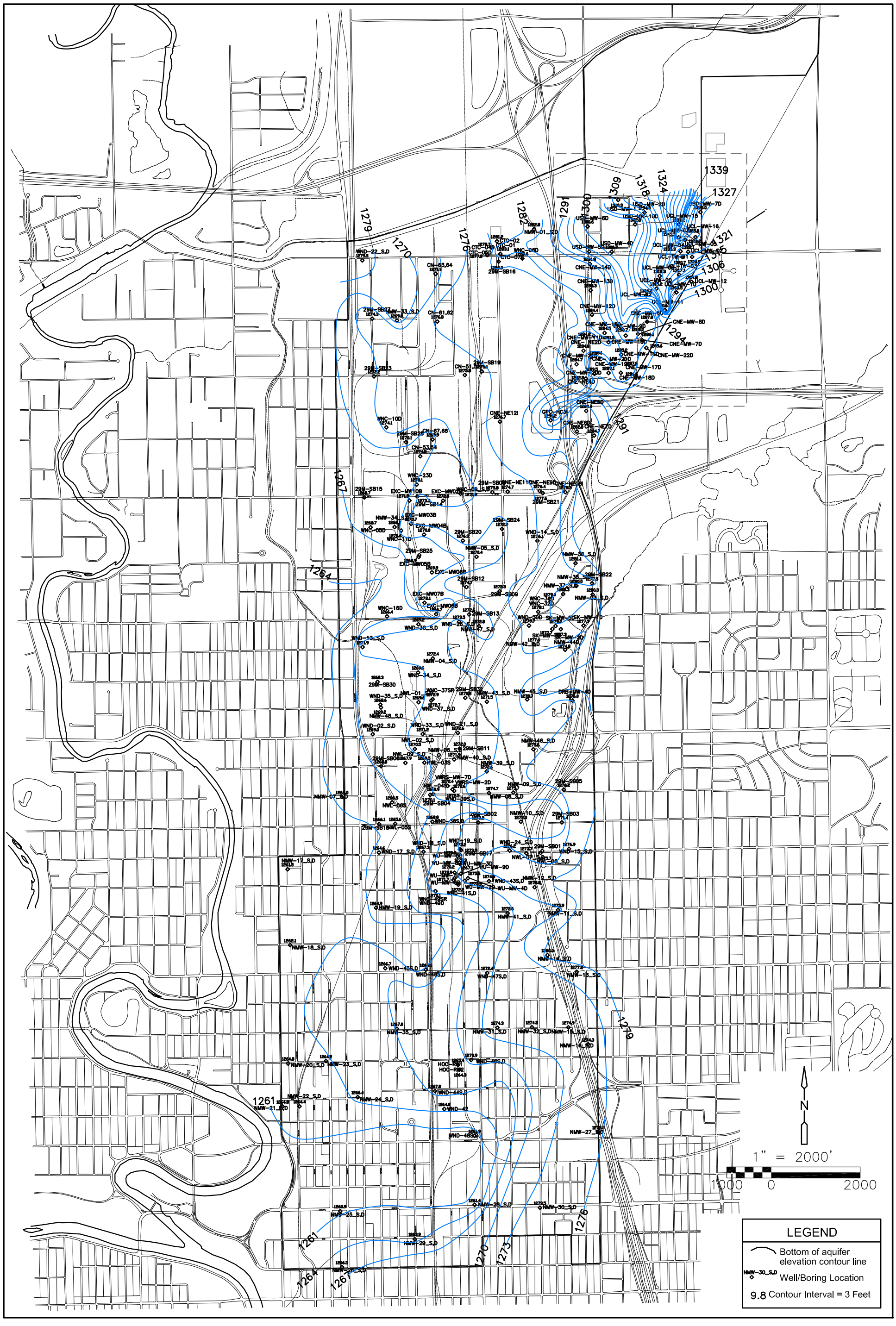
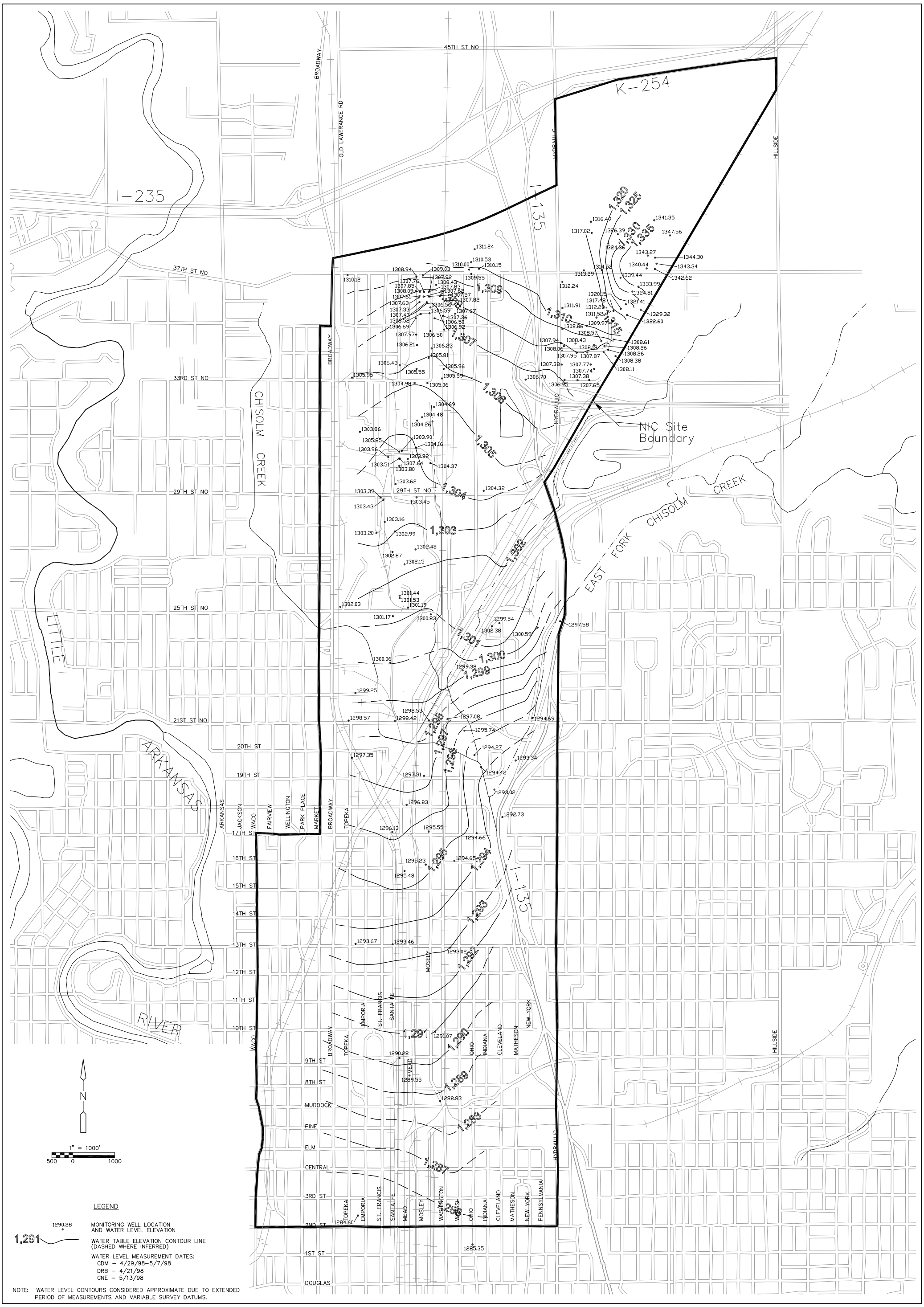


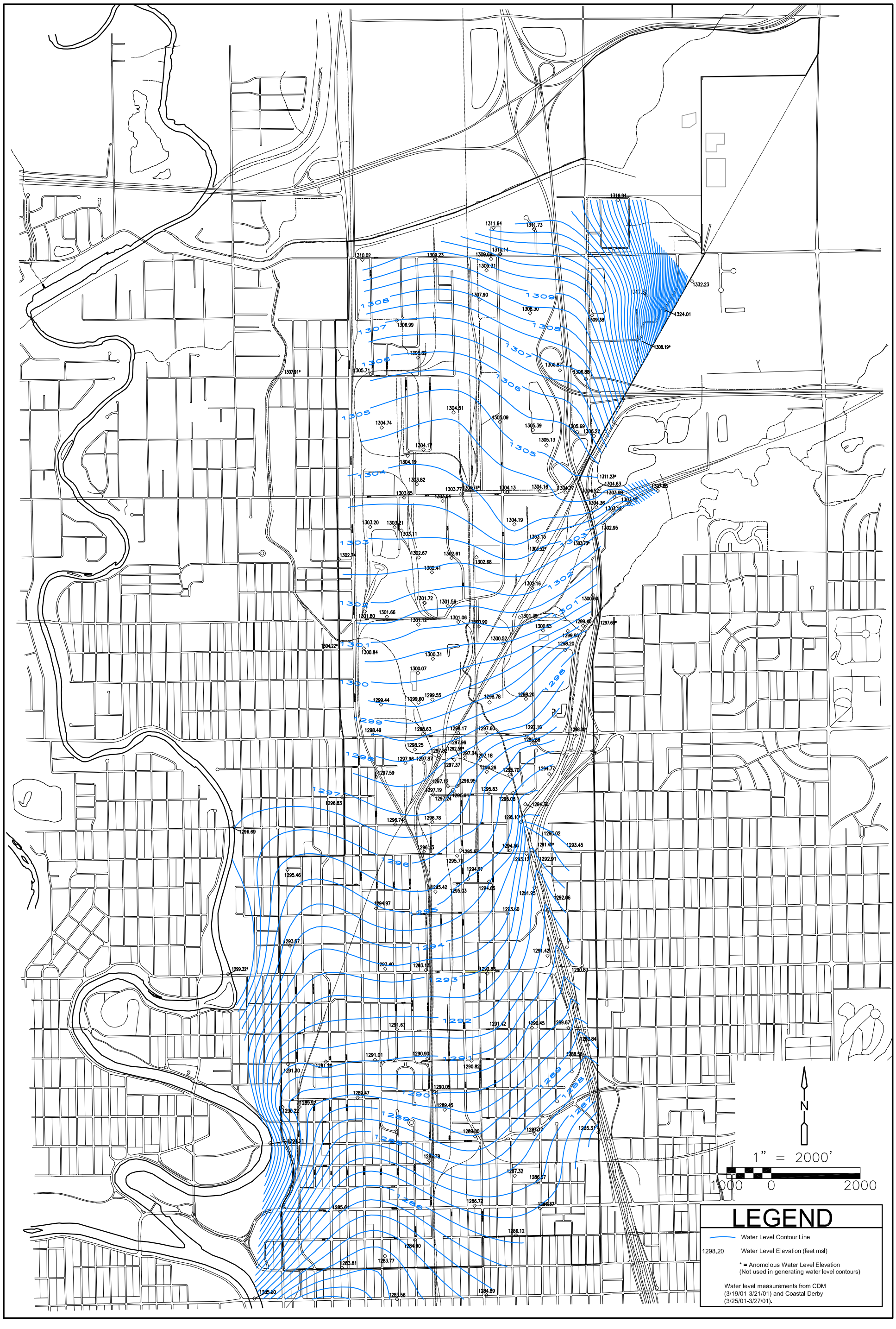
Figure 4-3
North Industrial Corridor (NIC) Site
Base of Aquifer Surface Map

CDM



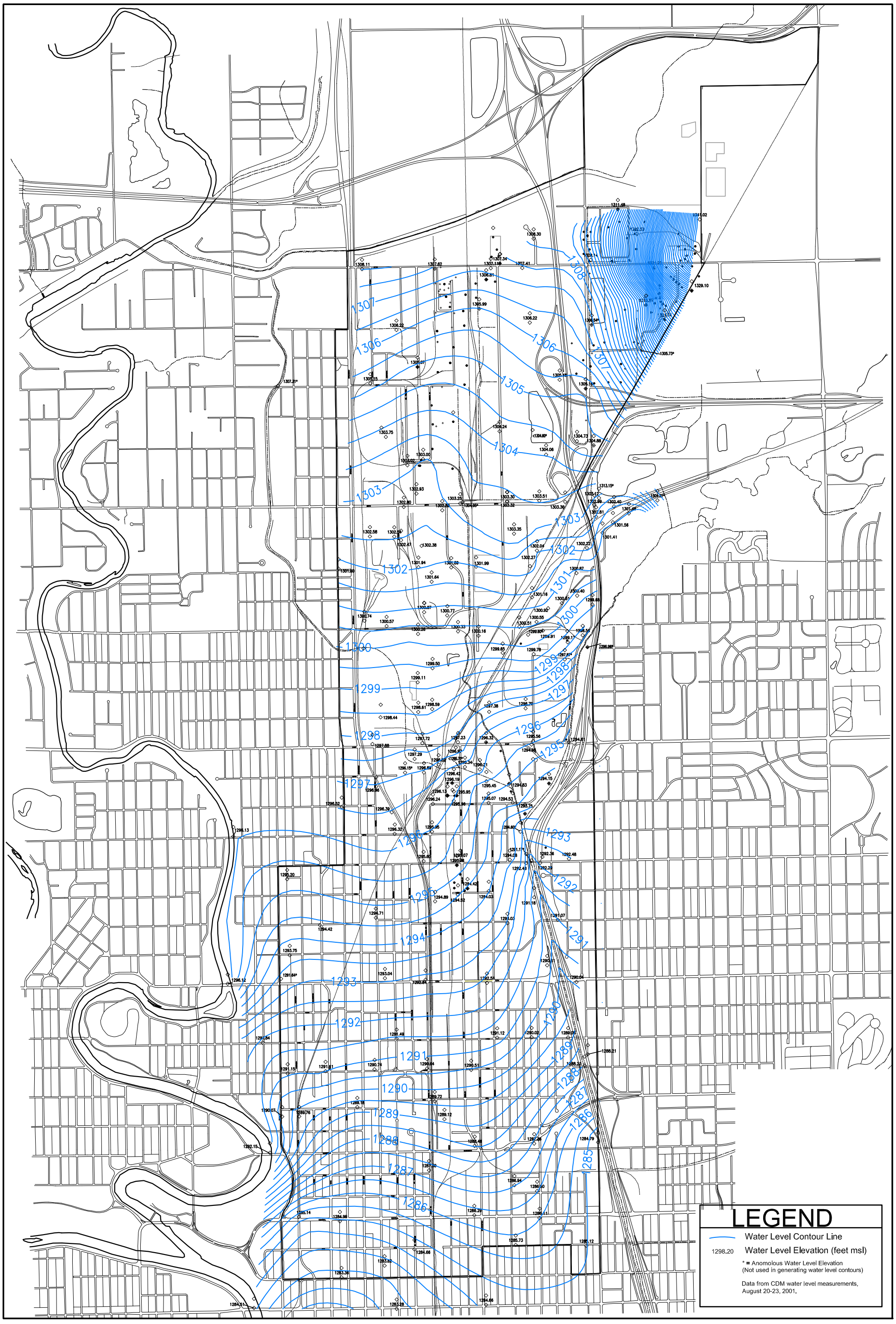
CDM

Figure 4-4
North Industrial Corridor (NIC) Site
Potentiometric Surface Contour Map, April/May 1998



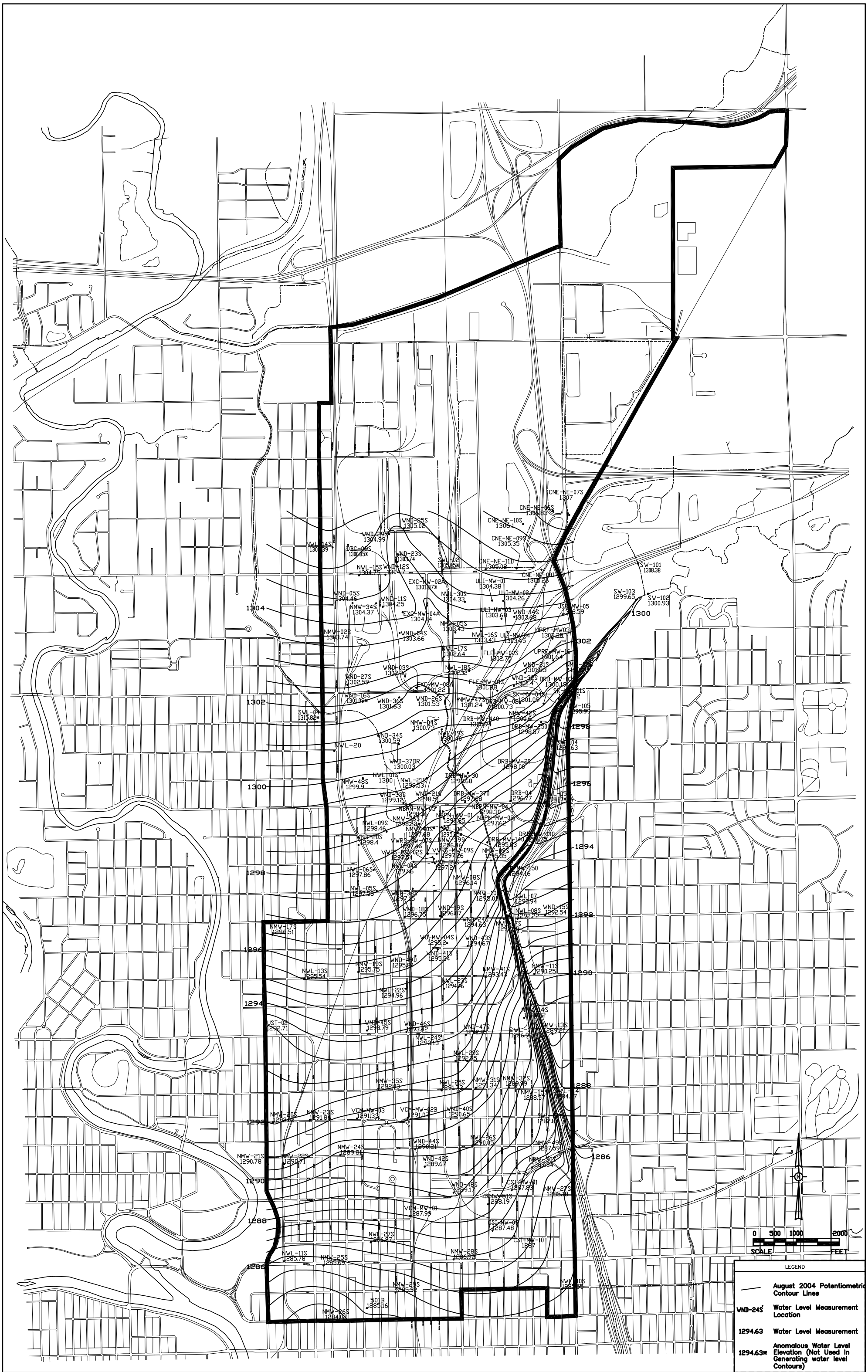
CDM

Figure 4-5
North Industrial Corridor (NIC) Site
Potentiometric Surface Map, March 2001



CDM

Figure 4-6
North Industrial Corridor (NIC) Site
Potentiometric Surface Map, August 2001



P:\2395 - Wichita\Wichita-NIC\54800_Amendment 4_2006_2007\7.0 Reports & Studies\NIC Model Work Plan\Draft for NIC TAC\Plate_3-1_WLs 0804.dwg BERRY, MICHAEL 09/18/2008 3:57 PM

CDM

Figure 4-7
North Industrial Corridor (NIC) Site
August 2004 Potentiometric Surface Map

Section 5
The Mathematical Model

The mathematical model used for this work is MODFLOW-2000 version 1.18.00. MODFLOW is a three-dimensional finite-difference groundwater flow model developed by the USGS. The MODFLOW (USGS, 2000) report includes detailed explanations of the physical and mathematical concepts on which the model is based.

5.1 Selection of Model and Code

For the purposes of the NIC modeling study, the remedial alternatives assessment will focus on hydraulic issues, and will look into flushing volumes and capture zones using particle tracking techniques. These analyses can be conducted using MODFLOW and MODPATH (USGS 2003). MODPATH is a particle tracking post-processor that computes and displays three-dimensional pathlines based on output from MODFLOW.

Because of its ability to simulate a wide variety of groundwater systems, its rigorous peer review by groundwater practitioners, and its extensive publicly available documentation, MODFLOW has become the standard groundwater model. When properly applied, MODFLOW is the recognized standard model used by courts, regulatory agencies, consultants, industry, and universities.

The KDHE BER prefers use of well documented and peer-reviewed models. One of the software packages that meet their requirement is MODFLOW with its variation of pre- and post-processing and enhanced graphic user-interface.

5.2 Modeling Environment

Developing a groundwater flow simulation model for this work will involve using software required for site characterization, model development, calibration, post-processing, and visualization. In order to facilitate efficient model development, an integrated graphical user interface (GUI) will be used in this project. The GUI will be used for developing the input data, model package files, post-processing model output and preparing visualizations of modeling results. A demonstration version of GUI will be supplied to KDHE to facilitate their examination of model data file.

5.3 Model Framework

The model framework includes definition of the area to be modeled and the hydrostratigraphy within this area. A numerical grid will be developed within the model area that includes the elevations of layers used to represent the site hydrostratigraphy. The model will incorporate hydrostratigraphic units 1 and 2, described above. Elements of the model framework are described in following sections.

The model will be developed in a grid independent manner in order to allow flexibility in modifications that may be necessary for evaluating alternatives. The grid size will generally be approximately 100 to 200 feet on a side during calibration, and will be refined near proposed pumping locations during the alternatives assessment.

5.4 Model Extent

Figure 5-1 shows the extent of the area to be modeled. The model area includes the NIC site, and also incorporates the area of the Gilbert Mosley site model, since remedial pumping in this area has the potential to impact the southern portion of the area of interest. The total active area of the model is approximately 6600 acres. This area is bounded as follows:

- North – Highway 235/Highway 254 where it is intersected by the Little Arkansas River and North Hillside Avenue
- West-North half – Little Arkansas from NW to confluence with Arkansas River at Central Avenue
- West –South half – Arkansas River from Central Avenue to section of river closest to MaCarthur Road.
- South – Section of Arkansas River closet to MaCarthur Road. to projected intersection with Hillside Avenue.
- East – South half – Alluvial Valley wall – generally at Hillside Avenue between US 54 (Kellogg Street) and Arkansas River.
- East – North Half – Alluvial Valley wall – generally at Grove Street between 37th Street and US 54 (Kellogg Street)
- East – Northeast – approximately projection of Grove Street and 37th Street intersection northeast to Hillside Avenue

5.5 Model Layering

The groundwater system will be represented initially using 3 model layers. The upper layer will represent the interval from ground surface to the base of hydrostratigraphic unit 1. This unit is largely unsaturated. Hydrostratigraphic unit 2 will be represented using 2 layers to allow flexibility in representing the fining upward sequence observed at the site. The lower boundary of the model is represented by the contact with either the weathered clay unit overlying the Wellington Shale, or intact Wellington Shale.

The ground surface elevation is not a critical element for the proposed modeling, except for surface water features. Ground surface elevations will be estimated based on interpolation from surveyed elevations available at wells within the NIC site. Surface elevation in the Gilbert and Mosley portion of the site will be obtained from the existing model in this area. Surface water feature elevations will be estimated from site topographic maps. The elevations of the base of hydrostratigraphic unit 1 will be interpolated based on site boring logs in the NIC area, and from the existing Gilbert

Mosley model in the south. The base of hydrostratigraphic unit 2 will utilized the surface provided on Figure 4-2 in the NIC area and the Gilbert Mosley model in the south. The base of layer 2 will be calculated at the center point of hydrostratigraphic unit 2.

5.6 Hydraulic Properties

Hydraulic properties will be based on model calibration, bounded by results of aquifer tests that have been conducted in the NIC area. Hydraulic properties in the southern portion of the model will utilized the calibrated properties from the Gilbert Mosley model. The hydraulic properties of interest include horizontal and vertical hydraulic conductivity and storage coefficients. The storage coefficient will be assumed to be the same as that assumed for the Gilbert Mosley site (0.25).

5.7 Boundary Conditions

Boundary conditions describe conditions at the exterior model extents, and may be used to represent sources and sinks for groundwater. No flow boundary conditions will be used to represent model boundaries associated with the contact with the Wellington Shale along the eastern model boundary. A no flow boundary will also be used at the base of the model, since leakage to and from the bedrock zone is assumed to be minimal. Limited use of general head boundary conditions to account for groundwater inflows from areas outside of the model domain may be used in the northeast.

The plan view boundaries of the model area incorporate streams on the north, west and south boundaries, while the eastern boundary is defined by the bedrock boundary of the alluvial system. Chishom Creek will be simulated as a boundary, and may comprise the active model boundary in some areas, where appropriate. Streams will be simulated using the river package in MODFLOW, since the surface water flows are much higher in magnitude than the seepage rates from the stream. Elevations of surface water features will be estimated from topographic maps. A conductance term is used in the model to describe the connection between surface water and groundwater. This parameter will be varied during the calibration process.

5.8 Aquifer Stresses

Sources of water in the aquifer include inflows and outflows from surface water, described above, recharge from infiltration of precipitation and pumping. These stresses will be simulated in the model using the well and recharge packages in MODFLOW. Prior modeling efforts used model calibration and water budget evaluations to estimate the proportion of precipitation that recharges groundwater. This parameter will be varied within the range of uncertainty during the calibration process. Pumping records will be obtained from state records, individual facility records and the City for use in the simulations.

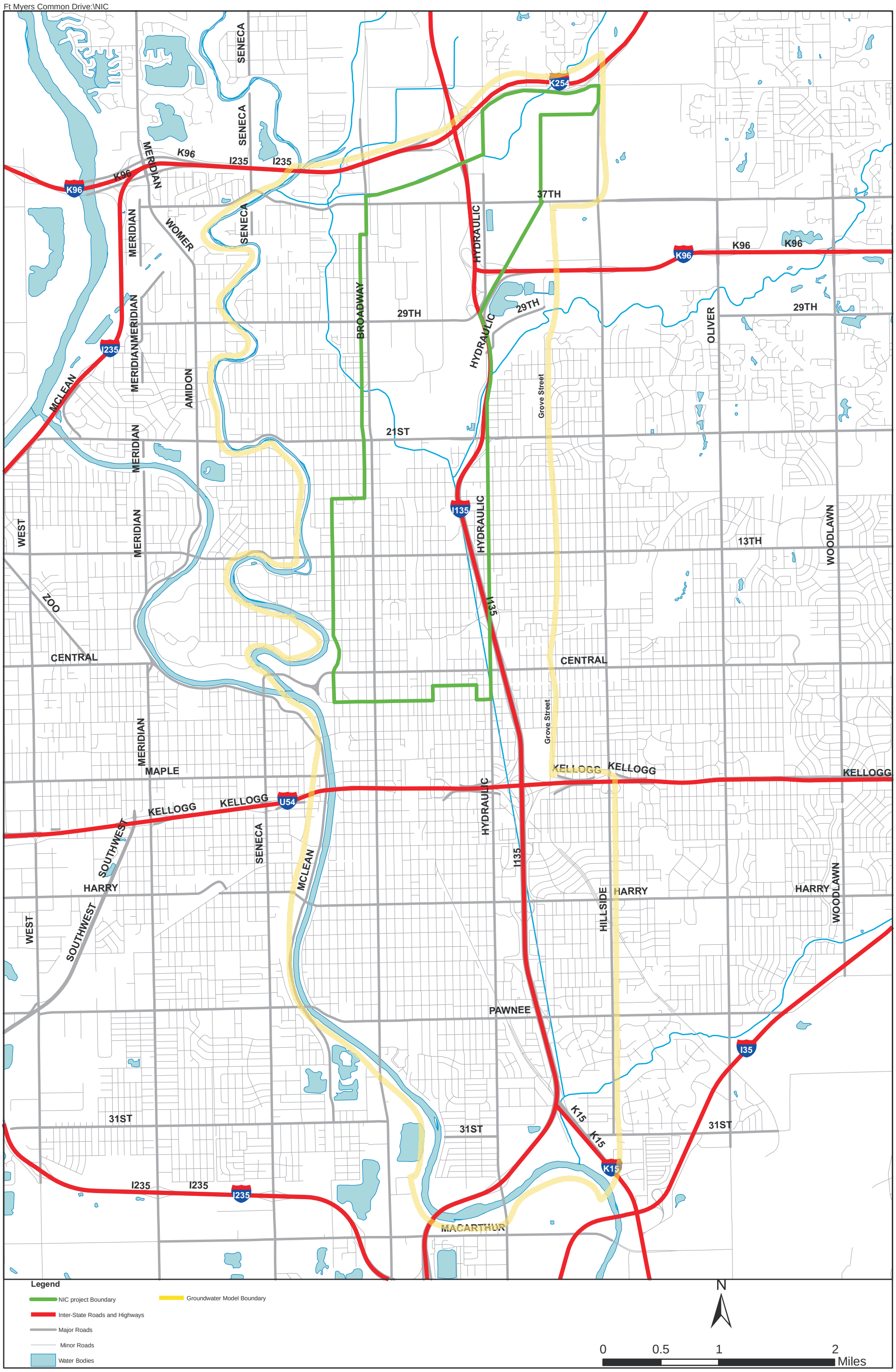
5.9 Calibration Approach

The model will be calibrated to steady-state conditions using the extensive synoptic water level event from water level measurements collected in March and August, 2001. Long-term average flow and climatic conditions will be used in the calibration. Pumping rates representative of the steady state calibration periods will be used for the calibration period. The calibration will utilize the difference between the observed and modeled water levels as a measure of the error in the model. The model calibration will minimize these residuals by varying sensitive model parameters, using optimization techniques. Sensitivity analyses will be conducted to assess the impact of uncertainty on model results.

5.10 Alternatives Assessment

A series of remedial alternatives consisting of hydraulic controls will be simulated during the FS process. The calibrated flow model will be used with a particle tracking model to assess effectiveness of hydraulic capture and pore volume flushing times.

Ft Myers Common Drive:\NIC



CDM

Figure 5-1
Proposed Groundwater Model Extent
North Industrial Corridor (NIC)
Wichita, Kansas

Section 6
Schedule

The modeling program will be conducted during 2008 in support of the NIC FS. The results of the modeling will be included as part of the NIC FS Report which is anticipated to be submitted to KDHE in early 2009.

Section 7
References

USEPA 1984. *Report on Sampling Investigation, Johns' Refinery Company (a.k.a. Super Refined Oil Co.), Wichita, Kansas,- Superfund Sit; # P-6*. United States Environmental Protection Agency Region VII, Emergency Planning and Response Branch, June 13, 1984.

Camp Dresser and McKee, Inc. (CDM). 2000a. *North Industrial Corridor Final Work Plan Addendum*.

_____. 2000b. *North Industrial Corridor Site Phase I/IA Technical Memorandum*.

_____. 1997a. *North Industrial Corridor Field Sampling Plan*.

_____. 1997b. *North Industrial Corridor Quality Assurance Project Plan*.

_____. 1997c. *North Industrial Corridor Work Plan for RI/FS.*

Camp Dresser and McKee, Inc. (CDM). April 2004. *North Industrial Corridor (NIC) Site Final Remedial Investigation Report.* City of Wichita

Camp Dresser and McKee, Inc. (CDM). 2005. *North Industrial Corridor (NIC) Site Final Remedial Investigation Report Addendum.* City of Wichita

Camp Dresser and McKee, Inc. (CDM). February 2007. *North Industrial Corridor (NIC) Site Final Remedial Investigation Report Addendum.* City of Wichita

Harbaugh, A.W., Banta, E.R., Hill, M.C., and McDonald, M.G., 2000, *MODFLOW-2000, the U.S. Geological Survey modular ground-water model -- User guide to modularization concepts and the Ground-Water Flow Process:* U.S. Geological Survey Open-File Report 00-92, 121 p.

Pollock, D.W., 1994, *User's Guide for MODPATH/MODPATH-PLOT, Version 3: A particle tracking post-processing package for MODFLOW, the U.S. Geological Survey finite-difference ground-water flow model:* U.S. Geological Survey Open-File Report 94-464, 6 ch.

GMS v.6.5 – A Groundwater Modeling Software, 2008. *Environmental modeling systems, Inc.,* 1204 W. South Jordan Pkwy, Suite B, South Jordan UT 84095.

Bureau of Environmental Remediation/Remedial Section Guideline. *Minimum standards for Model Use, BER Policy #BER-RS-007,* Revised: December 14, 2005.

Bevans, H.E. 1989. *Water Resources of Sedgwick County, Kansas.* U.S. Geological Survey, Water Resources Investigations. Report 88-4225.

Groundwater Technology, Inc. 1996. *Preliminary Results from Investigation of the 29th and Mead Area.* Volume 1. Prepared for Wichita North Industrial District. Project No. 040020138.

Lane, C.W. and D.E. Miller. 1965. *Geohydrology of Sedgwick County, Kansas.* Kansas Geological Survey. Bulletin 176.

SECOR International Inc. 1999. *Draft Remedial Investigation Report, Van Waters & Rogers, Inc. Mosley Avenue Facility, Wichita, Kansas.* Project No. 60013-001-01.

U.S. Department of the Interior, Geological Survey. 1960. *Valley Center Quadrangle 7.5 Minute Series Topographic Map.* State of Kansas.

U.S. Department of the Interior, Geological Survey. 1961. *Wichita East Quadrangle 7.5 Minute Series Topographic Map.* State of Kansas.

CDM 2004. *Downgradient Investigation Activities in the NIC Site*. Camp Dresser & McKee Inc., Wichita, Kansas.

CDM 2000. *Phase 1/1A Technical Memorandum, North Industrial Corridor, Wichita, Kansas.* Camp Dresser & McKee Inc., Wichita, Kansas.

CDM 2004. *Work Plan for Investigation Activities at Identified Source Areas in the NIC Site*. Camp Dresser & McKee Inc., Wichita, Kansas.

CDM 2004. *Work Plan for Investigation Activities at Suspect Source Areas in the NIC Site*. Camp Dresser & McKee Inc., Wichita, Kansas.

City of Wichita. *North Industrial Corridor Application for Certificate and Release for Environmental Conditions, Love Box Company, Inc.*, 700 E. 37th Street North, Wichita, Kansas 67219.

G&E 1997. "*Draft*" *Site Assessment Report, 1707 North Mosley Street, Wichita, Kansas*. G&E Engineering, Oklahoma City, Oklahoma, November 1997.

KDHE 1993. *Expanded Site Investigation, 13th and Washington Site, Wichita, Kansas, CERCLIS Identification Number KSD984988456.* Kansas Department of Health and Environment, Bureau of Environmental Remediation, Pre-Remedial Unit/Remediation Section, September 1993.

Kreonite, Inc. 1998. *North Industrial Corridor Redevelopment District, Application for Certificate and Release for Environmental Conditions*. November 11.

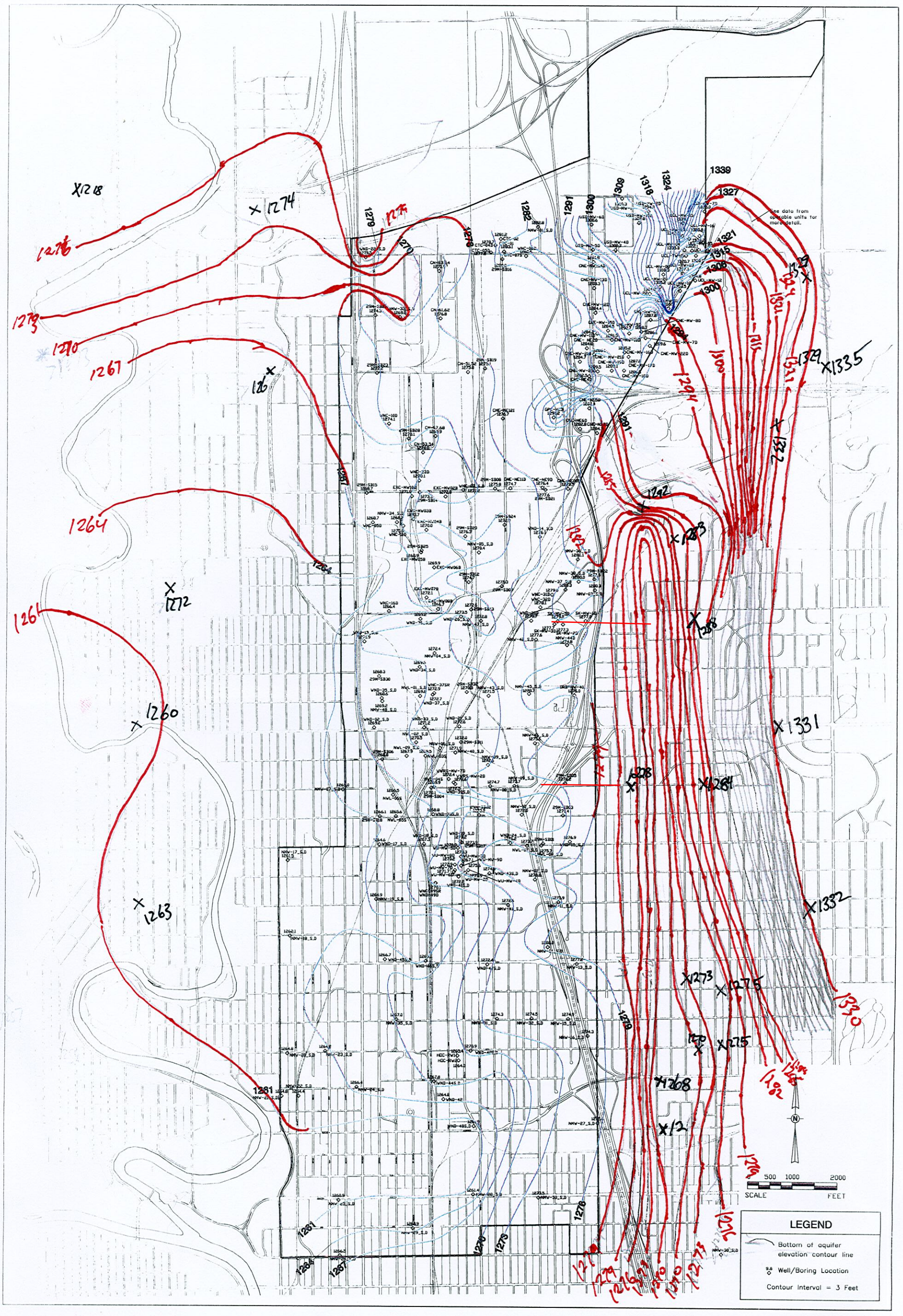
TerraTech, 1993. *Preliminary Assessment, Groundwater Investigation Utilizing the Heated Headspace Method, 936 - 940 N. Waco, Wichita, Kansas*. Prepared for Bank IV Kansas, N.A.

TerraTech, 1999. *Final Report, Phase II Sampling Investigation-Love Box Company Inc., June 1999*. Prepared for Love Box Company, Inc., 700 E 37th Street North, Wichita, Kansas.

USEPA 1985. *After Action Report, Superfund Immediate Removal – Johns' Refinery, Wichita, Kansas, - Site No. P-6.* United States Environmental Protection Agency Region VII, Emergency Planning and Response Branch, May 30, 1985.

Appendix F
NIC FS Model Report
Attachment F2 – Supporting Data for Bedrock Surface Outside of NIC Boundary

Appendix F
NIC FS Model Report
Attachment F2 – Supporting Data for Bedrock Surface Outside of NIC Boundary



CDM

Plate 4-3
North Industrial Corridor (NIC) Site
Base of Aquifer Surface Map

KGS Hydrology | Water Well Database Query | Scan of WWC5 Form

GSI Job No. 037272

MW-UP-17

WATER WELL RECORD Form WWC-5 KSA 82a-1212 ID No.

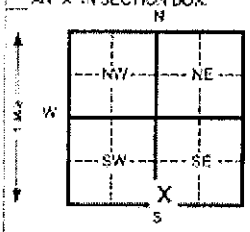
1 LOCATION OF WATER WELL: County: Sedgwick | Fraction: SW ¼ SW ¼ SE ¼ | Section Number: 10 | Township Number: T 27 S | Range Number: R 01 E

Distance and direction from nearest town or city street address of well if located within city?
South side of 10th Street; ~148 ft. east of Grove

2 WATER WELL OWNER: Union Pacific Railroad
RR#, St. Address, Box # : 1416 Dodge Street, Room 930
City, State, ZIP Code : Omaha NE 68179

Board of Agriculture, Division of Water Resources
Application Number:

3 LOCATE WELL'S LOCATION WITH AN "X" IN SECTION BOX:



4 DEPTH OF COMPLETED WELL 30.5 ft. ELEVATION:
Depth(s) Groundwater Encountered 1 ft. 2 ft. 3 ft.
WELL'S STATIC WATER LEVEL ft. below land surface measured on mo/day/yr
Pump test data: Well water was ft. after hours pumping gpm
Est. Yield gpm: Well water was ft. after hours pumping gpm
Bore Hole Diameter 8.5 in. to 32.5 ft. and in. to ft.
WELL WATER TO BE USED AS: 1 Domestic 3 Feed lot 5 Public water supply 8 Air conditioning 11 Injection well 2 Irrigation 4 Industrial 6 Oil field water supply 7 Lawn and garden (domestic) 9 Dewatering 10 Monitoring well 12 Other (Specify below)
Was a chemical/bacteriological sample submitted to Department? Yes No X If yes, mo/day/yr sample was submitted
Water Well Disinfected? Yes No X

5 TYPE OF BLANK CASING USED: 1 Steel 2 PVC 3 RMP (SR) 4 ABS 5 Wrought iron 6 Asbestos-Cement 7 Fiberglass 8 Concrete tile 9 Other (specify below)
CASING JOINTS: Glued Clamped Welded Threaded Flush
Blank casing diameter 2 in. to 25.3 ft., Dia in. to ft., Dia in. to ft.
Casing height above land surface Flushmount in., weight 0.703 lbs./ft. Wall thickness or gauge No. Sch. 40
TYPE OF SCREEN OR PERFORATION MATERIAL: 1 Steel 2 Brass 3 Stainless steel 4 Galvanized steel 5 Fiberglass 6 Concrete tile 7 PVC 8 RMP (SR) 9 ABS 10 Asbestos-cement 11 Other (specify) 12 None used (open hole)
SCREEN OR PERFORATION OPENINGS ARE: 1 Continuous slot 2 Louvered shutter 3 Mill slot 4 Key punched 5 Gauzed wrapped 6 Wire wrapped 7 Torch cut 8 Saw cut 9 Drilled holes 10 Other (specify) 11 None (open hole)
SCREEN-PERFORATED INTERVALS: From 25.3 ft. to 30.3 ft. From ft. to ft.
From ft. to ft. From ft. to ft.
GRAVEL PACK INTERVALS: From 22.8 ft. to 32.5 ft. From ft. to ft.
From ft. to ft. From ft. to ft.

6 GROUT MATERIAL: 1 Neat cement 2 Cement grout 3 Bentonite 4 Other
Grout Intervals From 1 ft. to 22.6 ft. From ft. to ft. From ft. to ft.
What is the nearest source of possible contamination: 1 Septic tank 2 Sewer lines 3 Watertight sewer lines 4 Lateral lines 5 Cess pool 6 Seepage pit 7 Pit privy 8 Sewage lagoon 9 Feedyard 10 Livestock pens 11 Fuel storage 12 Fertilizer storage 13 Insecticide storage 14 Abandoned water well 15 Oil well/Gas well 16 Other (specify below)
Direction from well? How many feet?

FROM	TO	CODE	LITHOLOGIC LOG	FROM	TO	PLUGGING INTERVALS
0	13.5		Clay & Silt			
13.5	32		Sand			
32			Top of Shale			

7 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This water well was (1) constructed, (2) reconstructed, or (3) plugged under my jurisdiction and was completed on (mo/day/yr) 11-14-03 and this record is true to the best of my knowledge and belief. Kansas Water Well Contractor's License No. 531 This Water Well Record was completed on (mo/day/yr) 11-18-03 under the business name of Geotechnical Services, Inc. by (signature)

INSTRUCTIONS: Please fill in blanks and circle the correct answers. Send three copies to Kansas Department of Health and Environment, Bureau of Water, 1000 S.W. Jackson St., Ste. 420, Topeka, Kansas 66612-1367, Telephone: 913-296-5545. Send one to WATER WELL OWNER and retain one for your records.

Assume 100' Surface & Oil Heard to Approach 1275'
Top of Sand 1295

KGS Hydrology | Water Well Database Query | Specific Water Well Detail

Well T27S, R1E, Sec. 15, SWSWNE, Action: Constructed

Location Info	
County: Sedgwick	**Location:** T27S, R1E, Sec. 15, SWSWNE
Owner: GRACEY	**Status**: Constructed
Directions: 1156 NORTH GROVE WICHITA, KANSAS	
Longitude: -97.30672	**Latitude**: 37.70181
View section on interactive map This link will create a new window and display an interactive map of this well and its neighbors.	

General Info	
Well Depth: 35 ft.	**Elevation:** ft.
Static Water Level: 14 ft.	**Well Use:** Lawn and Garden - domestic only
Est. Yield: 0 gpm.	**Other ID:**

Driller Info	
Driller: Todd S. Harp Well & Pump Service, Inc.	**License #:** 236
Comp. Date: 18-Jul-1988	**DWR Applic. #:**

Chemical Sample Submitted?: N

Casing Info
Casing Type: RMP(SR)
Diam: 5 in. to 25 ft.
Diam: 0 in. to 0 ft.
Diam: 0 in. to 0 ft.

Grout Info
Grout used: CEMENT GROUT
From: 4 to 24 ft.
From: 0 to 0 ft.
From: 0 to 0 ft.

Contamination Info	
Contamination type: WATERTIGHT SEWER LINES	
Direction:	**Distance:** 0

Screen and Perforation Info	
Screen Type: SAW CUT	**Screen Openings:** SAW CUT

Assume 1305' BGLAG Elevation

Depth to Bedrock 1275'

Top of Sand 1293'

From: 25 ft. to 35 ft.	**From:** 0 ft. to 0 ft.
From: 0 ft. to 0 ft.	**From:** 0 ft. to 0 ft.

Lithologic Log
(log data not edited or checked by the KGS.)

From: 0 ft. **to** 12 ft.	**Type:** CLAY
From: 12 ft. **to** 22 ft.	**Type:** FINE SAND
From: 22 ft. **to** 30 ft.	**Type:** MEDIUM SAND
From: 30 ft. **to** 35 ft.	**Type:** SHALE

Kansas Geological Survey
Comments to webadmin@kgs.ku.edu
URL=http://www.kgs.ku.edu/Magellan/WaterWell/index.html
Display Programs Updated July 29, 2004
Data added continuously.

KGS Hydrology | Water Well Database Query

Scan of WWC5 Form

Water Well Record Form WWC-5 KSA 82a-1212

1 LOCATION OF WATER WELL:	FRACTION	Section Number	Township Number	Range Number
Sedgwick	NE 1/4 NE 1/4 NW 1/4	15	T 27 S	R 18 E/W

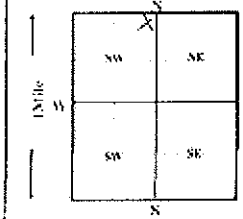
Distance and direction from nearest town or city street address of well if located within city?

1317 N. Madison Wichita, Kansas

2 WATER WELL OWNER: ROLTE, Lonnie
RR#, ST. ADDRESS, BOX #: 1317 N. Madison
CITY, STATE, ZIP CODE: Wichita, Kansas

Board of Agriculture, Division of Water Resource
Application Number:

3 LOCATE WELL'S LOCATION WITH AN "X" IN SECTION BOX:



4 DEPTH OF COMPLETED WELL: 40 ft. ELEVATION:
Depth(s) groundwater Encountered 1 ft. 2 ft. 3 ft.
WELL'S STATIC WATER LEVEL 15 ft. BELOW LAND SURFACE MEASURED ON mo/day/yr 2-20-2002
Pump test data: Well water was ft. after hours pumping gpm
Est. Yield gpm: Well water was ft. after hours pumping gpm
Bore Hole Diameter 12 in. to 40 ft. and in. to ft.
WELL WATER TO BE USED AS: 5 Public water supply 8 Air conditioning 11 Injection well
1 Domestic 3 Feedlot 6 Oil field water supply 9 Dewatering 12 Other (Specify below)
2 Irrigation 4 Industrial 7 Lawn and garden only 10 Monitoring well
Was a chemical/bacteriological sample submitted to Department? Yes No X ; If yes, mo/day/yr sample was submitted
Water Well Disinfected? Yes X No

ASSUME 1305 SURFACE ELEVATION DEPTH TO BEDROCK 1273' 100 OF SAND ROCK

5 TYPE OF CASING USED: 5 Wrought iron 8 Concrete tile CASING JOINTS: Glued X Clamped
1 Steel 3 RMP (SR) 6 Asbestos-Cement 9 Other (Specify below) Welded
2 PVC 4 ABS 7 Fiberglass SDR-26 Threaded
Blank casing Diameter 5 in. to 25 ft., Dia in. to ft., Dia in. to ft.
Casing height above land surface 12 in., weight 2.35 lbs./ft. Wall thickness or gauge No. .214
TYPE OF SCREEN OR PERFORATION MATERIAL: 7 PVC 10 Asbestos-cement
1 Steel 3 Stainless Steel 5 Fiberglass 8 RMP (SR) 11 Other (specify)
2 Brass 4 Galvanized steel 6 Concrete tile 9 ABS 12 None used (open hole)
SCREEN OR PERFORATION OPENING ARE: 5 Gauzed wrapped 8 Saw cut 11 None (open hole)
1 Continuous slot 3 Mill slot 6 Wire wrapped 9 Drilled holes
2 Louvered shutter 4 Key punched 7 Torch cut 10 Other (specify)
SCREEN-PERFORATION INTERVALS: from 25 ft. to 40 ft., From ft. to ft.
from ft. to ft., From ft. to ft.
GRAVEL PACK INTERVALS: from 24 ft. to 40 ft., From ft. to ft.
from ft. to ft., From ft. to ft.

6 GROUT MATERIAL: 1 Neat cement 2 Cement grout 3 Bentonite 4 Other bentonite hole plug
Grout Intervals: From 4 ft. to 24 ft., From ft. to ft., From ft. to ft.
What is the nearest source of possible contamination: 10 Livestock pens 14 Abandon water well
1 Septic tank 4 Lateral lines 7 Pit privy 11 Fuel storage 15 Oil well/Gas well
2 Sewer lines 5 Cess pool 8 Sewage lagoon 12 Fertilizer storage 16 Other (specify below)
3 Watertight sewer lines 6 Seepage pit 9 Feedyard 13 Insecticide storage
Direction from well? South How many feet? 35

FROM	TO	LITHOLOGIC LOG	FROM	TO	PLUGGING INTERVALS
0	4	topsoil			
4	12	clay			
12	20	fine sand			
20	32	medium sand			
32	40	shale			

7 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This water well was (1) constructed, (2) reconstructed, or (3) plugged under my jurisdiction and was completed on (mo/day/year) 2-20-2002 and this record is true to the best of my knowledge and belief. Kansas Water Well Contractor's License No. 236 This Water Well Record was completed on (mo/day/yr) 2-22-2002
Under the business name of Harp Well & Pump Service, Inc by (signature) Todd S. Harp

KGS Hydrology | Water Well Database Query

Scan of WWC5 Form

GSI Job No. 037272

MW-UP-14

WATER WELL RECORD Form WWC-5 KSA 82a-1212 ID No.

1 LOCATION OF WATER WELL: County: Sedgwick | Fraction: SW ¼ NW ¼ NE ¼ | Section Number: 10 | Township Number: T 27 S | Range Number: R 01 E

Distance and direction from nearest town or city street address of well if located within city?
South side of 19th Street; ~50 ft east of Poplar

2 WATER WELL OWNER: Union Pacific Railroad
RR#, St. Address, Box # : 1416 Dodge Street, Room 930
City, State, ZIP Code : Omaha NE 68179
Board of Agriculture, Division of Water Resources Application Number:

3 LOCATE WELL'S LOCATION WITH AN "X" IN SECTION BOX: N, W, E, S; NW, NE, SW, SE

4 DEPTH OF COMPLETED WELL 40.8 ft. ELEVATION:
Depth(s) Groundwater Encountered 1 ft. 2 ft. 3 ft.
WELL'S STATIC WATER LEVEL ft. below land surface measured on mo/day/yr
Pump test data: Well water was ft. after hours pumping gpm
Est. Yield gpm: Well water was ft. after hours pumping gpm
Bore Hole Diameter 8.5 in. to 41 ft. and in. to ft.
WELL WATER TO BE USED AS: 1 Domestic 3 Feed lot 5 Public water supply 6 Oil field water supply 8 Air conditioning 9 Dewatering 11 Injection well 12 Other (Specify below) 2 Irrigation 4 Industrial 7 Lawn and garden (domestic) 10 Monitoring well
Was a chemical/bacteriological sample submitted to Department? Yes No X ; If yes, mo/day/yr sample was submitted
Water Well Disinfected? Yes No X

ASSUME 1325' SURFACE ELEV
DEPTH TO BEDROCK 1284'
TOP OF SAND 1303'

5 TYPE OF BLANK CASING USED: 1 Steel 2 PVC 3 RMP (SR) 4 ABS 5 Wrought iron 6 Asbestos-Cement 7 Fiberglass 8 Concrete tile 9 Other (specify below)
CASING JOINTS: Glued Clamped Welded Threaded Flush
Blank casing diameter 2 in. to 35.5 ft., Dia in. to ft., Dia in. to ft.
Casing height above land surface Flushmount in., weight 0.703 lbs./ft. Wall thickness or gauge No. Sch. 40
TYPE OF SCREEN OR PERFORATION MATERIAL: 1 Steel 2 Brass 3 Stainless steel 4 Galvanized steel 5 Fiberglass 6 Concrete tile 7 PVC 8 RMP (SR) 9 ABS 10 Asbestos-cement 11 Other (specify) 12 None used (open hole)
SCREEN OR PERFORATION OPENINGS ARE: 1 Continuous slot 2 Louvered shutter 3 Mill slot 4 Key punched 5 Gauzed wrapped 6 Wire wrapped 7 Torch cut 8 Saw cut 9 Drilled holes 10 Other (specify) 11 None (open hole)
SCREEN-PERFORATED INTERVALS: From 35.5 ft. to 40.8 ft. From ft. to ft.
From ft. to ft. From ft. to ft.
GRAVEL PACK INTERVALS: From 32 ft. to 41 ft. From ft. to ft.
From ft. to ft. From ft. to ft.

6 GROUT MATERIAL: 1 Neat cement 2 Cement grout 3 Bentonite 4 Other
Grout Intervals From 1 ft. to 32 ft. From ft. to ft. From ft. to ft.
What is the nearest source of possible contamination: 1 Septic tank 2 Sewer lines 3 Watertight sewer lines 4 Lateral lines 5 Cess pool 6 Seepage pit 7 Pit privy 8 Sewage lagoon 9 Feedyard 10 Livestock pens 11 Fuel storage 12 Fertilizer storage 13 Insecticide storage 14 Abandoned water well 15 Oil well/ Gas well 16 Other (specify below)
Direction from well? How many feet?

FROM	TO	CODE	LITHOLOGIC LOG	FROM	TO	PLUGGING INTERVALS
0	22		Clay & Silt			
22	41		Sand			
41			Top of Shale			

7 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This water well was (1) constructed, (2) reconstructed, or (3) plugged under my jurisdiction and was completed on (mo/day/yr) 11-14-03 and this record is true to the best of my knowledge and belief. Kansas Water Well Contractor's License No. 531 This Water Well Record was completed on (mo/day/yr) 11-18-03 under the business name of Geotechnical Services, Inc. by (signature)

INSTRUCTIONS: Please fill in blanks and circle the correct answers. Send three copies to Kansas Department of Health and Environment, Bureau of Water, 1000 S.W. Jackson St., Ste. 420, Topeka, Kansas 66612-1367. Telephone: 913-296-5545. Send one to WATER WELL OWNER and retain one for your records.

KGS Hydrology | Water Well Database Query | Specific Water Well Detail

Well T27S, R1E, Sec. 10, SWNESE, Action: Constructed

Location Info	
County: Sedgwick	**Location:** T27S, R1E, Sec. 10, SWNESE
Owner: TRAN	**Status**: Constructed
Directions: 1545 N Chautauqua, Wichita	
Longitude: -97.30214	**Latitude**: 37.71273
View section on interactive map This link will create a new window and display an interactive map of this well and its neighbors.	

General Info	
Well Depth: 47 ft.	**Elevation:** ft.
Static Water Level: 15 ft.	**Well Use:** Lawn and Garden - domestic only
Est. Yield: 0 gpm.	**Other ID:**

Driller Info	
Driller: Todd S. Harp Well & Pump Service, Inc.	**License #:** 236
Comp. Date: 18-Jul-1984	**DWR Applic. #:**

Chemical Sample Submitted?: N

Casing Info
Casing Type: RMP(SR)
Diam: 5 in. to 15 ft.
Diam: 0 in. to 0 ft.
Diam: 0 in. to 0 ft.

Grout Info
Grout used: CEMENT GROUT
From: 4 to 14 ft.
From: 0 to 0 ft.
From: 0 to 0 ft.

Contamination Info	
Contamination type: WATERTIGHT SEWER LINES	
Direction:	**Distance:** 0

Screen and Perforation Info	
Screen Type: SAW CUT	**Screen Openings:** SAW CUT

ASSUME
1340'
SURFACE ELEVATION
DEPTH TO BEDROCK
1332'
TOP OF BED
NOT PRESENT

From: 15 ft. to 47 ft.	**From:** 0 ft. to 0 ft.
From: 0 ft. to 0 ft.	**From:** 0 ft. to 0 ft.

Lithologic Log
(log data not edited or checked by the KGS.)

From: 0 ft. **to** 8 ft.	**Type:** CLAY
From: 8 ft. **to** 47 ft.	**Type:** SHALE

Kansas Geological Survey
Comments to webadmin@kgs.ku.edu
URL=http://www.kgs.ku.edu/Magellan/WaterWell/index.html
Display Programs Updated July 29, 2004
Data added continuously.

KGS Hydrology | **Water Well Database Query** Scan of WWC5 Form

GSI Job No. 037272 MW-UP-8D

WATER WELL RECORD Form WWC-5 KSA 82a-1212 ID No.

1 LOCATION OF WATER WELL: County: Sedgwick | Fraction: SE ¼ NW ¼ NW ¼ | Section Number: 03 | Township Number: T 27 S | Range Number: R 01 E

Distance and direction from nearest town or city street address of well if located within city?
Drainage R-O-W N of East Fork Chisholm Creek, 400 feet NE of I-135 (N of Creek @ ~ Minnesota @ 27th Streets)

2 WATER WELL OWNER: Union Pacific Railroad
RR#, St. Address, Box #: 1416 Dodge Street, Room 930
City, State, ZIP Code: Omaha NE 68179
Board of Agriculture, Division of Water Resources Application Number:

3 LOCATE WELL'S LOCATION WITH AN "X" IN SECTION BOX: X in NW

4 DEPTH OF COMPLETED WELL 48.2 ft. ELEVATION:
Depth(s) Groundwater Encountered 1 ft. 2 ft. 3 ft.
WELL'S STATIC WATER LEVEL ft. below land surface measured on mo/day/yr
Pump test data: Well water was ft. after hours pumping gpm
Est. Yield gpm: Well water was ft. after hours pumping gpm
Bore Hole Diameter 8.5 in. to 50 ft. and in. to ft.
WELL WATER TO BE USED AS: 1 Domestic 3 Feed lot 5 Public water supply 6 Oil field water supply 8 Air conditioning 9 Dewatering 11 Injection well 12 Other (Specify below) 2 Irrigation 4 Industrial 7 Lawn and garden (domestic) 10 Monitoring well
Was a chemical/bacteriological sample submitted to Department? Yes No X If yes, mo/day/yr sample was submitted
Water Well Disinfected? Yes No X

5 TYPE OF BLANK CASING USED: 1 Steel 3 RMP (SR) 5 Wrought iron 8 Concrete tile 2 PVC 4 ABS 6 Asbestos-Cement 9 Other (specify below) 7 Fiberglass
CASING JOINTS: Glued Clamped Welded Threaded Flush
Blank casing diameter 2 in. to 43 ft., Dia in. to ft., Dia in. to ft.
Casing height above land surface Flushmount in., weight 0.703 lbs./ft. Wall thickness or gauge No. Sch. 40
TYPE OF SCREEN OR PERFORATION MATERIAL: 7 PVC 10 Asbestos-cement
1 Steel 3 Stainless steel 5 Fiberglass 8 RMP (SR) 11 Other (specify)
2 Brass 4 Galvanized steel 6 Concrete tile 9 ABS 12 None used (open hole)
SCREEN OR PERFORATION OPENINGS ARE: 5 Gauzed wrapped 8 Saw cut 11 None (open hole)
1 Continuous slot 3 Mill slot 6 Wire wrapped 9 Drilled holes
2 Louvered shutter 4 Key punched 7 Torch cut 10 Other (specify)
SCREEN/PERFORATED INTERVALS: From 43 ft. to 48.2 ft. From ft. to ft. From ft. to ft.
GRAVEL PACK INTERVALS: From 41 ft. to 50 ft. From ft. to ft. From ft. to ft.

6 GROUT MATERIAL: 1 Neat cement 2 Cement grout 3 Bentonite 4 Other
Grout Intervals: From 1 ft. to 41 ft. From ft. to ft. From ft. to ft.
What is the nearest source of possible contamination:
1 Septic tank 4 Lateral lines 7 Pit privy 10 Livestock pens 14 Abandoned water well
2 Sewer lines 5 Cess pool 8 Sewage lagoon 11 Fuel storage 15 Oil well/Gas well
3 Watertight sewer lines 6 Seepage pit 9 Feedyard 12 Fertilizer storage 16 Other (specify below)
13 Insecticide storage
Direction from well? How many feet?

FROM	TO	CODE	LITHOLOGIC LOG	FROM	TO	PLUGGING INTERVALS
0	17		Clay and Silt			
17	49.5		Sand			
49.5	50		Top of Shale			

7 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This water well was (1) constructed, (2) reconstructed, or (3) plugged under my jurisdiction and was completed on (mo/day/yr) 11-14-03 and this record is true to the best of my knowledge and belief. Kansas Water Well Contractor's License No. 531 This Water Well Record was completed on (mo/day/yr) 11-20-03 under the business name of Geotechnical Services, Inc. by (signature)

INSTRUCTIONS: Please fill in blanks and circle the correct answers. Send three copies to Kansas Department of Health and Environment, Bureau of Water, 1000 S.W. Jackson St., Ste. 420, Topeka, Kansas 66612-1367. Telephone: 913-296-5545. Send one to WATER WELL OWNER and retain one for your records.

ASSUME 1320' SURFACE ELEV.
DEPTH TO BEDROCK 1271'
TOP OF SAND 1303'

Kansas Geological Survey
Comments to webadmin@kgs.ku.edu
URL=http://www.kgs.ku.edu/Magellan/WaterWell/index.html

KGS Hydrology | Water Well Database Query

Scan of WWC5 Form

WATER WELL RECORD Form WWC-5 KSA 82a-1212

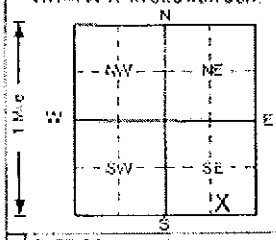
1 LOCATION OF WATER WELL: County: Sedgwick | Fraction: SW ¼ SE ¼ SE ¼ | Section Number: 3 | Township Number: T 27 S | Range Number: R 1 (E) W

Distance and direction from nearest town or city street address of well if located within city?
2828 E. 21st St. North, Wichita, Kansas

2 WATER WELL OWNER: VAN THU HO
RR#, St. Address, Box # : 2828 E 21st ST. NORTH
City, State, ZIP Code : WICHITA, KS 67214

Board of Agriculture, Division of Water Resources Application Number:

3 LOCATE WELL'S LOCATION WITH AN "X" IN SECTION BOX:



4 DEPTH OF COMPLETED WELL: 20 ft. ELEVATION:
Depth(s) Groundwater Encountered: 1. ft. 2. ft. 3. ft.
WELL'S STATIC WATER LEVEL: 4.09 ft. below land surface measured on (mo/day/yr) 5/5/2004
Pump test data: Well water was NA ft. after hours pumping gpm
Est. Yield NA gpm: Well water was ft. after hours pumping gpm
Bore Hole Diameter 8 in. to 20 ft., and in. to ft.
WELL WATER TO BE USED AS: 5 Public water supply 8 Air conditioning 11 Injection well
1 Domestic 3 Feedlot 6 Oil field water supply 9 Dewatering 12 Other (Specify below)
2 Irrigation 4 Industrial 7 Lawn and garden only (10) Monitoring well
Was a chemical/bacteriological sample submitted to Department? Yes No ✓ If yes, mo/day/yr sample was submitted
Water Well Disinfected? Yes No ✓

5 TYPE OF BLANK CASING USED: 5 Wrought iron 8 Concrete tile CASING JOINTS: Glued Clamped
1 Steel 3 RMP (SR) 6 Asbestos-Cement 9 Other (specify below) Welded
(2) PVC 4 ABS 7 Fiberglass Threaded ✓
Blank casing diameter 2 in. to 10 ft., Dia in. to ft., Dia in. to ft.
Casing height above land surface 0 in., weight lbs./ft. Wall thickness or gauge No. Sch. 40
TYPE OF SCREEN OR PERFORATION MATERIAL: (7) PVC 10 Asbestos-cement
1 Steel 3 Stainless steel 5 Fiberglass 8 RMP (SR) 11 Other (specify)
2 Brass 4 Galvanized steel 6 Concrete tile 9 ABS 12 None used (open hole)
SCREEN OR PERFORATION OPENINGS ARE: 5 Gauzed wrapped 8 Saw cut 11 None (open hole)
1 Continuous slot (3) Mill slot 6 Wire wrapped 9 Drilled holes
2 Louvered shutter 4 Key punched 7 Torch cut 10 Other (specify)
SCREEN-PERFORATED INTERVALS: From 10 ft. to 20 ft., From ft. to ft.
From ft. to ft., From ft. to ft.
GRAVEL PACK INTERVALS: From 8 ft. to 20 ft., From ft. to ft.
From ft. to ft., From ft. to ft.

6 GROUT MATERIAL: 1 Neat cement (2) Cement grout (3) Bentonite 4 Other
Grout Intervals: From 0 ft. to 1 ft., From 1 ft. to 8 ft., From ft. to ft.
What is the nearest source of possible contamination:
1 Septic tank 4 Lateral lines 7 Pit privy 10 Livestock pens 14 Abandoned water well
2 Sewer lines 5 Cess pool 8 Sewage lagoon 11 Fuel storage 15 Oil well/Gas well
3 Watertight sewer lines 6 Seepage pit 9 Feedyard 12 Fertilizer storage 16 Other (specify below)
13 Insecticide storage
Direction from well? How many feet? 0

FROM	TO	LITHOLOGIC LOG	FROM	TO	PLUGGING INTERVALS
0	0.5	Concrete,			
0.5	5	Sand, m-c grain, clayey, sl. moist, Brown			
5	8	Shale, weathered, clayey, crumbly, Brownish			
8	14	Shale, weathered, clayey, fissile to blocky, Oliv			
14	20	Shale, no odor, Dark Gray			
					MWL (Elevation)
					Project Name: GeoStat - Lee's Store
					GeoCore # 1148

7 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This water well was (1) constructed, (2) reconstructed, or (3) plugged under my jurisdiction and was completed on (mo/day/year) 5/4/2004 and this record is true to the best of my knowledge and belief. Kansas Water Well Contractor's License No. 527 This Water Well Record was completed on (mo/day/yr) 6/2/2004 under the business name of GeoCore, Inc. by (signature)

INSTRUCTIONS: Use typewriter or ball point pen. PLEASE PRESS FIRMLY and PRINT clearly. Please fill in blanks, underline or circle the correct answers. Send top three copies to Kansas Department of Health and Environment, Bureau of Water, Topeka, Kansas 66620-0001. Telephone: 913-296-5545. Send one to WATER WELL OWNER and retain one for your records.

ASSUME '1345' SURFACE ELEVATION

BEDROCK ELEV. '1331'

TOP OF SAND 1341'

KGS Hydrology | Water Well Database Query | Specific Water Well Detail

Well T27S, R1E, Sec. 3, NENESW, Action: Constructed

Location Info	
County: Sedgwick	**Location:** T27S, R1E, Sec. 3, NENESW
Owner:	**Status:** Constructed
Directions:	
Longitude: -97.30901	**Latitude:** 37.72911
View section on interactive map This link will create a new window and display an interactive map of this well and its neighbors.	

ASSUMED ELEV. 1330'
DEPTH TO BEDROCK
126'

TOP OF SM.
132'

General Info	
Well Depth: 45 ft.	**Elevation:** ft.
Static Water Level: 22 ft.	**Well Use:** Lawn and Garden - domestic only
Est. Yield: 0 gpm.	**Other ID:**

Driller Info	
Driller: Todd S. Harp Well & Pump Service, Inc.	**License #:** 236
Comp. Date: 19-Oct-1982	**DWR Applic. #:**

Chemical Sample Submitted?: N

Casing Info
Casing Type:
Diam: 0 in. to 0 ft.
Diam: 0 in. to 0 ft.
Diam: 0 in. to 0 ft.

Grout Info
Grout used: other
From: 0 to 0 ft.
From: 0 to 0 ft.
From: 0 to 0 ft.

Contamination Info	
Contamination type: none	
Direction:	**Distance:** 0

Screen and Perforation Info	
Screen Type: OTHER	**Screen Openings:** OTHER

From: 25 ft. to 45 ft.	**From:** 0 ft. to 0 ft.
From: 0 ft. to 0 ft.	**From:** 0 ft. to 0 ft.

Lithologic Log
(log data not edited or checked by the KGS.)

From: 0 ft. **to** 22 ft.	**Type:** CLAY
From: 22 ft. **to** 27 ft.	**Type:** SANDSTONE
From: 27 ft. **to** 42 ft.	**Type:** MEDIUM SAND
From: 42 ft. **to** 45 ft.	**Type:** SHALE

Kansas Geological Survey
Comments to webadmin@kgs.ku.edu
URL=http://www.kgs.ku.edu/Magellan/WaterWell/index.html
Display Programs Updated July 29, 2004
Data added continuously.

KGS Hydrology | Water Well Database Query | Specific Water Well Detail

Well T26S, R1E, Sec. 34, NENE, Action: Constructed

Location Info	
County: Sedgwick	**Location:** T26S, R1E, Sec. 34, NENE
Owner:	**Status:** Constructed
Directions:	
Longitude: -97.30128	**Latitude:** 37.7504
View section on interactive map This link will create a new window and display an interactive map of this well and its neighbors.	

General Info	
Well Depth: 110 ft.	**Elevation:** ft.
Static Water Level: 20 ft.	**Well Use:** Lawn and Garden - domestic only
Est. Yield: 0 gpm.	**Other ID:**

Driller Info	
Driller: Todd S. Harp Well & Pump Service, Inc.	**License #:** 236
Comp. Date: 02-May-1978	**DWR Applic. #:**

Chemical Sample Submitted?: N	

Casing Info
Casing Type:
Diam: 0 in. to 0 ft.
Diam: 0 in. to 0 ft.
Diam: 0 in. to 0 ft.

Grout Info
Grout used: other
From: 0 to 0 ft.
From: 0 to 0 ft.
From: 0 to 0 ft.

Contamination Info	
Contamination type: none	
Direction:	**Distance:** 0

Screen and Perforation Info	
Screen Type: OTHER	**Screen Openings:** OTHER

Assume 1345'
Surface Elevation
Depth to Bedrock
~~1327~~ 1316'
Top of Sand
1338'

From: 35 ft. to 110 ft.	**From:** 0 ft. to 0 ft.
From: 0 ft. to 0 ft.	**From:** 0 ft. to 0 ft.

Lithologic Log
(log data not edited or checked by the KGS.)

From: 0 ft. **to** 14 ft.	**Type:** CLAY
From: 14 ft. **to** 18 ft.	**Type:** FINE SAND
From: 18 ft. **to** 22 ft.	**Type:** CLAY
From: 22 ft. **to** 29 ft.	**Type:** FINE SAND
From: 29 ft. **to** 96 ft.	**Type:** SHALE
From: 96 ft. **to** 110 ft.	**Type:** LIMESTONE

Kansas Geological Survey
Comments to webadmin@kgs.ku.edu
URL=http://www.kgs.ku.edu/Magellan/WaterWell/index.html
Display Programs Updated July 29, 2004
Data added continuously.

KGS Hydrology | Water Well Database Query | Specific Water Well Detail

Well T26S, R1E, Sec. 34, SESWNE, Action: Constructed

Location Info	
County: Sedgwick	**Location:** T26S, R1E, Sec. 34, SESWNE
Owner: MCCLISH	**Status:** Constructed
Directions: 2730 E 33RD N WICHITA KS	
Longitude: -97.30458	**Latitude:** 37.74577
View section on interactive map This link will create a new window and display an interactive map of this well and its neighbors.	

General Info	
Well Depth: 126 ft.	**Elevation:** ft.
Static Water Level: 15 ft.	**Well Use:** Lawn and Garden - domestic only
Est. Yield: 0 gpm.	**Other ID:**

Driller Info	
Driller: Todd S. Harp Well & Pump Service, Inc.	**License #:** 236
Comp. Date: 10-Apr-1996	**DWR Applic. #:**

Chemical Sample Submitted?: N

Casing Info
Casing Type: PVC
Diam: 5 in. to 26 ft.
Diam: 0 in. to 0 ft.
Diam: 0 in. to 0 ft.

Grout Info
Grout used: CEMENT GROUT and OTHER
From: 4 to 24 ft.
From: 0 to 0 ft.
From: 0 to 0 ft.

Contamination Info	
Contamination type: OTHER	
Direction:	**Distance:** 0

Screen and Perforation Info	
Screen Type: TORCH CUT	**Screen Openings:** SAW CUT

ASSUME
1347'
SURF ELEV.
DATUM
BELOW
1329'

TOP OF SCRN
1531'

From: 26 ft. to 126 ft.	**From:** 0 ft. to 0 ft.
From: 0 ft. to 0 ft.	**From:** 0 ft. to 0 ft.

Lithologic Log
(log data not edited or checked by the KGS.)

From: 0 ft. **to** 15 ft.	**Type:** CLAY
From: 15 ft. **to** 18 ft.	**Type:** FINE SAND
From: 18 ft. **to** 110 ft.	**Type:** SHALE
From: 110 ft. **to** 126 ft.	**Type:** LIMESTONE

Kansas Geological Survey
Comments to webadmin@kgs.ku.edu
URL=http://www.kgs.ku.edu/Magellan/WaterWell/index.html
Display Programs Updated July 29, 2004
Data added continuously.

KGS Hydrology | Water Well Database Query

Scan of WWC5 Form

Water Well Record Form WWC-5 KSA 82a-1212

1 LOCATION OF WATER WELL: Sedgwick | FRACTION: SE 1/4 NE 1/4 NE 1/4 | Section Number: 34 | Township Number: T 26 S | Range Number: R 12 E/W

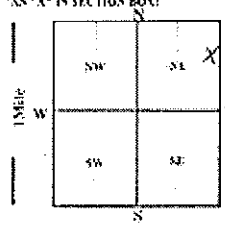
Distance and direction from nearest town or city street address of well if located within city?

3601 N. Hillside Wichita, Kansas

2 WATER WELL OWNER: GREEN GLO
RR#, ST. ADDRESS, BOX #: 3601 N. Hillside
CITY, STATE, ZIP CODE: Wichita, Kansas

Board of Agriculture, Division of Water Resources
Application Number:

LOCATE WELL'S LOCATION WITH AN "X" IN SECTION BOX:



4 DEPTH OF COMPLETED WELL: 97 ft. ELEVATION:
Depth(s) groundwater Encountered 1 ft. 2 ft. 3 ft.
WELL'S STATIC WATER LEVEL 21 FT. BELOW LAND SURFACE MEASURED ON mo/day/yr 7-23-2001
Pump test data: Well water was ft. after hours pumping gpm
Est. Yield gpm: Well water was ft. after hours pumping gpm
Bore Hole Diameter 12 in. to 97 ft. and in. to ft.
WELL WATER TO BE USED AS: 5 Public water supply 8 Air conditioning 11 Injection well
1 Domestic 3 Feedlot 6 Oil field water supply 9 Dewatering 12 Other (Specify below)
2 Irrigation 4 Industrial 7 Lawn and garden only 10 Monitoring well
Was a chemical/bacteriological sample submitted to Department? Yes No X ; If yes, mo/day/yr sample was submitted
Water Well Disinfected? Yes X No

5 TYPE OF CASING USED: 5 Wrought iron 8 Concrete tile CASING JOINTS: Glued X Clamped
1 Steel 3 RMP (SR) 6 Asbestos-Cement 9 Other (Specify below) Welded
2 PVC 4 ABS 7 Fiberglass SDR-26 Threaded
Blank casing Diameter 5 in. to 30 ft., Dia in. to ft., Dia in. to ft.
Casing height above land surface 12 in., weight 2.35 lbs./ft. Wall thickness or gauge No. .214
TYPE OF SCREEN OR PERFORATION MATERIAL: 7 PVC 10 Asbestos-cement
1 Steel 3 Stainless Steel 5 Fiberglass 8 RMP (SR) 11 other (specify)
2 Brass 4 Galvanized steel 6 Concrete tile 9 ABS 12 None used (open hole)
SCREEN OR PERFORATION OPENING ARE: 5 Gauzed wrapped 8 Saw cut 11 None (open hole)
1 Continuous slot 3 Mill slot 6 Wire wrapped 9 Drilled holes
2 Louvered shutter 4 Key punched 7 Torch cut 10 Other (specify)
SCREEN-PERFORATION INTERVALS: from 30 ft. to 97 ft., From ft. to ft.
from ft. to ft., From ft. to ft.
GRAVEL PACK INTERVALS: from 30 ft. to 97 ft., From ft. to ft.
from ft. to ft., From ft. to ft.

6 GROUT MATERIAL: 1 Neat cement 2 Cement grout 3 Bentonite 4 Other bentonite hole plug
Grout Intervals: From ft. to ft., From ft. to ft., From 10 ft. to 30 ft.
What is the nearest source of possible contamination: 10 Livestock pens 14 Abandon water well
1 Septic tank 4 Lateral lines 7 Pit privy 11 Fuel storage 15 Oil well/Gas well
2 Sewer lines 5 Cess pool 8 Sewage lagoon 12 Fertilizer storage 16 Other (specify below)
3 Watertight sewer lines 6 Seepage pit 9 Feedyard 13 Insecticide storage None Apparent
Direction from well? How many feet?

FROM	TO	LITHOLOGIC LOG	FROM	TO	PLUGGING INTERVALS
0	3	topsoil			
3	15	clay			
15	40	brown shale			
40	97	grey shale			

7 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This water well was (1) constructed, (2) reconstructed, or (3) plugged under my jurisdiction and was completed on (mo/day/year) 7-23-2001 and this record is true to the best of my knowledge and belief. Kansas Water Well Contractor's License No. 236 This Water Well Record was completed on (mo/day/yr) 7-25-2001
Under the business name of Harp Well & Pump Service, Inc by (signature)

Todd S. Harp

Assume surface elevation 1350' msl based on USGS map. Top of sand not present

Assumed Ground Elev. 13' o/ms.
Bench Elev. 1/29/95
TOP OF SAND
1'x18'

GSI Job No. 057452

ART- 03

WATER WELL RECORD Form WWC-5 KSA 82a-1212 ID No. _____

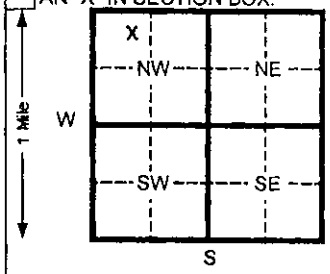
1 LOCATION OF WATER WELL:	Fraction	Section Number	Township Number	Range Number
County: **Sedgwick**	NE ¼ NW ¼ NW ¼	03	T 27 S	R 01 E

Distance and direction from nearest town or city street address of well if located within city?
North of Minnesota, south of Hydraulic

2 WATER WELL OWNER: **Union Pacific Railroad**
RR#, St. Address, Box # : **1416 Dodge Street, Room 930**
City, State, ZIP Code : **Omaha, NE 68179**

Board of Agriculture, Division of Water Resources
Application Number:

3 LOCATE WELL'S LOCATON WITH AN "X" IN SECTION BOX:



4 DEPTH OF COMPLETED WELL **30** ft. ELEVATION:
Depth(s) Groundwater Encountered 1 _____ ft. 2 _____ ft. 3 _____ ft.
WELL'S STATIC WATER LEVEL _____ ft. below land surface measured on mo/day/yr _____
Pump test data: Well water was _____ ft. after _____ hours pumping _____ gpm
Est. Yield _____ gpm: Well water was _____ ft. after _____ hours pumping _____ gpm
Bore Hole Diameter **10** in. to **30** ft. and _____ in. to _____ ft.
WELL WATER TO BE USED AS: 5 Public water supply 8 Air conditioning 11 Injection well
1 Domestic 3 Feed lot 6 Oil field water supply 9 Dewatering 12 Other (Specify below)
2 Irrigation 4 Industrial 7 Lawn and garden (domestic) 10 Monitoring well **Remediation**
Was a chemical/bacteriological sample submitted to Department? Yes _____ No **X** If yes, mo/day/yr sample was submitted
Water Well Disinfected? Yes _____ No **X**

5 TYPE OF BLANK CASING USED: 5 Wrought Iron 8 Concrete tile CASING JOINTS: Glued _____ Clamped _____
1 Steel 3 RMP (SR) 6 Asbestos-Cement 9 Other (specify below) Welded
2 PVC 4 ABS 7 Fiberglass Threaded **Flush**
Blank casing diameter **6** in. to **9.7** ft., Dia _____ in. to _____ ft., Dia _____ in. to _____ ft.
Casing height above land surface **Flushmout** in., weight **3.45** lbs./ft. Wall thickness or gauge No. **Sch 40**

TYPE OF SCREEN OR PERFORATION MATERIAL: 7 PVC 10 Asbestos-cement
1 Steel 3 Stainless steel 5 Fiberglass 8 RMP (SR) 11 Other (specify) _____
2 Brass 4 Galvanized steel 6 Concrete tile 9 ABS 12 None used (open hole)

SCREEN OR PERFORATION OPENINGS ARE: 5 Gauzed wrapped 8 Saw cut 11 None (open hole)
1 Continuous slot 3 Mill slot 6 Wire wrapped 9 Drilled holes
2 Louvered shutter 4 Key punched 7 Torch cut 10 Other (specify) _____

SCREEN-PERFORATED INTERVALS: From **9.7** ft. to **29.7** ft. From _____ ft. to _____ ft.
From _____ ft. to _____ ft. From _____ ft. to _____ ft.
GRAVEL PACK INTERVALS: From **8.7** ft. to **30** ft. From _____ ft. to _____ ft.
From _____ ft. to _____ ft. From _____ ft. to _____ ft.

6 GROUT MATERIAL: 1 Neat cement 2 Cement grout 3 Bentonite 4 Other _____
Grout Intervals From **3.0** ft. to **8.7** ft. From _____ ft. to _____ ft. From _____ ft. to _____ ft.
What is the nearest source of possible contamination: 10 Livestock pens 14 Abandoned water well
1 Septic tank 4 Lateral lines 7 Pit privy 11 Fuel storage 15 Oil well/ Gas well
2 Sewer lines 5 Cess pool 8 Sewage lagoon 12 Fertilizer storage 16 Other (specify below)
3 Watertight sewer lines 6 Seepage pit 9 Feedyard 13 Insecticide storage
Direction from well? How many feet?

FROM	TO	CODE	LITHOLOGIC LOG	FROM	TO	PLUGGING INTERVALS
0	1.5		Clay, with road gravel, brittle			
1.5	6		Clay, med to low plasticity, soft to firm			
6	10		Clay, firm to stiff, silty			
10	15.5		Clay, firm to soft, calcareous			
15.5	16		Sand, silty, with clay			
16	18.5		Clay, soft, med to high plasticity, sandy			
18.5	18.8		Sand, fine to med grain			
18.8	22		Clay, silty, firm to stiff			
22	26.9		Sand, fine to med trace silt			
26.9	28		Clay, very sandy, soft to firm			
28	29.5		Sand, fine to very coarse grain			
29.5	30		Shale, gray, competent			

7 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This water well was (1) constructed, (2) reconstructed, or (3) plugged under my jurisdiction and was completed on (mo/day/yr) **12-05-05** and this record is true to the best of my knowledge and belief. Kansas Water Well Contractor's License No. **531** This Water Well Record was completed on (mo/day/yr) **3-21-06** under the business name of **Geotechnical Services, Inc.** by (signature)

INSTRUCTIONS:. Please fill in blanks and circle the correct answers. Send three copies to Kansas Department of Health and Environment, Bureau of Water, 1000 S W Jackson St., Ste. 420, Topeka, Kansas 66612-1367. Telephone: 913-296-5545. Send one to WATER WELL OWNER and retain one for your records.

KGS Hydrology | Water Well Database Query | Specific Water Well Detail

Well T27S, R1E, Sec. 18, NESWNE, Action: Constructed

Location Info	
County: Sedgwick	**Location:** T27S, R1E, Sec. 18, NESWNE
Owner: City of Wichita	**Status:** Constructed
Directions: NORTHWEST OF THE INTERSECTION OF 11TH STREET AND 12TH STREET	
Longitude: -97.3591	**Latitude:** 37.70366
View section on interactive map This link will create a new window and display an interactive map of this well and its neighbors.	

General Info	
Well Depth: 46 ft.	**Elevation:** ft.
Static Water Level: 12.74 ft.	**Well Use:** Other
Est. Yield: 0 gpm.	**Other ID:**

Driller Info	
Driller: Darrell W. Clarke Well and Equipment, Inc.	**License #:** 185
Comp. Date: 02-Jul-1997	**DWR Applic. #:**

Chemical Sample Submitted?: N

Casing Info
Casing Type: PVC
Diam: 2 in. to 34 ft.
Diam: 0 in. to 0 ft.
Diam: 0 in. to 0 ft.

Grout Info
Grout used: BENTONITE
From: 0 to 30 ft.
From: 0 to 0 ft.
From: 0 to 0 ft.

Contamination Info	
Contamination type: none	
Direction:	**Distance:** 0

Screen and Perforation Info	
Screen Type: TORCH CUT	**Screen Openings:** MILL SLOT

From: 34 ft. to 44 ft.	**From:** 0 ft. to 0 ft.
From: 0 ft. to 0 ft.	**From:** 0 ft. to 0 ft.

Lithologic Log
(log data not edited or checked by the KGS.)

From: 0 ft. **to** 1 ft.	**Type:** CLAY
From: 1 ft. **to** 7 ft.	**Type:** FINE SAND
From: 7 ft. **to** 8 ft.	**Type:** CLAY
From: 8 ft. **to** 44 ft.	**Type:** SAND & GRAVEL
From: 44 ft. **to** 47 ft.	**Type:** SHALE

Kansas Geological Survey
Comments to webadmin@kgs.ku.edu
URL=http://www.kgs.ku.edu/Magellan/WaterWell/index.html
Display Programs Updated July 29, 2004
Data added continuously.

KGS Hydrology | Water Well Database Query

Scan of WWC5 Form

WATER WELL PLUGGING RECORD Form WWC-5P KSA 82a-1212

1 LOCATION OF WATER WELL:	Fraction	Section Number	Township Number	Range Number
County: Sedgwick	NW/4 Center NW/4	31	26	1 E

Distance and direction from nearest town or city street address of well if located within city?

In City Limits - 1430 Nottingham Circle, Wichita, KS

2 WATER WELL OWNER: Glen Cambers

RR#, St. Address, Box #: 1430 Nottingham Circle Board of Agriculture, Division of Water Resources Application Number:

City, State, ZIP Code : Wichita, KS 67204-3450

3 WARC WELL'S LOCATION WITH AN "X" IN SECTION BOX:

N / W / E / S

4 DEPTH OF WELL 150 ft. 150 ft.

WELL'S STATIC WATER LEVEL ..... ft.

WELL WAS USED AS:

1 Domestic 5 Public Water Supply 9 Dewatering
2 Irrigation 6 Oil Field Water Supply 10 Monitoring Well
3 Feedlot 7 Lawn and Garden Only 11 Injection Well
4 Industrial 8 Air Conditioning X Other: Hydr. Pump

Was a chemical/bacteriological sample submitted to Department? Yes ... No. X.
If yes, mo/day/yr sample was submitted .....

Water Well Disinfected: Yes ..... No. X

5 TYPE OF BLANK CASING USED:

1 Steel 3 RMP (SR) 5 Wrought 7 Fiberglass X Other (specify below) Polyethylene
2 PVC 4 ABS 6 Asbestos Cement 8 Concrete Tile

Blank casing diameter 2 in. Was casing pulled? Yes ..... No. X If yes, how much .....
Casing height above or below land surface ..... in.

6 GROUT PLUG MATERIAL: 1 Neat cement 2 Cement grout X Bentonite 4 Other .....

Grout Plug Intervals: from 0 ft. to 150 ft., from 0 ft. to 150 ft., from ..... to ..... ft.

What is the nearest source of possible contamination:

1 Septic tank 6 Seepage pit 11 Fuel storage 16 Other (specify below)
2 Sewer lines 7 Pit privy 12 Fertilizer storage
X Watertight sewer lines 8 Sewage lagoon 13 Insecticide storage
4 Lateral lines 9 Feedyard 14 Abandoned water well
5 Cess Pool 10 Livestock pens 15 Oil well/Gas well

Direction from well? South How many feet? 50

FROM	TO	PLUGGING MATERIALS
0	2	Topsoil
2	11	Tan Clay
11	42	Fine to Medium Sand
42	80	Gray Shale
80	103	Red Shale
103	150	Gray Shale

7 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This water well was plugged under my jurisdiction and was completed on (mo/day/year) 6/21/99 and this record is true to the best of my knowledge and belief. Kansas Water Well Contractor's License No. 138. This Water Well Record was completed on (mo/day/year) 6/30/99 under the business name of DICKSON IRRIGATION, INC. by (signature) Mike Dickson

INSTRUCTIONS: Use typewriter or ball point pen. Please press firmly and print clearly. Please fill in blanks, underline or circle the correct answers. Send top three copies to Kansas Department of Health and Environment, Bureau of Water, Topeka, Kansas 66620-0001, Telephone: 913/296-5565. Send one to Water Well Owner and retain one for your records.

Assume 1320'
Oldrock Elev 1271'
TOP of Shale 1301'

KGS Hydrology | Water Well Database Query

Scan of WWC5 Form

WATER WELL RECORD Form WWC-5 KSA 82a-1212 ID No. 52-P21

1 LOCATION OF WATER WELL: County: Sedgwick | Fraction: SW ¼ NE ¼ NW ¼ | Section Number: 18 | Township Number: T 27 (S) | Range Number: R 1 (E) (W)

Distance and direction from nearest town or city street address of well if located within city? West of West Sim Park Drive Wichita, KS 67203

2 WATER WELL OWNER: City of Wichita Water & Sewer Dept. Mike Carney P.E.
RR#, St. Address, Box #: City Hall-8th Floor 455 North Main Street
City, State, ZIP Code: Wichita, KS 67202
Board of Agriculture, Division of Water Resources Application Number:

3 LOCATE WELL'S LOCATION WITH AN "X" IN SECTION BOX: N, NW, NE, W, E, SW, SE, S

4 DEPTH OF COMPLETED WELL: 56.5 ft. ELEVATION:
Depth(s) Groundwater Encountered 1. 19.68 ft. 2. ft. 3. ft.
WELL'S STATIC WATER LEVEL 19.61 ft. below land surface measured on mo/day/yr 5-21-04
Pump test data: Well water was ft. after hours pumping gpm
Est. Yield gpm: Well water was ft. after hours pumping gpm
Bore Hole Diameter 7.25 in. to 56.5 ft., and in. to ft.
WELL WATER TO BE USED AS: 1 Domestic 2 Irrigation 3 Feedlot 4 Industrial 5 Public water supply 6 Oil field water supply 7 Domestic (lawn & garden) 8 Air conditioning 9 Dewatering 10 Monitoring well 11 Injection well (12) Other (Specify below) Water Level Drawdown
Was a chemical/bacteriological sample submitted to Department? Yes No X ; If yes, mo/day/yrs sample was submitted
Water Well Disinfected? Yes (No)

5 TYPE OF BLANK CASING USED: 1 Steel (2 PVC) 3 RMP (SR) 4 ABS 5 Wrought iron 6 Asbestos-Cement 7 Fiberglass 8 Concrete tile 9 Other (specify below)
CASING JOINTS: Glued Clamped Welded (Threaded) X
Blank casing diameter 1.5" in. to 51.5 ft., Dia in. to ft., Dia in. to ft.
Casing height above land surface Flush in., weight lbs./ft. Wall thickness or gauge No. Sch. 40
TYPE OF SCREEN OR PERFORATION MATERIAL: 1 Steel 2 Brass 3 Stainless steel 4 Galvanized steel 5 Fiberglass 6 Concrete tile (7 PVC) 8 RMP (SR) 9 ABS 10 Asbestos-cement 11 Other (specify) 12 None used (open hole)
SCREEN OR PERFORATION OPENINGS ARE: (1) Continuous slot 2 Louvered shutter 3 Mill slot 4 Key punched 5 Gauzed wrapped 6 Wire wrapped 7 Torch cut 8 Saw cut 9 Drilled holes 10 Other (specify) 11 None (open hole)
SCREEN-PERFORATED INTERVALS: From 51.5 ft. to 56.5 ft., From ft. to ft.; From ft. to ft., From ft. to ft.
GRAVEL PACK INTERVALS: From 56.5 ft. to 19.0 ft., From ft. to ft.; From ft. to ft., From ft. to ft.

6 GROUT MATERIAL: 1 Neat cement 2 Cement grout (3) Bentonite 4 Other
Grout Intervals: From 19.68 ft. to 1 ft., From ft. to ft., From ft. to ft.
What is the nearest source of possible contamination: 1 Septic tank 2 Sewer lines 3 Watertight sewer lines 4 Lateral lines 5 Cess pool 6 Seepage pit 7 Pit privy 8 Sewage lagoon 9 Feedyard 10 Livestock pens 11 Fuel storage 12 Fertilizer storage 13 Insecticide storage 14 Abandoned water well 15 Oil well/Gas well 16 Other (specify below)
Direction from well? How many feet?

FROM	TO	LITHOLOGIC LOG	FROM	TO	PLUGGING INTERVALS
0	7'	Fine Sand			
7	14'	Medium Coarse Sand			
14'	37'	Coarse Sand and Gravel w/Clay			
37'	40'	Sand and Gravel			
40'	44'	Sand and Gravel - Coarse			
44	48'	Sand and Gravel			
48'	56.5	Coarse Sand & Gravel			
	56.5	Gray Shale			

7 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This water well was (1) constructed, (2) reconstructed, or (3) plugged under my jurisdiction and was completed on (mo/day/year) 5-19-04 and this record is true to the best of my knowledge and belief. Kansas Water Well Contractor's License No. 606 This Water Well Record was completed on (mo/day/yr) under the business name of PSA Environmental by (signature)

INSTRUCTIONS: Use typewriter or ball point pen. PLEASE PRESS FIRMLY and PRINT clearly. Please fill in blanks, underline or circle the correct answers. Send top three copies to Kansas Department of Health and Environment, Bureau of Water, Topeka, Kansas 66620-0001. Telephone 785-296-5524. Retain one WATER WELL OWNER'S and one for your records. Fee of $5.00 for each constructed well.

ASSUMED ELEV 1247 DEPTH TO WATER 12475 TOP OF SAND = GROUND SURFACE

KGS Hydrology | Water Well Database Query

Scan of WWC5 Form

GSI Job No. 037272

MW-UP-20

WATER WELL RECORD Form WWC-5 KSA 82a-1212 ID No.

1 LOCATION OF WATER WELL: County: Sedgwick | Fraction: SE ¼ SE ¼ NW ¼ | Section Number: 15 | Township Number: T 27 S | Range Number: R 01 E

Distance and direction from nearest town or city street address of well if located within city?
North side of 10th Street; ~62 ft. east of Spruce

2 WATER WELL OWNER: Union Pacific Railroad
RR#, St. Address, Box #: 1416 Dodge Street, Room 930
City, State, ZIP Code: Omaha NE 68179
Board of Agriculture, Division of Water Resources Application Number:

3 LOCATE WELL'S LOCATION WITH AN "X" IN SECTION BOX: N, NW, NE, W, X, E, SW, SE, S

4 DEPTH OF COMPLETED WELL 38.2 ft. ELEVATION:
Depth(s) Groundwater Encountered 1 ft. 2 ft. 3 ft.
WELL'S STATIC WATER LEVEL ft. below land surface measured on mo/day/yr
Pump test data: Well water was ft. after hours pumping gpm
Est. Yield gpm: Well water was ft. after hours pumping gpm
Bore Hole Diameter 8.5 in. to 40 ft. and in. to ft.
WELL WATER TO BE USED AS: 1 Domestic 3 Feed lot 5 Public water supply 8 Air conditioning 11 Injection well; 2 Irrigation 4 Industrial 6 Oil field water supply 7 Lawn and garden (domestic) 9 Dewatering 10 Monitoring well 12 Other (Specify below)
Was a chemical/bacteriological sample submitted to Department? Yes No X If yes, mo/day/yr sample was submitted
Water Well Disinfected? Yes No X

5 TYPE OF BLANK CASING USED: 1 Steel 3 RMP (SR) 5 Wrought iron 8 Concrete tile; 2 PVC 4 ABS 6 Asbestos-Cement 9 Other (specify below) 7 Fiberglass
CASING JOINTS: Glued Clamped Welded Threaded Flush
Blank casing diameter 2 in. to 33 ft., Dia in. to ft., Dia in. to ft.
Casing height above land surface Flushmount in., weight 0.703 lbs./ft. Wall thickness or gauge No. Sch. 40
TYPE OF SCREEN OR PERFORATION MATERIAL: 7 PVC 10 Asbestos-cement; 1 Steel 3 Stainless steel 5 Fiberglass 8 RMP (SR) 11 Other (specify); 2 Brass 4 Galvanized steel 6 Concrete tile 9 ABS 12 None used (open hole)
SCREEN OR PERFORATION OPENINGS ARE: 5 Gauzed wrapped 8 Saw cut 11 None (open hole); 1 Continuous slot 3 Mill slot 6 Wire wrapped 9 Drilled holes; 2 Louvered shutter 4 Key punched 7 Torch cut 10 Other (specify)
SCREEN-PERFORATED INTERVALS: From 33 ft. to 38 ft. From ft. to ft.; From ft. to ft. From ft. to ft.
GRAVEL PACK INTERVALS: From 29 ft. to 40 ft. From ft. to ft.; From ft. to ft. From ft. to ft.

6 GROUT MATERIAL: 1 Neat cement 2 Cement grout 3 Bentonite 4 Other
Grout Intervals From 1 ft. to 29 ft. From ft. to ft. From ft. to ft.
What is the nearest source of possible contamination: 1 Septic tank 4 Lateral lines 7 Pit privy 10 Livestock pens 14 Abandoned water well; 2 Sewer lines 5 Cess pool 8 Sewage lagoon 11 Fuel storage 15 Oil well/Gas well; 3 Watertight sewer lines 6 Seepage pit 9 Feedyard 12 Fertilizer storage 16 Other (specify below); 13 Insecticide storage
Direction from well? How many feet?

FROM	TO	CODE	LITHOLOGIC LOG	FROM	TO	PLUGGING INTERVALS
0	10		Clay & Silt			
10	38		Sand			
38			Top of Shale			

7 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This water well was (1) constructed, (2) reconstructed, or (3) plugged under my jurisdiction and was completed on (mo/day/yr) 11-14-03 and this record is true to the best of my knowledge and belief. Kansas Water Well Contractor's License No. 531 This Water Well Record was completed on (mo/day/yr) 11-18-03 under the business name of Geotechnical Services, Inc. by (signature)

INSTRUCTIONS: Please fill in blanks and circle the correct answers. Send three copies to Kansas Department of Health and Environment, Bureau of Water, 1000 S.W. Jackson St., Ste. 420, Topeka, Kansas 66612-1367, Telephone: 913-296-5545. Send one to WATER WELL OWNER and retain one for your records.

Assume 1308' surface elev. Depth to Bedrock 1270' Top of Shale 1298'

Kansas Geological Survey
Comments to webadmin@kgs.ku.edu
URL=http://www.kgs.ku.edu/Magellan/WaterWell/index.html

KGS Hydrology | Water Well Database Query | Specific Water Well Detail

Well T27S, R1E, Sec. 8, SENWSW, Action: Constructed

Location Info	
County: Sedgwick	**Location:** T27S, R1E, Sec. 8, SENWSW
Owner: WOODLAND METH C	**Status**: Constructed
Directions: 1606 PAYNE WICHITA KS	
Longitude: -97.35027	**Latitude**: 37.71247
View section on interactive map This link will create a new window and display an interactive map of this well and its neighbors.	

General Info	
Well Depth: 46 ft.	**Elevation:** ft.
Static Water Level: 18 ft.	**Well Use:** Lawn and Garden - domestic only
Est. Yield: 0 gpm.	**Other ID:**

Driller Info	
Driller: Todd S. Harp Well & Pump Service, Inc.	**License #:** 236
Comp. Date: 31-Jan-1992	**DWR Applic. #:**
Chemical Sample Submitted?: N	

Casing Info
Casing Type: PVC
Diam: 8 in. to 26 ft.
Diam: 0 in. to 0 ft.
Diam: 0 in. to 0 ft.

Grout Info
Grout used: CEMENT GROUT
From: 4 to 24 ft.
From: 0 to 0 ft.
From: 0 to 0 ft.

Contamination Info	
Contamination type: WATERTIGHT SEWER LINES	
Direction:	**Distance:** 0

Screen and Perforation Info	

Assume
1300' msl
Surface Elevation

Depth to
Bedrock
1263'
Top of Sand
1295'

Screen Type: TORCH CUT	**Screen Openings:** SAW CUT
From: 26 ft. to 46 ft.	**From:** 0 ft. to 0 ft.
From: 0 ft. to 0 ft.	**From:** 0 ft. to 0 ft.

Lithologic Log
(log data not edited or checked by the KGS.)

From: 0 ft. **to** 7 ft.	**Type:** CLAY
From: 7 ft. **to** 13 ft.	**Type:** SANDY CLAY
From: 13 ft. **to** 25 ft.	**Type:** MEDIUM SAND
From: 25 ft. **to** 45 ft.	**Type:** SAND & GRAVEL
From: 45 ft. **to** 46 ft.	**Type:** SHALE

Kansas Geological Survey
Comments to webadmin@kgs.ku.edu
URL=http://www.kgs.ku.edu/Magellan/WaterWell/index.html
Display Programs Updated July 29, 2004
Data added continuously.

KGS Hydrology | Water Well Database Query

Scan of WWC5 Form

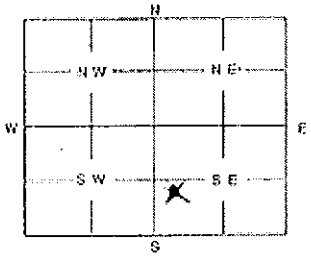
WATER WELL PLUGGING RECORD Form WWC-5P KSA 82a-1212 ID NO. _____

1 LOCATION OF WATER WELL: County: Sedgwick	Fraction: NW¼ SW¼ SE¼	Section Number: 29	Township Number: 26	Range Number: 1 E

Distance and direction from nearest town or city street address of well if located within city?
In city limits, 2353 Harbour Light Court, Wichita, KS

2 WATER WELL OWNER: Mr. Smelzer; c/o Fahnestock Htg. & Cooling
RR #, St. Address, Box #: 3532 N. Comotara
City, State, ZIP Code : Wichita, KS 67226-9883
Board of Agriculture, Division of Water Resources Application Number:

3 MARK WELL'S LOCATION WITH AN "X" IN SECTION BOX:



4 DEPTH OF WELL 200-200-200-200-200-200 ft. 7 @ 200 ft.
WELL'S STATIC WATER LEVEL 15 ft.

WELL WAS USED AS:

1 Domestic 2 Irrigation 3 Feedlot 4 Industrial 5 Public Water Supply 6 Oil Field Water Supply 7 Domestic (Lawn & Garden) 8 Air Conditioning 9 Dewatering 10 Monitoring Well 11 Injection Well 12 X Other Heat Pump

Was a chemical / bacteriological sample submitted to Department? Yes ____ No X
If yes, mo/day/yr sample was submitted ____

Water Well Disinfected. Yes X No ____

5 TYPE OF BLANK CASING USED:

1 Steel 2 PVC 3 RMP (SR) 4 ABS 5 Wrought 6 Asbestos-Cement 7 Fiberglass 8 Concrete Tile X Other (Specify below) Polyethylene

Blank casing diameter 3/4 in. Was casing pulled? Yes ____ No X If yes, how much ____
Casing height above or below land surface ____ in.

6 GROUT PLUG MATERIAL: 1 Neat cement 2 Cement grout X Bentonite 4 Other ____

Grout Plug Intervals: From 0 ft. to 200 ft., From 0 ft. to 200 ft., From 0 ft. to 200 ft.
0 to 200 ft. 0 to 200 ft. 0 to 200 ft. 0 to 200 ft.

What is the nearest source of possible contamination:

1 Septic tank 2 Sewer lines X Waterlight sewer lines 4 Lateral lines 5 Cess Pool 6 Seepage pit 7 Pit privy 8 Sewage lagoon 9 Feedyard 10 Livestock pens 11 Fuel storage 12 Fertilizer storage 13 Insecticide storage 14 Abandoned water well 15 Oil well/Gas well 16 Other (specify below)

Direction from well? West How many feet? 50

FROM	TO	~~XXXXXXX~~ MATERIALS
		Lithologic Log
0	2	Topsoil
2	12	Clay, Brown
12	48	Sand & gravel, coarse
48	55	Shale, Red
55	172	Shale, gray
172	200	Shale & gypsum

7 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This water well was plugged under my jurisdiction and was completed on (mo/day/year) 1/8/02 and this record is true to the best of my knowledge and belief. Kansas Water Well Contractor's License No. 138 This Water Well Record was completed on (mo/day/year) 1/21/02 under the business name of Peterson Irrigation, Inc.
by (signature) Mike Peterson

INSTRUCTIONS: Use typewriter or ball point pen. Please press firmly and print clearly. Please fill in blanks, underline or circle the correct answers. Send top three copies to Kansas Department of Health and Environment, Bureau of Water, Topeka, Kansas 66620-0001. Telephone: 785/296-3565. Send one to Water Well Owner and retain one for your records.

Assume 12" Diameter hole

Base of Sand Aqu. 215'

Bottom 12"

KGS Hydrology | Water Well Database Query

Scan of WWC5 Form

Water Well Record Form WWC-5 KSA 82a-1212

1 LOCATION OF WATER WELL: Sedgwick | FRACTION: SW 1/4 SE 1/4 NE 1/4 | Section Number: 31 | Township Number: T 26 S | Range Number: R 1E E/W

Distance and direction from nearest town or city street address of well if located within city?: 1640 W. 34th N. Wichita, Kansas

2 WATER WELL OWNER: MECHENSTOCK, Bill
RR#, ST. ADDRESS, BOX #: 1640 W. 34th N.
CITY, STATE, ZIP CODE: Wichita, Kansas

Board of Agriculture, Division of Water Resource
Application Number:

3 LOCATE WELL'S LOCATION WITH AN "X" IN SECTION BOX: N, NW, NE, W, X, E, SW, SE, S; 1 Mile

4 DEPTH OF COMPLETED WELL: 45 ft. ELEVATION:
Depth(s) groundwater Encountered 1 ft. 2 ft. 3 ft.
WELL'S STATIC WATER LEVEL 15 FT. BELOW LAND SURFACE MEASURED ON mo/day/yr 05/23/2000
Pump test data: Well water was ft. after hours pumping gpm
Est. Yield gpm: Well water was ft. after hours pumping gpm
Bore Hole Diameter 12 in. to 45 ft. and in. to ft.
WELL WATER TO BE USED AS: 1 Domestic 2 Irrigation 3 Feedlot 4 Industrial 5 Public water supply 6 Oil field water supply 7 Lawn and garden only 8 Air conditioning 9 Dewatering 10 Monitoring well 11 Injection well 12 Other (Specify below)
Was a chemical/bacteriological sample submitted to Department? Yes No X ; If yes, mo/day/yr sample was submitted
Water Well Disinfected? Yes X No

Assume elev 1318' msl
Bench 1273
1303' to base dam

5 TYPE OF CASING USED: 1 Steel 2 PVC 3 RMP (SR) 4 ABS 5 Wrought iron 6 Asbestos-Cement 7 Fiberglass 8 Concrete tile 9 Other (Specify below) SDR-26
CASING JOINTS: Glued X Clamped Welded Threaded
Blank casing Diameter 5 in. to 35 ft., Dia in. to ft., Dia in. to ft.
Casing height above land surface 12 in., weight 2.35 lbs./ft. Wall thickness or gauge No. .214
TYPE OF SCREEN OR PERFORATION MATERIAL: 1 Steel 2 Brass 3 Stainless Steel 4 Galvanized steel 5 Fiberglass 6 Concrete tile 7 PVC 8 RMP (SR) 9 ABS 10 Asbestos-cement 11 other (specify) 12 None used (open hole)
SCREEN OR PERFORATION OPENING ARE: 1 Continuous slot 2 Louvered shutter 3 Mill slot 4 Key punched 5 Gauzed wrapped 6 Wire wrapped 7 Torch cut 8 Saw cut 9 Drilled holes 10 Other (specify) 11 None (open hole)
SCREEN-PERFORATION INTERVALS: from 35 ft. to 45 ft., From ft. to ft.; from ft. to ft., From ft. to ft.
GRAVEL PACK INTERVALS: from 24 ft. to 45 ft., From ft. to ft.; from ft. to ft., From ft. to ft.

6 GROUT MATERIAL: 1 Neat cement 2 Cement grout 3 Bentonite 4 Other bentonite hole plug
Grout Intervals: From ft. to ft., From ft. to ft., From 4 ft. to 24 ft.
What is the nearest source of possible contamination: 1 Septic tank 2 Sewer lines 3 Watertight sewer lines 4 Lateral lines 5 Cess pool 6 Seepage pit 7 Pit privy 8 Sewage lagoon 9 Feedyard 10 Livestock pens 11 Fuel storage 12 Fertilizer storage 13 Insecticide storage 14 Abandoned water well 15 Oil well/Gas well 16 Other (specify below)
Direction from well? West How many feet? 100

FROM	TO	LITHOLOGIC LOG	FROM	TO	PLUGGING INTERVALS
0	3	topsoil			
3	15	clay			
15	25	fine sand			
25	45	medium sand			

7 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This water well was (1) constructed, (2) reconstructed, or (3) plugged under my jurisdiction and was completed on (mo/day/year) 05/23/00 and this record is true to the best of my knowledge and belief. Kansas Water Well Contractor's License No. 236 This Water Well Record was completed on (mo/day/yr) 05/26/00
Under the business name of Harp Well & Pump Service, Inc. by (signature) Todd S. Harp

KGS Hydrology | Water Well Database Query

Scan of WWC5 Form

Water Well Record Form WWC-5 KSA 82a-1212

1 LOCATION OF WATER WELL: Sedgwick

FRACTION: SE 1/4 SW 1/4 NE 1/4

Section Number: 32 | Township Number: T 26 S | Range Number: R 1E E/W

Distance and direction from nearest town or city street address of well if located within city?

33rd N. & 1/8th m. E. of Arkansas, N. side Wichita, Kansas

2 WATER WELL OWNER: WICHITA, CITY OF

RR#, ST. ADDRESS, BOX #: 455 N. Main

CITY, STATE, ZIP CODE: Wichita, Kansas 67202

Board of Agriculture, Division of Water Resources

Application Number: 20000105

3 LOCATE WELL'S LOCATION WITH AN "X" IN SECTION BOX

N / NW / NE / W / X / E / SW / SE / S

4 DEPTH OF COMPLETED WELL: 45 ft. ELEVATION:

Depth(s) groundwater Encountered 1 ft. 2 ft. 3 ft.

WELL'S STATIC WATER LEVEL 15 FT. BELOW LAND SURFACE MEASURED ON mo/day/yr 05/30/2000

Pump test data: Well water was ft. after hours pumping gpm

Est. Yield gpm: Well water was ft. after hours pumping gpm

Bore Hole Diameter 12 in. to 45 ft. and in. to ft.

WELL WATER TO BE USED AS: 5 Public water supply 8 Air conditioning 11 Injection well

1 Domestic 3 Feedlot 6 Oil field water supply 9 Dewatering 12 Other (Specify below)

2 Irrigation 4 Industrial 7 Lawn and garden only 10 Monitoring well

Was a chemical/bacteriological sample submitted to Department? Yes No X ; If yes, mo/day/yr sample was submitted

Water Well Disinfected? Yes X No

5 TYPE OF CASING USED: 5 Wrought iron 8 Concrete tile CASING JOINTS: Glued X Clamped

1 Steel 3 RMP (SR) 6 Asbestos-Cement 9 Other (Specify below) Welded

2 PVC 4 ABS 7 Fiberglass SDR-26 Threaded

Blank casing Diameter 8 in. to 25 ft., Dia in. to ft., Dia in. to ft.

Casing height above land surface 12 in., weight 5.52 lbs./ft. Wall thickness or gauge No. .332

TYPE OF SCREEN OR PERFORATION MATERIAL: 7 PVC 10 Asbestos-cement

1 Steel 3 Stainless Steel 5 Fiberglass 8 RMP (SR) 11 other (specify)

2 Brass 4 Galvanized steel 6 Concrete tile 9 ABS 12 None used (open hole)

SCREEN OR PERFORATION OPENING ARE: 5 Gauzed wrapped 8 Saw cut 11 None (open hole)

1 Continuous slot 3 Mill slot 6 Wire wrapped 9 Drilled holes

2 Louvered shutter 4 Key punched 7 Torch cut 10 Other (specify)

SCREEN-PERFORATION INTERVALS: from 25 ft. to 45 ft., From ft. to ft.

from ft. to ft., From ft. to ft.

GRAVEL PACK INTERVALS: from 25 ft. to 45 ft., From ft. to ft.

from ft. to ft., From ft. to ft.

6 GROUT MATERIAL: 1 Neat cement 2 Cement grout 3 Bentonite 4 Other bentonite hole plug

Grout Intervals: From ft. to ft., From ft. to ft., From 4 ft. to 24 ft.

What is the nearest source of possible contamination:

1 Septic tank 4 Lateral lines 7 Pit privy 10 Livestock pens 14 Abandon water well

2 Sewer lines 5 Cess pool 8 Sewage lagoon 11 Fuel storage 15 Oil well/Gas well

3 Watertight sewer lines 6 Seepage pit 9 Feedyard 12 Fertilizer storage 16 Other (specify below)

13 Insecticide storage None Apparent

Direction from well? How many feet?

FROM	TO	LITHOLOGIC LOG:	FROM	TO	PLUGGING INTERVALS
0	3	topsoil			
3	17	clay			
17	25	fine sand			
25	45	medium sand			

7 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This water well was (1) constructed, (2) reconstructed, or (3) plugged under my jurisdiction and was completed on (mo/day/year) 05/30/00 and this record is true to the best of my knowledge and belief. Kansas Water Well Contractor's License No. 236 This Water Well Record was completed on (mo/day/yr) 06/01/00

Under the business name of Harp Well & Pump Service, Inc by (signature) Todd S. Harp

Assume 1310' Surf elev.

1310 - 45 = >1265'

TOP of SAND

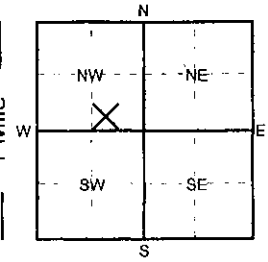
WATER WELL RECORD Form WWC-5 KSA 82a-1212

1 LOCATION OF WATER WELL:	FRACTION	SECTION NUMBER	TOWNSHIP NUMBER	RANGE NUMBER
Sedgwick	SW 1/4 SE 1/4 NW 1/4	5	T 27 S	R 1E E/W

Distance and direction from nearest town or city street address of well if located within city?
1205 W. 26th N. Wichita, Kansas

2 WATER WELL OWNER: CLOUD ELEMENTARY SCHOOL (Soccer Field) USD 259
RR#,ST. ADDRESS,BOX #: 1205 W. 26th N.
CITY, STATE: Wichita, Kansas ZIP CODE:
Board of Agriculture, Division of Water Resource
Application Number:

3 LOCATE WELL'S LOCATION WITH AN "X" IN SECTION BOX:



4 DEPTH OF COMPLETED WELL: 43 ft. ELEVATION:
Depth of groundwater Encountered: ft. ft. ft.
WELL'S STATIC WATER LEVEL 15 FT. BELOW LAND SURFACE MEASURED ON mo/day/yr: 8/2/06
Pump test data: Well water was ft. after hours of pumping @ gpm
Est. Yield: gpm Well water was ft. after hours of pumping @ gpm
Bore Hole Diameter 12 in. to 43 ft. and in. to ft.
WELL WATER TO BE USED AS:
1. Domestic 3. Feedlot 5. Public water supply 7. Lawn and garden only 9. Dewatering 11. Injection well
2. Irrigation 4. Industrial 6. Oil field water supply 8. Air conditioning 10. Monitoring well 12. Other (Specify below)
Was a chemical/bacteriological sample submitted to Department? YES NO ; If yes, what mo/day/yr was sample submitted
Was Water Well Disinfected? YES NO

5 TYPE OF CASING USED:
1. Steel 3. RPM (SR) 5. Wrought Iron 7. Fiberglass 9. Other (Specify below) CASING JOINTS: Glued Threaded
2. PVC 4. ABS 6. Asbestos-Cement 8. Concrete tile SDR-26 Welded Clamped
Blank casing diameter 5 in. to 23 ft., Dia. in. to ft., Dia. in. to ft.
Casing height above land surface: 12 in., Weight: 2.35 lbs. / ft. Wall thickness or gauge No. .214
TYPE OF SCREEN OR PERFORATION MATERIAL:
1. Steel 3. Stainless Steel 5. Fiberglass 7. PVC 9. ABS 11. Other (specify)
2. Brass 4. Galvanized 6. Concrete Tile 8. RMP (SR) 10. Asbestos-Cement 12. None used (open hole)
SCREEN OR PERFORATION OPENINGS ARE:
1. Continuous slot 3. Mill slot 5. Gauzed wrapped 7. Torch cut 9. Drilled holes 11. None (open hole)
2. Louvered shutter 4. Key punched 6. Wire wrapped 8. Saw cut 10. Other (specify)
SCREEN - PERFORATION INTERVAL From 23 ft. to 43 ft., From ft. to ft.
From ft. to ft., From ft. to ft.
GRAVEL PACK INTERVALS: From 23 ft. to 43 ft., From ft. to ft.
From ft. to ft., From ft. to ft.

6 GROUT MATERIALS: 1. Neat cement 2. Cement Grout 3. Bentonite Other bentonite hole plug
Grout Intervals: From 4 ft. to 24 ft., From ft. to ft., From ft. to ft.
What is the nearest source of possible contamination:
1. Septic tank 4. Lateral lines 7. Pit privy 10. Livestock pens 13. Insecticide storage 15. Oil well/Gas well
2. Sewer lines 5. Cess Pool 8. Sewage lagoon 11. Fuel storage 14. Abandon water well 16. Other (specify below)
3. Watertight sewer line 6. Seepage pit 9. Feed yard 12. Fertilizer storage
Direction from well? East How many feet? 15

From	To	LITHOLOGIC LOG	From	To	LITHOLOGIC LOG
0	4	topsoil			
4	15	clay			
15	20	fine sand			
20	43	coarse sand			

7 Contractor's or Landowner's Certification: This water well was 1. constructed 2. reconstructed or 3. plugged under my jurisdiction and was completed on (mo/day/year) 8-2-2006 and this record is true to the best of my knowledge and belief.
Kansas Water Well Contractor's License No. 236 This water well record was completed on (mo/day/year) 8-4-2006
under the business name of Harp Well and Pump Service by (signature) Todd S. Harp

KGS Hydrology | Water Well Database Query | Specific Water Well Detail

Well T27S, R1E, Sec. 7, NENENE, Action: Constructed

Location Info	
County: Sedgwick	**Location:** T27S, R1E, Sec. 7, NENENE
Owner: TYLER ARTZ MD	**Status**: Constructed
Directions: 560 ESE OF THE INTERSICTION OF 21ST AND SOMERSET WICHITA KANSAS	
Longitude: -97.35475	**Latitude**: 37.72159
View section on interactive map This link will create a new window and display an interactive map of this well and its neighbors.	

General Info	
Well Depth: 47 ft.	**Elevation:** 1311 ft.
Static Water Level: 16 ft.	**Well Use:** Monitoring well/observation/piezometer
Est. Yield: gpm.	**Other ID:**

Driller Info	
Driller: Terracon, Inc.	**License #:** 416
Comp. Date: 07-May-1991	**DWR Applic. #:**

Chemical Sample Submitted?: N

Casing Info
Casing Type: PVC
Diam: 2 in. to 12 ft.
Diam: 0 in. to 0 ft.
Diam: 0 in. to 0 ft.

Grout Info
Grout used: NEAT CEMENT and BENTONITE
From: 0 to 9 ft.
From: 9 to 11 ft.
From: 0 to 0 ft.

Contamination Info	
Contamination type: OTHER	
Direction:	**Distance:** 0

Screen and Perforation Info	

Surface Elev 1305
Elev [illegible] 1260
Top of Sand 1288
KBE [illegible]

Screen Type: TORCH CUT	**Screen Openings:** MILL SLOT
From: 12 ft. to 47 ft.	**From:** 0 ft. to 0 ft.
From: 0 ft. to 0 ft.	**From:** 0 ft. to 0 ft.

Lithologic Log
(log data not edited or checked by the KGS.)

From: 0 ft. **to** 17 ft.	**Type:** SAND
From: 17 ft. **to** 37 ft.	**Type:** SANDY CLAY
From: 37 ft. **to** 45 ft.	**Type:** MEDIUM SAND
From: 45 ft. **to** 47 ft.	**Type:** SHALE

Kansas Geological Survey
Comments to webadmin@kgs.ku.edu
URL=http://www.kgs.ku.edu/Magellan/WaterWell/index.html
Display Programs Updated July 29, 2004
Data added continuously.

ROBERT M. KICK
LICENSED
556
KANSAS
GEOLOGIST

6-16-06

REVISED REMEDIAL INVESTIGATION REPORT
29TH AND GROVE SITE
WICHITA, KANSAS

Case #01-E-0191

Prepared for

UNION PACIFIC RAILROAD

1400 Douglas Street, Stop 1030
Omaha, Nebraska 68179-1030

Prepared by

THE FORRESTER GROUP INC.

605 North Boonville Avenue
Springfield, Missouri 65806
www.forrestergroup.com
417-864-6444

June 16, 2006
Project Number 13740000

THE FORRESTER GROUP
INSIGHTFUL ENVIRONMENTAL SOLUTIONS™

TITLE:

FIGURE 4-1
TOP OF BEDROCK
29th AND GROVE SITE
WICHITA, KANSAS

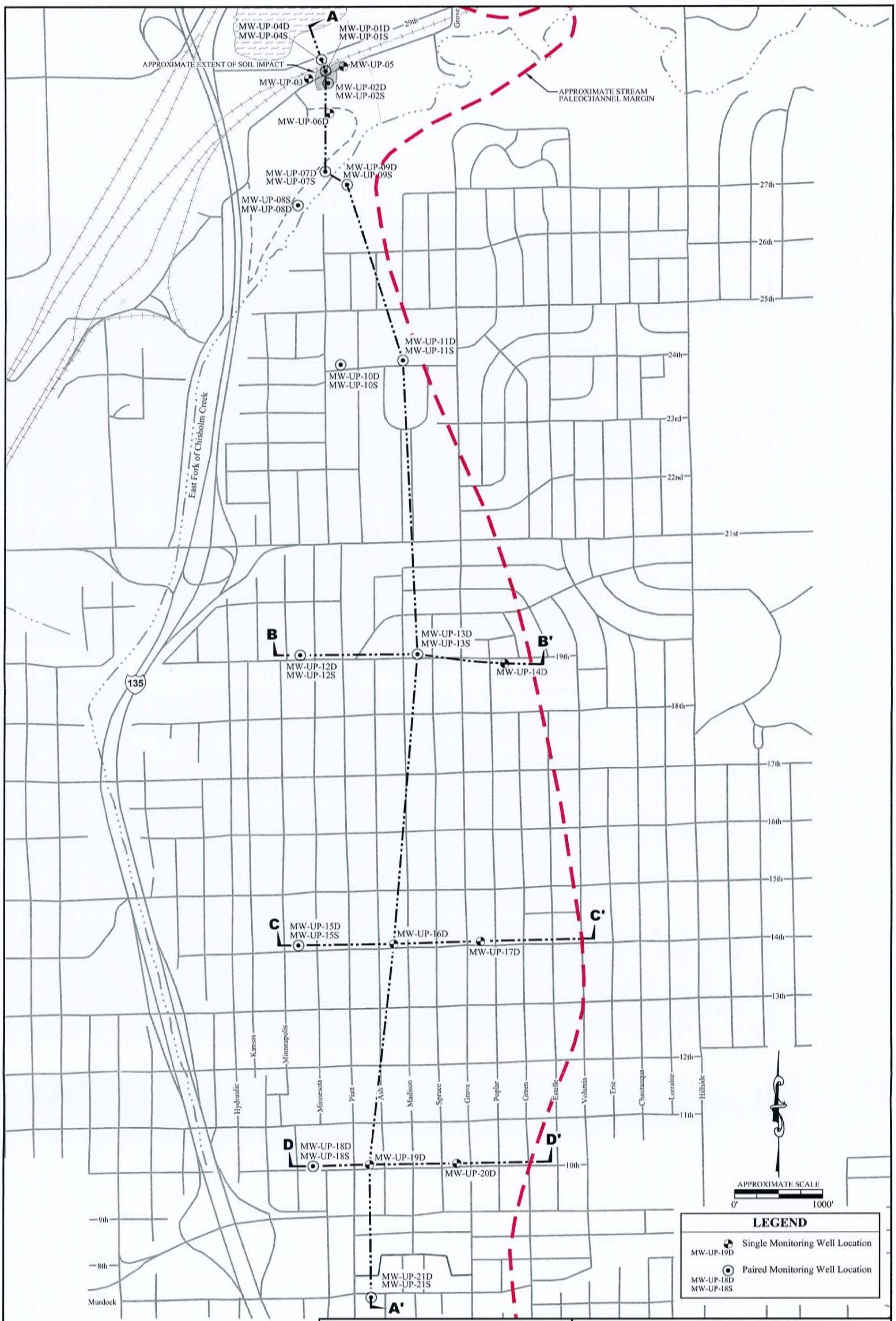
1374-RI_4-01.dwg 2453830.#006959

THE FORRESTER GROUP
INSIGHTFUL ENVIRONMENTAL SOLUTIONS

TITLE:

FIGURE 4-4
SAND THICKNESS MAP
29th AND GROVE SITE
WICHITA, KANSAS

1374-RI 4-04.dwg 2453830.49074853



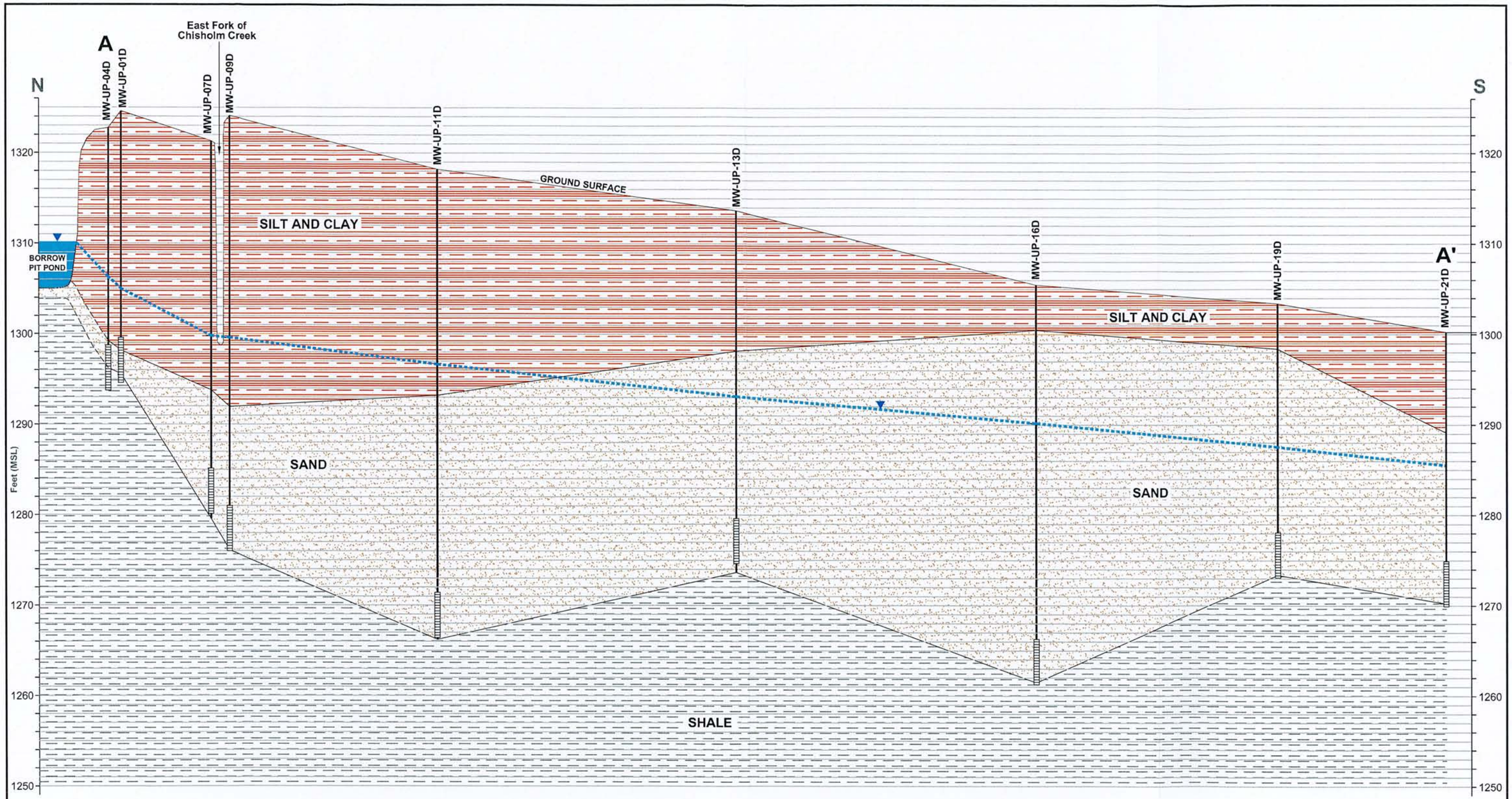
THE FORRESTER GROUP

INSIGHTFUL ENVIRONMENTAL SOLUTIONS

TITLE:

FIGURE 4-5
CROSS SECTION REFERENCE MAP
29th AND GROVE SITE
WICHITA, KANSAS

1374-RI_4-01.dwg 2453830.4996959



NOTE:
Monitoring well and creek elevation data is from March 2004. Pond water elevation is from December 2004.

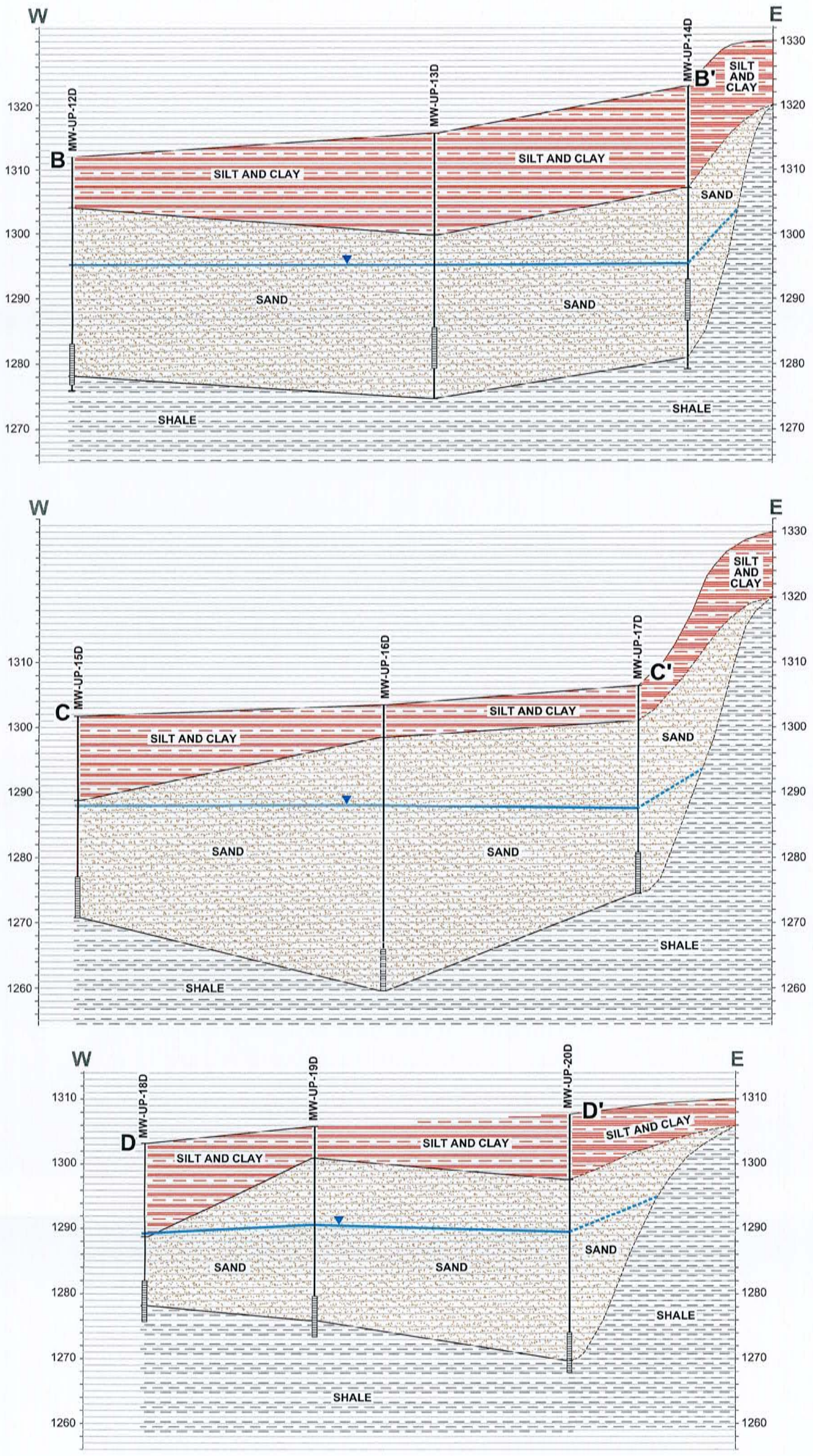
0 1000
Approximate Horizontal Scale (feet)

THE FORRESTER GROUP
INSIGHTFUL ENVIRONMENTAL SOLUTIONS™

TITLE:

FIGURE 4-6
CROSS SECTION A - A'
MW-UP-06D TO MW-UP-21D
29th AND GROVE SITE
WICHITA, KANSAS

1374-RI_4-03.dwg 2453396.50197112



0 1800
Approximate Horizontal Scale (feet)

Note: Water level data from March 1, 2004

THE FORRESTER GROUP
INSIGHTFUL ENVIRONMENTAL SOLUTIONS™

TITLE:

FIGURE 4-7
CROSS SECTION B-B', C-C', & D-D'
MW-UP-12D TO MW-UP-20D
29th AND GROVE SITE
WICHITA, KANSAS

1374-RI_4-03.dwg 2453396,50197112

Appendix F
NIC FS Model Report
Attachment F3 – Water Level Trends and Particle Tracking Figures

Appendix F
NIC FS Model Report
Attachment F3 – Water Level Trends and Particle Tracking Figures

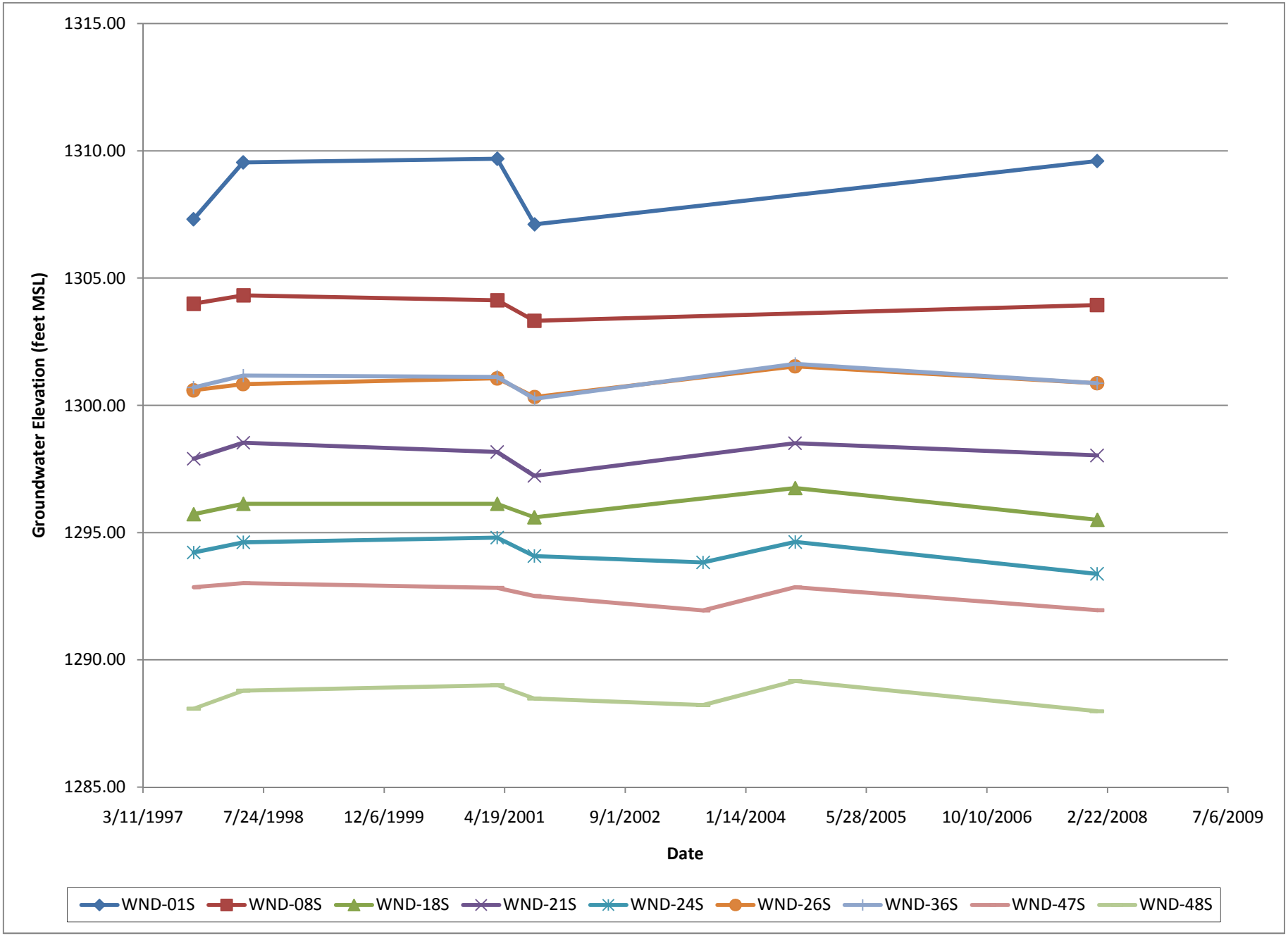


Figure F3-1

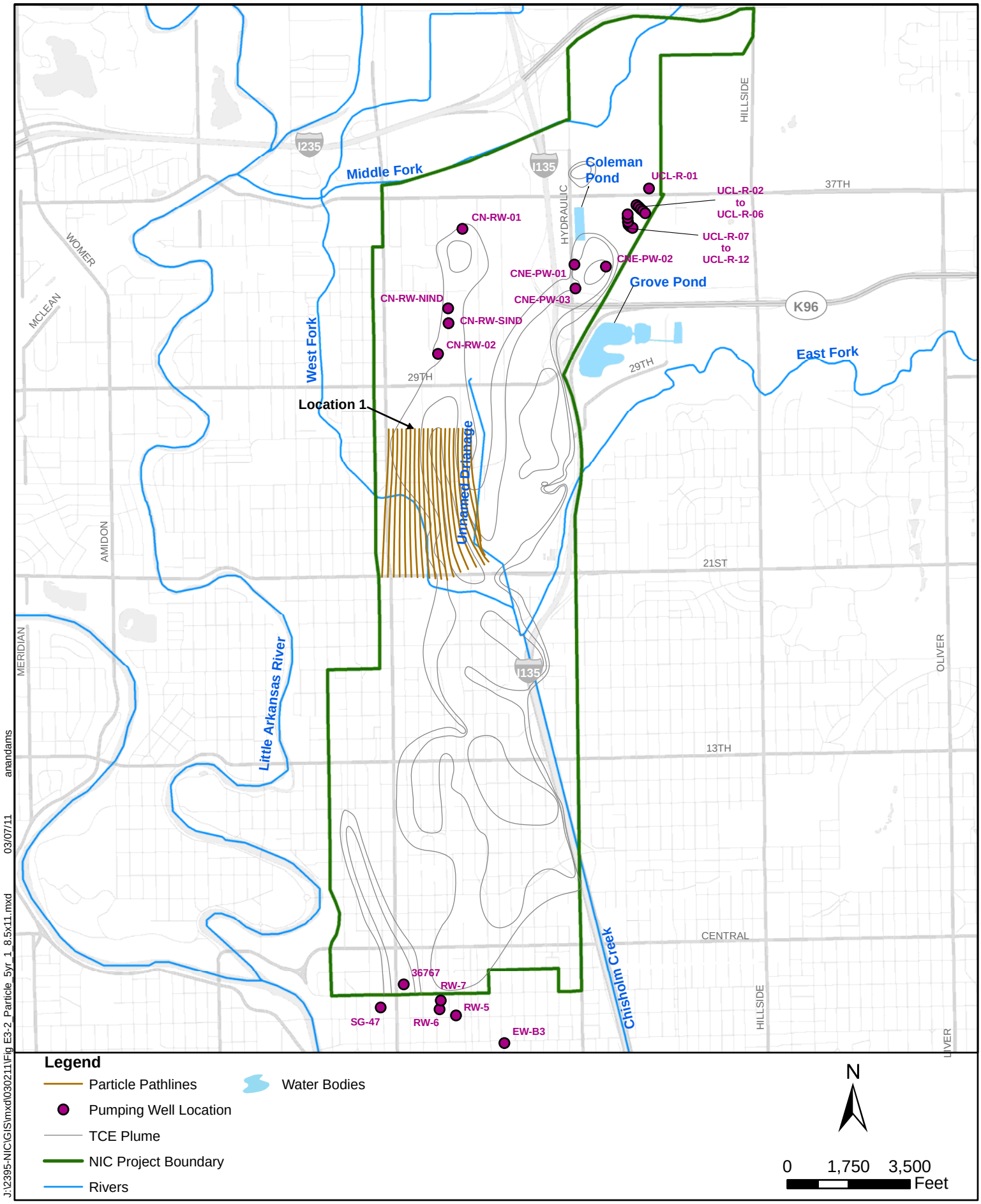
Groundwater Elevation Time Trend Plot for Selected Monitoring Wells

North Industrial Corridor (NIC)

Wichita, Kansas

CDM

E:\Projects\NIC\Report\Revised\Figures\
WL Trends.xlsx



CDM

Figure F3-2
Particles Originating at Location 1
Simulated Particle Tracking Pathlines at the End of 5 Years
North Industrial Corridor (NIC)
Wichita, Kansas

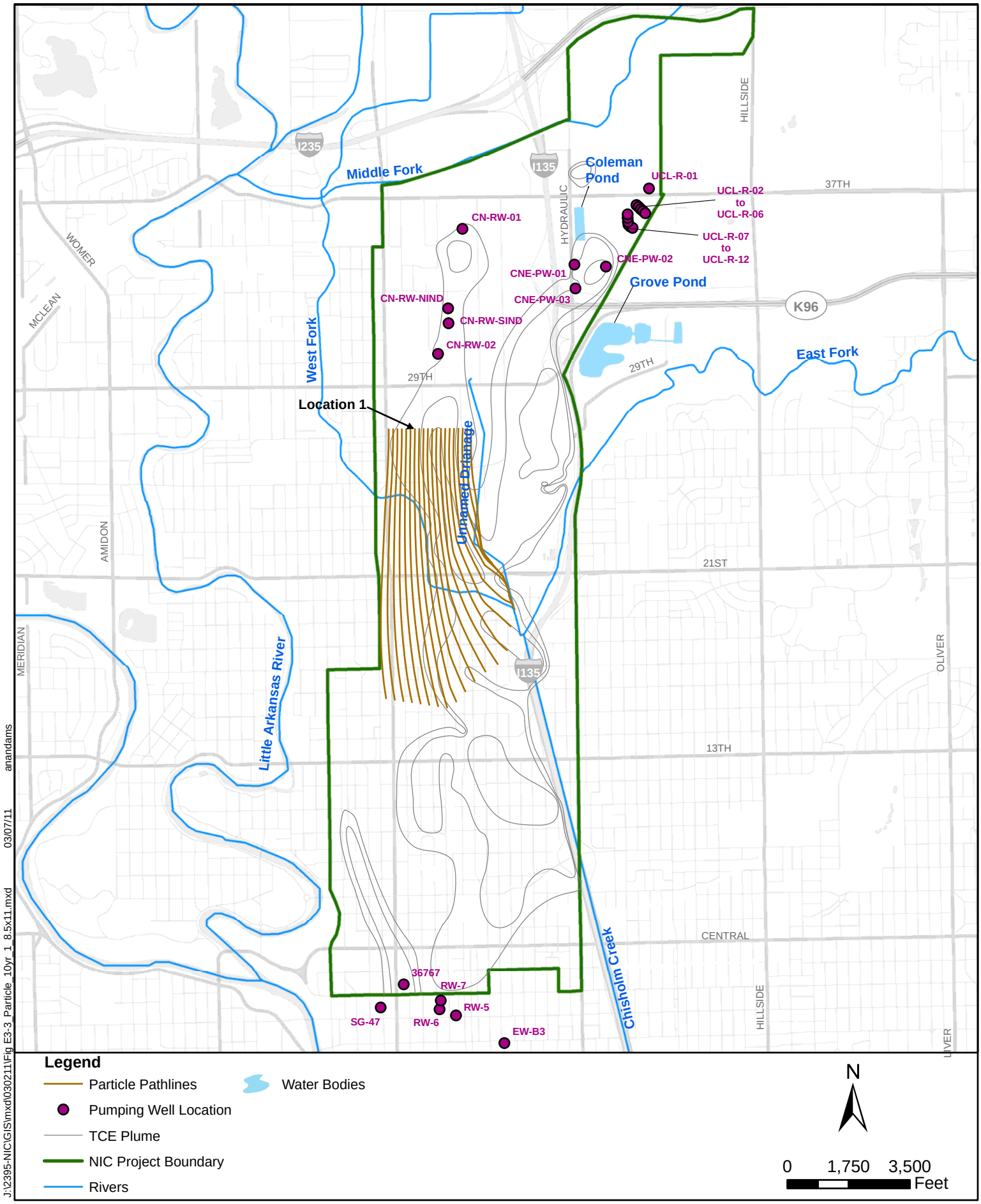
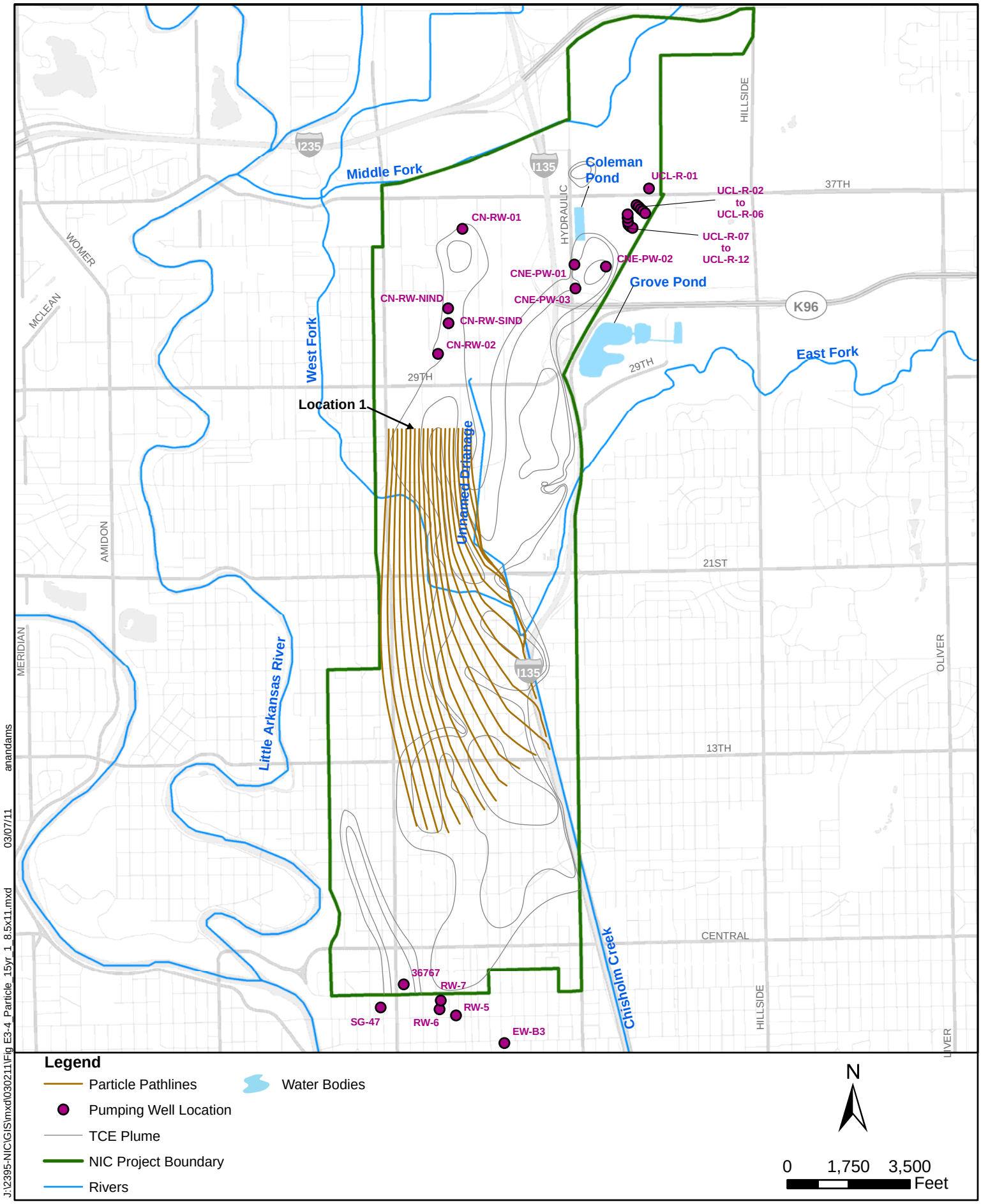


Figure F3-3
Particles Originating at Location 1
Simulated Particle Tracking Pathlines at the End of 10 Years
North Industrial Corridor (NIC)
Wichita, Kansas

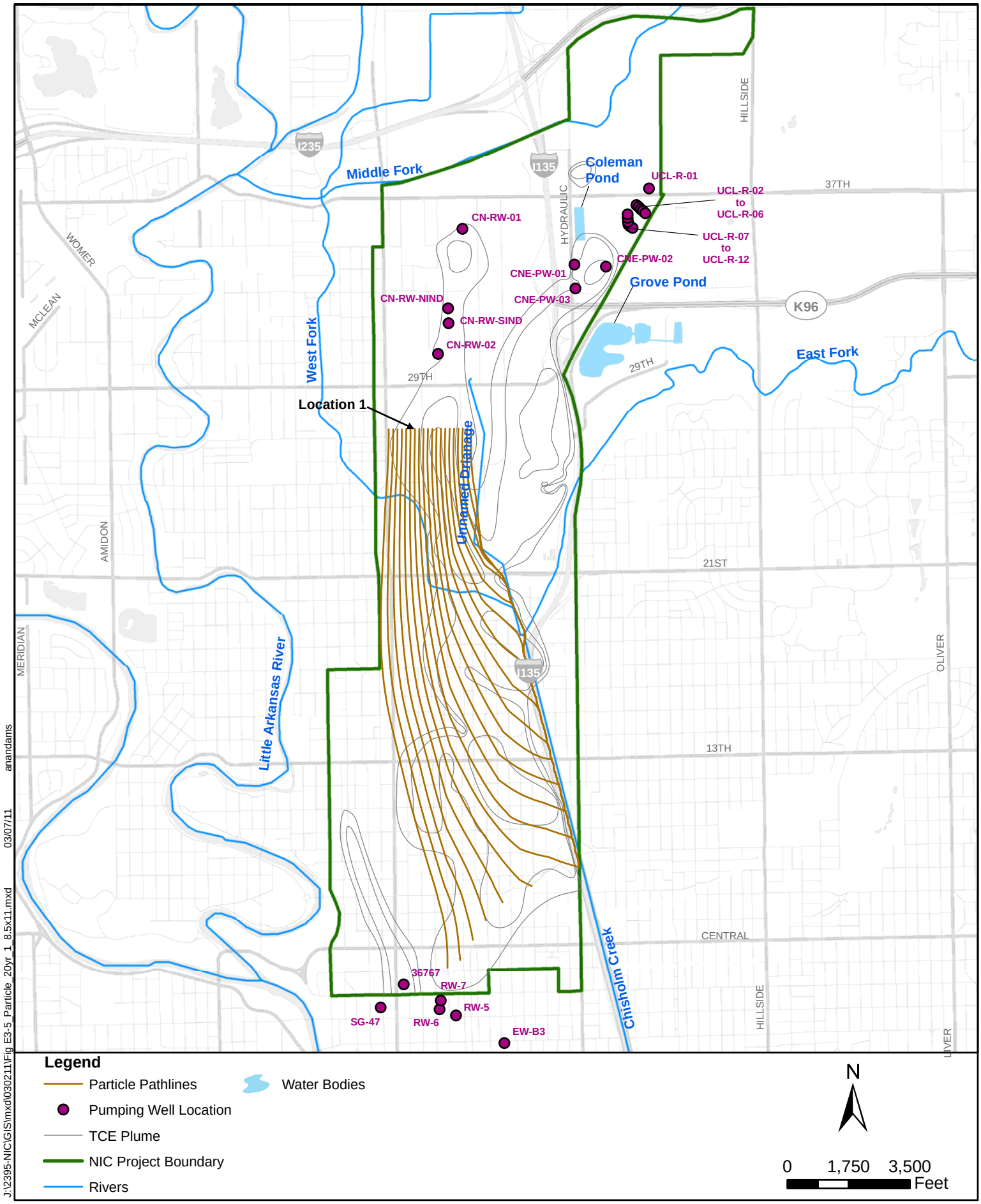
CDM



J:\2395-NIC\GIS\mxd\030211\Fig E3-4 Particle_15yr_1_8.5x11.mxd 03/07/11 anandams

CDM

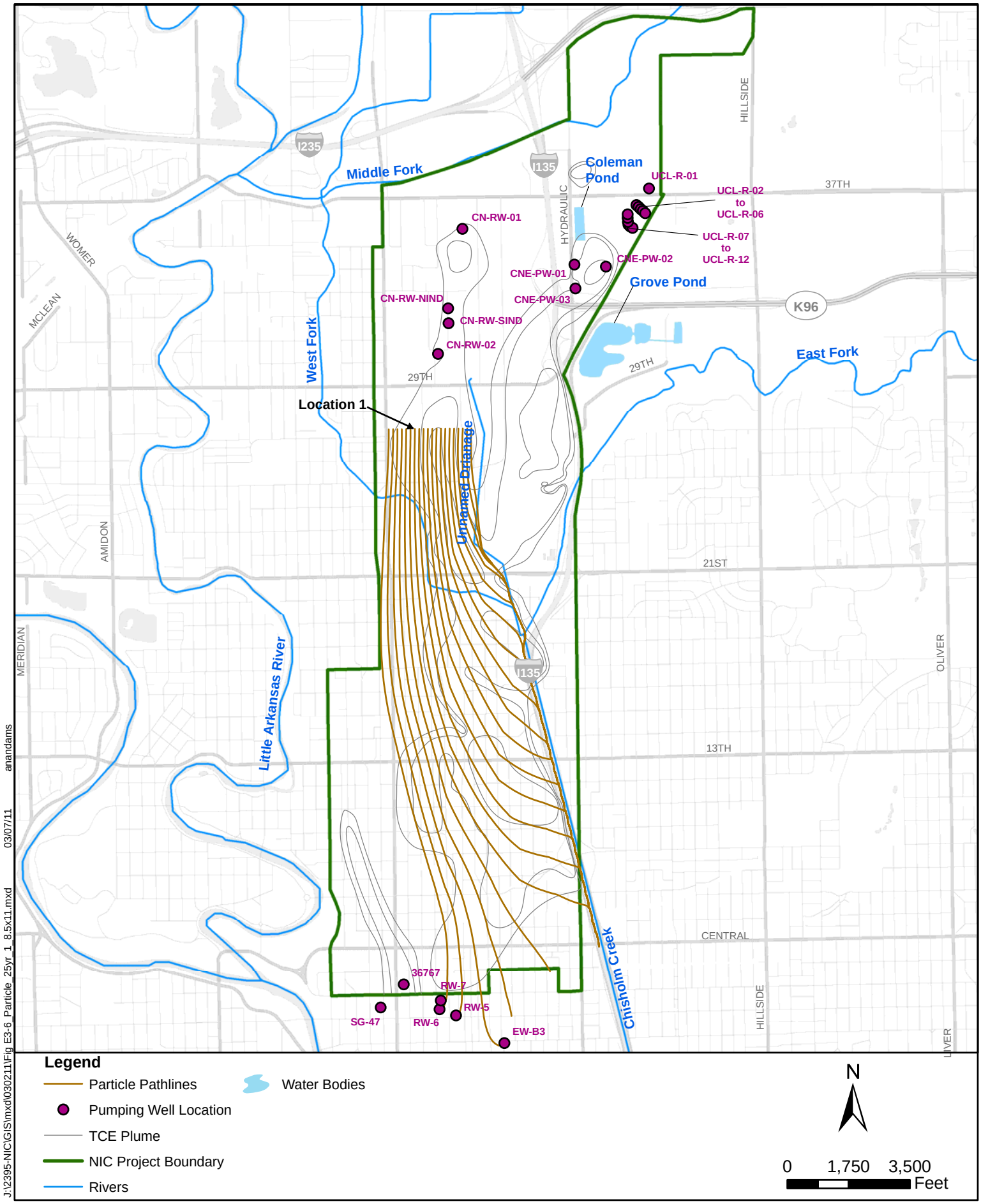
Figure F3-4
Particles Originating at Location 1
Simulated Particle Tracking Pathlines at the End of 15 Years
North Industrial Corridor (NIC)
Wichita, Kansas



J:\2395-NIC\GIS\mxd\030211\Fig E3-5_Particle_20yr_1_8.5x11.mxd 03/07/11 anandams

CDM

Figure F3-5
Particles Originating at Location 1
Simulated Particle Tracking Pathlines at the End of 20 Years
North Industrial Corridor (NIC)
Wichita, Kansas



CDM

Figure F3-6
Particles Originating at Location 1
Simulated Particle Tracking Pathlines at the End of 25 Years
North Industrial Corridor (NIC)
Wichita, Kansas

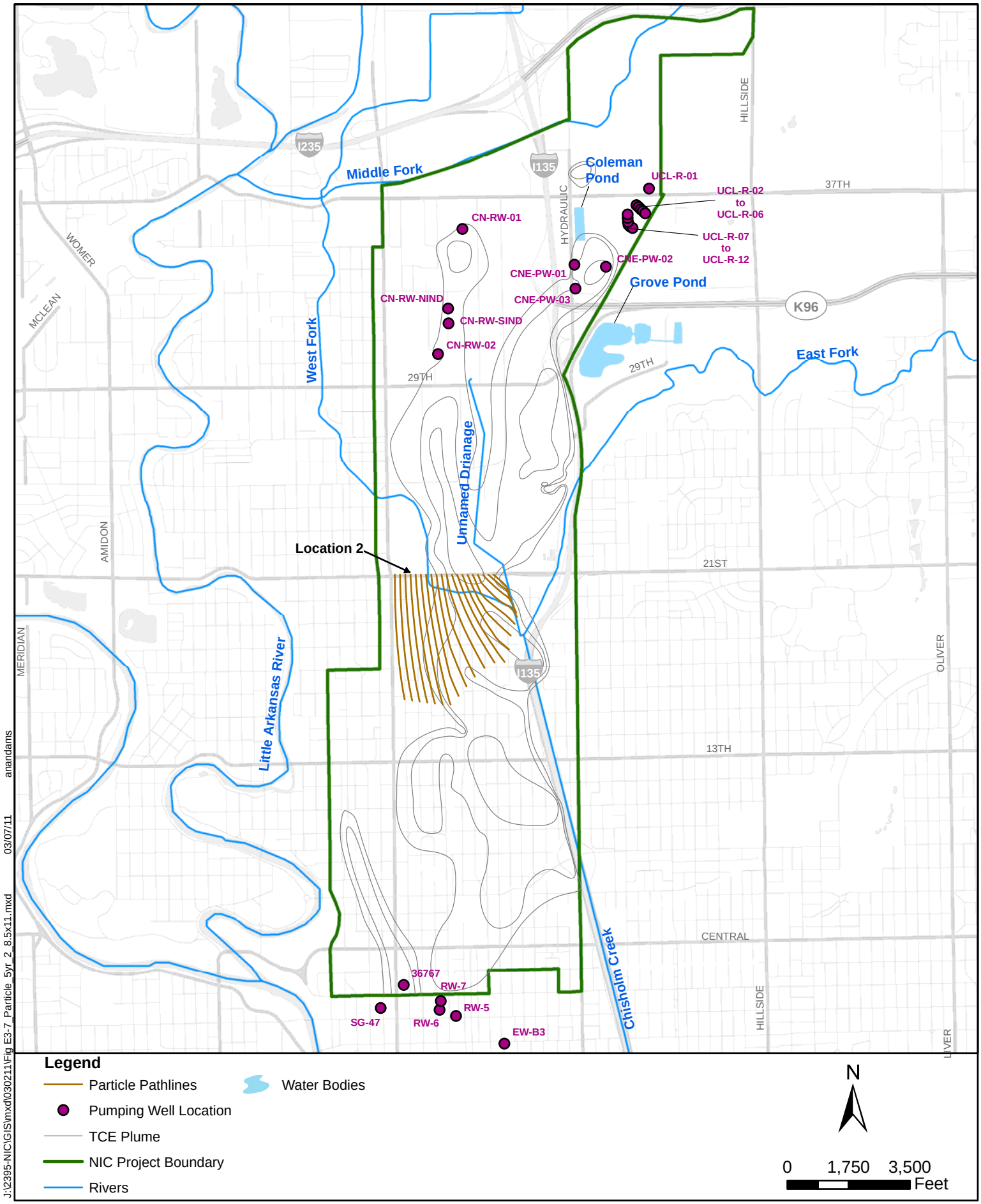


Figure F3-7
Particles Originating at Location 2
Simulated Particle Tracking Pathlines at the End of 5 Years
North Industrial Corridor (NIC)
Wichita, Kansas

CDM

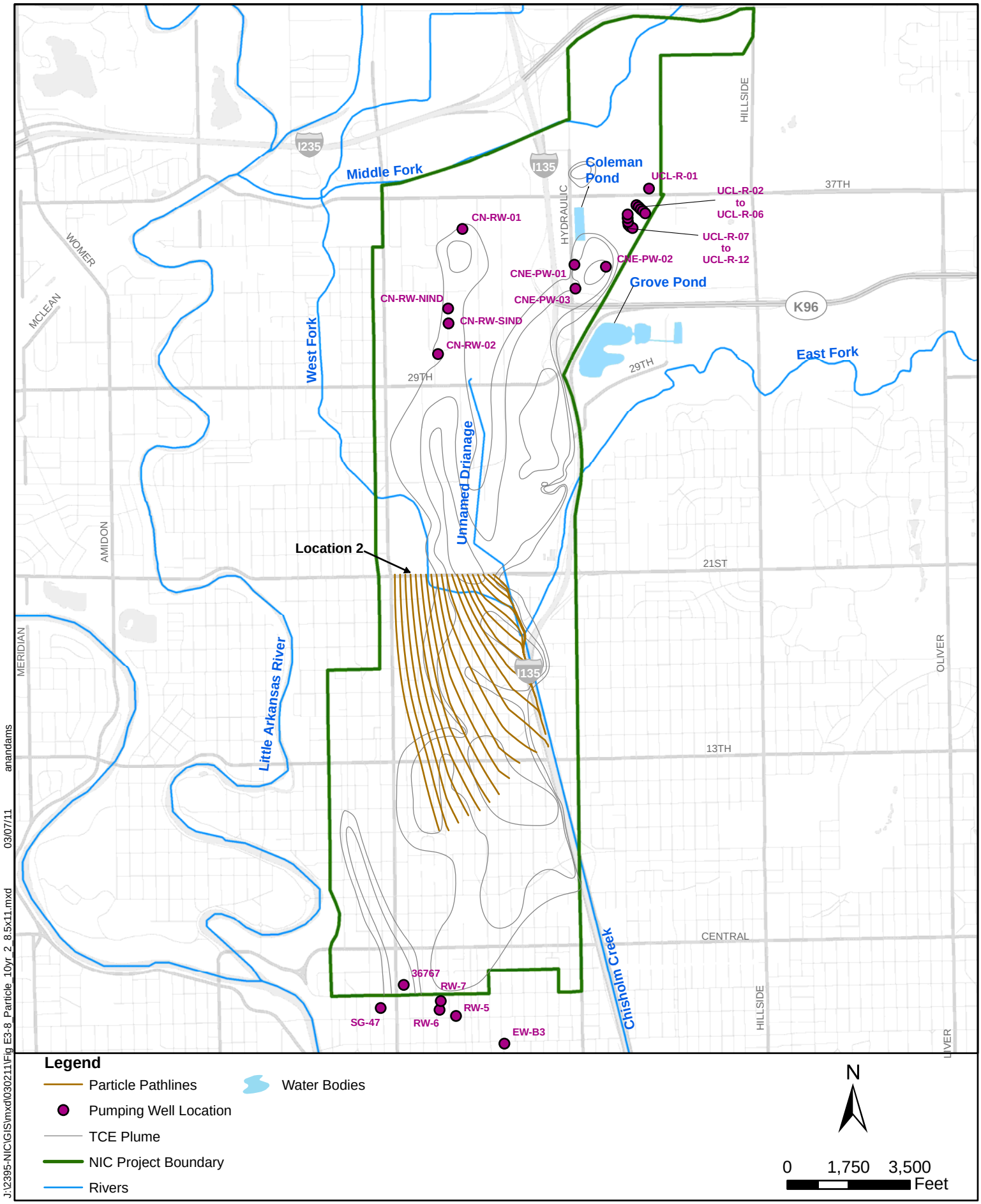
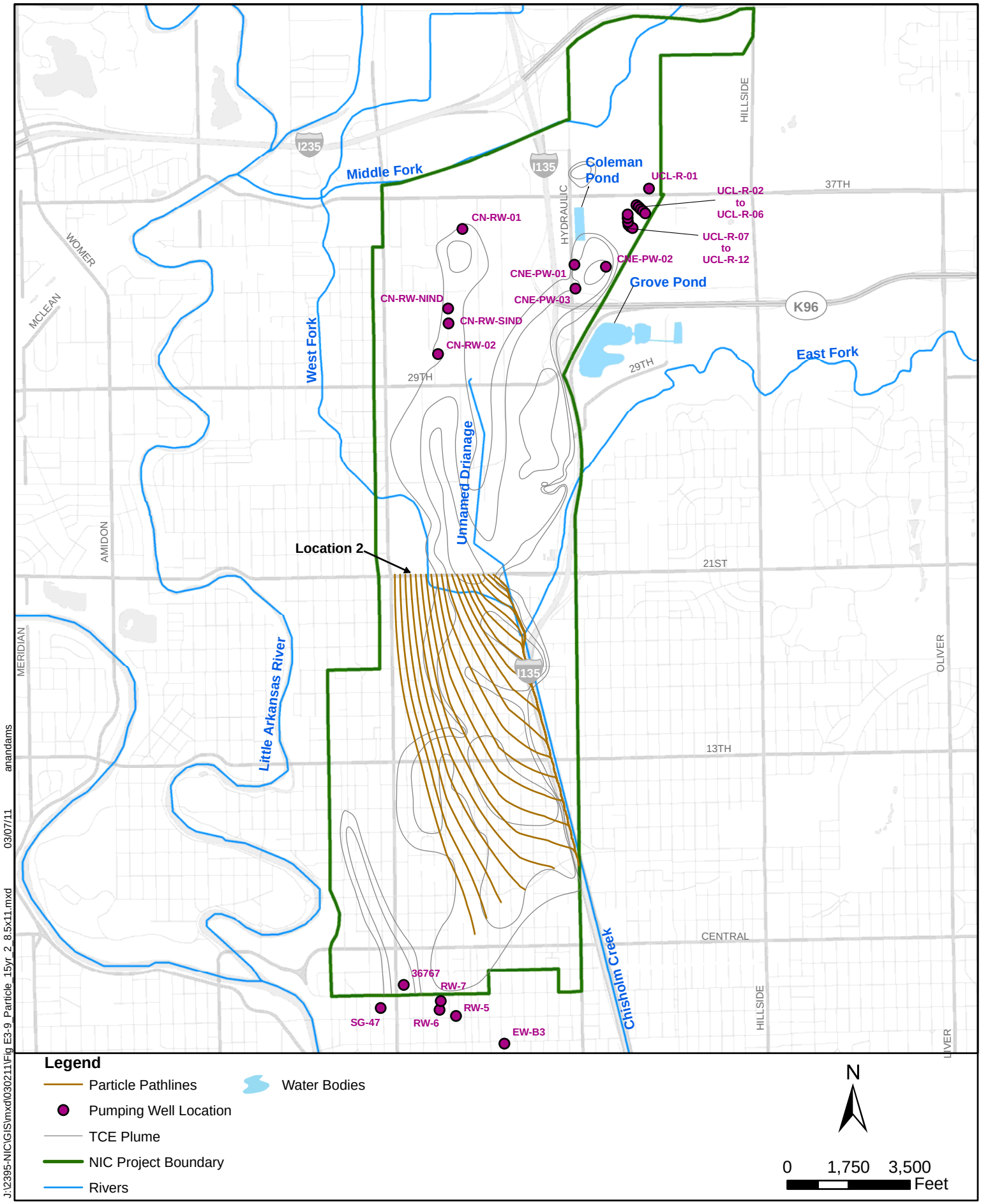


Figure F3-8
Particles Originating at Location 2
Simulated Particle Tracking Pathlines at the End of 10 Years
North Industrial Corridor (NIC)
Wichita, Kansas

CDM



J:\2395-NIC\GIS\mxd\030211\Fig E3-9_Particle_15yr_2_8.5x11.mxd 03/07/11 anandams

CDM

Figure F3-9
Particles Originating at Location 2
Simulated Particle Tracking Pathlines at the End of 15 Years
North Industrial Corridor (NIC)
Wichita, Kansas

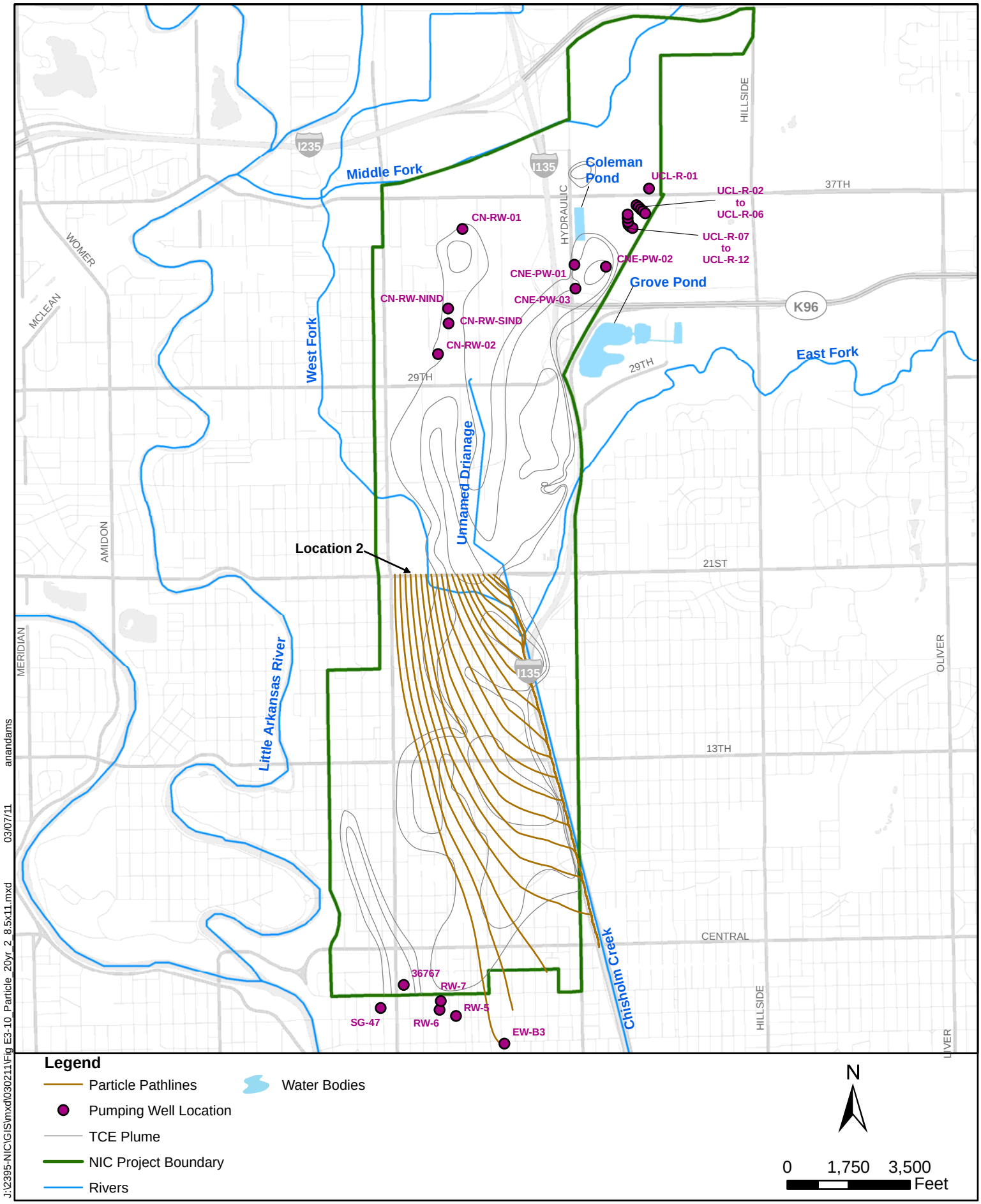
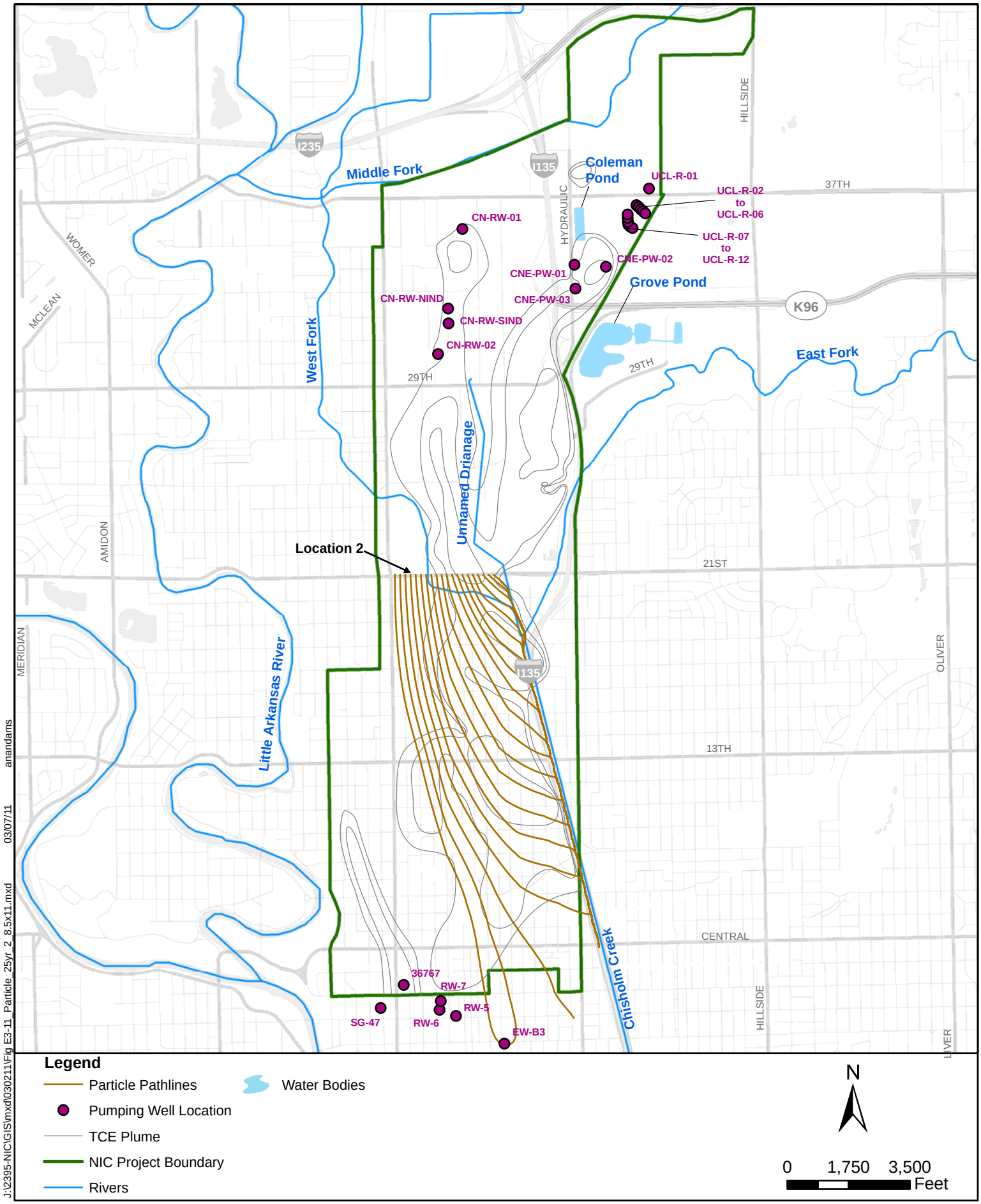


Figure F3-10
Particles Originating at Location 2
Simulated Particle Tracking Pathlines at the End of 20 Years
North Industrial Corridor (NIC)
Wichita, Kansas

CDM



CDM

Figure F3-11
Particles Originating at Location 2
Simulated Particle Tracking Pathlines at the End of 25 Years
North Industrial Corridor (NIC)
Wichita, Kansas

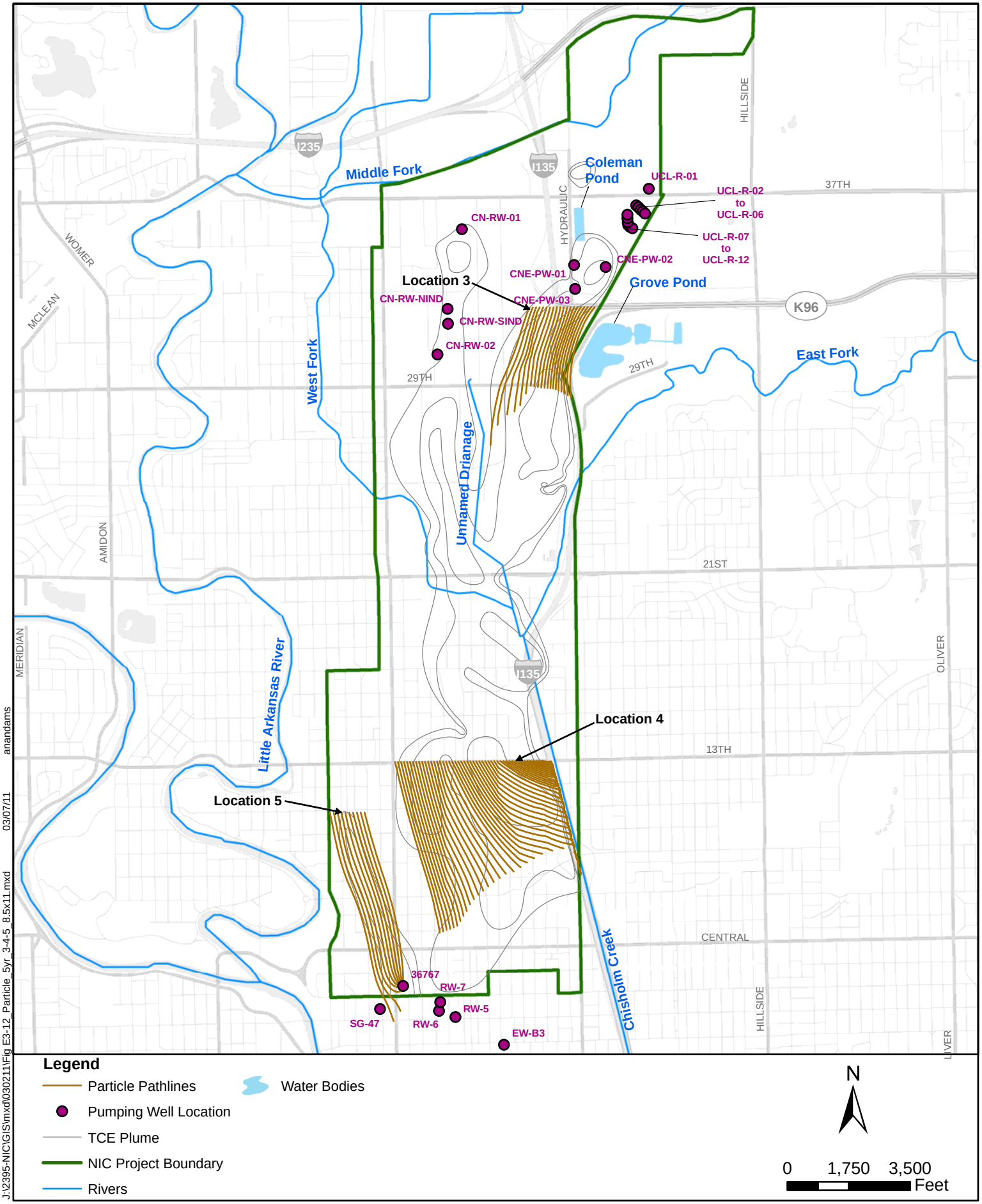
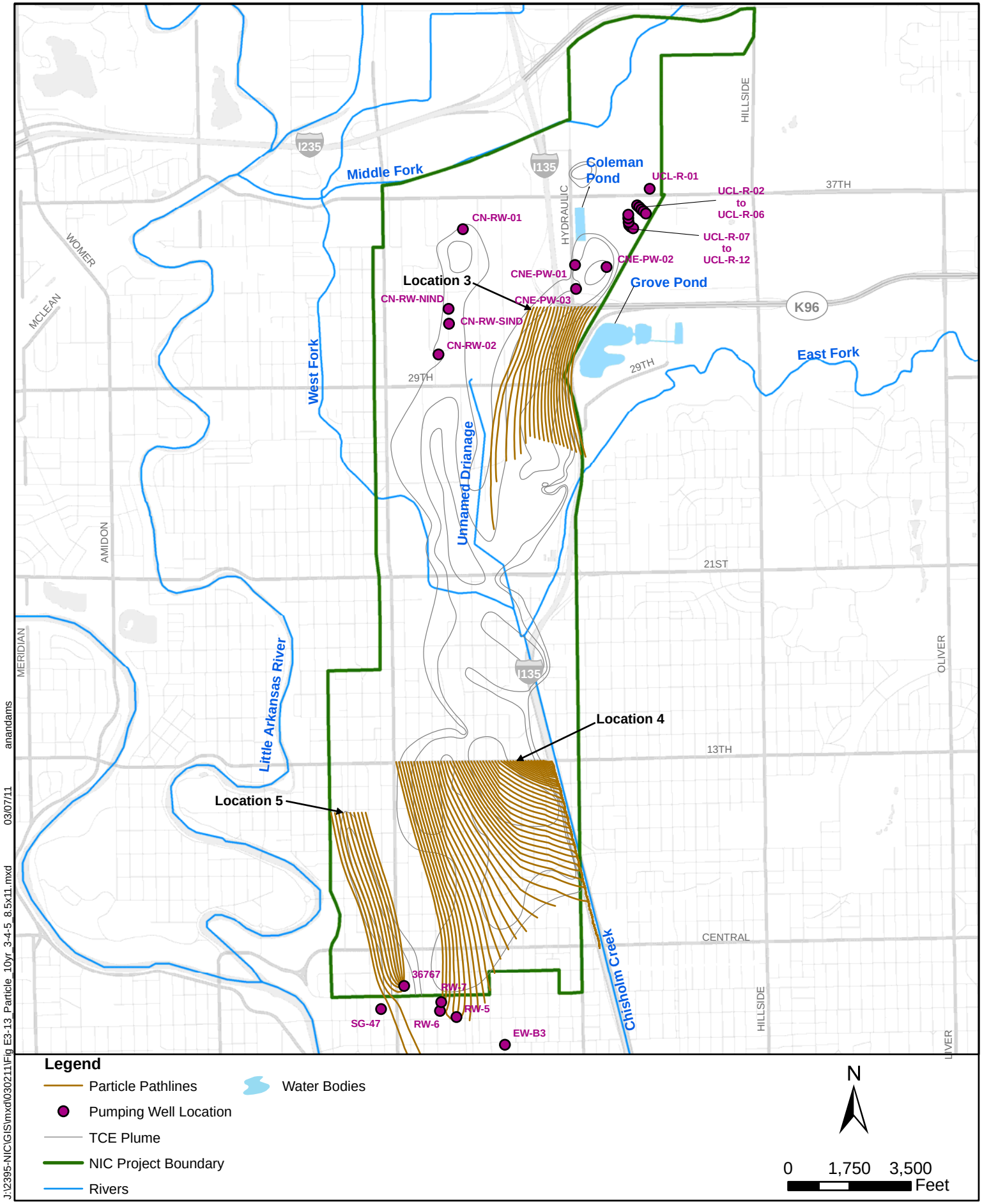


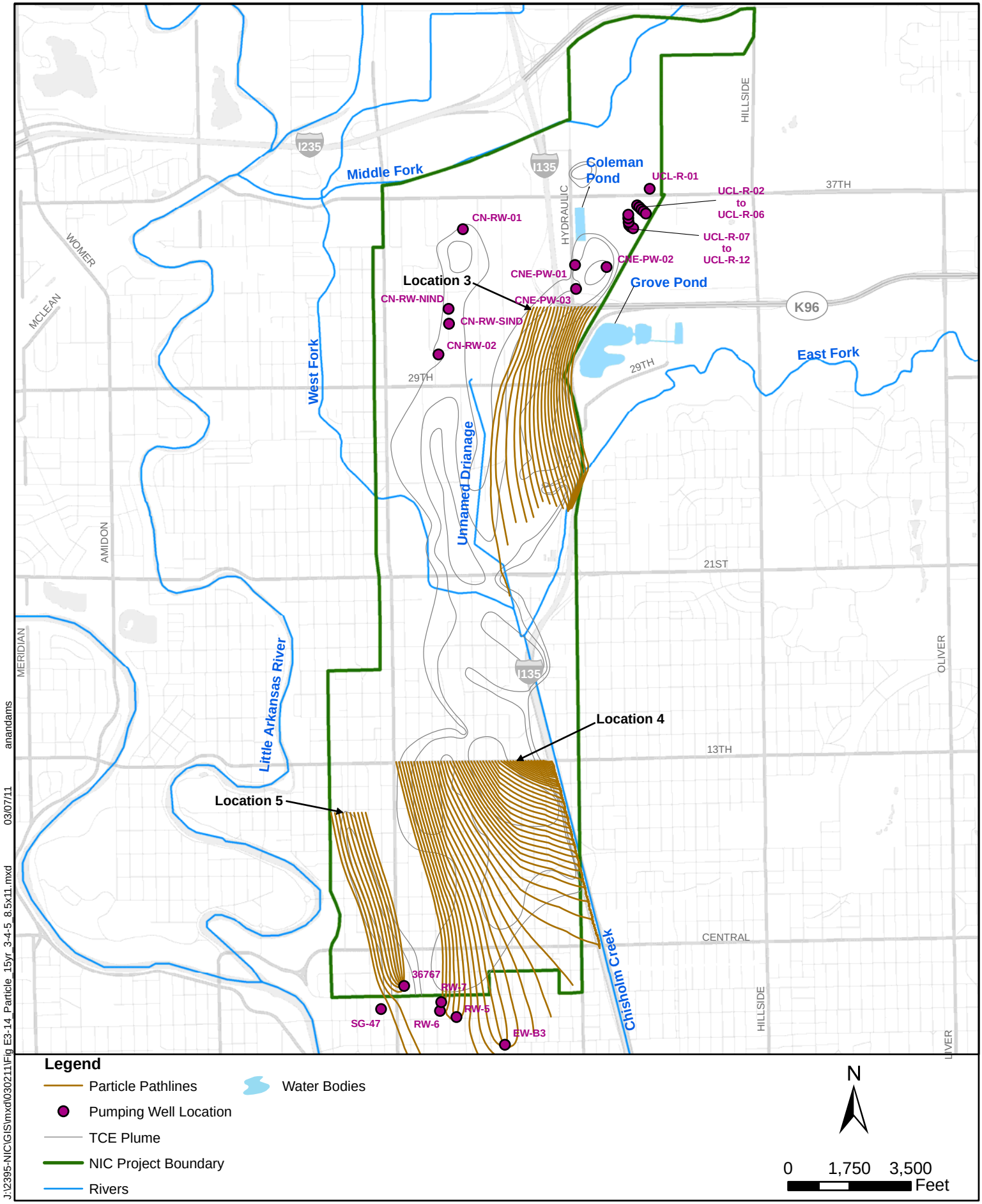
Figure F3-12
Particles Originating at Locations 3, 4 and 5
Simulated Particle Tracking Pathlines at the End of 5 Years
North Industrial Corridor (NIC)
Wichita, Kansas

CDM



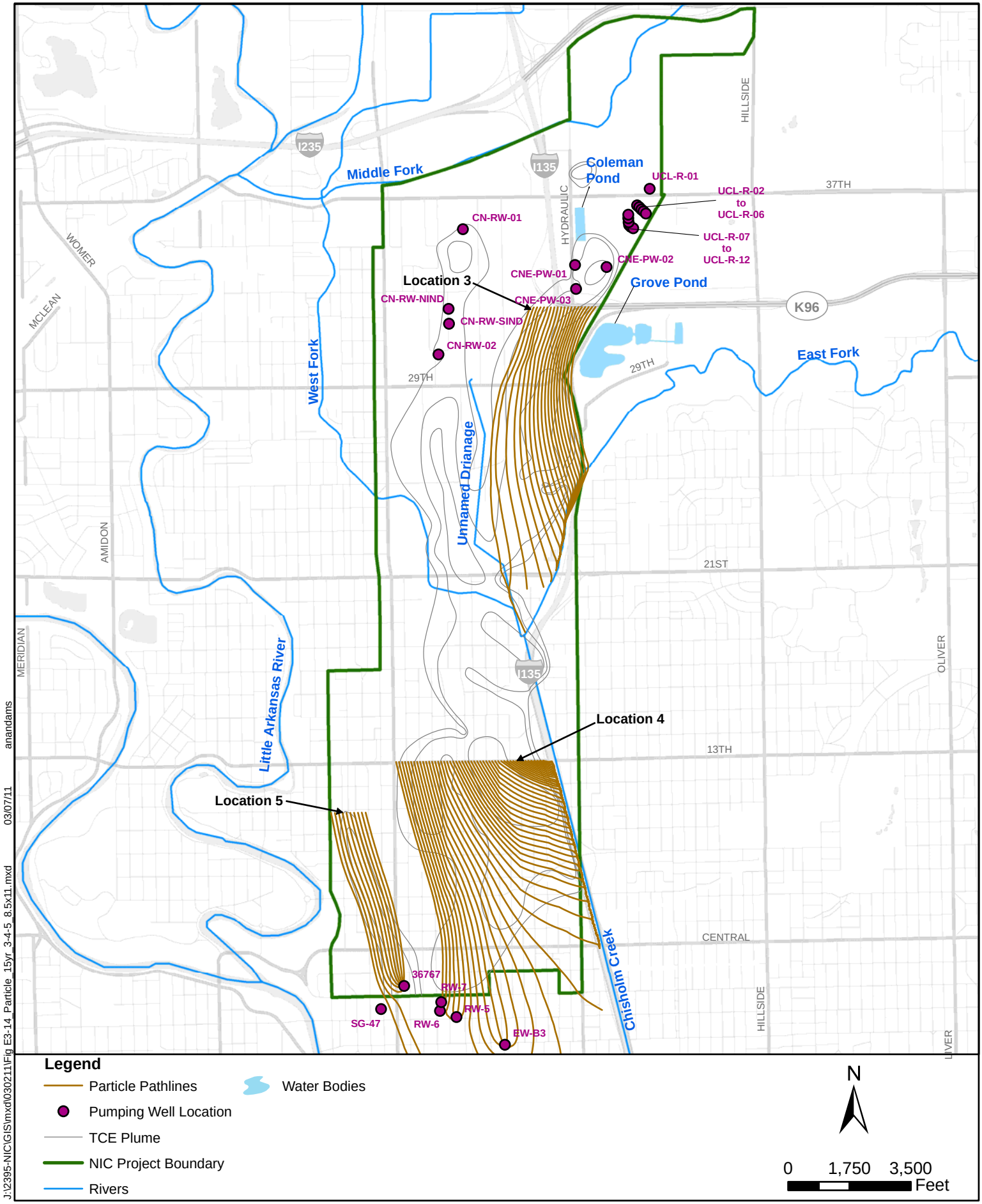
CDM

Figure F3-13
Particles Originating at Locations 3, 4 and 5
Simulated Particle Tracking Pathlines at the End of 10 Years
North Industrial Corridor (NIC)
Wichita, Kansas



CDM

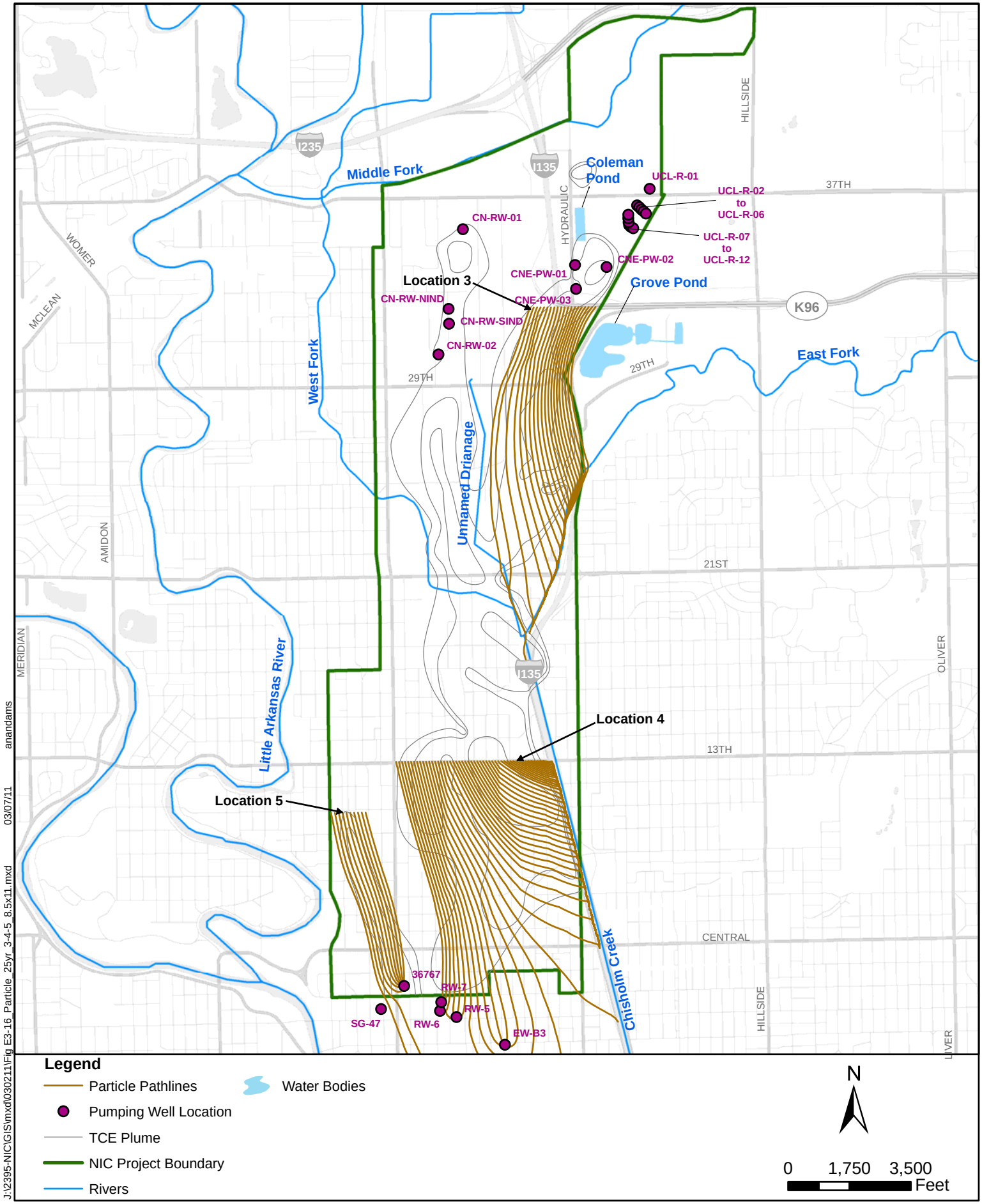
Figure F3-14
Particles Originating at Locations 3, 4 and 5
Simulated Particle Tracking Pathlines at the End of 15 Years
North Industrial Corridor (NIC)
Wichita, Kansas



J:\2395-NIC\GIS\mxd\030211\Fig E3-14_Particle_15yr_3-4-5_8.5x11.mxd 03/07/11 anandams

CDM

Figure F3-15
Particles Originating at Locations 3, 4 and 5
Simulated Particle Tracking Pathlines at the End of 20 Years
North Industrial Corridor (NIC)
Wichita, Kansas



CDM

Figure F3-16
Particles Originating at Locations 3, 4 and 5
Simulated Particle Tracking Pathlines at the End of 25 Years
North Industrial Corridor (NIC)
Wichita, Kansas

Appendix F
NIC FS Model Report
Attachment F4 – CD with Model Input/Output Results – 2001/2004/2008 Calibration Runs