ALS Environmental

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Chain of Custody Form

Page 1 of 1

COC ID: 124872

ALS Project Manager: | ALS Work Order #:

Customer Information		Project Information		Parameter/Method Request for Analysis	
Purchase Order		Project Name	E3CE-0065 Andover Release Site	A	300_W (Sulfate, nitrate, O-Phos)
Work Order		Project Number		B	8260_LL_W (Colt Court GW List)
Company Name	Apex Companies	Bill To Company	Apex Companies	C	ALK_W 2320B
Send Report To	Samuel Jackson	Invoice Attn	Samuel Jackson	D	ICP_DISS (Dissolved Iron)
Address	3015 SW First Avenue	Address	3015 SW First Avenue	E	ICP_TW (Potassium only)
				F	NIT_AMM_W_ISE
City/State/Zip	Portland, OR 97201	City/State/Zip	Portland, OR 97201	G	RSK175 (Methane)
Phone	(503) 924-4704	Phone	(503) 924-4704	H	VPH OA-1_W (HYD-5)
Fax		Fax		I	XXX SUB (SUB CO2 (Simi Valley))
e-Mail Address		e-Mail Address		J	

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	MW-18	4/20/15	1227	W	1,2,3 Neat 4-SM, HNO3	17	X	X	X	X	X	X	X	X	X		
2	MW-19	↓	1315	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓		
3	MW-17	↓	1440	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓		
4	MW-1	↓	1522	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓		
5	MW-4	↓	1604	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓		
6	MW-5	↓	1647	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓		
7					1,2,3 Neat												
8																	
9																	
10																	

Sampler(s) Please Print & Sign: Ted Alfred

Shipment Method:

Required Turnaround Time: (Check Box) TAT: 7 days Other:

Results Due Date:

Relinquished by:	Date: 4/20/15	Time: 1830	Received by:
Relinquished by:	Date:	Time:	Received by (Laboratory):
Logged by (Laboratory):	Date:	Time:	Checked by (Laboratory):

Notes: (E3CE-0065 Andover Release Site)

Cooler ID	Cooler Temp.

QC Package: (Check One Box Below)
QC Level: STD
Other:

Preservative Key: 1-HCl 2-HNO_3 3-H_2SO_4 4-NaOH 5-$Na_2S_2O_3$ 6-$NaHSO_4$ 7-Other 8-4°C 9-5035

Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.
2. Unless otherwise agreed in a formal contract, services provided by ALS Environmental are expressly limited to the terms and conditions stated on the reverse.
3. The Chain of Custody is a legal document. All information must be completed accurately.

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WELL MONITORING DATA SHEET

Ash Creek Associates, Inc.

Well I.D.	MW-5	Job Number:	1641-08.002
Client:	NiSource	Date:	6/16/15
Project:	Andover Q. Co	Sampler:	TA, JH
Weather:	Rainy	Time In/Out:	0815

WELL DATA

Well Depth:	30.00	Well Diameter:	2"	Water Height	
Depth to Water:	19.60	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	bladder	Pump Intake Depth:	25'
Sampling Method:	same	Tubing Type:	poly

Comments

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.2	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
8:41	.400	.400	19.65	.200	6.96	18.16	1412	2.10	158.5	—	AC
8:44	.600	1.000	19.68	.200	6.96	18.00	1420	1.86	157.1	—	C
8:47	.600	1.600	19.72	.200	6.95	17.88	1418	1.44	155.2	—	C
8:50	.600	2.200	19.76	.200	6.95	17.88	1426	1.48	152.6	—	C
8:53	.600	2.800	19.80	.200	6.96	17.90	1429	1.49	148.7	—	C

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-5	Sampling Flow Rate	.200	Analytical Laboratory:	ALS
Sample Time:	08:59	Final Depth to Water:	19.87	Did Well Dewater?	No

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
39 VOA's	HCl	C.O.C.	yes no			
3 VOA's	Neat		yes no			
(3) 250 mL pl	Neat		yes no			
1 H_2SO_4 pl-250mL	H_2SO_4		yes no			
1 HNO_3 pl-250mL	HNO_3		yes no			
			yes no			

COMMENTS

Full MNA parameters ran

WELL MONITORING DATA SHEET

Ash Creek Associates, Inc.

Well I.D.	MW-17	Job Number:	1641-08.002
Client:	NuStar	Date:	6/16/15
Project:	Andover Q.C.	Sampler:	TA, JH
Weather:	Rainy	Time In/Out:	0915

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	
Depth to Water:	31.28	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	bladder	Pump Intake Depth:	36'	Comments	
Sampling Method:	same	Tubing Type:	poly		

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.2	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
0920	.500	.500	31.42	.250	7.14	18.16	1035	1.40	-17.1	-	AC
923	.750	1.250	31.48	.250	7.06	18.27	1033	1.11	-13.8	-	AC
926	.750	2.000	31.48	.250	7.03	17.70	1035	1.06	-11.5	-	C
929	.750	2.750	31.49	.250	7.01	17.51	1036	0.96	-10.6	-	C
0932	.750	3.500	31.49	.250	7.00	17.43	1047	0.92	-9.9	-	C

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-17	Sampling Flow Rate	.250	Analytical Laboratory:	ALS
Sample Time:	0940	Final Depth to Water:	31.52	Did Well Dewater?	No

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
9 VOA's	HCl	C.O	yes no			
3 VOA's	Neat		yes no			
3 250mL Pl	Neat	C.	yes no			
1 250mL Pl	H_2SO_4		yes no			
1 250mL Pl	HNO_3		yes no			
			yes no			

COMMENTS

Full MNA San

WELL MONITORING DATA SHEET

Ash Creek Associates, Inc.

Well I.D.	MW-1	Job Number:	1641-05.004
Client:	Nustar	Date:	6/16/15
Project:	Andover Q.L.	Sampler:	TA, JH
Weather:	Rainy/misty	Time In/Out:	0945

WELL DATA

Well Depth:		Well Diameter:	4"	Water Height	
Depth to Water:	31.31	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	bladder	Pump Intake Depth:	4' from bottom
Sampling Method:	same	Tubing Type:	poly

Comments

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.2	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
0951	.600	.600	31.31	.300	7.08	16.86	1318	1.50	-50.6	–	AC
0954	.900	1.500	31.39	.300	7.05	16.65	1315	1.18	-51.0	–	AC
0957	.900	2.400	31.46	.300	7.02	16.59	1312	1.01	-51.6	–	C
1000	.900	3.300	31.55	.300	7.01	16.50	1311	0.95	-51.7	–	C

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-1	Sampling Flow Rate	.300	Analytical Laboratory:	ALS
Sample Time:	1010	Final Depth to Water:	31.58	Did Well Dewater?	NO

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
9 VOA's	HCl	C.D.L	yes no			
3 VOA's	Neat		yes no			
3 250-pl	Neat		yes no			
1 250-pl	H_2SO_4		yes no			
1 250-pl	HNO_3		yes no			
			yes no			

COMMENTS

Full MNA run

WELL MONITORING DATA SHEET

Ash Creek Associates, Inc.

Well I.D.	MW-18	Job Number:	1641-08.002
Client:	NuStar	Date:	6/16/15
Project:	Andover Q.C.	Sampler:	TA, JH
Weather:	Rainy / Misty	Time In/Out:	1015

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	
Depth to Water:	30.64	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	bladder	Pump Intake Depth:	35'	Comments	
Sampling Method:	same	Tubing Type:	poly		

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.2	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
1022	.500	.500	30.79	.250	7.24	19.17	902	1.90	-34.5	–	Cl
1025	.750	1.250	30.89	.250	7.19	20.00	894	1.31	-30.0	–	Cl
1028	.750	2.000	31.05	.250	7.17	19.21	897	1.24	-26.8	–	Cl
1031	.750	2.750	31.21	.250	7.15	18.99	845	0.95	-22.7	–	SC
1034	.750	3.500	31.33	.250	7.13	18.99	895	0.89	-19.8	–	SC
1037	.750	4.250	31.41	.250	7.12	18.90	899	0.93	-17.6	–	SC

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-18	Sampling Flow Rate	.250	Analytical Laboratory:	AES
Sample Time:	10:45	Final Depth to Water:	31.51	Did Well Dewater?	No

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
9 VOAs	HCl	C	yes ~~no~~			
3 VOAs	NaOH	C	yes ~~no~~			
3 250-PI	NaOH	C	yes ~~no~~			
1 250-PI	H_2SO_4		yes ~~no~~			
1 250-PI	HNO_3		yes ~~no~~			
			yes no			

COMMENTS

Full MNA

WELL MONITORING DATA SHEET

Ash Creek Associates, Inc.

Well I.D.	MW-19	Job Number:	1641-08.002
Client:	NuStar	Date:	6/16/15
Project:	Andover Q.C.	Sampler:	TA, JH
Weather:	Rainy/Misty	Time In/Out:	1055

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	
Depth to Water:	30.60	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	bladder	Pump Intake Depth:	34'
Sampling Method:	Same	Tubing Type:	poly

Comments

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.2	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
10:59	.500	.500	30.59	.250	7.45	20.13	820	1.94	-21.8	–	Cl
11:02	.750	1.250	30.70	.250	7.38	19.66	825	1.28	-34.8	–	Cl
1105	.750	2.000	30.40	.250	7.32	18.77	825	0.66	-62.6	–	SC
1108	.750	2.750	31.15	.250	7.27	18.65	825	0.57	-72.9	–	SC
1111	.450	3.200	31.40	.150	7.25	18.83	827	0.49	-81.6	–	SC

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-19	Sampling Flow Rate	.200	Analytical Laboratory:	ALS
Sample Time:	11:18	Final Depth to Water:	31.86	Did Well Dewater?	No

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
9 VOAs	HCl	C.	yes no			DUP-1
3 VOAs	neat	O.	yes no			
3 250-Pl	neat	C.	yes no			
1 250-Pl	H_2SO_4		yes no			
1 250-Pl	HNO_3		yes no			
			yes no			

COMMENTS

Full MNA

WELL MONITORING DATA SHEET

Ash Creek Associates, Inc.

Well I.D.	MW-4	Job Number:	1641-08.002
Client:	NuStar	Date:	6/16/15
Project:	Andover Q.C.	Sampler:	TA, JA
Weather:	Cloudy	Time In/Out:	

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	
Depth to Water:	29.02	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	bladder	Pump Intake Depth:	33'		Comments
Sampling Method:	same	Tubing Type:	poly		

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.2	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
1156	.500	.500	29.21	.250	7.50	19.46	1084	5.04	15.2	-	AC
1159	.600	1.100	29.34	.200	7.33	19.48	1090	3.88	22.8	—	AC
1202	.450	1.550	29.49	.150	7.27	19.52	1097	3.88	25.7	-	AC
1205	.450	~~1.101~~ 2.000	29.53	.150	7.24	19.74	1101	3.82	26.1	-	AC

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-4	Sampling Flow Rate	.150	Analytical Laboratory:	ALS
Sample Time:	1210	Final Depth to Water:	29.76	Did Well Dewater?	No

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
9 VOAs	HCl	C.	yes no			
3 VOAs	Neat	O.	yes no			
3 250-PI	Neat	C.	yes no			
1 250-PI	H_2SO_4		yes no			
1 250-PI	HNO_3		yes no			
			yes no			

COMMENTS

Full MNA

WELL MONITORING DATA SHEET

Ash Creek Associates, Inc.

Well I.D.	MW-2	Job Number:	1641-08.002
Client:	NuStar	Date:	8-16-15
Project:	Andover Q.C.	Sampler:	TA, JH
Weather:	Sunny	Time In/Out:	1340

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	
Depth to Water:	34.83	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	bladder	Pump Intake Depth:	38'		Comments
Sampling Method:	sample	Tubing Type:	poly		

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.2	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
13:45	.400	.400	34.94	.200	7.70	21.76	820	4.21	29.7	–	AC
13:48	.600	1.000	34.88	.200	7.42	20.17	816	3.25	36.7	–	C
1351	.600	1.600	34.96	.200	7.36	19.20	799	2.77	47.1	–	C
1354	.600	2.200	35.15	.200	7.30	19.22	803	2.69	42.8	–	C
1357	.600	2.800	35.23	.200	7.29	19.01	806	2.73	40.4	–	C
1400	.600	3.400	35.28	.200	7.28	18.89	805	2.75	40.1	–	C

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-2	Sampling Flow Rate	.200	Analytical Laboratory:	ACS
Sample Time:	14:02	Final Depth to Water:	35.34	Did Well Dewater?	NO

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
6 VOAs	HCl	GRO/VOCs	yes (no)			
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

Ash Creek Associates, Inc.

Well I.D.	MW-12	Job Number:	
Client:	NuStar	Date:	6-16-15
Project:	Andover Q.C.	Sampler:	TA, JH
Weather:	Sunny	Time In/Out:	1455

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	
Depth to Water:	30.86	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	bladder	Pump Intake Depth:	35'
Sampling Method:	same	Tubing Type:	poly

	Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
						+/-0.2	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	← Stabilization Criteria
Sunny	1503	.600	.600	30.87	.300	7.26	21.89	1028	3.61	48.5	—	SC
	1506	.750	1.350	30.90	.250	7.06	21.28	1019	2.49	54.3	—	SC
	1509	.750	2.100	30.91	.250	7.15	20.46	1018	2.47	51.1	—	SC
Cloud	1512	.750	2.850	30.91	.250	7.15	19.91	1017	2.45	50.6	—	SC
	1515	.750	3.600	30.91	.250	7.16	19.69	1014	2.42	50.5	—	SC
Sunny	1518	.750	4.350	30.91	.250	7.15	20.24	1014	2.43	49.8	—	SC

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-12	Sampling Flow Rate	.200	Analytical Laboratory:	ALS
Sample Time:	15:22	Final Depth to Water:	30.91	Did Well Dewater?	No

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
6 VOAS	HCl	C.O.C.	yes no			
		VOCs/GRO	yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

Cloud cover affecting YSI chamber & tubing – intermittent & causing temp fluctuations.

WELL MONITORING DATA SHEET

Ash Creek Associates, Inc.

Well I.D.	MW-10	Job Number:	1641-08.003
Client:	NuStar	Date:	6-16-15
Project:	Andover Q.C.	Sampler:	TA, JH
Weather:	Sunny	Time In/Out:	1555

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	
Depth to Water:	28.30	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	bladder	Pump Intake Depth:	1.5' from bottom
Sampling Method:	same	Tubing Type:	poly

Comments

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.2	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<- Stabilization Criteria
16:02	.600	.600	28.35	.300	7.36	21.30	1466	5.21	47.4	–	AC
16:05	.900	1.500	28.39	.300	7.24	19.73	1452	1.08	54.5	–	AC
16:08	.900	2.400	28.42	.300	7.17	19.02	1447	0.74	52.2	–	AC
16:11	.900	3.300	28.45	.300	7.29	19.30	1447	0.64	49.5	–	AC
16:14	.900	4.200	28.46	.300	7.28	19.13	1439	0.55	47.1	–	AC

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-10	Sampling Flow Rate	.200	Analytical Laboratory:	ALS
Sample Time:	16:17	Final Depth to Water:	28.47	Did Well Dewater?	No

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
6 VOAs	HCl	C.O.C.	yes no			
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

Ash Creek Associates, Inc.

Well I.D.	MW-9	Job Number:	1641-09.002
Client:	NuStar	Date:	6/16/15
Project:	Andover Q.C.	Sampler:	TA, JH
Weather:	Sunny	Time In/Out:	16:32

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	
Depth to Water:	29.83	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	bladder	Pump Intake Depth:	32'	Comments	
Sampling Method:	same	Tubing Type:	poly		

	Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
						+/-0.2	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
	16:33	.500	.500	29.84	.250	7.23	20.70	1263	2.61	60.8	—	SC
	16:36	.750	1.250	30.01	.250	7.07	19.15	1249	1.06	66.8	—	SC
1639	16:39	.750	2.000	30.12	.250	7.04	19.03	1247	0.92	65.9	—	SC
1642	16:42	.600	2.600	30.19	.200	7.10	19.35	1247	0.79	62.5	—	AC
1645	16:45	.600	3.200	30.28	.200	7.16	19.40	1247	0.67	60.5	-	AC

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-9	Sampling Flow Rate	.200	Analytical Laboratory:	ALS	
Sample Time:	16:49	Final Depth to Water:	30.33	Did Well Dewater?	No	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
6 VOAs	HCl	C.O.C.	yes (no)			
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

Ash Creek Associates, Inc.

Well I.D.	MW-15	Job Number:	1641-08.002
Client:	NuStar	Date:	6-17-15
Project:	Andover Q.C.	Sampler:	TA, JH
Weather:	Cloudy	Time In/Out:	0845

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	
Depth to Water:	32.34	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	bladder	Pump Intake Depth:	35.5'	Comments	
Sampling Method:	Same	Tubing Type:	poly		

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.2	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
0850	.400	.400	32.50	.200	7.12	19.76	748	4.58	116.9	—	AC
0853	.450	.850	32.55	.150	7.08	19.28	744	3.72	113.6	—	AC
0856	.450	1.300	32.62	.150	7.08	19.16	745	3.63	113.2	—	AC
0859	.450	1.750	32.66	.150	7.08	18.82	744	3.60	113.1	—	C
0902	.450	1.200	32.70	.150	7.08	18.87	744	3.58	113.0	—	C
0905	.450	1.650	32.73	.150	7.08	18.85	744	3.58	112.8	—	C

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-15	Sampling Flow Rate	.200	Analytical Laboratory:	ALS
Sample Time:	0910	Final Depth to Water:	32.75	Did Well Dewater?	NO

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
6 VOAs	HCl	C.O.C.	yes ~~no~~			
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

Ash Creek Associates, Inc.

Well I.D.	MW-16	Job Number:	1641-08.002
Client:	NuStar	Date:	6/17/15
Project:	Andover Q.C.	Sampler:	TA, JH
Weather:	Cloudy	Time In/Out:	0927

WELL DATA

Well Depth:		Well Diameter:		Water Height	
Depth to Water:	29.48	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	bladder	Pump Intake Depth:	33'	Comments	
Sampling Method:	same	Tubing Type:	poly		

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.2	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
0930	.500	.500	28.52	.250	7.41	20.20	886	5.04	119.3	—	SC
933	.750	1.250	28.98	.250	7.24	19.42	882	4.05	124.4	—	SC
936	.450	1.700	29.21	.150	7.16	20.16	884	3.71	123.9	—	AC
939	.300	2.000	29.30	.100	7.14	20.22	888	3.70	123.2	—	AC
0942	.300	2.300	29.35	.100	7.16	20.30	889	3.66	120.2	—	AC

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-16	Sampling Flow Rate	.150	Analytical Laboratory:	ALS
Sample Time:	9:45	Final Depth to Water:	29.40	Did Well Dewater?	No

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
6 VOAs	HCl	C.O.C.	yes (no)			
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

Ash Creek Associates, Inc.

Well I.D.	MW-11	Job Number:	1641-08.002
Client:	NuStar	Date:	6/17/15
Project:	Andover Q.C.	Sampler:	TA, JH
Weather:	Cloudy	Time In/Out:	10:01

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	
Depth to Water:	30.86 6/16	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	bladder	Pump Intake Depth:	34'
Sampling Method:	same	Tubing Type:	poly

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.2	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	← Stabilization Criteria
10:06	.600	.600	28.45	.300	7.29	19.51	1466	2.01	121.8	–	AC
10:09	.750	1.300	28.87	.250	7.14	18.81	1467	1.75	125.9	–	AC
10:12	.450	1.750	28.97	.150	7.12	18.98	1465	1.73	124.1	–	AC
10:15	.450	1.200	29.08	.150	7.12	18.94	1463	1.78	120.3	–	AC

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-11	Sampling Flow Rate	.200	Analytical Laboratory:	ALS
Sample Time:	10:19	Final Depth to Water:	29.20	Did Well Dewater?	No

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
6 VOAs	HCl	C.O.C.	yes (no)			DUP 2
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

Ash Creek Associates, Inc.

Well I.D.	MW-8	Job Number:	1641-08.002
Client:	Nustar	Date:	6-17-15
Project:	Andover Q.C.	Sampler:	TA, JH
Weather:	Cloudy	Time In/Out:	1038

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	
Depth to Water:	19.93	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	bladder	Pump Intake Depth:	23'
Sampling Method:	same	Tubing Type:	poly

Comments

	Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
						+/-0.2	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
Sunny	1041	.400	.400	20.08	.200	7.49	20.46	1217	7.85	110.8	—	AC
cloudy	1044	.600	1.000	20.30	.200	7.32	18.82	1202	3.71	115.7	—	AC
Cloudy	1047	.450	1.450	20.26	.150	7.22	18.91	1202	3.38	118.3	—	AC
cloudy	1050	.600	2.050	20.30	.200	7.20	19.10	1201	3.24	115.6	—	C
sunny	1053	.600	2.650	20.30	.200	7.19	19.42	1207	3.19	112.4	—	C
	1056	.600	3.250	20.31	.200	7.18	19.26	1209	3.16	109.8	—	C

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-8	Sampling Flow Rate	.200	Analytical Laboratory:	ALS
Sample Time:	11:00	Final Depth to Water:	20.31	Did Well Dewater?	No

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
6 VOAs	HCl	~~AA~~ C.O.C.	yes (no)			
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

Ash Creek Associates, Inc.

Well I.D.	MW-13	Job Number:	1641-08.002
Client:	NuStar	Date:	6-17-15
Project:	Andover Q.C.	Sampler:	TA, SH
Weather:	Sunny	Time In/Out:	1104

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	
Depth to Water:	31.94	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	bladder	Pump Intake Depth:	35'
Sampling Method:	same	Tubing Type:	poly

Comments

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.2	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	← Stabilization Criteria
11:13	.500	.500	31.96	.250	7.53	21.08	685	6.55	99.5	—	SC
11:16	.750	1.250	32.34	.250	7.36	18.54	672	5.47	109.1	—	SC
11:19	.450	1.700	32.46	.150	7.31	18.71	672	5.31	106.9	—	SC
11:22	.450	2.150	32.55	.150	7.30	18.89	673	5.26	105.4	—	SC
11:25	.450	2.600	32.64	.150	7.28	18.91	673	5.19	103.6	—	SC
11:27	.300	2.900	32.73	.150	7.27	18.95	673	5.22	101.9	—	SC

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-13	Sampling Flow Rate	.200	Analytical Laboratory:	ALS
Sample Time:	11:30	Final Depth to Water:	32.79	Did Well Dewater?	No

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
6 VOAs	HCl	C.O.C.	yes (no)			
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

Ash Creek Associates, Inc.

Well I.D.	MW-14	Job Number:	1641-08.002
Client:	NuStar	Date:	6-17-15
Project:	Andover Q.C.	Sampler:	JA, JH
Weather:	Sunny/Cloudy	Time In/Out:	~~1130~~ 1138

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	
Depth to Water:	31.70	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	bladder	Pump Intake Depth:	34'	Comments	
Sampling Method:	bladder	Tubing Type:	poly		

	Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
						+/-0.2	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
	11:41	.500	.500	31.80	.250	7.48	20.11	700	4.37	95.1	–	AC
cloudy	11:44	.750	1.250	32.30	.250	7.24	18.37	693	3.72	102.0	–	AC
cloudy	11:47	.300	1.550	32.50	.100	7.20	18.56	697	3.59	101.0	–	AC
cloudy	11:50	.300	1.850	32.63	.100	7.20	18.63	696	3.49	99.8	–	AC
partly sunny	11:53	.300	2.150	32.71	.100	7.20	18.90	698	3.42	97.3	–	AC

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-14	Sampling Flow Rate	.200	Analytical Laboratory:	ALS
Sample Time:	11:57	Final Depth to Water:	32.83	Did Well Dewater?	No

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
6 VOAs	HCl	C.O.C.	yes (no)			
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

Ash Creek Associates, Inc.

Well I.D.	MW-3	Job Number:	1641-08.002
Client:	NuStar	Date:	6-17-15
Project:	Andover Q.C.	Sampler:	TA, JH
Weather:	Sunny	Time In/Out:	1320

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	
Depth to Water:	38.21	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	bladder	Pump Intake Depth:	42'	Comments	
Sampling Method:	same	Tubing Type:	poly		

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.2	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<- Stabilization Criteria
1327	.500	.500	38.10	.250	7.30	22.77	920	1.91	-56.1	—	C
1330	.750	1.250	38.12	.250	7.20	20.60	939	0.85	-61.7	—	C
1333	.750	2.000	38.14	.250	7.12	19.97	934	0.68	-68.2	—	C
1336	.750	2.750	38.15	.250	7.08	19.33	944	0.62	-74.2	—	C
1339	.750	3.500	38.15	.250	7.05	18.97	946	0.50	-80.1	—	C
1342	.750	4.250	38.16	.250	7.04	18.87	947	0.46	-83.3	—	C

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-3	Sampling Flow Rate	.200	Analytical Laboratory:	ACS	
Sample Time:	13:45	Final Depth to Water:	38.16	Did Well Dewater?	NO	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
6 VOAs	HCl	C.O.C	yes no			
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

tubing + YSI cylinder exposed to intermittent sunshine - temp variances experienced, as well as higher than avg. temps.

WELL MONITORING DATA SHEET

Ash Creek Associates, Inc.

Well I.D.	MW-7	Job Number:	1641-08.002
Client:	NuStar	Date:	6-17-15
Project:	Andover Q.C.	Sampler:	TA, JH
Weather:	Sunny	Time In/Out:	1350

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	
Depth to Water:	14.91	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	~~Hydrolift~~ peri	Pump Intake Depth:	19'
Sampling Method:	same - peri	Tubing Type:	poly

Comments

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.2	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
1357	.600	.600	15.01	.200	7.41	17.75	866	2.26	-43.2	—	C
1400	.600	1.200	15.15	.200	7.32	17.30	897	1.13	-37.2	—	C
1403	.600	1.800	15.18	.200	7.27	17.20	879	0.90	-34.1	—	C
1406	.600	2.400	15.21	.200	7.26	17.32	881	0.78	-32.4	—	C
1409	.600	3.000	15.22	.200	7.26	17.28	876	0.64	-31.9	—	C
1411	.600	3.600	15.23	.200	7.27	17.16	868	0.60	-31.2	—	C

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-7	Sampling Flow Rate	.200	Analytical Laboratory:	ACS
Sample Time:	1414	Final Depth to Water:	15.23	Did Well Dewater?	NO

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
6 VOAs	HCl	C.O.C.	yes (no)			
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

Ash Creek Associates, Inc.

Well I.D.	MW-6	Job Number:	164f-08.002
Client:	Nustar	Date:	6-17-15
Project:	Andover Q.C.	Sampler:	TA, JH
Weather:	Sunny	Time In/Out:	1416

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	
Depth to Water:	20.45	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	peristaltic	Pump Intake Depth:	24'	Comments
Sampling Method:	same	Tubing Type:	poly	

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.2	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	← Stabilization Criteria
14:20	.400	.400	20.71	.200	7.38	17.51	1294	4.56	-1.7	—	C
1423	.600	1.000	20.93	.200	7.25	17.49	1297	3.95	4.9	—	C
1426	.600	1.600	21.11	.200	7.19	17.45	1292	3.96	10.3	—	C
1429	.600	2.200	21.25	.200	7.17	17.62	1288	3.94	13.0	—	C
1432	.600	2.800	21.37	.200	7.15	17.60	1280	3.88	14.9	—	C

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-6	Sampling Flow Rate	.200	Analytical Laboratory:	ALS
Sample Time:	1434	Final Depth to Water:	21.43	Did Well Dewater?	No

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
6 VOAs	HCl	C.O.C.	yes (no)			
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

Tubing bringing up small, intermittent bubbles - possibly affecting YSI cylinder DO reading

APEX

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(503) 924-4704 Phone
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PROJECT NUMBER 320001641-07/08
FIELD REPORT NUMBER
PAGE 1 OF 1
DATE 03-10-2015

PROJECT	QUAIL CROSSING PILOT TEST	ARRIVAL TIME	0845
LOCATION	ANDOVER, KANSAS	DEPARTURE TIME	1630
CLIENT	NUSTAR	WEATHER	FOG (40'S) AM / CLEAR (70'S) PM
PURPOSE OF OBSERVATIONS	WELL INSTALLATION / PILOT TEST		
APEX REPRESENTATIVE	M. WHITSON	APEX PROJECT MANAGER	S. JACKSON
CONTRACTOR	LAYNE DRILLING	PERMIT NO.	–
CONTRACTOR REP.	CHAD AND MARK	H&S REVIEW	✓

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0845 APEX (M. WHITSON) ARRIVES ON SITE, DRILLERS (CHAD AND MARK; LAYNE) HAVE STAGED EQUIPMENT AND LEFT TO OBTAIN WATER USE PERMIT AND TOTALIZER FROM CITY.
WELL LOCATIONS HAVE BEEN CLEARED, UTILITY LOCATES APPEAR TO HAVE BEEN COMPLETED.
PID AND INTERFACE PROBE SHIPMENT WAS DELAYED, WILL ARRIVE AT FEDEX FACILITY BY NOON TODAY.
0945 LAYNE ON SITE, MOVE PORTA POTTY INSIDE OF DELINEATION ZONE
WALK SITE WITH LAYNE, GO OVER SCOPE OF WORK
1015 START MOVING EQUIPMENT, JACE AND JASON (APEX) ARRIVE ON SITE.
APEX FINISHES CLEARING MW-17 LOC.
LAYNE SETUP ON MW-18 LOC.
H+S REVIEW
1100 JACE AND JASON HEAD TO EASTER ADDITION TO CLEAR LOCATIONS
LAYNE EXPERIENCING RIG DIFFICULTIES / TROUBLESHOOT
APEX MOBS TO FEDEX TO PICKUP PID / INTERFACE PROBE AND SAMPLE JARS / COOLERS
RETURN TO SITE, FEDEX WILL DELIVER TOMORROW MORNING
MOB TO EASTER ADDITION
1515 START ABANDONING WELLS AT EASTER ADDITION, AS-1 - AS-3, MC-1 - MC-3, MW-1, MW-F.
1600 SURFACE MONUMENTS REMOVED, PROTECT HOLES
CLEAN UP
1630 DEPART SITE

BY

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PROJECT NUMBER 320001641-08
FIELD REPORT NUMBER
PAGE 1 OF 1
DATE 03-11-2015

PROJECT	QUAIL CROSSING PILOT TEST	ARRIVAL TIME	1010
LOCATION	ANDOVER, KS	DEPARTURE TIME	1830
CLIENT	NUSTAR	WEATHER	CLEAR (60'S-70'S) CALM
PURPOSE OF OBSERVATIONS	WELL INSTALLATION / PILOT TEST		
APEX REPRESENTATIVE	M. WHITSON	APEX PROJECT MANAGER	S. JACKSON
CONTRACTOR	LAYNE DRILLING	PERMIT NO.	–
CONTRACTOR REP.	CHAD AND MARK	H&S REVIEW	✓

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1010 APEX ARRIVES ON SITE AFTER PICKING UP EQUIP/BOTTLES AT FEDEX, LAYNE ON SITE
1015 H+S PLAN REVIEW WITH CHAD AND MARK, LAYNE DOES NOT HAVE FR, OKAY (PM)
1030 START CORING MW-18 LOCATION (SEE LOG), PAMELA (KDHE) ON SITE
1130 KDHE DEPARTS, PHOTOGRAPH MW-6 AND MW-7 MON.S FOR FIX
1345 FINISH WITH MW-18 (CASED TO 19' BGS)
MOVE TO MW-19 LOCATION AND SET UP
1500 START CORING MW-19 (SEE LOG), DRILLERS ASK ABOUT LANDFARM
1800 DOWN TO 45' BGS IN MW-19 (CASED TO 19' BGS)
CLEAN UP, TALK TO DRILLERS ABOUT LANDFARM HOURS (8-5 PM)
1830 DEPART SITE

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PROJECT NUMBER 320001641-08/07
FIELD REPORT NUMBER
PAGE 1 OF 1
DATE 03-12-2015

PROJECT	QUAIL CROSSING PILOT TEST	ARRIVAL TIME	0800
LOCATION	ANDOVER, KS	DEPARTURE TIME	1815
CLIENT	NUSTAR	WEATHER	CLEAR (40's-70's) CALM
PURPOSE OF OBSERVATIONS	WELL INSTALLATION/PILOT TEST		
APEX REPRESENTATIVE	M. WHITSON	APEX PROJECT MANAGER	S. JACKSON
CONTRACTOR	LAYNE DRILLING	PERMIT NO.	–
CONTRACTOR REP.	CHAD AND MARK	H&S REVIEW	✓

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0800 APEX ARRIVES ON SITE, LAYNE ON SITE, H+S REVIEW
LAYNE SETS UP ON MW-17 LOCATION USING MUD MATS FOR TRACE RIG
0830 GAUGE WATER IN MW-18 AND MW-19
0830 START CORING MW-17 LOCATION (SEE LOG)
1115 FINISH CORING MW-17 (CASED TO 19' BGS)
1200 GAUGE OPEN BOREHOLE
LAYNE CLEANS UP AND MOBS TO EASTER ADDITION
SETUP ON MW-1R LOCATION
1430 START CORING MW-1R (SEE LOG)
1640 FINISH CORING MW-1R LOCATION
INSTALL MW-1R WELL FROM 25-40' (SCREENED) (SEE INSTALLATION LOG)
MOVE RIG OFF MW-1R
CLEAN UP
1815 DEPART SITE

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PROJECT NUMBER 320001641-07
FIELD REPORT NUMBER
PAGE 1 OF 1
DATE 03-13-2015

PROJECT	EASTER ADDITION	ARRIVAL TIME	0845
LOCATION	ANDOVER, KS	DEPARTURE TIME	1915
CLIENT	NUSTAR	WEATHER	CLEAR (40'S-70'S) CALM
PURPOSE OF OBSERVATIONS	WELL INSTALLATION / PILOT TEST		
APEX REPRESENTATIVE	M. WHITSON	APEX PROJECT MANAGER	S. JACKSON
CONTRACTOR	LAYNE DRILLING	PERMIT NO.	–
CONTRACTOR REP.	MARK AND CHAD	H&S REVIEW	✓

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0845 APEX ARRIVES ON SITE, H+S REVIEW
0915 LAYNE SAYS RIG IS NOT STARTING UP, THEY ARE TROUBLESHOOTING AND MAKING PHONE CALLS TO FIX IT. CALL S. JACKSON
LAYNE CALLS JOHN DEERE MECHANIC
1015 GAUGE WELLS AT QUAIL CROSSING
LAYNE TROUBLESHOOTING RIG
CLEAN UP SITE, LOAD UP SOIL
1120 LAYNE TAKES LOAD TO EL DORADO
1300 LAYNE RETURNS FROM EL DORADO
MECHANIC ON SITE
WORK ON RIG
1445 RIG UP AND RUNNING MECHANIC DEPARTS
SENSOR, FUEL FILTER, COMBINATION OF OTHER ISSUES
WITH RIG IN VICINITY OF WELLS TO BE ABANDONED, SET UP TREMIE AND INJECT GROUT IN WELLS TO ABANDON, MOVE RIG TO F-1R LOC.
1550 SETUP ON F-1R LOC.
1615 START CORING F-1R LOCATION (SEE LOG)
1900 FINISH CORING F-1R
1915 CLEAN UP, DEPART SITE

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PROJECT NUMBER 320001641-07/08
FIELD REPORT NUMBER
PAGE 1 OF
DATE 03-14-15

PROJECT	EASTER ADDITION / QUAIL CROSSING	ARRIVAL TIME	0800
LOCATION	ANDOVER, KS	DEPARTURE TIME	1730
CLIENT	NUSTAR	WEATHER	CLEAR (70'S) CALM
PURPOSE OF OBSERVATIONS	WELL REPLACEMENT / INSTALLATION / PILOT TEST		
APEX REPRESENTATIVE	M. WHITSON	APEX PROJECT MANAGER	S. JACKSON
CONTRACTOR	LAYNE DRILLING	PERMIT NO.	-
CONTRACTOR REP.	MARK AND CHAD	H&S REVIEW	✓

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0800 APEX ARRIVES ON SITE, H+S REVIEW
RUN CASING IN F-1R LOCATION, START INSTALLING WELL (25-40')
0915 WELL INSTALLED, START CLEANUP DEMOB OFF WELL LOCATION
SETUP OVER F-1 TO ABANDON, MOVE EQUIPMENT
0930 START ABANDONMENT OF F-1
CHIP MONUMENT
0945 PLUG WELL WITH GROUT THROUGH TREMIE
CUT CASING 3' BGS, TALK WITH OWNER ABOUT RUTS IN DRIVEWAY THEY SUGGEST GRAVEL FILL
1020 LAYNE TO MENARDS FOR TOP SOIL
PLACE TOP SOIL, COMPLETE SURFACE ON F-1R AND MW-1R
1300 ALL ABANDONMENTS COMPLETE
CLEAN UP AND MOVE TO QUAIL CROSSING
1330 GAUGE WELLS AT QUAIL CROSSING
MOVE EQUIPMENT
1430 START SETTING UP ON INJECTION LOCATION IB-1
1515 START CORING IB-1 LOC. (SEE LOG)
1700 GET TO 29' BGS, STOP FOR DAY
CLEAN UP
1730 DEPART SITE

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PROJECT NUMBER 320001641-08
FIELD REPORT NUMBER
PAGE 1 OF 1
DATE 03-15-2015

PROJECT	QUAIL CROSSING	ARRIVAL TIME	0930
LOCATION	ANDOVER, KS	DEPARTURE TIME	1800
CLIENT	NUSTAR	WEATHER	CLEAR (40'S/60'S) CALM
PURPOSE OF OBSERVATIONS	WELL INSTALL/PILOT TEST		
APEX REPRESENTATIVE	M. WHITSON	APEX PROJECT MANAGER	S. JACKSON
CONTRACTOR	LAYNE	PERMIT NO.	–
CONTRACTOR REP.	MARK/CHAD	H&S REVIEW	✓

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0930 APEX ARRIVES ON SITE, LAYNE ON SITE, H+S REVIEW
SETUP ON IB-1 LOCATION
1015 RESUME CORING IB-1 (SEE LOG)
1115 COMPLETE IB-1 (CASED TO 20' BGS)
MOVE TO IB-2 AND SETUP
1115 CORE IB-2 (SEE LOG)
1330 IB-2 COMPLETE (CASED TO 20' BGS)
MOVE TO IB-3 AND SETUP
1330 CORE IB-3 (SEE LOG)
1600 COMPLETE IB-3 (CASED TO 20' BGS
1600 GAUGE WELLS ON SITE (SEE GAUGING SHEET)
CLEAN UP
SETUP ON IB WELLS FOR INJECTION, DISCUSS WITH S. JACKSON
WILL START WITH WELL INSTALLATIONS TOMORROW
CLEAN UP
1800 DEPART SITE

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PROJECT NUMBER 320001641-08
FIELD REPORT NUMBER
PAGE 1 OF 1
DATE 03-16-15

PROJECT	NUSTAR QUAIL CROSSING	ARRIVAL TIME	0830
LOCATION	ANDOVER, KS	DEPARTURE TIME	~~1630~~ MW 03-16-15 1700
CLIENT	NUSTAR	WEATHER	CLEAR
PURPOSE OF OBSERVATIONS	WELL INSTALLATION / PILOT STUDY / TEST		
APEX REPRESENTATIVE	M. WHITSON	APEX PROJECT MANAGER	S. JACKSON
CONTRACTOR	LAYNE DRILLING	PERMIT NO.	–
CONTRACTOR REP.	MARK AND CHAD	H&S REVIEW	✓

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0830 APEX ARRIVES ON SITE, LAYNE ON SITE, H+S REVIEW
MOVE RIG TO SETUP ON MW-17 FOR INSTALLATION
RIG SETUP OVER MW-17
RUN CASING DOWN TO 42'
CASING DOWN TO DEPTH
START INSTALLING WELL MW-17 FROM 27-42' (SCREENED)
1310 WELL INSTALLED (MW-17)
MOVE RIG, SETUP ON MW-19 TO CONSTRUCT WELL
RIG SETUP, POSITION CASING
1340 START SENDING CASING DOWN TO 42'
CASING DOWN TO DEPTH
1510 INSTALL WELL COMPONENTS ON MW-19 FROM 27-42' (SCREENED)
1550 FINISH INSTALL ON MW-19
PULL CASING
PULL RIG OFF OF MW-19 LOCATION
(620)245-7847 - JAY HAWK LANDSCAPING
SETUP ON MW-18 LOCATION
CLEAN UP
1700 DEPART SITE

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PROJECT NUMBER 320001641-08
FIELD REPORT NUMBER
PAGE 1 OF 1
DATE 03-17-2015

PROJECT	QUAIL CROSSING	ARRIVAL TIME	0815
LOCATION	ANDOVER, KS	DEPARTURE TIME	1745
CLIENT	NUSTAR	WEATHER	M.CLEAR (40'S) WINDY
PURPOSE OF OBSERVATIONS	WELL INSTALLATION/PILOT TEST		
APEX REPRESENTATIVE	M. WHITSON	APEX PROJECT MANAGER	S. JACKSON
CONTRACTOR	LAYNE	PERMIT NO.	–
CONTRACTOR REP.	MARK AND CHAD	H&S REVIEW	✓

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0815 APEX ARRIVES ON SITE, LAYNE ON SITE, RIG IS DOWN
HYDRAULIC CYLINDER/ACTUATOR ON DRILL HEAD BROKE THIS MORNING
CALL S.JACKSON, LAYNE HAS SOMEONE FROM TEXAS DRIVING UP REPLACEMENT
COMPLETE SURFACE OF MW-17 MONITORING WELL
EXTEND PAD ON MW-7 LOC. (PER S. JACKSON)
PART COMES IN FOR DRILL RIG, INSTALL ON DRILL HEAD
1515 SAMPLES SHIPPED TO LABORATORY
WORK ON DRILL RIG
RIG BACK UP AND RUNNING, START PUSHING CASING TO 42' BGS
CASING DOWN TO DEPTH
1625 START INSTALLING MONITORING WELL MW-18
WELL MW-18 INSTALL, SCREEN FROM 27-42' BGS
1645 APEX (PAUL AND RYAN) DEPART SITE
1700 WELL INSTALLED, PULL RIG OFF HOLE.
BENTONITE IN SURFACE
MOVE EQUIPMENT AROUND
CLEAN UP SITE
1745 DEPART

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PROJECT NUMBER 320001641-08
FIELD REPORT NUMBER
PAGE 1 OF 2
DATE 03-18-2015

PROJECT	QUAIL CROSSING	ARRIVAL TIME	0800
LOCATION	ANDOVER, KS	DEPARTURE TIME	1700
CLIENT	NUSTAR	WEATHER	OVERCAST, LIGHT RAIN (40's)
PURPOSE OF OBSERVATIONS	WELL INSTALL / PILOT TEST		
APEX REPRESENTATIVE	M. WHITSON	APEX PROJECT MANAGER	S. JACKSON
CONTRACTOR	LAYNE	PERMIT NO.	—
CONTRACTOR REP.	MARK/CHAD	H&S REVIEW	✓

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0800 APEX ARRIVES ON SITE, LAYNE ON SITE, H+S REVIEW
SETUP ON IB-7 LOCATION WITH MUD MATS FOR TRACKS
0815 CORE IB-7 LOCATION (SEE LOG)
0940 COMPLETE IB-7 LOCATION
SETUP EQUIPMENT FOR INJECTION
0950 MIX FIRST 40-GALLON BATCH OF ORC ADVANCED, 2 x 40 LB BAGS ORC, 36 GALLONS OF WATER, 40-GALLON SLURRY, PLAN TO INJECT THROUGH 4-4.5" CASING (CORE BARREL) (4-INCH OD CORE BARREL AND 3.5" OD TOOLING/RODS)
(SEE INJECTION LOG
MIX SECOND BATCH OF ORC, INJECT
1030 INJECTION IB-7 COMPLETE 80-GALLONS OF SLURRY INJECTED
PULL RIG OFF IB-7 LOCATION, CALL S. JACKSON, ASF DRILLER TO REDUCE INJECTION PRESSURE TO 50 PSI, PER INJECTION PERMIT (VIC PERMIT DOES NOT ALLOW GREATER THAN 50 PSI FOR INJECTIONS)
SETUP ON IB-8 LOCATION
1045 CORE IB-8
1155 IB-8 COMPLETED TO 40' BGS
1200 INJECT AT IB-8 LOCATION (SEE INJECTION LOG)
SETUP ON IB-4 LOCATION
1300 CORE IB-4
1415 IB-4 COMPLETED TO 40' BGS
1418 INJECT AT IB-4 LOCATION (SEE INJECTION LOG)
SETUP ON IB-5 LOCATION
1435 CORE IB-5

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PROJECT NUMBER 320001641-08
FIELD REPORT NUMBER
PAGE 2 OF 2
DATE 03-18-2015

1545 IB-5 CORED TO 40' BGS
1~~5~~5 INJECT AT IB-5 LOC. (SEE INJECTION LOG)
1610 COMPLETE INJECTION
CLEAN UP
1700 DEPART SITE

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PROJECT NUMBER 320001641-08
FIELD REPORT NUMBER
PAGE 1 OF 1
DATE 03-19-2015

PROJECT	QUAIL CROSSING	ARRIVAL TIME	0815
LOCATION	ANDOVER, KS	DEPARTURE TIME	1215
CLIENT	NUSTAR	WEATHER	LT RAIN (40's-50's)
PURPOSE OF OBSERVATIONS	WELL INSTALLATION / PILOT TEST		
APEX REPRESENTATIVE	M. WHITSON	APEX PROJECT MANAGER	S. JACKSON
CONTRACTOR	LAYNE	PERMIT NO.	–
CONTRACTOR REP.	(MARK AND CHAD)	H&S REVIEW	✓

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0815 APEX ON SITE, LAYNE ON SITE, H+S REVIEW
CORE IB-9 LOCATION TO 40' BGS
0910 INJECT AT IB-9 LOCATION (SEE INJECTION LOG)
MOVE TO IB-6
CORE IB-6 LOCATION TO 40' BGS
1120 INJECT AT IB-6 LOCATION (SEE INJECTION LOG)
CLEAN UP
LEAVE APEX TULSA WITH INJECTION LOG AND INSTRUCTIONS
1215 DEPART SITE FOR FEDEX AND KANSAS CITY AIRPORT

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APEX PROJECT MANAGER

WELL GAGING DATA SHEET

APEX

		Job Number:	1641
Client:	NUSTAR	Date:	03-12-2015
Project:	QUAIL CROSSING	Sampler:	M. WHITSON
Weather:	CLEAR (70'S) CALM	Time In/Out:	

WATER LEVEL DATA

Well I.D.	Time	Depth to Free Product (feet)	Depth to Water (feet)	Depth to Well Bottom (feet)	Product Thickness (feet)	Water Column Height (feet)	Notes/Other Remarks
MW-19	0835	–	45.0	45.7'	–	0.7'	
MW-18	0845	–	43.2'	44'	–	0.8'	
MW-17	1200	–	–	45.0'	–	–	
	03-13						
MW-19	1030	–	42.6'	44.8'	–	2.2'	
MW-18	1035	–	40.0'	43.3'	–	3.3'	
MW-17	1040	–	42.8	44.0'	–	1.2'	
	03-14						
MW-19	1335	–	40.1'	44.6	–	4.5'	
MW-18	1340	–	36.3'	41.5	–	5.2'	
MW-17	1345	–	38.7'	41.3	–	2.6'	
	03-15						
MW-17	1600	–	35.4	39.4	–	4.0'	
MW-19	1605	–	38.5	41.1	–	2.6'	
MW-18	1610	–	33.5	39.8	–	6.3'	

WELL GAGING DATA SHEET

APEX

		Job Number:	
Client:	NUSTAR	Date:	03-18-15
Project:	QUAIL CROSSING	Sampler:	M. WHITSON
Weather:	CLOUDY (40'S)	Time In/Out:	

WATER LEVEL DATA

Well I.D.	Time	~~Depth to Free Product (feet)~~	~~Depth to Water (feet)~~	~~Depth to Well Bottom (feet)~~	~~Product Thickness (feet)~~	~~Water Column Height (feet)~~	Notes/Other Remarks		
WELL ID	TIME START	SLURRY GALLONS	BOTTOM DEPTH	TOP DEPTH	TIME FINISH	PRESSURE	SLURRY MIX TIME	ORC LBS	WATER GALLONS
IB-7	~~09~~ 1000	~~40~~ 80	40	30	1015	100	0950	80	36
	1015	~~40~~ 80	30	20	1030	100	1015	80	36
IB-8	1200	~40	40	30	1207	40	1155	~75	36
	1209	~40	30	20	1215	40	1208	~75	36
IB-4	1418	~40	40	30	1421	35	1415	~75	36
	1424	~40	30	20	1430	35	1422	~75	36
IB-5	1555	~40	40	30	1600	40	1550	~75	36
	1605	~40	30	20	1610	40	1601	~75	36

WELL GAGING DATA SHEET

APEX

		Job Number:	
Client:		Date:	03-19-15
Project:		Sampler:	M. WHITSON
Weather:		Time In/Out:	

WATER LEVEL DATA

Well I.D.	Time	Depth to Free Product (feet)	Depth to Water (feet)	Depth to Well Bottom (feet)	Product Thickness (feet)	Water Column Height (feet)	Notes/Other Remarks		
WELL ID	TIME START	SLURRY GAL.	BOTTOM DEPTH	TOP DEPTH	TIME FINISH	PRESS	SLURRY MIX TIME	ORC	WATER
IB-4	0910	40	40	30	0915	35	0907	75	36
	0918	40	30	20	0923	35	0916	75	36
IB-6	1120	40	40	30	1125	40	1116	75	36
	1130	40	30	20	1135	40	1128	75	36

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Chain of Custody Form

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COC ID: 118554

ALS Project Manager: | ALS Work Order #:

Customer Information		Project Information		Parameter/Method Request for Analysis	
Purchase Order		Project Name	Andover Release Site	A	VOCs (8260) 14 compound Select List
Work Order		Project Number	E3CE-0065	B	GRO - VPH OA-1
Company Name	Apex Companies	Bill To Company	Apex Companies	C	
Send Report To	Samuel Jackson	Invoice Attn	Samuel Jackson	D	
Address	3015 SW First Avenue	Address	3015 SW First Avenue	E	H = HOLD FOR INSTRUCTIONS FROM PM
				F	(NOT ALL SAMPLES WILL BE RUN FOR ANALYSIS)
City/State/Zip	Portland, OR 97201	City/State/Zip	Portland, OR 97201	G	
Phone	(503) 924-4704	Phone	(503) 924-4704	H	
Fax		Fax		I	
e-Mail Address	sjackson@apexcos.com	e-Mail Address		J	

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	MW-19 (28)	03-11	1710	S	–	2	H	H									
2	MW-19 (32)	03-11	1720	S	–	2	H	H									
3	MW-19 (45)	03-11	1800	S	–	2	H	H									
4	MW-18 (26.5)	03-11	1315	S	–	2	H	H									
5	MW-18 (31.5)	03-11	1325	S	–	2	H	H									
6	MW-17 (19)	03-12	1005	S	–	2	H	H									
7	MW-17 (22)	03-12	1015	S	–	2	H	H									
8	MW-17 (37)	03-12	1100	S	–	2	H	H									
9	IB-1 (18.0)	03-14	1650	S	–	2	H	H									
10	IB-1 (24.0)	03-14	1700	S	–	2	H	H									

Sampler(s) Please Print & Sign: MICHAEL WHITSON

Shipment Method: FEDEX

Required Turnaround Time: (Check Box) [X] Std 10 Wk days [ ] 5 Wk Days [ ] 2 Wk Days [ ] 24 Hour [ ] Other

Results Due Date:

Relinquished by:	Date: 03.17	Time: 1530	Received by:
Relinquished by:	Date:	Time:	Received by (Laboratory):
Logged by (Laboratory):	Date:	Time:	Checked by (Laboratory):

Notes: Andover Quail Crossing Soil Investigation

Cooler ID	Cooler Temp.

QC Package: (Check One Box Below)
[X] Level 2 Std QC
[ ] Level 3 Std QC/Row da
[ ] Level 4 SW846/CLP
[ ] Other/EDD
[ ] TPRP Chk List
[ ] TPRP Level 4

Preservative Key: 1-HCl 2-HNO_3 3-H_2SO_4 4-NaOH 5-$Na_2S_2O_3$ 6-$NaHSO_4$ 7-Other 8-4°C 9-5035

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ALS Project Manager: | ALS Work Order #:

Customer Information		Project Information		Parameter/Method Request for Analysis	
Purchase Order		Project Name	Andover Release Site	A	VOCs (8260) 14 compound Select List
Work Order		Project Number	E3CE-0065	B	GRO - VPH OA-1
Company Name	Apex Companies	Bill To Company	Apex Companies	C	
Send Report To	Samuel Jackson	Invoice Attn	Samuel Jackson	D	
Address	3015 SW First Avenue	Address	3015 SW First Avenue	E	H = HOLD FOR INSTRUCTIONS FROM PM
				F	(NOT ALL SAMPLES RUN FOR ANALYSIS)
City/State/Zip	Portland, OR 97201	City/State/Zip	Portland, OR 97201	G	
Phone	(503) 924-4704	Phone	(503) 924-4704	H	
Fax		Fax		I	
e-Mail Address	sjackson@apexcos.com	e-Mail Address		J	

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	IB-2 (32)	03-15	1320	S	–	2	H	H									
2	IB-2 (38)	03-15	1330	S	–	2	H	H									
3	IB-3 (24)	03-15	1530	S	–	2	H	H									
4	IB-3 (30)	03-15	1540	S	–	2	H	H									
5	IB-3 (36)	03-15	1600	S	–	2	H	H									
6																	
7																	
8																	
9																	
10																	

Sampler(s) Please Print & Sign: MICHAEL WHITSON

Shipment Method: FEDEX

Required Turnaround Time: (Check Box): ☒ Std 10 Wk days ☐ 5 Wk Days ☐ 2 Wk Days ☐ 24 Hour ☐ Other

Results Due Date:

Relinquished by:	Date: 03-17	Time: 1530	Received by:
Relinquished by:	Date:	Time:	Received by (Laboratory):
Logged by (Laboratory):	Date:	Time:	Checked by (Laboratory):

Notes: Andover Road Crossing Soil Investigation

Cooler ID	Cooler Temp.

QC Package: (Check One Box Below)

☒ Level 2 Std QC ☐ TRRP ChkList
☐ Level 3 Std QC/Row da ☐ TRRP Level 4
☐ Level 4 SW846/CLP
☐ Other/EDD

Preservative Key: 1-HCl 2-HNO_3 3-H_2SO_4 4-NaOH 5-$Na_2S_2O_3$ 6-$NaHSO_4$ 7-Other 8-4°C 9-5035

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Apex Companies, LLC- Portland, OR

3015 SW First Avenue
Portland, OR 97201-4707

Billing Information:
Accounts Payable- Rachelle Vanderzanden
3015 SW First Avenue
Portland, OR 97201-4707

Report to: Ian Maguire-/ Sam Jackson

Email To: IMaguire@apexcos.com; SJackson@apexcos.com

Project Description: Andover Release Site

City/State Collected: ANDOVER, KS

Phone: 503-924-4704
Fax: 503-943-6357

Client Project #: E3CE-0065

Lab Project #: ASHCREPOR-NUSTAR

Collected by (print): MICHAEL WHITSON

Site/Facility ID #: EASTER ADDITION

P.O. #

Collected by (signature): [signature]

Immediately Packed on Ice N ____ Y ✓

Rush? (Lab MUST Be Notified)
___ Same Day 200%
___ Next Day 100%
___ Two Day 50%
___ Three Day 25%

Date Results Needed

Email? ___No X__Yes
FAX? ___No ___Yes

Analysis / Container / Preservative

Chain of Custody Page ___ of ___

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12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L#

Table #

Acctnum: ASHCREPOR
Template: T100693
Prelogin: P500936
TSR: 358 - Jarred Willis
PB: 03/17/15 NW
Shipped Via: FedEx Ground

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	OA1(GRO) / V8260 2ozClr-NoPres	OA2 4ozClr-NoPres	V8260-Trip Blank 40mlAmb-HCl-Blk							Rem./Contaminant	Sample # (lab only)
MW-1R (19.5)	G	SS	19.5	03-12	1550	2	H	H									
MW-1R (22)	G	SS	22	03-12	1600	2	H	H									
MW-1R (33)	G	SS	33	03-12	1630	2	H	H									
F1R (26)	G	SS	26	03-13	1750	2	H	H									
F-1R (30)	G	SS	30	03-13	1830	2	H	H									
F-1R (36)	G	SS	36	03-13	1845	2	H	H									
TRIP BLANK	~	~~SS~~	—	—	—	~~2~~	~~X~~	~~X~~	MW	03-17-15							
		SS				~~2~~	~~X~~	~~X~~	MW	03-17-15							
		SS				~~2~~	~~X~~	~~X~~	MW	03-17-15							
		SS				~~2~~	~~X~~	~~X~~	MW	03-17-15							

* Matrix: SS - Soil GW - Groundwater WW - WasteWater DW - Drinking Water OT - Other_____

Remarks: H = HOLD FOR INSTRUCTIONS FROM PM
(NOT ALL SAMPLES WILL BE RUN FOR ANALYSIS)

pH _____ Temp _____
Flow _____ Other _____

Hold #

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Samples returned via: ☐ UPS ☑ FedEx ☐ Courier ☐ _____	Condition: (lab use only)
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: °C Bottles Received:	COC Seal Intact: ___Y ___N ___NA
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: Time:	pH Checked: NCF:

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ALS Project Manager: | ALS Work Order #:

Customer Information		Project Information		Parameter/Method Request for Analysis	
Purchase Order		Project Name	Andover Release Site	A	VOCs (8260) 14 compound Select List
Work Order		Project Number	E3CE-0065	B	GRO - VPH OA-1
Company Name	Apex Companies	Bill To Company	Apex Companies	C	
Send Report To	Samuel Jackson	Invoice Attn	Samuel Jackson	D	
Address	3015 SW First Avenue	Address	3015 SW First Avenue	E	
				F	H = HOLD FOR INSTRUCTIONS FROM PM
City/State/Zip	Portland, OR 97201	City/State/Zip	Portland, OR 97201	G	(NOT ALL SAMPLES WILL BE RUN FOR
Phone	(503) 924-4704	Phone	(503) 924-4704	H	ANALYSIS)
Fax		Fax		I	
e-Mail Address	sjackson@apexcos.com	e-Mail Address		J	

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	IB-7 (19)	03-18-15	0900	S	–	2	H	H									
2	IB-7 (24)	03-18-15	0915	S	–	2	H	H									
3	IB-7 (39)	03-18-15	0930	S	–	2	H	H									
4	IB-8 (18)	03-18-15	1130	S	–	2	H	H									
5	IB-8 (32.5)	03-18-15	1200	S	–	2	H	H									
6	IB-8 (39)	03-18-15	1205	S	–	2	H	H									
7	IB-4 (6)	03-18-15	1330	S	–	2	H	H									
8	IB-4 (19.5)	03-18-15	1345	S	–	2	H	H									
9	IB-4 (31)	03-18-15	1400	S	–	2	H	H									
10	IB-4 (39)	03-18-15	1415	S	–	2	H	H									

Sampler(s) Please Print & Sign: MIKE WHITSON

Shipment Method: FEDEX OVERNIGHT

Required Turnaround Time: (Check Box) ☒ Std 10 Wk days ☐ 5 Wk Days ☐ 2 Wk Days ☐ 24 Hour ☐ Other

Results Due Date:

Relinquished by: | Date: 03-19 | Time: 1700 | Received by:

Relinquished by: | Date: | Time: | Received by (Laboratory):

Logged by (Laboratory): | Date: | Time: | Checked by (Laboratory):

Notes: Andover Quail Crossing Soil Investigation

Cooler ID	Cooler Temp.

QC Package: (Check One Box Below)
- ☒ Level 2 Std QC
- ☐ Level 3 Std QC/Row da
- ☐ Level 4 SW846/CLP
- ☐ Other/EDD
- ☐ TRRP ChkList
- ☐ TRRP Level 4

Preservative Key: 1-HCl 2-HNO_3 3-H_2SO_4 4-NaOH 5-$Na_2S_2O_3$ 6-$NaHSO_4$ 7-Other 8-4°C 9-5035

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ALS Project Manager: | ALS Work Order #:

Customer Information		Project Information		Parameter/Method Request for Analysis	
Purchase Order		Project Name	Andover Release Site	A	VOCs (8260) 14 compound Select List
Work Order		Project Number	E3CE-0065	B	GRO - VPH OA-1
Company Name	Apex Companies	Bill To Company	Apex Companies	C	
Send Report To	Samuel Jackson	Invoice Attn	Samuel Jackson	D	
Address	3015 SW First Avenue	Address	3015 SW First Avenue	E	
				F	
City/State/Zip	Portland, OR 97201	City/State/Zip	Portland, OR 97201	G	
Phone	(503) 924-4704	Phone	(503) 924-4704	H	
Fax		Fax		I	
e-Mail Address	sjackson@apexcos.com	e-Mail Address		J	

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	TRIP BLANK	—	—	W	1	2	X										
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Sampler(s) Please Print & Sign: MIKE MATTSON

Shipment Method: FEDEX OVERNIGHT

Required Turnaround Time: (Check Box) [X] Std 10 Wk days [ ] 5 Wk Days [ ] 2 Wk Days [ ] 24 Hour [ ] Other

Results Due Date:

Relinquished by: | Date: | Time: 1700 | Received by:

Relinquished by: | Date: | Time: | Received by (Laboratory):

Logged by (Laboratory): | Date: | Time: | Checked by (Laboratory):

Notes: Andover Quail Crossing Soil Investigation

Cooler ID	Cooler Temp

QC Package: (Check One Box Below)
- [X] Level 2 Std QC
- [ ] Level 3 Std QC/Row da
- [ ] Level 4 SW846/CLP
- [ ] Other/EDD
- [ ] TRRP ChkList
- [ ] TRRP Level 4

Preservative Key: 1-HCl 2-HNO_3 3-H_2SO_4 4-NaOH 5-$Na_2S_2O_3$ 6-$NaHSO_4$ 7-Other 8-4°C 9-5035

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WELL GAGING DATA SHEET

APEX

		Job Number:	320024410B.003
Client:	Nissan	Date:	20150318
Project:	Ambassador / coltCart	Sampler:	
Weather:	Cloudy	Time In/Out:	

WATER LEVEL DATA

	Well I.D.	Time	Depth to Free Product (feet)	Depth to Water (feet)	Depth to Well Bottom (feet)	Product Thickness (feet)	Water Column Height (feet)	Notes/Other Remarks
	2006	15:49	—	45.55	—	—	—	
	MW-18	16:05	—	27.93	41.09	—	—	16:09 Began Development
	MW-18	16:20	—	—	—	—	—	16:20 Dry
	MW-19	16:30	—	35.14	42.85	—	—	16:32 Began Development
	MW-19	16:33	water	clear	16:34 Back to	Cloudy		dry at 16:35
03-19	MW-11	13:56	—	29.84	—	—	—	
	MW-14	14:07	—	33.94	—	—	—	
	MW-13	14:14	—	38.16	—	—	—	
	MW-8	14:17	—	21.96	—	—	—	
	MW-5	14:19	—	20.80	—	—	—	
	MW-2	14:22	—	32.87	—	—	—	
	MW3	14:25	—	41.02	—	—	—	
	MW-6	14:28	—	22.62	—	—	—	
	MW-7	14:31	—	16.63	—	—	—	
	Pond	14:33	—	—	—	—	—	1343.6
	MW9	14:36	—	31.59	—	—	—	
	MW-10	14:39	—	28.42	—	—	—	
	MW12	14:42	—	30.95	—	—	—	
	MW-4	14:45	—	31.22	—	—	—	
16	MW-16	14:48	—	31.80	—	—	—	
	MW-15	14:54	—	35.04	—	—	—	
3-20	MW-1	10:55	—	31.38	—	—	—	

WELL MONITORING DATA SHEET

APEX

Well I.D.	MW-4	Job Number:	320001641108-003
Client:	NUSTAR	Date:	3-20-2015
Project:	Anderson / Colt Creek	Sampler:	PN
Weather:	cool, sunny	Time In/Out:	0930 / 1015

WELL DATA

Well Depth:	—	Well Diameter:	2	Water Height	—
Depth to Water:	31.22	Screened Interval:	—	x Multiplier	—
Water Column Length:	—	Depth to Free Product:	—	x Casing Volumes	—
Purge Volume:	—	Free Product Thickness:	—	= Purge Volume	—
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	—

PURGING DATA

Purge Method:	PN	Pump Intake Depth:	35	Comments	
Sampling Method:	PN	Tubing Type:	poly		

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
0945	0.3	0.3	31.28	0.3	6.45	14.83	1.047	11.48	5.2	/	CL
0948	0.9	1.2	31.58	0.3	6.49	15.46	1.051	1.69	-16.7	—	CL
0951	0.9	2.1	31.95	0.3	6.50	15.51	1.050	1.24	-24.3	—	SC
0954	0.9	3.0	32.07	0.3	6.51	15.49	1.050	0.99	-28.3	—	AC
0957	0.9	3.9	32.33	0.3	6.52	15.77	1.050	0.86	-30.2	—	C

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-4	Sampling Flow Rate	0.3	Analytical Laboratory:	ALS	
Sample Time:	0959	Final Depth to Water:	33.46	Did Well Dewater?	NO	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

APEX

Well I.D.	MW-5	Job Number:	32001641 08-004
Client:	NUSTAR	Date:	3-20-2015
Project:	Amboy Colt Court	Sampler:	PN
Weather:	cool, sunny	Time In/Out:	1020/1050

WELL DATA

Well Depth:	—	Well Diameter:	2"	Water Height	—
Depth to Water:	20.80	Screened Interval:	—	x Multiplier	—
Water Column Length:	—	Depth to Free Product:	—	x Casing Volumes	—
Purge Volume:	—	Free Product Thickness:	—	= Purge Volume	—
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	—

PURGING DATA

Purge Method:	PN	Pump Intake Depth:	23	Comments	
Sampling Method:	PN	Tubing Type:	poly		

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
1026	0.3	0.3	21.06	0.3	6.85	16.37	1.444	2.42	28.9	—	C
1029	0.9	1.2	21.29	0.3	6.78	16.45	1.451	1.07	[illegible]	—	C
1032	0.9	2.1	21.43	0.3	6.75	16.45	1.452	1.13	31.3	—	C
1035	0.9	3.0	21.53	0.3	6.73	16.44	1.451	1.07	35.2	—	C

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-5	Sampling Flow Rate	0.3	Analytical Laboratory:	ALS
Sample Time:	1037	Final Depth to Water:	21.59	Did Well Dewater?	NO

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

APEX

Well I.D.	MW-1	Job Number:	320201641-08.003
Client:	NV STAT	Date:	3-20-2015
Project:	Arbour Lott Court	Sampler:	PW
Weather:	NICE, sunny	Time In/Out:	11:10

WELL DATA

Well Depth:	—	Well Diameter:	4"	Water Height	—
Depth to Water:	31.38	Screened Interval:	—	x Multiplier	—
Water Column Length:	—	Depth to Free Product:	—	x Casing Volumes	—
Purge Volume:	—	Free Product Thickness:	—	= Purge Volume	—
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	—

PURGING DATA

Purge Method:	PN	Pump Intake Depth:	34	Comments	
Sampling Method:	PN	Tubing Type:	Poly		

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
1116	0.3	0.3	31.52	0.3	7.06	16.87	1.391	6.07	-71.9	—	CL
1119	0.9	1.2	31.64	0.3	6.84	16.80	1.391	2.08	-67.9	—	CL
1122	0.9	2.1	31.77	0.3	6.78	16.87	1.389	1.41	-63.7	—	CL
1125	0.9	3.0	31.81	0.3	6.76	16.70	1.388	1.21	-54.0	—	CL
1128	0.9	3.9	32.02	0.3	6.75	16.77	1.388	1.16	-46.0	—	CL

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-1	Sampling Flow Rate	0.3	Analytical Laboratory:	ALS		
Sample Time:	1130	Final Depth to Water:	32.55	Did Well Dewater?	NO		
# Containers/Type	Preservative	Analysis/Method	Field Filtered		Filter Size	MS/MSD	Duplicate ID
			yes	no			
			yes	no			
			yes	no			
			yes	no			
			yes	no			
			yes	no			

COMMENTS

WELL MONITORING DATA SHEET

APEX

Well I.D.	MW-17	Job Number:	32016641-0804
Client:	NW STAT	Date:	3-20-2015
Project:	Anadarko Volt Lake	Sampler:	PW
Weather:	Nice/sunny	Time In/Out:	11:50

WELL DATA

Well Depth:	—	Well Diameter:	2"	Water Height	—
Depth to Water:	31.45	Screened Interval:	—	x Multiplier	—
Water Column Length:	—	Depth to Free Product:	—	x Casing Volumes	—
Purge Volume:	—	Free Product Thickness:	—	= Purge Volume	—
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	—

PURGING DATA

Purge Method:	PN	Pump Intake Depth:	42
Sampling Method:	PN	Tubing Type:	Poly

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
1155	0.3	0.3	35.45	0.3	6.45	18.01	1,051	3.03	30.1		VC
1158	0.9	1.2	36.35	0.3	6.88	16.28	1056	1.28	38.8		VC
1201	0.9	2.1	36.81	0.3	6.84	18.18	1,053	0.87	43.3		VC
1204	0.9	3.0	37.30	0.3	6.82	18.07	1,055	0.70	43.2		VC
1207	0.9	3.9	37.85	0.3	6.81	18.15	1,057	0.61	42.0		VC

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-17	Sampling Flow Rate	0.3	Analytical Laboratory:	ALS
Sample Time:	1209	Final Depth to Water:	40.32	Did Well Dewater?	NO

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

APEX

Well I.D.	MW-18	Job Number:	32200641-08.003
Client:	NUSTAR	Date:	3-20-2015
Project:	Andover / Salt Creek	Sampler:	PN
Weather:	nice, sunny	Time In/Out:	12:45

WELL DATA

Well Depth:	—	Well Diameter:	2"	Water Height	—
Depth to Water:	~~21.46~~ 27.93	Screened Interval:	—	x Multiplier	—
Water Column Length:	—	Depth to Free Product:	—	x Casing Volumes	—
Purge Volume:	—	Free Product Thickness:	—	= Purge Volume	—
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	—

PURGING DATA

Purge Method:	PN	Pump Intake Depth:	~~39~~ 36
Sampling Method:	PN	Tubing Type:	poly

Comments

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
1248	0.3	0.3	31.00	0.3	7.05	17.89	0.993	2.03	~~100~~ 3.5	/	VC
1251	0.9	1.2	31.52	0.3	6.97	17.78	1.009	1.03	-18.8	/	VC
1254	0.9	2.1	31.92	0.3	6.90	17.52	0.999	0.78	-19.2	/	VC
1257	0.9	3.0	32.19	0.3	6.89	17.43	0.990	0.68	-12.6	/	VC

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-18	Sampling Flow Rate	0.3	Analytical Laboratory:	ALS
Sample Time:	1259	Final Depth to Water:	33.17	Did Well Dewater?	NO

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

APEX

Well I.D.	MW-19	Job Number:	32000/211-08.023
Client:	NV Star	Date:	5-20-2015
Project:	Anderson / Lot Count	Sampler:	PN
Weather:	nice, sunny	Time In/Out:	13:14

WELL DATA

Well Depth:	—	Well Diameter:	2"	Water Height	—
Depth to Water:	35.19	Screened Interval:	—	x Multiplier	—
Water Column Length:	—	Depth to Free Product:	—	x Casing Volumes	—
Purge Volume:	—	Free Product Thickness:	—	= Purge Volume	—
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	—

PURGING DATA

Purge Method:	PN	Pump Intake Depth:	39	Comments	
Sampling Method:	PN	Tubing Type:	poly		

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
1318	0.3	6.3	34.26	0.3	7.24	18.18	0.909	6.54	53.9	/	CL
1321	0.9	1.2	34.55	0.3	7.13	17.99	0.906	1.90	43.8	/	CL
1324	0.9	2.1	34.89	0.3	7.09	17.91	0.906	1.55	43.7	/	CL
1327	0.9	3.0	35.22	0.3	7.09	17.83	0.905	1.57	49.7	/	CL

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-19	Sampling Flow Rate	0.3	Analytical Laboratory:	ALS
Sample Time:	1329	Final Depth to Water:	~~36.7~~ 35.36	Did Well Dewater?	NO

# Containers/Type	Preservative	Analysis/Method	Field Filtered		Filter Size	MS/MSD	Duplicate ID
			yes	no			
			yes	no			
			yes	no			
			yes	no			
			yes	no			
			yes	no			

COMMENTS

ALS Environmental

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Chain of Custody Form

Page 1 of 1

COC ID: 118685

Houston, TX +1 281 530 5656 | Spring City, PA +1 610 948 4903 | South Charleston, WV +1 304 356 3168 | Middletown, PA +1 717 944 5541 | Salt Lake City, UT +1 801 266 7700 | York, PA +1 717 505 5280

ALS Project Manager: | ALS Work Order #:

Customer Information		Project Information		Parameter/Method Request for Analysis	
Purchase Order		Project Name	E3CE-0065 Andover Release Site	A	300_W (Sulfate, nitrate, O-Phos)
Work Order		Project Number		B	8260_LL_W (Colt Court GW List)
Company Name	Apex Companies	Bill To Company	Apex Companies	C	ALK_W 2320B
Send Report To	Samuel Jackson	Invoice Attn	Samuel Jackson	D	ICP_DISS (Dissolved Iron)
Address	3015 SW First Avenue	Address	3015 SW First Avenue	E	ICP_TW (Potassium only)
				F	NIT_AMM_W_ISE
City/State/Zip	Portland, OR 97201	City/State/Zip	Portland, OR 97201	G	RSK175 (Methane)
Phone	(503) 924-4704	Phone	(503) 924-4704	H	VPH OA-1_W (HYD-5)
Fax		Fax		I	XXX SUB (SUB CO2 (Simi Valley))
e-Mail Address		e-Mail Address		J	

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	MW-4	3-20-2011	0959	GW	VAPOR	15	X	X	X	X	X	X	X	X	X		
2	MW-5		1037	GW	VAPOR	15	X	X	X	X	X	X	X	X	X		
3	MW-1		1130	GW	VAPOR	15	X	X	X	X	X	X	X	X	X		
4	MW-17		1209	GW	VAPOR	15	X	X	X	X	X	X	X	X	X		
5	MW-18	1259	~~1326~~	GW	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓		
6	MW-19		1329	GW	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓		
7																	
8																	
9																	
10																	

Sampler(s) Please Print & Sign: Paul Ward

Shipment Method: FEDEX

Required Turnaround Time: (Check Box) TAT 7 days Other

Results Due Date:

Relinquished by:	Date:	Time:	Received by:
Relinquished by:	Date:	Time:	Received by (Laboratory):
Logged by (Laboratory):	Date:	Time:	Checked by (Laboratory):

Notes: E3CE-0065 Andover Release Site

Cooler ID	Cooler Temp.

QC Package: (Check One Box Below)

QC Level STD

Other

Preservative Key: 1-HCl 2-HNO_3 3-H_2SO_4 4-NaOH 5-$Na_2S_2O_3$ 6-$NaHSO_4$ 7-Other 8-4°C 9-5035

Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.
2. Unless otherwise agreed in a formal contract, services provided by ALS Environmental are expressly limited to the terms and conditions stated on the reverse.
3. The Chain of Custody is a legal document. All information must be completed accurately.

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FIELD OBSERVATION FORM

SITE: Andover Quail Crossing	DATE: 4/20/15
WEATHER: wind 55°F	ESTIMATED DURATION OF EVENT: 1 day
EVENT TYPE: Gauge + Sample 6 wells	PTW #:
FIELD STAFF / COMPANY NAME: Jace Harris Ted Alfred	

OBJECTIVE OF FIELD WORK: Gauge all wells + Sample 6 new wells for MNA parameters

LIST APPLICABLE SOPs: Gauge wells + Sample

WERE SOPs FOLLOWED?	YES	NO	N/A
ARE THE WELLS IN GOOD CONDITION?	YES	NO	N/A
WERE WATER LEVELS CONSISTENT WITH PREVIOUS EVENTS?	YES	NO	N/A
WERE NAPL LEVELS CONSISTENT WITH PREVIOUS EVENTS (if applicable)?	YES	NO	N/A
ARE OFF-SITE ACTIVITIES/RECEPTORS NEAR SITE THE SAME AS DURING PREVIOUS EVENTS?	YES	NO	N/A
NUMBER OF DRUMS ONSITE UPON ARRIVAL: ___ ARE DRUMS LABELED:	YES	NO	N/A

(PROVIDE EXPLANATION BELOW FOR ALL "NO" ANSWERS. ATTACH ADDITIONAL DOCUMENTATION TO FORM IF NECESSARY)

NOTES/COMMENTS:

WELL GAGING DATA SHEET

APEX

		Job Number:	N/A
Client:	NuStar	Date:	4/20/15
Project:	Andover Quarl Xing	Sampler:	JH + TA
Weather:	wind 55°F	Time In/Out:	

WATER LEVEL DATA

Well I.D.	Time	Depth to Free Product (feet)	Depth to Water (feet)	Depth to Well Bottom (feet)	Product Thickness (feet)	Water Column Height (feet)	Notes/Other Remarks
MW-1	10:41	—	31.39				
MW-2	10:44	—	36.43				
MW-3	10:29	—	45.61				
MW-4	11:13	—	34.10				
MW-5	10:51	—	21.01				
MW-6	10:34	—	23.05				
MW-7	10:32	—	16.10				
MW-8	10:950	—	22.25				
MW-9	10:27	—	33.25				
MW-10	10:24	—	28.53				
MW-11	11:11	—	30.39				
MW-12	10:20	—	31.09				
MW-13	10:48	—	33.34				
MW-14	10:46	—	34.93				
MW-15	11:06	—	36.50				
MW-16	11:02	—	33.03				
MW-17	10:39	—	33.91 ~~34.91~~				
MW-18	11:18	—	33.51				
MW-19	11:19	—	33.70				
Pond	10:31	—	1344.75'				

WELL MONITORING DATA SHEET

Ash Creek Associates, Inc.

Well I.D.	MW-1	Job Number:	
Client:	Nu Star	Date:	4/20/15
Project:	Andrews Quail Crossing	Sampler:	TA, JH
Weather:	Sunny / cloudy	Time In/Out:	1455 / 1535

WELL DATA

Well Depth:		Well Diameter:	4"	Water Height	
Depth to Water:	31.39	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	bladder	Pump Intake Depth:	0.5' ft from bottom	Comments
Sampling Method:	bladder	Tubing Type:	poly	

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.2	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
15:06			31.45	.2	6.81	16.72	1.186	1.03	-72.2		SC
15:09			31.49	.2	6.73	17.42	1.208	0.59	-75.6		SC
15:12			31.53	.2	6.71	16.94	1.214	0.89	-77.7		SC
15:15			31.60	.2	6.67	16.67	1.203	0.75	-78.4		SC

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-1	Sampling Flow Rate	.2	Analytical Laboratory:	ALS
Sample Time:	1522	Final Depth to Water:	31.82	Did Well Dewater?	No

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
12 VOAs	9 HCl / 3 Neat	See	yes (no)			
1 250 Plastic	H_2SO_4		yes no			
1 250 Plastic	HNO_3	COC	yes no			
3 250 Plastic	Neat		yes no			
			yes no			
			yes no			

COMMENTS

Variations in cloud cover causing large swings in temp readings due to sun exposure (YSI vessel + tubing)

WELL MONITORING DATA SHEET

Ash Creek Associates, Inc.

Well I.D.	MW-4	Job Number:	
Client:	Nu Star	Date:	4/20/15
Project:	Andover Quail Crossing	Sampler:	TA, JH
Weather:	Sunny / cloudy	Time In/Out:	1540 / 1615

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	
Depth to Water:	34.10	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	bladder	Pump Intake Depth:	4' from bottom	Comments	
Sampling Method:	bladder	Tubing Type:	poly		

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.2	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
15:45			34.19	.15	7.09	18.01	0.722	3.10	-25.3		SC
15:48			34.34	.15	7.04	17.41	0.724	2.83	-29.0		SC
15:51			34.57	.15	6.99	17.07	0.722	2.69	-27.9		SC
15:53			34.64	.125 ~~.15~~	7.00	17.31	0.719	2.54	-25.3		SC
15:56			34.69	.125	7.02	17.43	0.719	2.71	-24.9		SC

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-4	Sampling Flow Rate	.125	Analytical Laboratory:	ALS
Sample Time:	16:04	Final Depth to Water:	34.80	Did Well Dewater?	No

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
12 VOAs	9 HCl / 3 Neat	See	yes (no)			
1 250 PL	H_2SO_4	C.O.C.	yes no			
1 250 PL	HNO_3		yes no			
3 250 PL	Neat		yes no			
			yes no			
			yes no			

COMMENTS

fluctuations in cloud cover causing temperature variances due to sun exposure to vessel / tubing

WELL MONITORING DATA SHEET

Ash Creek Associates, Inc.

Well I.D.	MW-5	Job Number:	
Client:	NuStar	Date:	4/20/15
Project:	Andrews Quail Crossing	Sampler:	TA, JH
Weather:	Sunny / Cloudy	Time In/Out:	16 /

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	
Depth to Water:	21.01	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	bladder	Pump Intake Depth:		Comments
Sampling Method:	bladder	Tubing Type:	poly	

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.2	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
1624			21.12	.2	6.99	17.63	1.337	1.71	*1.6		AC
1627			21.25	.2	6.85	17.12	1.358	1.27	10.5		AC
1630			21.34	.2	6.84	17.04	1.356	1.27	14.2		C
1633			21.56	.2	6.82	17.01	1.357	1.30	20.1		C
1636			21.71	.2	6.80	16.80	1.360	1.10	20.2		

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-5	Sampling Flow Rate	.2	Analytical Laboratory:	ALS
Sample Time:	1647	Final Depth to Water:	27.87	Did Well Dewater?	No

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
12 VOAs	9 HCl / 3 Neat		yes (no)			
1 250 PL	H_2SO_4	See	yes no			
1 250 PL	HNO_3	C.O.C	yes no			
3 250 PL	Neat		yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

Ash Creek Associates, Inc.

Well I.D.	MW-17	Job Number:	
Client:	NuStar	Date:	4/20/15
Project:	Andrews Quail Crossing	Sampler:	TA, JH
Weather:	Sunny / cloudy	Time In/Out:	1416

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	
Depth to Water:	~~34.91~~ 33.91	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	bladder	Pump Intake Depth:	2.5' from bottom	Comments	
Sampling Method:	bladder	Tubing Type:	poly		

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (mS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.2	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
1421			34.10	.2	7.08	17.40	1.020	2.60	-44.8		SC
1424			34.31	.2	6.81	17.16	1.014	1.04	-42.9		SC
1427			34.47	.15	6.74	16.89	1.014	1.15	-44.3		SC
1430			34.69	.15	6.68	16.63	1.004	0.87	-44.1		SC
1433			34.83	.15	6.70	16.87	1.012	0.83	-45.6		SC

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-17	Sampling Flow Rate	.15	Analytical Laboratory:	ALS
Sample Time:	14:40	Final Depth to Water:	35.31	Did Well Dewater?	No

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
12 VOAs	9 HCl / 3 neat	See COC	yes (no)			
1 250mL Plastic	H_2SO_4		yes no			
1 250mL Plastic	HNO_3		yes no			
3 250mL Plastic	Neat		yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

Ash Creek Associates, Inc.

Well I.D.	MW-18	Job Number:	
Client:	NuStar	Date:	4/20/15
Project:	Andover Release	Sampler:	TA, JH
Weather:	Sunny	Time In/Out:	1205/1235

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	
Depth to Water:	33.51	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	Bladder	Pump Intake Depth:	5' from bottom	Comments	
Sampling Method:	Bladder	Tubing Type:	poly		

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (mS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.2	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
12:13			33.71	.15	5.93	17.07	.951	1.03	62.4	—	Cl
12:16			34.07	.15	6.03	17.18	.885	0.89	64.0	-	Cl
12:19			34.36	.15	6.10	17.17	.880	0.84	62.4	-	Cl
12:22			34.45	.10	6.17	17.38	.880	0.79	62.1	-	Cl

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-18	Sampling Flow Rate	.100	Analytical Laboratory:	ALS
Sample Time:	12:27	Final Depth to Water:	34.97	Did Well Dewater?	No

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
12 vocs	HCl	See CoC.	yes (no)			
25ml 1 Pl, H_2SO_4			yes no			
" 1 Pl, HNO_3			yes no			
" 3 Neat			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

Ash Creek Associates, Inc.

Well I.D.	MW-19	Job Number:	
Client:	NuStar	Date:	4/20/15
Project:	Andrews Quail Xing	Sampler:	TA/JH
Weather:	Sunny	Time In/Out:	12:40/1325

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	
Depth to Water:	33.70	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	Bladder	Pump Intake Depth:			Comments
Sampling Method:	Bladder	Tubing Type:	Poly		

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (mS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.2	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
12:53			33.90	.15	6.91	17.74	.896	7.44	-14.3		SC
12:56			33.99	.15	6.74	17.34	.863	3.01	-45.9		SC
12:59			34.04	.15	6.63	17.16	.851	1.61	-59.5		SC
13:02			34.17	.15	6.62	17.10	.845	1.40	-61.6		SC
13:05			34.28	.15	6.62	17.11	.841	1.36	-61.2		SC

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-19	Sampling Flow Rate	.15	Analytical Laboratory:	ALS
Sample Time:	13:15	Final Depth to Water:	35.03	Did Well Dewater?	NO

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
12 VOA's	9 HCl / 3 Neat	See COC	yes (no)			
250 mL Plastic	H_2SO_4		yes no			
250 mL Plastic	HNO_3		yes no			
250 mL Plastic	Neat		yes no			
			yes no			
			yes no			

COMMENTS

ALS Environmental

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Chain of Custody Form

Page 1 of 1

COC ID: 124872

Houston, TX +1 281 530 5656 | Spring City, PA +1 610 948 4903 | South Charleston, WV +1 304 356 3168 | Middletown, PA +1 717 944 5541 | Salt Lake City, UT +1 801 266 7700 | York, PA +1 717 505 5280

ALS Project Manager: | ALS Work Order #:

Customer Information		Project Information		Parameter/Method Request for Analysis	
Purchase Order		Project Name	E3CE-0065 Andover Release Site	A	300_W (Sulfate, nitrate, O-Phos)
Work Order		Project Number		B	8260_LL_W (Colt Court GW List)
Company Name	Apex Companies	Bill To Company	Apex Companies	C	ALK_W 2320B
Send Report To	Samuel Jackson	Invoice Attn	Samuel Jackson	D	ICP_DISS (Dissolved Iron)
Address	3015 SW First Avenue	Address	3015 SW First Avenue	E	ICP_TW (Potassium only)
				F	NIT_AMM_W_ISE
City/State/Zip	Portland, OR 97201	City/State/Zip	Portland, OR 97201	G	RSK175 (Methane)
Phone	(503) 924-4704	Phone	(503) 924-4704	H	VPH OA-1_W (HYD-5)
Fax		Fax		I	XXX SUB (SUB CO2 (Simi Valley))
e-Mail Address		e-Mail Address		J	

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	MW-18	4/20/15	1227	W	HCl, NaOH, H_2SO_4, HNO_3	17	X	X	X	X	X	X	X	X	X		
2	MW-19	↓	1315	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓		
3	MW-17	↓	1440	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓		
4	MW-1	↓	1522	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓		
5	MW-4	↓	1604	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓		
6	MW-5	↓	1647	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓		
7					1,2,3 7-Heat												
8																	
9																	
10																	

Sampler(s) Please Print & Sign	Shipment Method	Required Turnaround Time: (Check Box)	Results Due Date:
Ted Alfred		TAT 7 days Other	

Relinquished by:	Date:	Time:	Received by:	Notes: (E3CE-0065 Andover Release Site)
	4/20/15	1830		
Relinquished by:	Date:	Time:	Received by (Laboratory):	Cooler ID / Cooler Temp.
Logged by (Laboratory):	Date:	Time:	Checked by (Laboratory):	QC Package: (Check One Box Below) QC Level STD Other:

Preservative Key: 1-HCl 2-HNO_3 3-H_2SO_4 4-NaOH 5-$Na_2S_2O_3$ 6-$NaHSO_4$ 7-Other 8-4°C 9-5035

Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.
2. Unless otherwise agreed in a formal contract, services provided by ALS Environmental are expressly limited to the terms and conditions stated on the reverse.
3. The Chain of Custody is a legal document. All information must be completed accurately.

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WELL MONITORING DATA SHEET

Ash Creek Associates, Inc.

Well I.D.	MW-5	Job Number:	1641-08.02
Client:	Nustar	Date:	6/16/15
Project:	Andover Q.C.	Sampler:	TA, JH
Weather:	Rainy	Time In/Out:	0815

WELL DATA

Well Depth:	30.00	Well Diameter:	2"	Water Height	
Depth to Water:	19.60	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	bladder	Pump Intake Depth:	25'	Comments	
Sampling Method:	same	Tubing Type:	poly		

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.2	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
8:41	.400	.400	19.65	.200	6.96	18.16	1412	2.10	158.5	—	AC
8:44	.600	1.000	19.68	.200	6.96	18.00	1420	1.86	157.1	—	C
8:47	.600	1.600	19.72	.200	6.95	17.88	1418	1.44	155.2	—	C
8:50	.600	2.200	19.76	.200	6.95	17.88	1426	1.48	152.6	—	C
8:53	.600	2.800	19.80	.200	6.96	17.90	1429	1.49	148.7	—	C

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-5	Sampling Flow Rate	.200	Analytical Laboratory:	ALS
Sample Time:	08:59	Final Depth to Water:	19.87	Did Well Dewater?	No

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
9 VOA's	HCl	C.O.C.	yes no			
3 VOA's	Neat		yes no			
(3) 250 mL pl	Neat		yes no			
1 H_2SO_4 pl-250mL	H_2SO_4		yes no			
1 HNO_3 pl-250mL	HNO_3		yes no			
			yes no			

COMMENTS

Full MNA parameters ran

WELL MONITORING DATA SHEET

Ash Creek Associates, Inc.

Well I.D.	MW-17	Job Number:	1641-08.002
Client:	NuStar	Date:	6/16/15
Project:	Andover Q.C.	Sampler:	TA, JH
Weather:	Rainy	Time In/Out:	0915

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	
Depth to Water:	31.28	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	bladder	Pump Intake Depth:	36'		Comments
Sampling Method:	same	Tubing Type:	poly		

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color .Other Remarks
					+/-0.2	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
0920	.500	.500	31.42	.250	7.14	18.16	1035	1.40	-17.1	-	AC
0923	.750	1.250	31.48	.250	7.06	18.27	1033	1.11	-13.8	-	AC
0926	.750	2.000	31.48	.250	7.03	17.70	1035	1.06	-11.5	-	C
0929	.750	2.750	31.49	.250	7.01	17.51	1036	0.96	-10.6	-	C
0932	.750	3.500	31.49	.250	7.00	17.43	1047	0.92	-9.9	-	C

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-17	Sampling Flow Rate	.250	Analytical Laboratory:	ALS
Sample Time:	0940	Final Depth to Water:	31.52	Did Well Dewater?	No

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
9 VOA's	HCl	C.O	yes no			
3 VOA's	Neat	C.	yes no			
3 250mL Pl	Neat		yes no			
1 250mL Pl	H_2SO_4		yes no			
1 250mL Pl	HNO_3		yes no			
			yes no			

COMMENTS

Full MNA par

WELL MONITORING DATA SHEET

Ash Creek Associates, Inc.

Well I.D.	MW-1	Job Number:	1641-05.00
Client:	Nustar	Date:	6/16/15
Project:	Andover Q.L.	Sampler:	TA, JH
Weather:	Rainy/misty	Time In/Out:	0945

WELL DATA

Well Depth:		Well Diameter:	4"	Water Height	
Depth to Water:	31.31	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	bladder	Pump Intake Depth:	4' from bottom
Sampling Method:	same	Tubing Type:	poly

Comments

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.2	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
0951	.600	.600	31.31	.300	7.08	16.86	1318	1.50	-50.6	-	AC
0954	.900	1.500	31.39	.300	7.05	16.65	1315	1.18	-51.0	-	AC
0957	.900	2.400	31.46	.300	7.02	16.59	1312	1.01	-51.6	-	C
1000	.900	3.300	31.55	.300	7.01	16.50	1311	0.95	-51.7	-	C

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-1	Sampling Flow Rate	.300	Analytical Laboratory:	ALS
Sample Time:	1010	Final Depth to Water:	31.58	Did Well Dewater?	No

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
9 VOA's	HCl	C.O.C	yes no			
3 VOA's	Neat		yes no			
3 250-PI	Neat		yes no			
1 250-PI	H_2SO_4		yes no			
1 250-PI	HNO_3		yes no			
			yes no			

COMMENTS

Full MNA run

WELL MONITORING DATA SHEET

Ash Creek Associates, Inc.

Well I.D.	MW-18	Job Number:	1641-08.002
Client:	NuStar	Date:	6/16/15
Project:	Andover Q.C	Sampler:	TA, JH
Weather:	Rainy / Misty	Time In/Out:	10/5

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	
Depth to Water:	30.64	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	bladder	Pump Intake Depth:	35'	Comments	
Sampling Method:	same	Tubing Type:	poly		

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.2	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
1022	.500	.500	30.79	.250	7.24	19.17	902	1.90	-34.5	—	Cl
1025	.750	1.250	30.89	.250	7.19	20.00	894	1.31	-30.0	—	Cl
1028	.750	2.000	31.05	.250	7.17	19.21	897	1.24	-26.8	—	Cl
1031	.750	2.750	31.21	.250	7.15	18.99	845	0.95	-22.7	—	SC
1034	.750	3.500	31.33	.250	7.13	18.99	895	0.89	-19.8	—	SC
1037	.750	4.250	31.41	.250	7.12	18.90	899	0.93	-17.6	—	SC

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-18	Sampling Flow Rate	.250	Analytical Laboratory:	ALS
Sample Time:	10:45	Final Depth to Water:	31.51	Did Well Dewater?	No

# Containers/Type	Preservative	Analysis/Method	Field Filtered		Filter Size	MS/MSD	Duplicate ID
9 VOAs	HCl	C.	yes	no			
3 VOAs	Neat	O.	yes	no			
3 250-Pl	Neat	C.	yes	no			
1 250-Pl	H_2SO_4		yes	no			
1 250-Pl	HNO_3		yes	no			
			yes	no			

COMMENTS

Full MNA

WELL MONITORING DATA SHEET

Ash Creek Associates, Inc.

Well I.D.	MW-19	Job Number:	1641-08.002
Client:	NuStar	Date:	6/16/15
Project:	Andover Q.C.	Sampler:	TA, JH
Weather:	Rainy/Misty	Time In/Out:	1055

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	
Depth to Water:	30.60	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	bladder	Pump Intake Depth:	34'
Sampling Method:	Same	Tubing Type:	Poly

Comments

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.2	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
10:59	.500	.500	30.59	.250	7.45	20.13	820	1.94	-21.8	–	Cl
11:02	.750	1.250	30.70	.250	7.38	19.66	825	1.28	-39.8	–	Cl
1105	.750	2.000	30.40	.250	7.32	18.77	825	0.66	-62.6	–	SC
1108	.750	2.750	31.15	.250	7.27	18.65	825	0.57	-72.9	–	SC
1111	.450	3.200	31.40	.150	7.25	18.83	827	0.49	-81.6	–	SC

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-19	Sampling Flow Rate	.200	Analytical Laboratory:	ALS
Sample Time:	11:18	Final Depth to Water:	31.86	Did Well Dewater?	No

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
9 VOAs	HCl	C.	yes no			DUP-1
3 VOAs	Neat	O.	yes no			
3 250-Pl	Neat	C.	yes no			
1 250-Pl	H_2SO_4		yes no			
1 250-Pl	HNO_3		yes no			
			yes no			

COMMENTS

Full NNA

WELL MONITORING DATA SHEET

Ash Creek Associates, Inc.

Well I.D.	MW-4	Job Number:	1641-08.002
Client:	NuStar	Date:	6/16/15
Project:	Andover Q.C.	Sampler:	TA, JH
Weather:	Cloudy	Time In/Out:	

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	
Depth to Water:	29.02	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	bladder	Pump Intake Depth:	33'		Comments
Sampling Method:	same	Tubing Type:	poly		

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.2	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
1156	.500	.500	29.21	.250	7.50	19.46	1084	5.04	15.2	-	AC
1159	.600	1.100	29.34	.200	7.33	19.48	1090	3.88	22.8	—	AC
1202	.450	1.550	29.49	.150	7.27	19.52	1097	3.88	25.7	-	AC
1205	.450	2.000 ~~1.101~~	29.53	.150	7.24	19.74	1101	3.82	26.1	-	AC

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-4	Sampling Flow Rate	.150	Analytical Laboratory:	ALS
Sample Time:	1210	Final Depth to Water:	29.76	Did Well Dewater?	No

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
9 VOAs	HCl	C.	yes no			
3 VOAs	Neat	O	yes no			
3 250-PI	Neat	C.	yes no			
1 250-PI	H_2SO_4		yes no			
1 250-PI	HNO_3		yes no			
			yes no			

COMMENTS

Full MNA

WELL MONITORING DATA SHEET

Ash Creek Associates, Inc.

Well I.D.	MW-2	Job Number:	1641-08.002
Client:	NuStar	Date:	8-16-15
Project:	Andover Q.C.	Sampler:	TA, JH
Weather:	Sunny	Time In/Out:	1340

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	
Depth to Water:	34.83	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	bladder	Pump Intake Depth:	38'		Comments
Sampling Method:	sample	Tubing Type:	poly		

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.2	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	← Stabilization Criteria
13:45	.400	.400	34.94	.200	7.70	21.76	820	4.21	29.7	—	AC
13:48	.600	1.000	34.88	.200	7.42	20.17	816	3.25	36.7	—	C
1351	.600	1.600	34.46	.200	7.36	19.20	799	2.77	47.1	—	C
1354	.600	2.200	35.15	.200	7.30	19.22	803	2.69	42.8	—	C
1357	.600	2.800	35.23	.200	7.29	19.01	806	2.73	40.4	—	C
1400	.600	3.400	35.28	.200	7.28	18.89	805	2.75	40.1	—	C

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-2	Sampling Flow Rate	.200	Analytical Laboratory:	ACS
Sample Time:	14:02	Final Depth to Water:	35.34	Did Well Dewater?	NO

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
6 VOAs	HCl	GRO/VOCs	yes (no)			
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

Ash Creek Associates, Inc.

Well I.D.	MW-12	Job Number:	
Client:	NuStar	Date:	6-16-15
Project:	Andover Q.C.	Sampler:	TA, JH
Weather:	Sunny	Time In/Out:	1455

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	
Depth to Water:	30.86	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	bladder	Pump Intake Depth:	35'		Comments
Sampling Method:	same	Tubing Type:	poly		

	Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
						+/-0.2	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<- Stabilization Criteria
Sunny	1503	.600	.600	30.87	.300	7.26	21.89	1028	3.61	48.5	—	SC
	1506	.750	1.350	30.90	.250	7.06	21.28	1019	2.49	54.3	—	SC
	1509	.750	2.100	30.91	.250	7.15	20.46	1018	2.47	51.1	—	SC
Cloud	1512	.750	2.850	30.91	.250	7.15	19.91	1017	2.45	50.6	—	SC
	1515	.750	3.600	30.91	.250	7.16	19.69	1014	2.42	50.5	—	SC
Sunny	1518	.750	4.350	30.91	.250	7.15	20.24	1014	2.43	49.8	—	SC

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-12	Sampling Flow Rate	.200	Analytical Laboratory:	ALS	
Sample Time:	15:22	Final Depth to Water:	30.91	Did Well Dewater?	No	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
6 VOAS	HCl	C.O.C.	yes no			
		VOCs/GRO	yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

Cloud cover affecting YSI chamber + tubing – intermittent + causing temp fluctuations

WELL MONITORING DATA SHEET

Ash Creek Associates, Inc.

Well I.D.	MW-10	Job Number:	1641-08.002
Client:	NuStar	Date:	6-16-15
Project:	Andover Q.C.	Sampler:	TA, JH
Weather:	Sunny	Time In/Out:	1555

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	
Depth to Water:	28.30	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	bladder	Pump Intake Depth:	1.5' from bottom	Comments	
Sampling Method:	same	Tubing Type:	poly		

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.2	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
16:02	.600	.600	28.35	.300	7.36	21.30	1466	5.21	47.4	–	AC
16:05	.900	1.500	28.39	.300	7.24	19.73	1452	1.08	54.5	–	AC
16:08	.900	2.400	28.42	.300	7.17	19.02	1447	0.74	52.2	–	AC
16:11	.900	3.300	28.45	.300	7.29	19.30	1447	0.64	49.5	–	AC
16:14	.900	4.200	28.46	.300	7.28	19.13	1439	0.55	47.1	–	AC

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-10	Sampling Flow Rate	.200	Analytical Laboratory:	ALS
Sample Time:	16:17	Final Depth to Water:	28.47	Did Well Dewater?	No

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
6 VOAs	HCl	C.O.C.	yes no			
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

Ash Creek Associates, Inc.

Well I.D.	MW-9	Job Number:	1641-08.002
Client:	NuStar	Date:	6/16/15
Project:	Radcor Q.C.	Sampler:	TA, JH
Weather:	Sunny	Time In/Out:	16:32

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	
Depth to Water:	29.83	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	bladder	Pump Intake Depth:	32'	Comments	
Sampling Method:	same	Tubing Type:	poly		

	Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
						+/-0.2	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
	16:33	.500	.500	29.84	.250	7.23	20.70	1263	2.61	60.8	—	SC
	16:36	.750	1.250	30.01	.750	7.07	19.15	1249	1.06	66.8	—	SC
1639	16:39	.750	2.000	30.12	.750	7.04	19.03	1247	0.92	65.9	—	SC
1642	16:42	.600	2.600	30.19	.200	7.10	19.35	1247	0.79	62.5	—	AC
1645		.600	3.200	30.28	.200	7.16	19.40	1247	0.67	60.5	-	AC

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-9	Sampling Flow Rate	.200	Analytical Laboratory:	ALS
Sample Time:	16:49	Final Depth to Water:	30.33	Did Well Dewater?	No

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
6 VOAs	HCl	C.O.C.	yes (no)			
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

Ash Creek Associates, Inc.

Well I.D.	MW-15	Job Number:	1641-08.002
Client:	NuStar	Date:	6-17-15
Project:	Andover Q.C.	Sampler:	TA, JH
Weather:	Cloudy	Time In/Out:	0845

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	
Depth to Water:	32.34	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	bladder	Pump Intake Depth:	35.5'	Comments
Sampling Method:	Same	Tubing Type:	poly	

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.2	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
0850	.400	.400	32.50	.200	7.12	19.76	748	4.58	116.9	—	AC
0853	.450	.850	32.55	.150	7.08	19.28	744	3.72	113.6	—	AC
0856	.450	1.300	32.62	.150	7.08	19.16	745	3.63	113.2	—	AC
859	.450	1.750	32.66	.150	7.08	18.82	744	3.60	113.1	—	C
0902	.450	1.200	32.70	.150	7.08	18.87	744	3.58	113.0	—	C
0905	.450	1.650	32.73	.150	7.08	18.85	744	3.58	112.8	—	C

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-15	Sampling Flow Rate	.200	Analytical Laboratory:	ALS
Sample Time:	0910	Final Depth to Water:	32.75	Did Well Dewater?	No

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
6 VOAs	HCl	C.O.C.	yes ~~no~~			
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

Ash Creek Associates, Inc.

Well I.D.	MW-16	Job Number:	1641-08.002
Client:	Nuson	Date:	6/17/15
Project:	Andover Q.C.	Sampler:	TA, JH
Weather:	Cloudy	Time In/Out:	0927

WELL DATA

Well Depth:		Well Diameter:		Water Height	
Depth to Water:	29.48	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	bladder	Pump Intake Depth:	33'	Comments	
Sampling Method:	same	Tubing Type:	poly		

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.2	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	← Stabilization Criteria
0930	.500	.500	28.52	.250	7.41	20.20	886	5.04	119.3	—	~~A~~SC
933	.750	1.250	28.48	.250	7.24	19.42	882	4.05	124.4	—	SC
936	.450	1.700	29.21	.150	7.16	20.16	884	3.71	123.9	—	AC
939	.300	2.000	29.30	.100	7.14	20.22	888	3.70	123.2	—	AC
0942	.300	2.300	29.35	.100	7.16	20.30	889	3.66	120.2	—	AC

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-16	Sampling Flow Rate	.150	Analytical Laboratory:	ALS	
Sample Time:	9:45	Final Depth to Water:	29.40	Did Well Dewater?	No	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
6 VOAs	HCl	C.O.C.	yes (no)			
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

Ash Creek Associates, Inc.

Well I.D.	MW-11	Job Number:	1641-08.002
Client:	NuStar	Date:	6/17/15
Project:	Andover Q.C.	Sampler:	TA, JH
Weather:	Cloudy	Time In/Out:	10:01

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	
Depth to Water:	30.86 6/16	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	bladder	Pump Intake Depth:	34'
Sampling Method:	same	Tubing Type:	poly

Comments

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.2	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
10:06	.600	.600	28.45	.300	7.29	19.51	1466	2.01	121.8	–	AC
10:09	.750	1.300	28.87	.250	7.14	18.91	1467	1.75	125.4	–	AC
10:12	.450	1.750	28.97	.150	7.12	18.98	1465	1.73	124.1	–	AC
10:15	.450	1.200	29.08	.150	7.12	18.94	1463	1.78	120.3	–	AC

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-11	Sampling Flow Rate	.200	Analytical Laboratory:	ALS
Sample Time:	10:19	Final Depth to Water:	29.20	Did Well Dewater?	NO

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
6 VOAs	HCl	C.O.C.	yes (no)			DUP2
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

Ash Creek Associates, Inc.

Well I.D.	MW-8	Job Number:	1641-08.002
Client:	Nustar	Date:	6-17-15
Project:	Andover Q.C.	Sampler:	TA, JH
Weather:	Cloudy	Time In/Out:	1038

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	
Depth to Water:	19.93	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	bladder	Pump Intake Depth:	23'	Comments	
Sampling Method:	same	Tubing Type:	poly		

	Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
						+/-0.2	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	← Stabilization Criteria
Sunny	1041	.400	.400	20.08	.200	7.49	20.46	1217	7.85	110.8	—	AC
cloudy	1044	.600	1.000	20.30	.200	7.32	18.82	1202	3.71	115.7	—	AC
cloudy	1047	.450	1.450	20.26	.150	7.22	18.91	1202	3.38	118.3	—	AC
cloudy	1050	.600	2.050	20.30	.200	7.20	19.10	1201	3.24	115.6	—	C
sunny	1053	.600	2.650	20.30	.200	7.19	19.42	1207	3.19	112.4	—	C
	1056	.600	3.250	20.31	.200	7.18	19.26	1209	3.16	109.8	—	C

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-8	Sampling Flow Rate	.200	Analytical Laboratory:	ALS
Sample Time:	11:00	Final Depth to Water:	20.31	Did Well Dewater?	No

#Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
6 VOAs	HCl	~~AA~~ C.O.C.	yes (no)			
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

Ash Creek Associates, Inc.

Well I.D.	MW-13	Job Number:	1641-08.002
Client:	NuStar	Date:	6-17-15
Project:	Andover Q.C.	Sampler:	TA, SH
Weather:	Sunny	Time In/Out:	1104

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	
Depth to Water:	31.44	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	bladder	Pump Intake Depth:	35'	Comments	
Sampling Method:	same	Tubing Type:	poly		

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.2	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	← Stabilization Criteria
11:13	.500	.500	31.46	.250	7.53	21.08	685	6.55	99.5	—	SC
11:16	.750	1.250	32.34	.250	7.36	18.54	672	5.47	109.1	—	SC
11:19	.450	1.700	32.46	.150	7.31	18.71	672	5.31	106.9	—	SC
11:22	.450	2.150	32.55	.150	7.30	18.89	673	5.26	105.4	—	SC
11:25	.450	2.600	32.64	.150	7.28	18.91	673	5.19	103.6	—	SC
11:27	.300	2.900	32.73	.150	7.27	18.95	673	5.22	101.9	—	SC

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-13	Sampling Flow Rate	.200	Analytical Laboratory:	ALS
Sample Time:	11:30	Final Depth to Water:	32.79	Did Well Dewater?	No

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
6 VOAs	HCl	C.O.C.	yes (no)			
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

Ash Creek Associates, Inc.

Well I.D.	MW-14	Job Number:	1641-08.002
Client:	NuStar	Date:	6-17-15
Project:	Andover Q.C.	Sampler:	TA, JH
Weather:	Sunny/Cloudy	Time In/Out:	~~1130~~ 1138

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	
Depth to Water:	31.70	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	bladder	Pump Intake Depth:	34'	Comments	
Sampling Method:	bladder	Tubing Type:	poly		

	Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
						+/-0.2	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<- Stabilization Criteria
	11:41	.500	.500	31.80	.250	7.48	20.11	700	4.37	95.1	–	AC
cloudy	11:44	.750	1.250	32.30	.250	7.24	18.37	693	3.72	102.0	–	AC
cloudy	11:47	.300	1.550	32.50	.100	7.20	18.56	697	3.59	101.0	–	AC
cloudy	11:50	.300	1.850	32.63	.100	7.20	18.63	696	3.49	99.8	–	AC
partly sunny	11:53	.300	2.150	32.71	.100	7.20	18.90	698	3.42	97.3	–	AC

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-14	Sampling Flow Rate	.200	Analytical Laboratory:	ALS
Sample Time:	11:57	Final Depth to Water:	32.83	Did Well Dewater?	No

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
6 VOAs	HCl	C.O.C.	yes (no)			
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

Ash Creek Associates, Inc.

Well I.D.	MW-3	Job Number:	1641-08.002
Client:	NuStar	Date:	6-17-15
Project:	Andover Q.C.	Sampler:	TA, JH
Weather:	Sunny	Time In/Out:	1320

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	
Depth to Water:	38.21	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	bladder	Pump Intake Depth:	42'	Comments	
Sampling Method:	same	Tubing Type:	poly		

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.2	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
1327	.500	.500	38.10	.250	7.30	22.77	920	1.91	-56.1	—	C
1330	.750	1.250	38.12	.250	7.20	20.60	939	0.85	-61.7	—	C
1333	.750	2.000	38.14	.250	7.12	19.97	934	0.68	-68.2	—	C
1336	.750	2.750	38.15	.250	7.08	19.33	944	0.62	-74.2	—	C
1339	.750	3.500	38.15	.250	7.05	18.97	946	0.50	-80.1	—	C
1342	.750	4.250	38.16	.250	7.04	18.87	947	0.46	-83.3	—	C

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-3	Sampling Flow Rate	.200	Analytical Laboratory:	ACS		
Sample Time:	13:45	Final Depth to Water:	38.16	Did Well Dewater?	No		
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID	
6 VOAs	HCl	6.0.6	yes no				
			yes no				
			yes no				
			yes no				
			yes no				
			yes no				

COMMENTS

tubing + YSI cylinder exposed to intermittent sunshine - temp variances experienced, as well as higher than avg. temps.

WELL MONITORING DATA SHEET

Ash Creek Associates, Inc.

Well I.D.	MW-7	Job Number:	1641-08.007
Client:	Nustar	Date:	6-17-15
Project:	Andover Q.C.	Sampler:	TA, JH
Weather:	Sunny	Time In/Out:	1350

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	
Depth to Water:	14.91	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	~~Bailer~~ peri	Pump Intake Depth:	19'	Comments	
Sampling Method:	same - peri	Tubing Type:	poly		

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.2	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
1357	.600	.600	15.01	.200	7.41	17.75	866	2.26	-43.2	—	C
1400	.600	1.200	15.15	.200	7.32	17.30	897	1.13	-37.2	—	C
1403	.600	1.800	15.18	.200	7.27	17.20	879	0.90	-34.1	—	C
1406	.600	2.400	15.21	.200	7.26	17.32	881	0.78	-32.4	—	C
1409	.600	3.000	15.22	.200	7.26	17.28	876	0.64	-31.9	—	C
1411	.600	3.600	15.23	.200	7.27	17.16	868	0.60	-31.2	—	C

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-7	Sampling Flow Rate	.200	Analytical Laboratory:	ACS
Sample Time:	1414	Final Depth to Water:	15.23	Did Well Dewater?	NO

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
6 VOAs	HCl	C.O.C.	yes (no)			
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

Ash Creek Associates, Inc.

Well I.D.	MW-6	Job Number:	164f-08.002
Client:	Nustar	Date:	6-17-15
Project:	Andover Q.C.	Sampler:	TA, JH
Weather:	Sunny	Time In/Out:	1416

WELL DATA

Well Depth:		Well Diameter:	2"	Water Height	
Depth to Water:	20.45	Screened Interval:		x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	peristaltic	Pump Intake Depth:	24'
Sampling Method:	same	Tubing Type:	poly

Comments

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.2	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
14:20	.400	.400	20.71	.200	7.38	17.51	1294	4.56	-1.7	—	C
1423	.600	1.000	20.93	.200	7.25	17.49	1297	3.95	4.9	—	C
1426	.600	1.600	21.11	.200	7.19	17.45	1292	3.96	10.3	—	C
1429	.600	2.200	21.25	.200	7.17	17.62	1288	3.94	13.0	—	C
1432	.600	2.800	21.37	.200	7.15	17.60	1280	3.88	14.9	—	C

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-6	Sampling Flow Rate	.200	Analytical Laboratory:	ALS
Sample Time:	1434	Final Depth to Water:	21.43	Did Well Dewater?	No

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
6 VOAs	HCl	G.O.C.	yes (no)			
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

Tubing bringing up small, intermittent bubbles - possibly affecting YSI cylinder DO reading

Appendix C

Boring and Well Logs

Sample Descriptions

Classification of soils in this report is based on visual field and laboratory observations which include density/consistency, moisture condition, and grain size, and should not be construed to imply field nor laboratory testing unless presented herein. Visual-manual classification methods of ASTM D 2488 were used as an identification guide.

Soil descriptions consist of the following:
MAJOR CONSTITUENT with additional remarks; color, moisture, minor constituents, density/consistency.

Density/Consistency

Soil density/consistency in borings is related primarily to the Standard Penetration Resistance. Soil density/consistency in test pits and push probe explorations is estimated based on visual observation and is presented parenthetically on test pit and push probe exploration logs.

SAND and GRAVEL Density	Standard Penetration Resistance in Blows/Foot
Very loose	0 - 4
Loose	4 - 10
Medium dense	10 - 30
Dense	30 - 50
Very dense	>50

SILT or CLAY Density	Standard Penetration Resistance in Blows/Foot	Approximate Shear Strength in TSF
Very soft	0 - 2	<0.125
Soft	2 - 4	0.125 - 0.25
Medium stiff	4 - 8	0.25 - 0.5
Stiff	8 - 15	0.5 - 1.0
Very Stiff	15 - 30	1.0 - 2.0
Hard	>30	>2.0

Moisture

Dry	Little perceptible moisture.
Sl. Moist	Some perceptible moisture, probably below optimum.
Moist	Probably near optimum moisture content.
Wet	Much perceptible moisture, probably above optimum.

Minor Constituents

	Estimated Percentage
Not identified in description	0 - 5
Slightly (clayey, silty, etc.)	5 - 12
Clayey, silty, sandy, gravelly	12 - 30
Very (clayey, silty, etc.)	30 - 50

Sampling Symbols

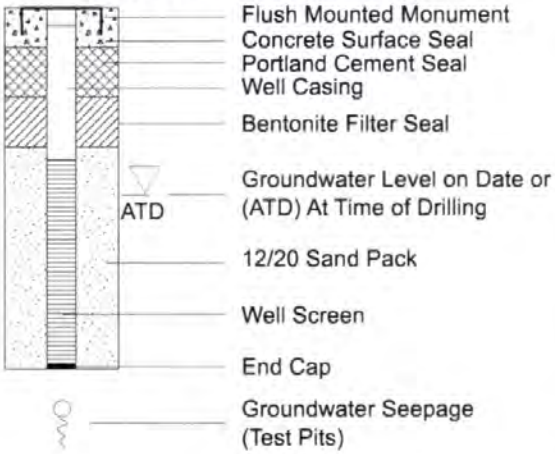
BORING AND PUSH-PROBE SYMBOLS

- Recovery
- No Recovery
- Temporarily Screened Interval
- PID Photoionization Detector Reading
- W Water Sample
- Sample Submitted for Chemical Analysis
- NS No Sheen
- SS Slight Sheen
- MS Moderate Sheen
- HS Heavy Sheen
- BF Biogenic Film

TEST PIT SOIL SAMPLES

- Grab (Jar)
- Bag
- Shelby Tube

Groundwater Observations and Monitoring Well Construction



Key to Exploration Logs

NuStar Pipeline Operating Partnership L.P.
Andover, Kansas

APEX Apex Companies, LLC 3015 SW First Avenue Portland, Oregon 97201	Project Number	1641-08	Figure
	April 2015		Key

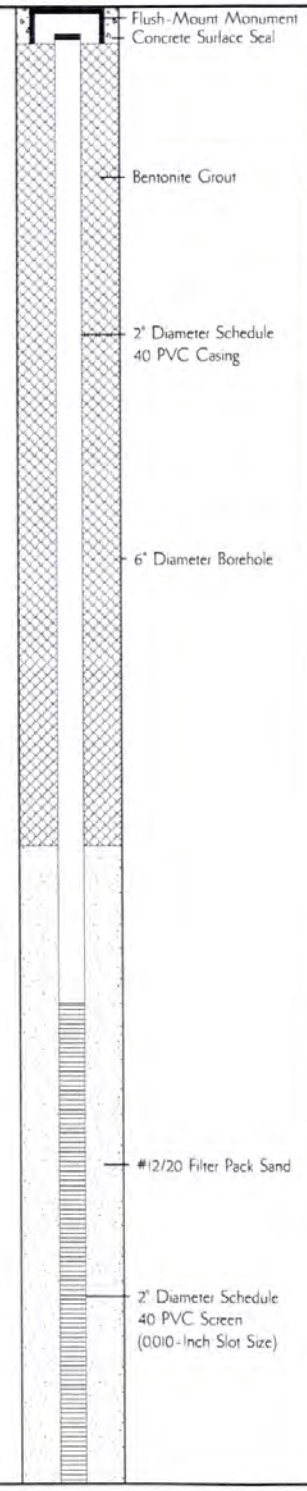
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

NuStar Terminals Operations Partnership L.P.
Andover, Kansas

Boring Number: **MW-17**
Project Number: **1641-08**
Logged By: **M. Whitson**
Date: **March 12, 2015**
Site Conditions: **Grass Yard**
Drilling Contractor: **Layne Drilling**
Drilling Equipment: **Mini Sonic**
Sampler Type: **10' Core Barrel**
Depth to Water (ATD): --
Surface Elevation: **Not Measured**

Depth, feet	Core Interval/Recovery	Laboratory Sample ID	PID	Sheen	Lithologic Description
					Grass surface over CLAY (CH); dark brown, slightly moist, very stiff to hard, trace organics, rootlets.
			<5	NS	
5					Becomes light brown, trace silt.
			<5	NS	
10					Becomes light gray, trace fine gravel.
			<5	NS	Clayey SILT (ML); light brown, slightly moist, very stiff, moderate plasticity, trace gravel.
			<5	NS	Clayey SILT with gravel (ML); very light brown, slightly moist, very stiff to hard, fine to coarse angular gravel.
15			<5	NS	Partially lithified [shale].
		MW-17 (19)	<5	NS	CLAY with gravel (CH); very light brownish-gray, slightly moist, very stiff to hard, fine to coarse angular gravel,(partially lithified [shale]).
20			96	NS	Becomes moist, soft to medium stiff.
		MW-17 (22)	361	LS	
25			<5	NS	Becomes very stiff to hard, slightly moist.
					Becomes lithified [shale].
			<5	NS	
30			<5	NS	
			187	NS	Silty CLAY with gravel (CH); brownish-gray, moist, soft, fine to coarse angular gravel.
			6	NS	Becomes light gray.
35		MW-17 (37)	<5	NS	SHALE/LIMESTONE; white to medium brown, very hard, interbedded.
			<5	NS	CLAY (CH); light brown, slightly moist, hard, waxy, high plasticity.

Well Construction Details and Notes:



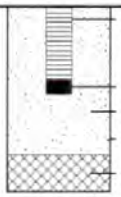
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

NuStar Terminals Operations Partnership L.P.
Andover, Kansas

Boring Number: **MW-17**
Project Number: **1641-08**
Logged By: **M. Whitson**
Date: **March 12, 2015**
Site Conditions: **Grass Yard**
Drilling Contractor: **Layne Drilling**
Drilling Equipment: **Mini Sonic**
Sampler Type: **10' Core Barrel**
Depth to Water (ATD): --
Surface Elevation: **Not Measured**

Depth, feet	Core Interval/Recovery	Laboratory Sample ID	PID	Sheen	Lithologic Description
			<5	NS	SHALE/LIMESTONE; very light gray, dry, very hard, lithified.
					Silty CLAY (CH); very light brown, slightly moist, hard, partially lithified (shale).
45					Bottom of Boring at 45.0' BGS.
50					
55					
60					
65					
70					
75					

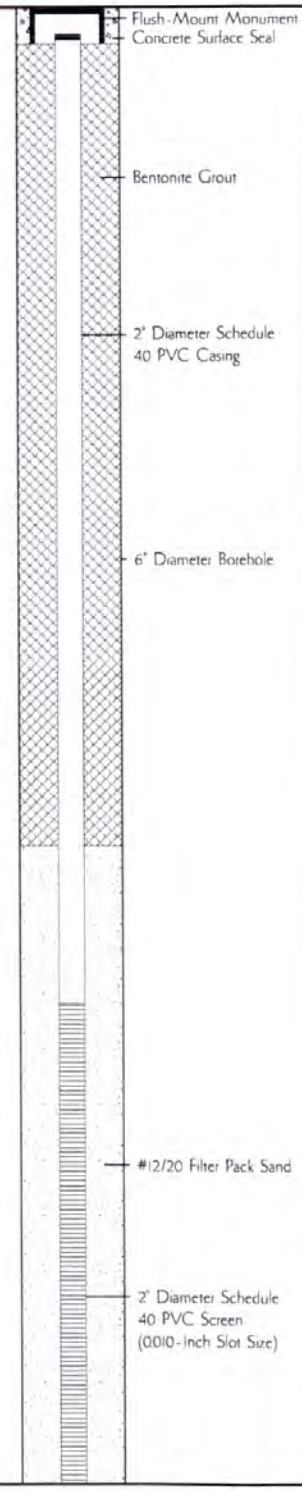
Well Construction Details and Notes:



Apex Companies, LLC 3015 SW First Avenue Portland, Oregon 97201	NuStar Terminals Operations Partnership L.P. Andover, Kansas	Boring Number: **MW-18**
		Project Number: **1641-08**
		Logged By: **M. Whitson**
		Date: **March 12, 2015**
		Site Conditions: **Road Surface**
		Drilling Contractor: **Layne Drilling**
		Drilling Equipment: **Mini Sonic**
		Sampler Type: **10' Core Barrel**
		Depth to Water (ATD): --
		Surface Elevation: **Not Measured**

Depth, feet	Core Interval/Recovery	Laboratory Sample ID	PID	Sheen	Lithologic Description
			<5	NS	Asphalt concrete road surface (6") over CLAY (CH); dark brown, slightly moist, very stiff to hard, highly plastic.
5			<5	NS	Becomes light greenish-brown, trace silt.
			<5	NS	Silty CLAY (CH); light brown, slightly moist, stiff to very stiff, highly plastic.
10			<5	NS	4-Inch lens; calcite/gypsum fragments. Trace gravel.
			<5	NS	Becomes very silty.
			<5	NS	Clayey GRAVEL (GP); light brown, very dense, slightly moist, fine to coarse angular gravel in a clay matrix.
15			<5	NS	Clayey SILT with gravel (ML); medium gray/greenish-gray, slightly moist, very stiff, fine to coarse angular gravel.
			<5	NS	Becomes very light brown.
			<5	NS	Stringers of calcite (crystalline) interbedded with partially lithified silts and clays (shale).
20			<5	NS	Silty CLAY (CH); very light grayish-brown, slightly moist, very stiff, with trace angular gravel, high plasticity. Becomes hard to very hard, lithified (shale).
			<5	NS	Becomes medium stiff, moist. Becomes hard to very hard, lithified (shale).
25					
		MW-18 (26.5)	<5	NS	
			72	NS	Becomes medium stiff, moist, gravelly (calcite [crystalline]).
					Becomes hard, dark brown. Becomes very light brown, moist to wet, medium stiff.
30			44	NS	
		MW-18 (31.5)	142	NS	SILT with gravel (ML); light brown, dry, stiff, mostly lithified, broken up during drilling.
			<5	NS	Clayey SILT (ML); medium reddish-brown, dry, hard. Becomes mostly lithified (shale).
35			<5	NS	Becomes moist, medium stiff. Becomes dry, hard, lithified (shale).
			<5	NS	Clayey SILT (ML); pale brown, dry, hard.

Well Construction Details and Notes:

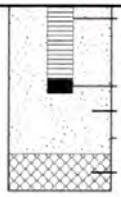


Apex Companies, LLC 3015 SW First Avenue Portland, Oregon 97201	NuStar Terminals Operations Partnership L.P. Andover, Kansas	Boring Number: **MW-18**

Project Number: **1641-08**
Logged By: **M. Whitson**
Date: **March 12, 2015**
Site Conditions: **Road Surface**
Drilling Contractor: **Layne Drilling**
Drilling Equipment: **Mini Sonic**
Sampler Type: **10' Core Barrel**
Depth to Water (ATD): **--**
Surface Elevation: **Not Measured**

Depth, feet	Core Interval/Recovery	Laboratory Sample ID	PID	Sheen	Lithologic Description
			<5	NS	
					Becomes lithified (shale).
			<5	NS	Becomes medium stiff to stiff.
45					Bottom of Boring at 45.0' BGS.
50					
55					
60					
65					
70					
75					

Well Construction Details and Notes:



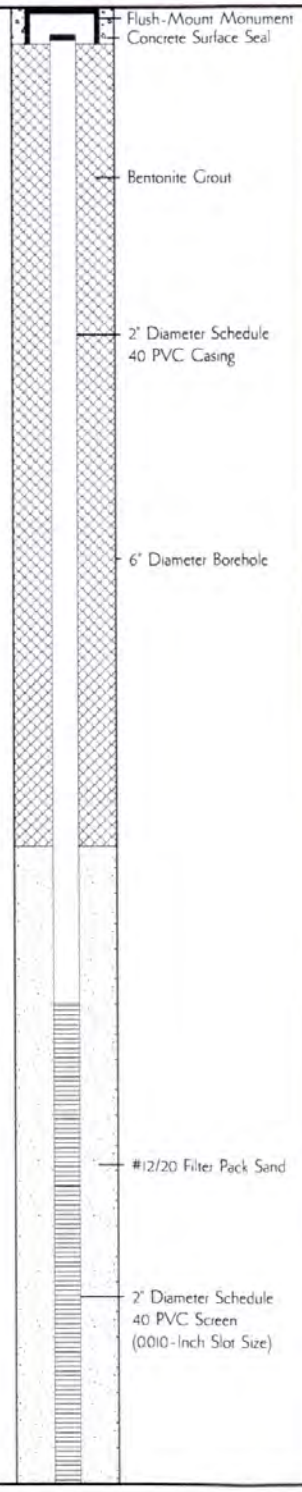
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

NuStar Terminals Operations Partnership L.P.
Andover, Kansas

Boring Number: **MW-19**
Project Number: **1641-08**
Logged By: **M. Whitson**
Date: **March 12, 2015**
Site Conditions: **Road Surface**
Drilling Contractor: **Layne Drilling**
Drilling Equipment: **Mini Sonic**
Sampler Type: **10' Core Barrel**
Depth to Water (ATD): --
Surface Elevation: **Not Measured**

Depth, feet	Core Interval/Recovery	Laboratory Sample ID	PID	Sheen	Lithologic Description
			<5	NS	Asphalt concrete road surface (6") over CLAY (CH); dark brown, slightly moist, medium stiff to stiff. Trace asphalt concrete at surface.
5			<5	NS	Silty CLAY (CH); medium brown, slightly moist, very stiff, moderate to high plasticity.
			<5	NS	Clayey SILT (ML); light brown, mottled brown, slightly moist, medium stiff, low to moderate plasticity.
					Becomes greenish-gray, very hard.
10			<5	NS	
					Becomes medium stiff with calcite (crystalline) gravels (vein).
			<5	NS	
					SHALE; light brown to medium greenish-brown, dry, hard, lithified.
15			<5	NS	Silty CLAY (CH); light brown, slightly moist, very stiff, trace calcite/gypsum, gravel lenses.
			<5	NS	
					Becomes medium stiff, reddish-brown, moist.
20			<5	NS	
			<5	NS	CLAY with SILT (CH); greenish-gray, dry, very hard, partially lithified, with trace crystalline calcite lens.
25					Becomes greenish-brown, waxy.
		MW-19 (28)	<5	NS	Becomes lithified (shale) with calcite veins.
					Becomes pale brown, medium stiff, moist.
30			7	NS	
		MW-19 (32)	43	NS	
					Becomes lithified (shale)
					Becomes very stiff to hard.
35			<5	NS	
			<5	NS	
			<5	NS	Becomes mostly lithified with calcite (crystalline).

Well Construction Details and Notes:



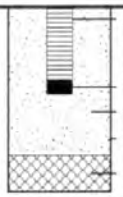
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

NuStar Terminals Operations Partnership L.P.
Andover, Kansas

Boring Number: **MW-19**
Project Number: **1641-08**
Logged By: **M. Whitson**
Date: **March 12, 2015**
Site Conditions: **Road Surface**
Drilling Contractor: **Layne Drilling**
Drilling Equipment: **Mini Sonic**
Sampler Type: **10' Core Barrel**
Depth to Water (ATD): --
Surface Elevation: **Not Measured**

Depth, feet	Core Interval/Recovery	Laboratory Sample ID	PID	Sheen	Lithologic Description
			<5	NS	
		MW-19 (45)	12	NS	Becomes medium stiff, slightly moist.
45			<5	NS	
					Bottom of Boring at 45.0' BGS.
50					
55					
60					
65					
70					
75					

Well Construction Details and Notes:



Apex Companies, LLC 3015 SW First Avenue Portland, Oregon 97201	NuStar Terminals Operations Partnership L.P. Andover, Kansas	Boring Number: **IB-1**

Project Number: **1641-08**
Logged By: **M. Whitson**
Date: **March 14, 2015**
Site Conditions: **Road Surface**
Drilling Contractor: **Layne Drilling**
Drilling Equipment: **Mini Sonic**
Sampler Type: **10' Core Barrel**
Depth to Water (ATD): **31'**
Surface Elevation: **Not Measured**

Depth, feet	Core Interval/Recovery	Laboratory Sample ID	PID	Sheen	Lithologic Description	Boring Details and Notes
			<5	NS	Asphalt concrete road surface (6") over CLAY (CH); dark brown, slightly moist, medium stiff to stiff. High plasticity.	
			<5	NS	Clayey SILT (ML); very light brown, dry to slightly moist, very stiff, low to moderate plasticity.	
5						5
10			<5	NS	CLAY (CH); very dark brown, mottled brown, slightly moist, very stiff to hard, trace silt, high plasticity.	10
			<5	NS		
			<5	NS	Clayey SILT (ML); light brown, slightly moist, very stiff to hard, low to moderate plasticity.	
15						15
		IB-1 (18)			— Becomes light greenish-gray.	
			<5	NS	— Becomes partially lithified, crystalline calcite veins.	
20					Gravelly CLAY (CH); medium brown, moist, soft to medium stiff, fine to coarse angular gravel.	20
			5	NS		
		IB-1 (24)			— Becomes stiff.	
			32	NS		
25						25
			<5	NS		
			<5	NS	Silty CLAY (CH) light brown, slightly moist, hard, partially lithified, calcite (crystalline).	
30						30
			29	NS	— Becomes wet, soft.	
					— Becomes hard.	
			<5	NS		
			<5	NS		
35						35
					— Calcite veins. Becomes partially lithified (shale).	
			<5	NS		
			25	NS		

Bottom of Boring at 40.0' BGS.

Apex Companies, LLC 3015 SW First Avenue Portland, Oregon 97201	NuStar Terminals Operations Partnership L.P. Andover, Kansas	Boring Number: **IB-2**

Project Number: **1641-08**
Logged By: **M. Whitson**
Date: **March 15, 2015**
Site Conditions: **Road Surface**
Drilling Contractor: **Layne Drilling**
Drilling Equipment: **Mini Sonic**
Sampler Type: **10' Core Barrel**
Depth to Water (ATD): --
Surface Elevation: **Not Measured**

Depth, feet	Core Interval/Recovery	Laboratory Sample ID	PID	Sheen	Lithologic Description	Boring Details and Notes
			<5	NS	Asphalt concrete road surface (6") over CLAY (CH); very dark brown to black, slightly moist, very stiff, high plasticity.	
5						5
			<5	NS	Silty CLAY (CH); light yellowish-brown, slightly moist, stiff, moderate to high plasticity.	
					Becomes very stiff.	
10			<5	NS		10
					Becomes light gray.	
			<5	NS	Gravelly CLAY (CH); brownish-gray, moist, soft to medium stiff, fine angular gravel.	
					Becomes lithified (shale), very hard.	
15					Becomes stiff to very stiff.	15
			<5	NS	Silty CLAY (CH); grayish-brown, moist, medium stiff to stiff, trace fine gravel.	
					Becomes hard, partially lithified.	
			<5	NS		
			<5	NS	3-Inch wet lens.	
20						20
			<5	NS	CLAY with gravel (CH); medium brown, moist, soft to medium stiff, fine to medium angular gravel, high plasticity.	
			<5	NS		
			<5	NS	Silty CLAY (CH); medium gray, slightly moist, very stiff to hard, high plasticity, partially lithified.	
25						25
			<5	NS		
30					Becomes lithified (shale).	30
		IB-2 (32)	<5	NS	2-Inch wet lens.	
35			39	NS	Becomes moist, medium stiff.	35
		IB-2 (38)	45	NS	Becomes hard.	

Bottom of Boring at 40.0' BGS.

Apex Companies, LLC 3015 SW First Avenue Portland, Oregon 97201	NuStar Terminals Operations Partnership L.P. Andover, Kansas	Boring Number: **IB-3**

Project Number: **1641-08**
Logged By: **M. Whitson**
Date: **March 15, 2015**
Site Conditions: **Road Surface**
Drilling Contractor: **Layne Drilling**
Drilling Equipment: **Mini Sonic**
Sampler Type: **10' Core Barrel**
Depth to Water (ATD): **--**
Surface Elevation: **Not Measured**

Depth, feet	Core Interval/Recovery	Laboratory Sample ID	PID	Sheen	Lithologic Description	Boring Details and Notes
			<5	NS	Asphalt concrete road surface (6") over CLAY (CH); dark brown, slightly moist, very stiff. High plasticity.	
5			<5	NS	Silty CLAY (CH); light yellowish-brown, slightly moist, stiff, moderate plasticity.	5
10			<5	NS	Becomes grayish-brown, moist, with trace gravel.	10
15			<5	NS		15
20			13	NS	Becomes yellowish-brown, moist to almost wet.	20
		IB-3 (24)	<5	NS		
25			111	NS	CLAY (CH); light yellowish-gray, slightly moist to moist, very stiff to hard, high plasticity, trace silt, partially lithified.	25
30		IB-3 (30)	342	NS		30
			6	NS	Silty CLAY (CH); gray brown, slightly moist, hard, high plasticity, partially lithified. 1-Foot wet lens.	
35		IB-3 (36)	<5	NS	Becomes lithified.	35
			<5	NS		

Bottom of Boring at 40.0' BGS.

Apex Companies, LLC 3015 SW First Avenue Portland, Oregon 97201	NuStar Terminals Operations Partnership L.P. Andover, Kansas	Boring Number: **IB-4**

Project Number: **1641-08**
Logged By: **M. Whitson**
Date: **March 18, 2015**
Site Conditions: **grass Surface**
Drilling Contractor: **Layne Drilling**
Drilling Equipment: **Mini Sonic**
Sampler Type: **10' Core Barrel**
Depth to Water (ATD): **--**
Surface Elevation: **Not Measured**

Depth, feet	Core Interval/Recovery	Laboratory Sample ID	PID	Sheen	Lithologic Description	Boring Details and Notes
			<5	NS	Grass surface over silty CLAY (CH); dark brown, moist, soft to medium stiff, moderate to high plasticity.	
			<5	NS	CLAY (CH); very dark brown, slightly moist, hard, high plasticity.	
5		IB-4 (6)	<5	NS		5
10						10
			<5	NS	Silty CLAY (CH); light brown, slightly moist,medium stiff, moderate to high plasticity.	
			<5	NS	Becomes fine angular gravel.	
					Becomes hard, cemented.	
15			<5	NS	Becomes moist, soft.	15
		IB-4 (19.5)			Becomes very hard, mostly lithified, greenish-gray.	
20			875	NS	Gravelly CLAY (CH); yellowish-brown, wet, soft, fine to medium angular gravel.	20
					Becomes dark gray.	
			260	NS		
			7	NS	Clayey SILT (ML); reddish-brown, slightly moist to moist, medium stiff, low to moderate plasticity, trace angular gravel.	
25					CLAY (CH); medium gray, slightly moist, very hard, high plasticity.	25
			7	NS	6-Inch lens of medium stiff material.	
30		IB-4 (31)			Becomes very soft, saturated.	30
			1,426	HS		
					Becomes medium stiff with trace gravel.	
			42	NS		
35					Becomes very light gray.	35
					Becomes partially lithified.	
					Becomes shale (12").	
		IB-4 (39)	<5	NS	Becomes very hard, medium brown.	
			<5	NS		

Bottom of Boring at 40.0' BGS.

Apex Companies, LLC 3015 SW First Avenue Portland, Oregon 97201	NuStar Terminals Operations Partnership L.P. Andover, Kansas	Boring Number: **IB-5**

Project Number: **1641-08**
Logged By: **M. Whitson**
Date: **March 18, 2015**
Site Conditions: **Grass Surface**
Drilling Contractor: **Layne Drilling**
Drilling Equipment: **Mini Sonic**
Sampler Type: **10' Core Barrel**
Depth to Water (ATD): **--**
Surface Elevation: **Not Measured**

Depth, feet	Core Interval/Recovery	Laboratory Sample ID	PID	Sheen	Lithologic Description	Boring Details and Notes
			<5	NS	Grass surface over silty CLAY (CH); dark brown, moist, very stiff, high plasticity.	
5			<5	NS		5
			<5	NS	Silty CLAY (CH); reddish-brown, slightly moist, very stiff, moderate to high plasticity.	
10			<5	NS		10
15			<5	NS	Trace gravel.	15
			<5	NS	Becomes mostly lithified, gray (shale).	
20					Becomes light brown.	20
			<5	NS		
			17	NS	Becomes calcite (1-inch crystalline vein).	
25					Becomes hard to very hard.	25
			<5	NS	Becomes gray.	
30			<5	NS	Gravelly CLAY (CH); light tan, saturated, soft, medium to coarse angular gravel.	30
			8	NS		
35			<5	NS	Silty CLAY (CH); grayish-brown, slightly moist, very stiff to hard, partially lithified in place.	35

Bottom of Boring at 40.0' BGS.

Apex Companies, LLC 3015 SW First Avenue Portland, Oregon 97201	NuStar Terminals Operations Partnership L.P. Andover, Kansas	Boring Number: **IB-6**

Project Number: **1641-08**
Logged By: **M. Whitson**
Date: **March 19, 2015**
Site Conditions: **Grass Surface**
Drilling Contractor: **Layne Drilling**
Drilling Equipment: **Mini Sonic**
Sampler Type: **10' Core Barrel**
Depth to Water (ATD): --
Surface Elevation: **Not Measured**

Depth, feet	Core Interval/Recovery	Laboratory Sample ID	PID	Sheen	Lithologic Description	Boring Details and Notes:
			<5	NS	Grass surface over CLAY (CH); very dark brown, slightly moist, stiff to very stiff, high plasticity.	
5						5
			<5	NS	Clayey SILT (ML); pale brown, slightly moist, stiff, low to moderate plasticity.	
10					Silty CLAY (CH); medium brown, slightly moist, stiff to very stiff, high plasticity.	10
			<5	NS		
15					Becomes grayish-brown, hard.	15
			<5	NS		
			23	NS	Becomes reddish-brown.	
20					Becomes grayish-brown, very stiff.	20
			<5	NS		
					Becomes hard.	
25			<5	NS		25
			15	NS	Gravelly CLAY (CH); light brown/pale brown, moist, to almost wet, medium stiff, fine to medium angular gravel.	
30						30
			<5	NS	Silty CLAY (CH); medium brown, slightly moist,stiff, high plasticity.	
35					Becomes mostly lithified, greenish-gray, hard.	35
			<5	NS		

Bottom of Boring at 40.0' BGS.

Apex Companies, LLC 3015 SW First Avenue Portland, Oregon 97201	NuStar Terminals Operations Partnership L.P. Andover, Kansas	Boring Number: **IB-7**

Project Number: **1641-08**
Logged By: **M. Whitson**
Date: **March 18, 2015**
Site Conditions: **Road Surface**
Drilling Contractor: **Layne Drilling**
Drilling Equipment: **Mini Sonic**
Sampler Type: **10' Core Barrel**
Depth to Water (ATD): --
Surface Elevation: **Not Measured**

Depth, feet	Core Interval/Recovery	Laboratory Sample ID	PID	Sheen	Lithologic Description	Boring Details and Notes
			<5	NS	Grass surface over silty CLAY (CH); medium brown, moist, moderate to high plasticity.	
			<5	NS	CLAY (CH); dark brown, slightly moist, stiff, high plasticity.	
5			<5	NS	Becomes reddish-brown, very stiff.	5
10			<5	NS	Clayey SILT (ML); tan, mottled white, slightly moist, very stiff.	10
			<5	NS	Silty CLAY (CH); light brown, slightly moist, very stiff, moderate to high plasticity.	
			<5	NS	Becomes very silty clay.	
15			<5	NS	Clayey SILT (MH); ium gray, slightly moist, very stiff to hard, medium plasticity. Becomes partially lithified, broken up into gravel size particles.	15
		IB-7 (19)	<5	NS	CLAY with silt (CH); gray, slightly moist, hard to very hard, high plasticity.	
20			<5	NS	Gravelly CLAY with silt (CH); yellowish-gray, slightly moist, medium stiff, fine to coarse angular gravel.	20
		IB-7 (24)	214	NS	Clayey SILT (MH); yellowish-brown, wet, soft to medim stiff, high plasticity.	
			447	NS		
25			<5	NS	Very silty CLAY (CH); grayish-brown, slightly moist,hard to very hard moderate to high plasticity.	25
			63	NS	Becomes wet.	
30					Becomes silty clay.	30
			31	NS		
			14	NS		
35			16	NS		35
					Becomes moist, very stiff.	
		IB-7 (39)	<5	NS		

Bottom of Boring at 40.0' BGS.

Apex Companies, LLC 3015 SW First Avenue Portland, Oregon 97201	NuStar Terminals Operations Partnership L.P. Andover, Kansas	Boring Number: **IB-8**

Project Number: **1641-08**
Logged By: M. Whitson
Date: March 18, 2015
Site Conditions: Road Surface
Drilling Contractor: Layne Drilling
Drilling Equipment: Mini Sonic
Sampler Type: 10' Core Barrel
Depth to Water (ATD): --
Surface Elevation: Not Measured

Depth, feet	Core Interval/Recovery	Laboratory Sample ID	PID	Sheen	Lithologic Description	Boring Details and Notes
					Grass surface over CLAY (CH); very dark brown, slightly moist, stiff, high plasticity.	
			<5	NS		
5						5
			<5	NS		
					Silty CLAY (CH); yellowish-brown, slightly moist, stiff, high plasticity	
			<5	NS		
10						10
					Clayey SILT (ML); light brown, moist, medium stiff, low to medium plasticity.	
15					Silty CLAY (CH); light brown, slightly moist, stiff, medium to high plasticity.	15
					Becomes gray.	
		IB-8 (18)	<5	NS	Becomes very hard.	
					Becomes medium lithified (shale).	
20					Silty CLAY (CH); yellowish-brown, wet, soft, trace gravel.	20
			<5	NS		
			7	NS	Becomes slightly moist, hard.	
25						25
			<5	NS	3-Inch moist, soft lens.	
			<5	NS	1-Inch wet lens.	
30					Trace gravel, fine to coarse angular gravel, calcite (crystalline).	30
			6	NS	Becomes moist, medium stiff.	
		IB-8 (32.5)	132	NS	Becomes wet, very soft.	
			99	NS	Becomes brownish-gray, hard.	
35						35
			5	NS	Becomes greenish-gray, slightly moist, very hard, partially lithified.	
		IB-8 (39)	<5	NS		

Bottom of Boring at 40.0' BGS.

Apex Companies, LLC 3015 SW First Avenue Portland, Oregon 97201	NuStar Terminals Operations Partnership L.P. Andover, Kansas	Boring Number: **IB-9**

Project Number: **1641-08**
Logged By: **M. Whitson**
Date: **March 19, 2015**
Site Conditions: **Road Surface**
Drilling Contractor: **Layne Drilling**
Drilling Equipment: **Mini Sonic**
Sampler Type: **10' Core Barrel**
Depth to Water (ATD): **30'**
Surface Elevation: **Not Measured**

Depth, feet	Core Interval/Recovery	Laboratory Sample ID	PID	Sheen	Lithologic Description	Boring Details and Notes
					Grass surface over CLAY (CH); very dark brown, slightly moist, medium stiff to stiff.	
					— Becomes very stiff.	
5						5
					Clayey SILT (ML); reddish-brown, slightly moist, medium stiff, low to moderate plasticity.	
10						10
					— Trace gravel.	
15					Silty CLAY (CH); medium brown, slightly moist, very stiff, high plasticity.	15
		IB-1 (18)			— Becomes mostly lithified (shale).	
20					— Becomes crystalline calcite lens.	20
					Silty CLAY (CH) medium light brown, slightly moist, stiff to very stiff.	
			7	NS		
		IB-1 (24)				
25			<5	NS	— Becomes greenish-gray, hard to very hard.	25
			<5	NS		
30						30
			723	NS	CLAY with gravel (CH); pale brown, wet, soft to medium stiff, fine to coarse angular gravel, trace silt.	
					— Becomes medium stiff to stiff.	
			14	NS		
35						35
			<5	NS	ROCK (Limestone); grayish-white, very hard, lithified.	
			5	NS	Silty CLAY (CH); reddish-brown, slightly moist, very stiff, high plasticity.	

Bottom of Boring at 40.0' BGS.

Appendix D

WWC-5 Well Installation Reports

WATER WELL RECORD — Form WWC-5

Division of Water Resources App. No. ____

1 LOCATION OF WATER WELL: County: Butler | Fraction: SW ¼ NW ¼ NE ¼ NW ¼ | Section Number: 7 | Township No.: T 27 S | Range Number: R 3 ☑E ☐W

Street/Rural Address of Well Location; if unknown, distance & direction from nearest town or intersection: If at owner's address, check here ☐.
2006 N Colt Court
Andover, KS 67002

Global Positioning System (GPS) information:
Latitude: 37.7217778° (in decimal degrees)
Longitude: -097.1470722° (in decimal degrees)
Elevation: ____
Datum: ☐ WGS 84, ☐ NAD 83, ☐ NAD 27
Collection Method:
☐ GPS unit (Make/Model: ____)
☑ Digital Map/Photo, ☐ Topographic Map, ☐ Land Survey
Est. Accuracy: ☐ <3 m, ☐ 3-5 m, ☐ 5-15 m, ☐ >15 m

2 WATER WELL OWNER: NuStar Pipeline Operating Plant
RR#, Street Address, Box #: 19003 IH-10 West
City, State, ZIP Code : San Antonio, TX 78257

3 LOCATE WELL WITH AN "X" IN SECTION BOX:

N
W | X NW | NE | E
SW | SE
S
|---------1 mile---------|

4 DEPTH OF COMPLETED WELL 42 ft.
Depth(s) Groundwater Encountered (1) n/a 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 6 in. to 45 ft., and ____ in. to ____ ft.
WELL WATER TO BE USED AS: ☐ Public water supply ☐ Geothermal ☐ Injection well
☐ Domestic ☐ Feedlot ☐ Oil field water supply ☐ Dewatering ☐ Other (Specify below)
☐ Irrigation ☐ Industrial ☐ Domestic-lawn & garden ☑ 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 CASING USED: ☐ Steel ☑ PVC ☐ Other ____
CASING JOINTS: ☐ Glued ☐ Clamped ☐ Welded ☑ Threaded
Casing diameter 2 in. to 27 ft., Diameter ____ in. to ____ ft., Diameter ____ in. to ____ ft.
Casing height above land surface -0.25 in., Weight ____ lbs./ft., Wall thickness or gauge No. Sch 40
TYPE OF SCREEN OR PERFORATION MATERIAL:
☐ Steel ☐ Stainless Steel ☑ PVC ☐ Other (Specify) ____
☐ Brass ☐ Galvanized Steel ☐ None used (open hole)
SCREEN OR PERFORATION OPENINGS ARE:
☐ Continuous slot ☑ Mill slot ☐ Gauze wrapped ☐ Torch cut ☐ Drilled holes ☐ None (open hole)
☐ Louvered shutter ☐ Key punched ☐ Wire wrapped ☐ Saw cut ☐ Other (specify) ____
SCREEN-PERFORATED INTERVALS: From 27 ft. to 42 ft., From ____ ft. to ____ ft.
From ____ ft. to ____ ft., From ____ ft. to ____ ft.
GRAVEL PACK INTERVALS: From 25 ft. to 44 ft., From ____ ft. to ____ ft.
From ____ ft. to ____ ft., From ____ ft. to ____ ft.

6 GROUT MATERIAL: ☐ Neat cement ☐ Cement grout ☑ Bentonite ☐ Other ____
Grout Intervals: From 1 ft. to 25 ft., From 44 ft. to 45 ft., From ____ ft. to ____ ft.
What is the nearest source of possible contamination:
☐ Septic tank ☐ Lateral lines ☐ Pit privy ☐ Livestock pens ☐ Insecticide storage ☐ Other (specify below)
☐ Sewer lines ☐ Cesspool ☐ Sewage lagoon ☐ Fuel storage ☐ Abandoned water well
☐ Watertight sewer lines ☐ Seepage pit ☐ Feedyard ☐ Fertilizer storage ☐ Oil well/gas well
Direction from well ____ Distance from well ____

FROM	TO	LITHOLOGIC LOG	FROM	TO	LITHO. LOG (cont.) or PLUGGING INTERVALS
0	1	Grass/Topsoil			
1	5	Dark Brown Clay			
5	11	Light Brown Clay w/ fine sand			
11	19	Silty Light Brown Clay			
19	31	Light Brown Clay w/Gravel			
31	34	Silty Brown Clay			
34	36	Shale/Limestone			
36	41	Light Brown Clay			
41	43	Shale/Limstone			
43	45	Silty Light Brown Clay			

7 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This water well was ☑ constructed, ☐ reconstructed, or ☐ plugged under my jurisdiction and was completed on (mo/day/year) 3/17/15 and this record is true to the best of my knowledge and belief. Kansas Water Well Contractor's License No. 102 This Water Well Record was completed on (mo/day/year) 5/21/15 under the business name of Layne Christen Company by (signature) Robert Knopf

INSTRUCTIONS: Use typewriter or ball point pen. *PLEASE PRESS FIRMLY* and *PRINT* clearly. Please fill in blanks and check the correct answers. Send three copies (white, blue, pink) to Kansas Department of Health and Environment, Bureau of Water, Geology Section, 1000 SW Jackson St., Suite 420, Topeka, Kansas 66612-1367. Telephone 785-296-5522. Send one copy to WATER WELL OWNER and retain one for your records. Include fee of $5.00 for each constructed well. Visit us at http://www.kdheks.gov/waterwell/index.html.

KSA 82a-1212 Check: ☐ White Copy, ☐ Blue Copy, ☐ Pink Copy

MW-18

WATER WELL RECORD — Form WWC-5

Division of Water Resources App. No. ____

1 LOCATION OF WATER WELL: County: Butler

Fraction: SW ¼ NW ¼ NE ¼ NW ¼

Section Number: 7 | Township No.: T 27 S | Range Number: R 3 ☑E ☐W

Street/Rural Address of Well Location; if unknown, distance & direction from nearest town or intersection: If at owner's address, check here ☐.

2006 N Colt Court
Andover, KS 67002

Global Positioning System (GPS) information:
Latitude: 37.7218778° (in decimal degrees)
Longitude: -097.1471389° (in decimal degrees)
Elevation: ____
Datum: ☐ WGS 84, ☐ NAD 83, ☐ NAD 27
Collection Method:
☐ GPS unit (Make/Model: ____)
☑ Digital Map/Photo, ☐ Topographic Map, ☐ Land Survey
Est. Accuracy: ☐ <3 m, ☐ 3-5 m, ☐ 5-15 m, ☐ >15 m

2 WATER WELL OWNER: NuStar Pipeline Operating Plant
RR#, Street Address, Box #: 19003 IH-10 West
City, State, ZIP Code : San Antonio, TX 78257

3 LOCATE WELL WITH AN "X" IN SECTION BOX:

N
W: - - NW - - | - - NE - - : E
- - SW - - | - - SE - -
S
|----------1 mile---------|

4 DEPTH OF COMPLETED WELL 42 ft.
Depth(s) Groundwater Encountered (1) n/a 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 6 in. to 45 ft., and ____ in. to ____ ft.
WELL WATER TO BE USED AS: ☐ Public water supply ☐ Geothermal ☐ Injection well
☐ Domestic ☐ Feedlot ☐ Oil field water supply ☐ Dewatering ☐ Other (Specify below)
☐ Irrigation ☐ Industrial ☐ Domestic-lawn & garden ☑ 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 CASING USED: ☐ Steel ☑ PVC ☐ Other ____
CASING JOINTS: ☐ Glued ☐ Clamped ☐ Welded ☑ Threaded
Casing diameter 2 in. to 27 ft., Diameter ____ in. to ____ ft., Diameter ____ in. to ____ ft.
Casing height above land surface -0.25 in., Weight ____ lbs./ft., Wall thickness or gauge No. Sch 40
TYPE OF SCREEN OR PERFORATION MATERIAL:
☐ Steel ☐ Stainless Steel ☑ PVC ☐ Other (Specify) ____
☐ Brass ☐ Galvanized Steel ☐ None used (open hole)
SCREEN OR PERFORATION OPENINGS ARE:
☐ Continuous slot ☑ Mill slot ☐ Gauze wrapped ☐ Torch cut ☐ Drilled holes ☐ None (open hole)
☐ Louvered shutter ☐ Key punched ☐ Wire wrapped ☐ Saw cut ☐ Other (specify) ____
SCREEN-PERFORATED INTERVALS: From 27 ft. to 42 ft., From ____ ft. to ____ ft.
From ____ ft. to ____ ft., From ____ ft. to ____ ft.
GRAVEL PACK INTERVALS: From 23 ft. to 44 ft., From ____ ft. to ____ ft.
From ____ ft. to ____ ft., From ____ ft. to ____ ft.

6 GROUT MATERIAL: ☐ Neat cement ☐ Cement grout ☑ Bentonite ☐ Other ____
Grout Intervals: From 1 ft. to 23 ft., From 44 ft. to 45 ft., From ____ ft. to ____ ft.
What is the nearest source of possible contamination:
☐ Septic tank ☐ Lateral lines ☐ Pit privy ☐ Livestock pens ☐ Insecticide storage ☐ Other (specify below)
☐ Sewer lines ☐ Cesspool ☐ Sewage lagoon ☐ Fuel storage ☐ Abandoned water well
☐ Watertight sewer lines ☐ Seepage pit ☐ Feedyard ☐ Fertilizer storage ☐ Oil well/gas well ____
Direction from well ____ Distance from well ____

FROM	TO	LITHOLOGIC LOG	FROM	TO	LITHO. LOG (cont.) or PLUGGING INTERVALS
0	1	Asphalt/Concrete/Road Base			
1	5	Dark Brown Clay			
5	7	Light Brown Clay w/ fine sand			
7	13	Silty Light Brown Clay			
13	19	Light Brown Silty Clay w/Gravel			
19	32	Silty Brown Clay			
32	39	Brown Silty Clay w/Gravel			
39	45	Brown Stiff Clay w/Shale			

7 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This water well was ☑ constructed, ☐ reconstructed, or ☐ plugged under my jurisdiction and was completed on (mo/day/year) 3/16/15 and this record is true to the best of my knowledge and belief. Kansas Water Well Contractor's License No. 102 This Water Well Record was completed on (mo/day/year) 5/21/15 under the business name of Layne Christen Company by (signature) Robert Knopf

INSTRUCTIONS: Use typewriter or ball point pen. *PLEASE PRESS FIRMLY* and *PRINT* clearly. Please fill in blanks and check the correct answers. Send three copies (white, blue, pink) to Kansas Department of Health and Environment, Bureau of Water, Geology Section, 1000 SW Jackson St., Suite 420, Topeka, Kansas 66612-1367. Telephone 785-296-5522. Send one copy to WATER WELL OWNER and retain one for your records. Include fee of $5.00 for each constructed well. Visit us at http://www.kdheks.gov/waterwell/index.html.

KSA 82a-1212 Check: ☐ White Copy, ☐ Blue Copy, ☐ Pink Copy

MW-19

WATER WELL RECORD — Form WWC-5

Division of Water Resources App. No.

1 LOCATION OF WATER WELL: County: Butler | Fraction: SW ¼ NW ¼ NE ¼ NW ¼ | Section Number: 7 | Township No.: T 27 S | Range Number: R 3 ☑E ☐W

Street/Rural Address of Well Location; if unknown, distance & direction from nearest town or intersection: If at owner's address, check here ☐.
2006 N Colt Court
Andover, KS 67002

Global Positioning System (GPS) information:
Latitude: 37.7218944° (in decimal degrees)
Longitude: -097.1471111° (in decimal degrees)
Elevation: .....
Datum: ☐ WGS 84, ☐ NAD 83, ☐ NAD 27
Collection Method:
☐ GPS unit (Make/Model: .....)
☑ Digital Map/Photo, ☐ Topographic Map, ☐ Land Survey
Est. Accuracy: ☐ <3 m, ☐ 3-5 m, ☐ 5-15 m, ☐ >15 m

2 WATER WELL OWNER: NuStar Pipeline Operating Plant
RR#, Street Address, Box #: 19003 IH-10 West
City, State, ZIP Code : San Antonio, TX 78257

3 LOCATE WELL WITH AN "X" IN SECTION BOX:

N
W | X NW | NE | E
SW | SE
S
|---------1 mile---------|

4 DEPTH OF COMPLETED WELL 42 ft.
Depth(s) Groundwater Encountered (1) n/a 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 6 in. to 45 ft., and ..... in. to ..... ft.
WELL WATER TO BE USED AS: ☐ Public water supply ☐ Geothermal ☐ Injection well
☐ Domestic ☐ Feedlot ☐ Oil field water supply ☐ Dewatering ☐ Other (Specify below)
☐ Irrigation ☐ Industrial ☐ Domestic-lawn & garden ☑ 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 CASING USED: ☐ Steel ☑ PVC ☐ Other .....
CASING JOINTS: ☐ Glued ☐ Clamped ☐ Welded ☑ Threaded
Casing diameter 2 in. to 27 ft., Diameter ..... in. to ..... ft., Diameter ..... in. to ..... ft.
Casing height above land surface -0.25 in., Weight ..... lbs./ft., Wall thickness or gauge No. Sch 40
TYPE OF SCREEN OR PERFORATION MATERIAL:
☐ Steel ☐ Stainless Steel ☑ PVC ☐ Other (Specify) .....
☐ Brass ☐ Galvanized Steel ☐ None used (open hole)
SCREEN OR PERFORATION OPENINGS ARE:
☐ Continuous slot ☑ Mill slot ☐ Gauze wrapped ☐ Torch cut ☐ Drilled holes ☐ None (open hole)
☐ Louvered shutter ☐ Key punched ☐ Wire wrapped ☐ Saw cut ☐ Other (specify) .....
SCREEN-PERFORATED INTERVALS: From 27 ft. to 42 ft., From ..... ft. to ..... ft.
From ..... ft. to ..... ft., From ..... ft. to ..... ft.
GRAVEL PACK INTERVALS: From 23 ft. to 44 ft., From ..... ft. to ..... ft.
From ..... ft. to ..... ft., From ..... ft. to ..... ft.

6 GROUT MATERIAL: ☐ Neat cement ☐ Cement grout ☑ Bentonite ☐ Other .....
Grout Intervals: From 1 ft. to 23 ft., From 44 ft. to 45 ft., From ..... ft. to ..... ft.
What is the nearest source of possible contamination:
☐ Septic tank ☐ Lateral lines ☐ Pit privy ☐ Livestock pens ☐ Insecticide storage ☐ Other (specify below)
☐ Sewer lines ☐ Cesspool ☐ Sewage lagoon ☐ Fuel storage ☐ Abandoned water well
☐ Watertight sewer lines ☐ Seepage pit ☐ Feedyard ☐ Fertilizer storage ☐ Oil well/gas well .....
Direction from well ..... Distance from well .....

FROM	TO	LITHOLOGIC LOG	FROM	TO	LITHO. LOG (cont.) or PLUGGING INTERVALS
0	1	Asphalt/Concrete/Road Base			
1	5	Dark Brown Clay			
5	7	Light Brown Clay w/ fine sand			
7	13	Silty Light Brown Clay			
13	15	Light Brown Clay w/Shale			
15	23	Silty Brown Clay			
23	45	Greenish Grey Silty Clay w/Gravel			

7 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This water well was ☑ constructed, ☐ reconstructed, or ☐ plugged under my jurisdiction and was completed on (mo/day/year) 3/16/15 and this record is true to the best of my knowledge and belief. Kansas Water Well Contractor's License No. 102 This Water Well Record was completed on (mo/day/year) 5/21/15 under the business name of Layne Christen Company by (signature) Robert Knopf

INSTRUCTIONS: Use typewriter or ball point pen. *PLEASE PRESS FIRMLY* and *PRINT* clearly. Please fill in blanks and check the correct answers. Send three copies (white, blue, pink) to Kansas Department of Health and Environment, Bureau of Water, Geology Section, 1000 SW Jackson St., Suite 420, Topeka, Kansas 66612-1367. Telephone 785-296-5522. Send one copy to WATER WELL OWNER and retain one for your records. Include fee of $5.00 for each constructed well. Visit us at http://www.kdheks.gov/waterwell/index.html.

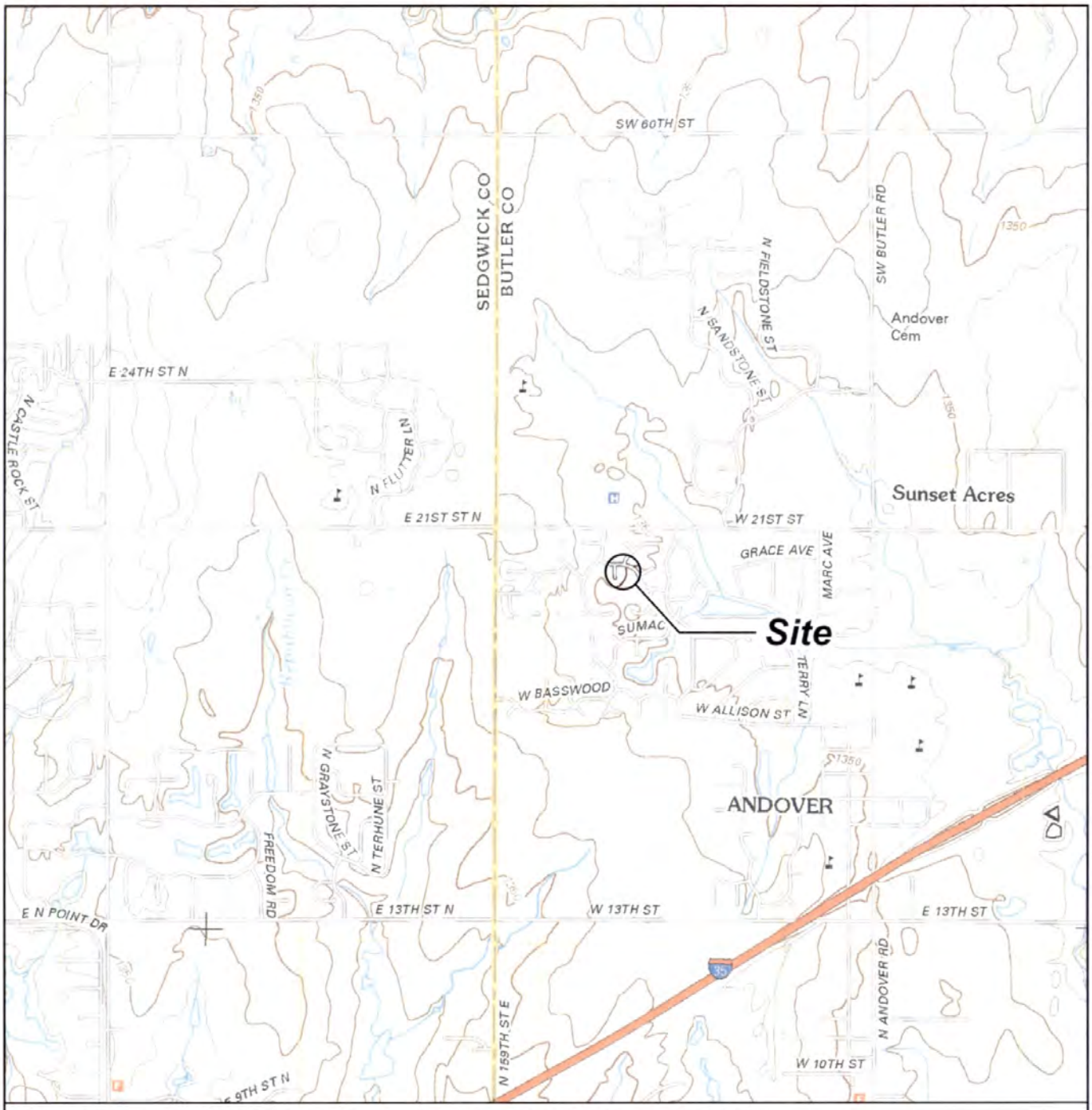
KSA 82a-1212 Check: ☐ White Copy, ☐ Blue Copy, ☐ Pink Copy

Appendix E

Well Survey

Attachment B

Figures, Second Quarter 2015
Groundwater Monitoring Report



Note: Base map prepared from USGS 7.5-minute quadrangles of Andover, KS, dated 2012 as provided by USGS.gov.

0 2,000 4,000

Approximate Scale in Feet

KANSAS

N

Site Location Map

Second Quarter 2015 Groundwater Monitoring Report
NuStar Pipeline Operating Partnership L.P.
Andover, Kansas

APEX Apex Companies, LLC 3015 SW First Avenue Portland, Oregon 97201	Project Number	1641-08	Figure
	September 2015		1

N

Legend:

- MW-1 Monitoring Well Location
- Irrigation Well
- P-1 Soil Vapor Monitoring Point
- B-1 Boring Location
- Property Line
- Pipeline
- Pipeline Easement Boundary
- HOA Lot Owned by Quail Crossing Homeowner's Association
- Deactivated Irrigation Well
- Excavation Area

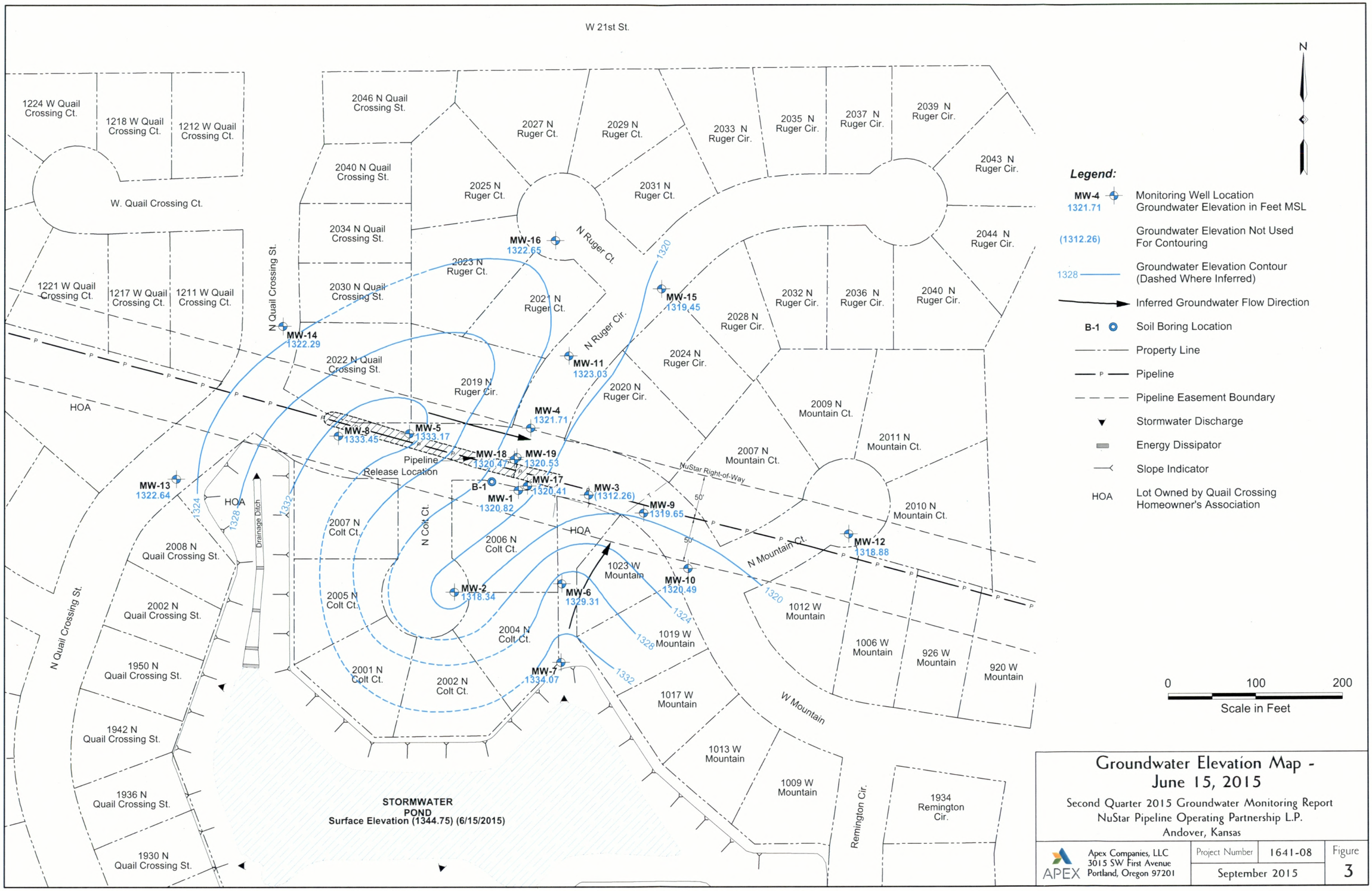
0 100 200

Scale in Feet

Site Plan and Sampling Location Map

Second Quarter 2015 Groundwater Monitoring Report
NuStar Pipeline Operating Partnership L.P.
Andover, Kansas

APEX	Apex Companies, LLC 3015 SW First Avenue Portland, Oregon 97201	Project Number 1641-08 September 2015	Figure 2



Groundwater Elevation Map - June 15, 2015

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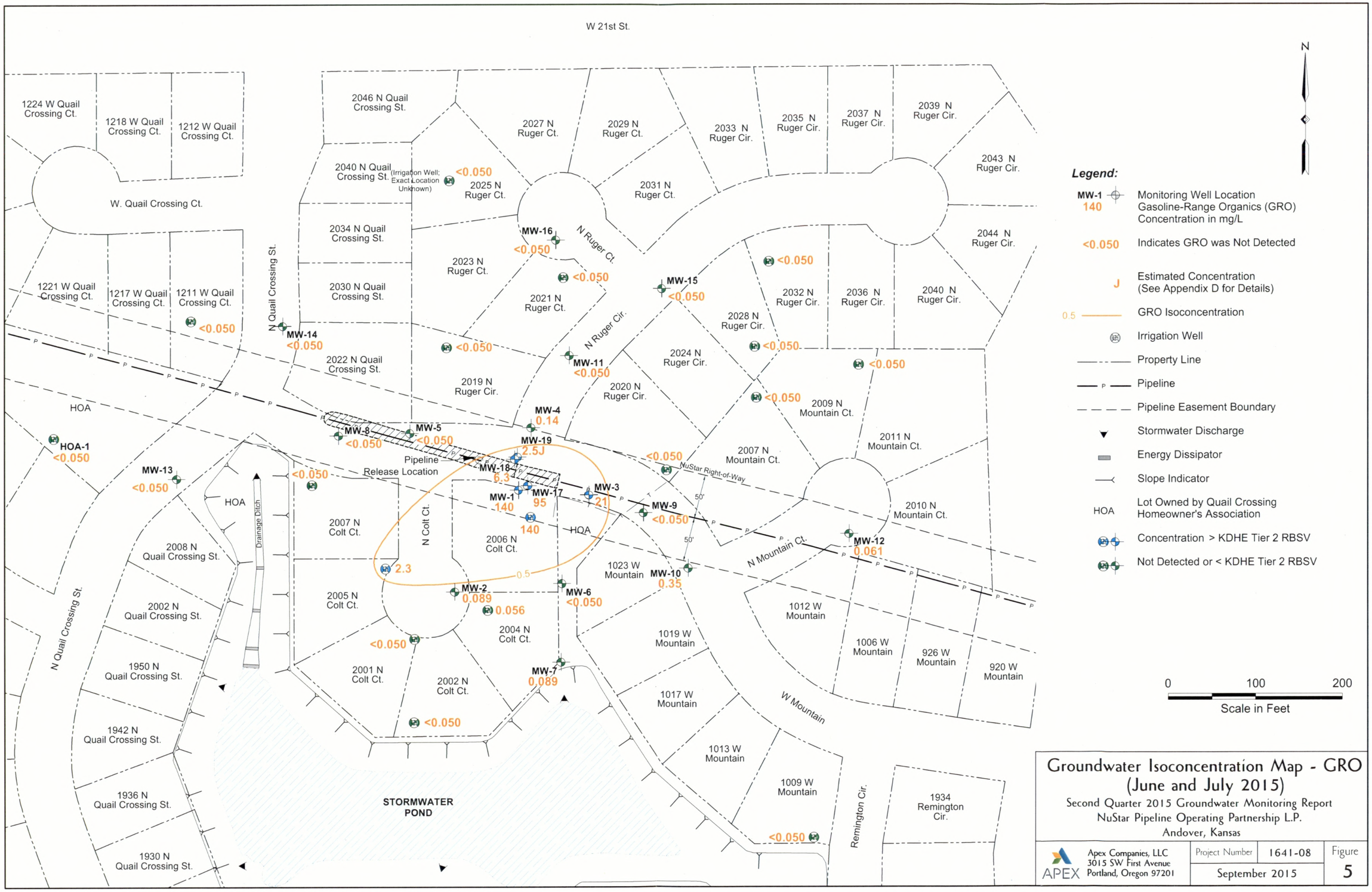
APEX Apex Companies, LLC 3015 SW First Avenue Portland, Oregon 97201	Project Number	1641-08	Figure
	September 2015		3



Groundwater Isoconcentration Map - GRO (June and July 2015)

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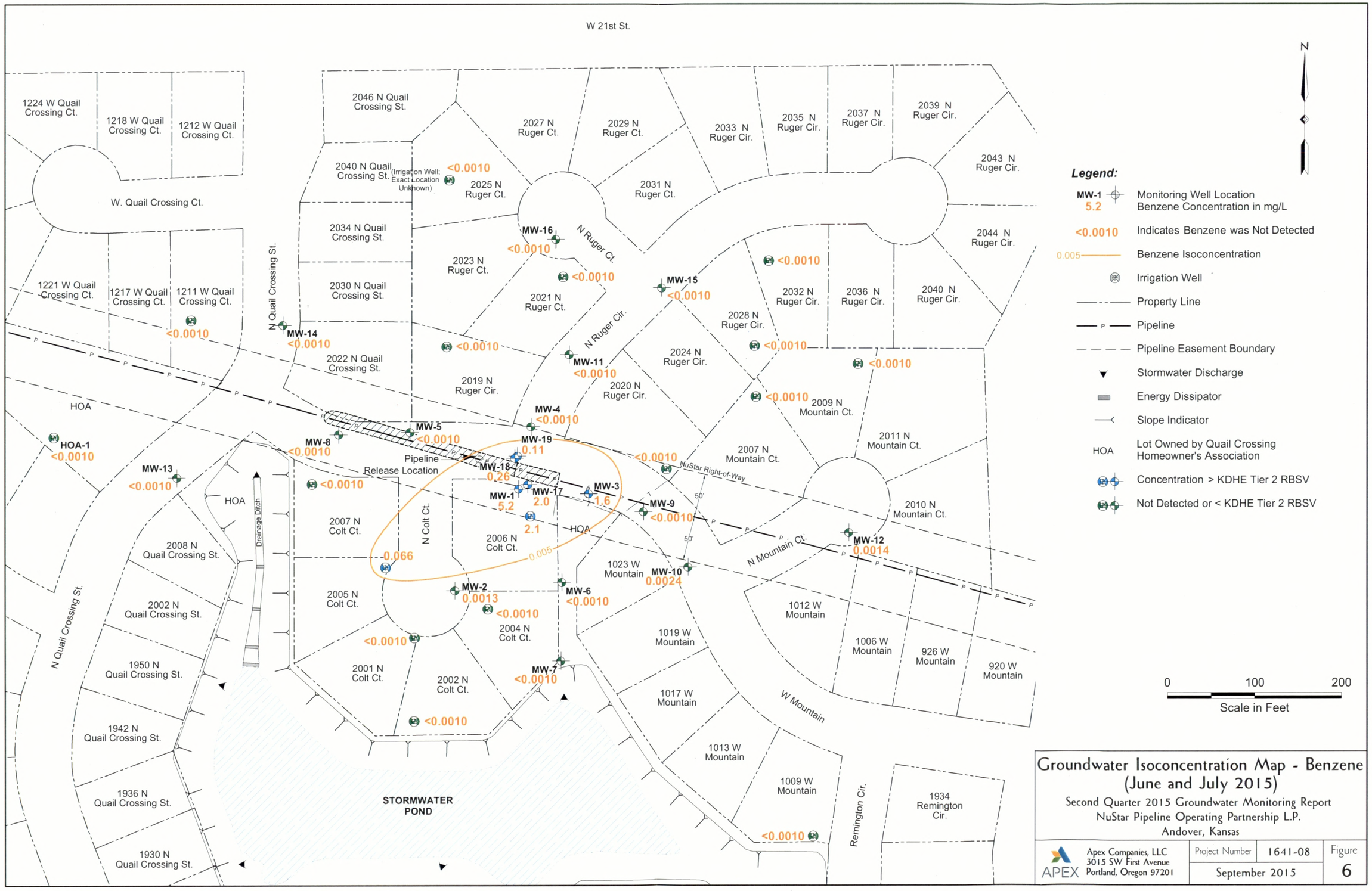
APEX Apex Companies, LLC 3015 SW First Avenue Portland, Oregon 97201	Project Number	1641-08	Figure
	September 2015		5



Groundwater Isoconcentration Map - Benzene (June and July 2015)

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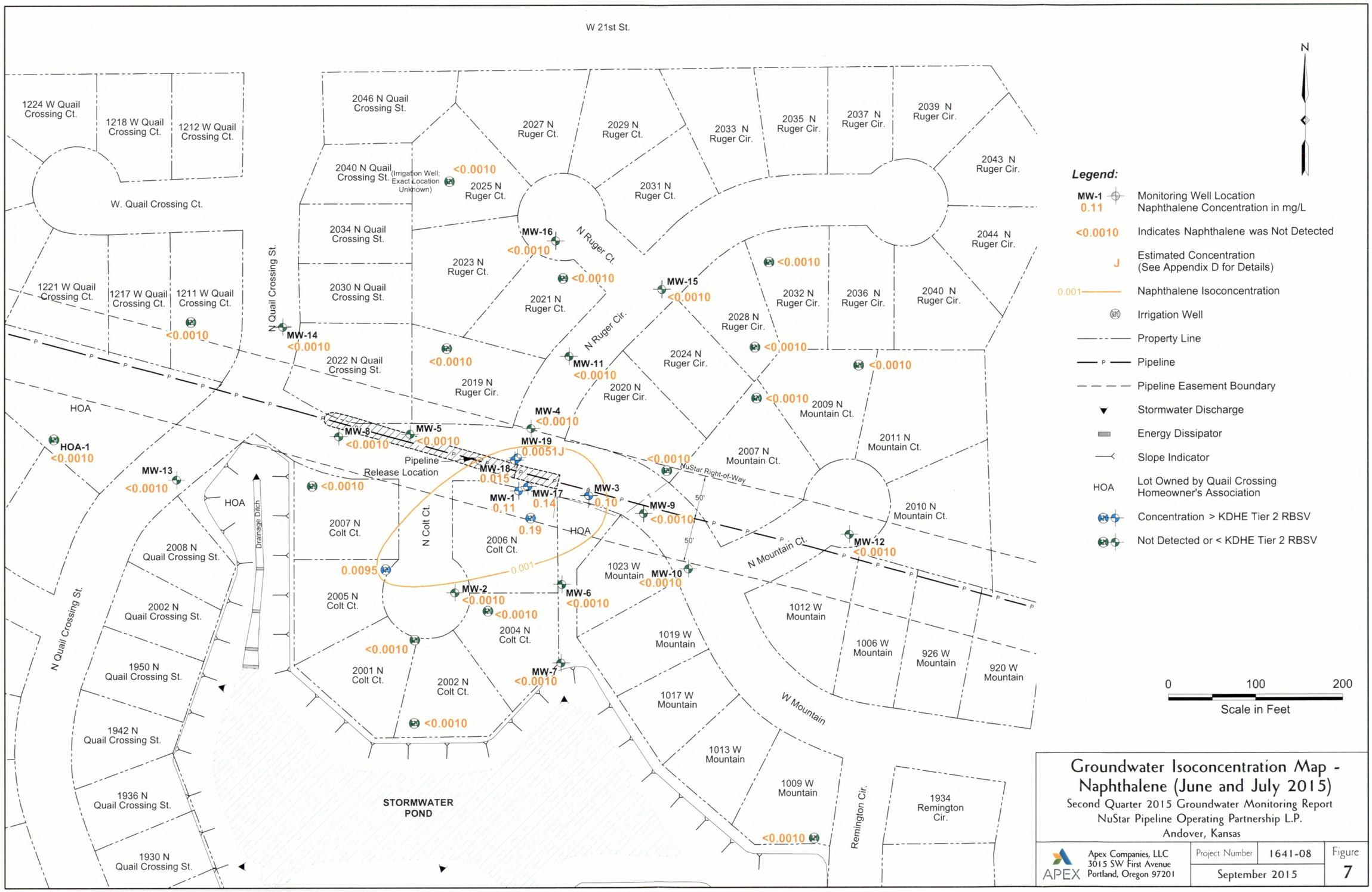
APEX	Apex Companies, LLC 3015 SW First Avenue Portland, Oregon 97201	Project Number 1641-08 September 2015	Figure 6



Groundwater Isoconcentration Map - Naphthalene (June and July 2015)

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APEX Apex Companies, LLC 3015 SW First Avenue Portland, Oregon 97201	Project Number	1641-08	Figure
	September 2015		7