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Golder Associates Inc.

820 South Main Street
Suite 100
St. Charles, Missouri 63301
(636) 724-9191



May 19, 2011

Project No.: 113-81564

The Boeing Company
P.O. Box 7730, MS K12-06
Wichita, KS 67277-7730

BER SCANNED

MAY 22 2012

Attn: Michael D. Spain

Re: REPORT ON DECEMBER 2010 500 RAMP SOURCE EXCAVATION ACTIVITIES

Dear Mr. Spain:

Golder Associates Inc. (Golder) is pleased to submit this Source Excavation Summary Report to The Boeing Company (Boeing), to document field activities performed during the excavation of source area contaminated soils and in-situ treatment of impacted soil and groundwater at the 500 Ramp Area (Site) of the Former Boeing Wichita Facility located in Wichita, Kansas. This work was performed in accordance with the *Scope Of Work For Source Excavation, 500 Ramp Area, Former Boeing Wichita Facility, Wichita, Kansas*, dated November 15, 2010, prepared by Golder (November 2010 Scope of Work), and subsequent written correspondence, email correspondence and conversations between Boeing, Golder, and the Kansas Department of Health and Environment (KDHE).

The objectives of the excavation and backfill activities were:

- To quickly and efficiently remove source area soils with the highest trichloroethene (TCE) and related constituent concentrations ;
- To facilitate anaerobic reductive dechlorination of TCE and related constituents; and
- To enhance natural attenuation.

Source area excavation activities were performed at the Site between December 13 and 17, 2010. Monitoring well BH03-01 was sampled and abandoned prior to Golder mobilizing to the Site. Excavation activities were completed by Pearsons Excavating and dewatering activities were

completed by Geotechnical Services, Inc. (GSI). Golder performed construction oversight and sampling activities as described below.

Field Screening and Excavation Confirmation Sample Collection

As described in the November 2010 Scope of Work, the excavation activities were performed in the immediate vicinity of monitoring well BH 03-01. The excavation was divided horizontally into 5-foot by 5-foot sections. In each section, soil samples for field screening were collected immediately from the clay underlying the concrete and sand fill and then from the base of the excavation after each foot of soil was removed. Samples for field screening were collected from the excavator bucket, placed in quart size Ziploc bags, allowed to warm up in field vehicle, and screened using a photoionization detector (PID).

Materials encountered in the subsurface (from top to bottom) included the following:

- Approximately 16 inches of concrete;
- Less than 0.5 inch of sand fill; and
- Silty clay to the base of the excavation.

The excavation area began with an area approximately 20 feet by 20 feet, and was subsequently expanded to the west, due to elevated field screening results (above 20 parts per million [ppm]). Based on field screening results, this excavation expansion was extended along the west sidewalls an additional 10 feet. Half of the excavation was completed to approximately 11 to 12 feet below ground surface (ft bgs) and half was completed to approximately 14 ft bgs. The depth of excavation was increased to 14 ft in areas based on the results of field screening. The total volume of concrete removed was approximately 33.3 cubic yards and the total volume of in situ soil removed was approximately 248.1 cubic yards (Photograph 1 in Appendix A).

Soils with field screening results greater than approximately 20 ppm were containerized in roll-off boxes for waste characterization and disposal. Soils with field screening values less than 20 ppm were staged separately for use during backfilling. The concrete was sent to a recycling facility after visual observation of the concrete and review of soil field screening data directly below the concrete.

Following field screening and completion of the excavation activities to the total depths described above, soil samples were collected from the side walls and floor of the excavation for laboratory

analysis of VOCs using Methods 5035/8260B. Excavation confirmation sample locations were based on the highest results of the field screening results. Results of excavation confirmation samples submitted for laboratory analysis are summarized in Table 1.

Dewatering

During the excavation, groundwater was encountered at a depth of approximately 9 ft bgs. The groundwater at the base of the excavation was pumped and transferred to the Industrial Water Plant at Spirit Aerosystems for treatment. A total of approximately 9,000 gallons of groundwater was removed during and after the completion of excavation activities and before backfilling.

Waste Characterization and Borrow Soil Sampling

Samples of the excavated materials placed into roll-off containers were submitted for laboratory analysis for waste characterization. One waste characterization sample was collected by Golder or Continental Analytical Services, Inc. from each roll-off container. Results of waste characterization samples are included in Table 2. Each waste characterization soil sample was analyzed for the following parameters:

- VOCs using EPA Methods 5035/8260B;
- TCLP VOCs using EPA Methods 1311/8260B;
- Semivolatile Organic Compounds (SVOCs) using EPA Methods 3510C/8270C;
- TCLP SVOCs using EPA Methods 1311/3540C/8270C;
- TCLP RCRA Metals using EPA Methods 1311/3050B/3010A/6010B/7470A;
- Total Metals using EPA Methods 3050B/6010B/7471A;
- Total Sulfide using EPA Methods 9030B/4500S2D; and
- Total Cyanide using EPA Methods 9010B (Mod)/9014.

Samples of ChitoRem and borrow soil were also submitted for laboratory analysis of VOCs using EPA Methods 5035/8260 and/or metals using EPA Methods 6010B/7471A. ChitoRem and borrow soil results are included in Table 3.

Backfill Activities

After excavation and sampling activities were complete, approximately 50 pounds of ChitoRem were spread evenly across the base of the deeper part of the excavation (approximately 14 ft bgs). Following ChitoRem application, approximately 1 foot of borrow soil was backfilled over the

ChitoRem and then another 75 pounds of ChitoRem was spread over the backfilled soil. The excavator operator then used the teeth of the excavator bucket to thoroughly mix the borrow soil and ChitoRem across the lift and, using the bucket, tamp the soil until the depth of the excavation in the area was approximately 13 ft bgs (Photograph 2 in Appendix A). The ChitoRem amendment was included in subsequent lifts of backfill until this material was approximately 8 ft bgs (approximately 400 pounds total ChitoRem).

When the floor of the excavation reached approximately 8 ft bgs, stockpiled soils from the excavation were placed back into the excavation in 1 foot lifts and compacted with a vibratory compactor up to approximately 1.3 ft bgs. The area was then restored to match existing conditions in the area (Photograph 3 in Appendix A). Well BH03-01 was subsequently replaced (after Golder departed from the Site). A log for this replacement well was provided by GSI and is included in Appendix B.

Closure

Golder appreciates the opportunity to assist Boeing with this project. If you require additional information, please do not hesitate to contact us.

GOLDER ASSOCIATES INC.

Anne Faith-Bond

for

Joshua D. Janzen
Staff Geologist

Eric Kern

Eric A. Kern, Ph.D.
Senior Scientist

R. March

Randy March, P.E., P.G.
Principal Geological Engineer

Attachments

TABLES

Table 1
Excavation Confirmation Analytical Detection Summary
500 Ramp Source Area Excavation
Former Boeing Wichita Facility, Wichita, Kansas

Sample Number	Units	12/15/2010	12/17/2010	12/17/2010	12/15/2010	12/15/2010	12/17/2010	12/17/2010	12/17/2010	12/17/2010	12/17/2010	12/17/2010
Nearest Grid Section		SW/SE	SE/SW	WE-01	SE/NE	NE/NE	NE/NE	NE/NE	WE-08	WE-03	WE-01	12/17/2010
Sample Depth	ft bgs	3-4	2-3	5-6	7-8	3-4	8-9	8-9	8-9	4-5	8-9	14
Field Screening Result	ppm	3.5	12.2	5.2	4.5	4.8	2.3	6.4	6.4	4.8	1.2	135.3
VOCs												
Acetone	µg/kg	84	44	80	QC	ND	86	60	60	164	47	ND
Cis-1,2-dichloroethylene	µg/kg	ND	ND	ND	18.3	ND	ND	ND	ND	ND	ND	300
TCLP RCRA Metals												
No Detections	mg/L	NS	No Detections									

Notes:
 ppm - parts per million
 ft bgs - feet below ground surface
 VOCs - Volatile Organic Compounds
 NA - Not Applicable
 NS - Not Sampled
 ND - Not Detected
 TCLP - Toxicity Characteristic Leaching Procedure
 RCRA - Resource Conservation Recovery Act
 µg/kg - micrograms per kilogram
 QC - QC data qualifiers were noted
 mg/L - milligrams per Liter

Prepared By: JD/JJAP
 Checked By: AMF/EK
 Reviewed By: RM

Table 2
Waste Characterization Analytical Detection Summary
500 Ramp Source Area Excavation
Former Boeing Wichita Facility, Wichita, Kansas

Sample Number	Units	Roll-off B-743**	Roll-off B-142**	Roll-off B-720**	Roll-off B-640	Roll-off B-590	Roll-off B-959	Roll-off B-531
Sample Date		12/14/2010	12/14/2010	12/14/2010	12/15/2010	12/17/2010	12/17/2010	12/17/2010
VOCs								
Acetone	µg/kg	ND	ND	ND	ND	42	31	120 QC
Trichloroethene	µg/kg	ND	28.1	33.3	62.5	ND	ND	16.6 QC
Vinyl Chloride	µg/kg	24.5	11	75.1	16.0 QC	ND	ND	ND
Cis 1,2 - dichloroethylene	µg/kg	123	109	73.3	142	15.6	ND	50.1 QC
TCLP VOCs								
No Detections	mg/L	No Detections						
SVOCs								
No Detections	µg/kg	No Detections						
TCLP SVOCs								
No Detections	mg/L	No Detections						
Total Sulfide	mg/kg	No Detections						
Total Cyanide	mg/kg	No Detections						
TCLP RCRA Metals								
Barium	mg/L	2.4	1.9	1.6	1.8	ND	ND	ND

Table 2
Waste Characterization Analytical Detection Summary
500 Ramp Source Area Excavation
Former Boeing Wichita Facility, Wichita, Kansas

Sample Number	Units	Roll-off B-743**	Roll-off B-1742**	Roll-off B-720**	Roll-off B-640	Roll-off B-590	Roll-off B-959	Roll-off B-531
Sample Date		12/14/2010	12/14/2010	12/14/2010	12/15/2010	12/17/2010	12/17/2010	12/17/2010
Total Metals								
Aluminum	mg/kg	27,000	30,200	28,100	23,700	24,000	27,500	27,800
Arsenic	mg/kg	7.5	7.7	6.5	7.0	7.6	8.1	6.8
Barium	mg/kg	232	170	242 QC	145	425	355	281
Calcium	mg/kg	22,500	24,600	41,600	48,600	50,300	31,000	30,700
Chromium	mg/kg	23	30	22	18	19	21	20
Cobalt	mg/kg	8.7	6.1	7.9	7.1	6.8	8.6	6
Copper	mg/kg	14	14	14	10	11	12	11
Iron	mg/kg	20,800	20,600	18,500	14,600	17,900	20,000	19,200
Lead	mg/kg	11	11	12	10 QC	10	11	11
Magnesium	mg/kg	7,380	7,470	7,180	5,200	6,100	6,450	5,900
Manganese	mg/kg	196	225	179	180 QC	203	186	194
Nickel	mg/kg	23	22	20	17	18	20	17
Potassium	mg/kg	4,300	4,700	4,100 QC	3,200 QC	3,500	3,900	4,100
Sodium	mg/kg	ND	ND	400	ND	ND	ND	ND
Vanadium	mg/kg	46	50	43	42 QC	41	46	41
Zinc	mg/kg	44	47	41 B	36	40	43	45

Notes:
 ppm - parts per million
 ft bgs - feet below ground surface
 VOCs - Volatile Organic Compounds
 mg/kg - milligrams per kilogram
 µg/kg - micrograms per kilogram
 B - Also present in Blank Sample
 QC - QC data qualifiers were noted
 mg/L - milligrams per Liter

** - Collected by Continental Analytical Services, Inc.
 SVOCs - Semivolatile Organic Compounds
 TCLP - Toxicity Characteristic Leaching Procedure
 RCRA - Resource Conservation Recovery Act
 ND - Not Detected

Prepared By: JD/JJAP
 Checked By: AMF/EK
 Reviewed By: RM

**Borrow Soil and ChitoRem Analytical Detection Summary
500 Ramp Source Area Excavation
Former Boeing Wichita Facility, Wichita, Kansas**

Sample Number	Units	ChitoRem	Borrow Soil - Ridge Road
Sample Date		12/16/2010	12/17/2010
VOCs			
No Detections	µg/kg	No Detections	
TCLP RCRA Metals			
Arsenic	mg/L	0.27	ND
Total Metals			
Aluminum		NS	10,500 QC
Arsenic	mg/kg	6.7	4
Barium	mg/kg	8.4	89.8 QC
Cadmium	mg/kg	1	ND
Calcium	mg/kg	NS	2,800 QC
Chromium	mg/kg	ND	11
Cobalt	mg/kg	NS	3
Copper	mg/kg	NS	8.6
Iron	mg/kg	NS	13,300
Lead	mg/kg	ND	6.7
Magnesium	mg/kg	NS	2,400
Manganese	mg/kg	NS	138
Nickel	mg/kg	NS	8.4
Potassium	mg/kg	NS	1,700
Sodium	mg/kg	NS	600
Vanadium	mg/kg	NS	28
Zinc	mg/kg	NS	30 B

Notes:

VOCs – Volatile Organic Compounds
 TCLP - Toxicity Characteristic Leaching Procedure
 ND - Not Detected
 NS - Not Sampled
 mg/kg - milligrams per kilogram
 µg/kg - micrograms per kilogram
 B - Also present in Blank Sample
 QC - QC data qualifiers were noted
 mg/L - milligrams per Liter

Prepared By: JDJ/JAP
 Checked By: AMF/EK
 Reviewed By: RM

** - Sampled by Boeing

APPENDIX A



Photograph 1: View of excavation prior to backfilling.



Photograph 2: View of ChitoRem mixing in excavation.



Photograph 3: View of excavation area, completed to match existing conditions.