Ms. Carolyn Bury
U.S. Environmental Protection Agency
Land and Chemicals Division
Remediation and Re-use Branch
Corrective Action Section 2 – LU9J
77 West Jackson Blvd
Chicago, IL 60604

Arcadis U.S., Inc.
6723 Towpath Road
P O Box 66
Syracuse
New York 13214-0066
Tel 315 446 9120
Fax 315 449 0017
www.arcadis.com

ENVIRONMENT

Subject:

Former Koppers Wood-Treating Site – Carbondale, IL
Groundwater Monitoring Network Modifications Report

Date:

February 12, 2016

Dear Ms. Bury:

On behalf of Beazer East, Inc., enclosed please find the *Groundwater Monitoring Network Modifications Report* for the Former Koppers Wood-Treating Site in Carbondale, Illinois (the Site). This report documents the completion of groundwater monitoring network modifications at the Site, conducted in accordance with the final *Groundwater Monitoring Plan*, which was submitted to the United States Environmental Protection Agency (USEPA) on November 25, 2015, and approved by USEPA on December 15, 2015. The report also presents the analytical results for soil samples collected during drilling for certain of the new monitoring wells along the southern property boundary of the Site. The soil sampling and analysis work was completed at the request of USEPA, and in accordance with a scope of work submitted to the USEPA on September 17, 2015 and conditionally approved by USEPA on September 29, 2015.

Please contact Michael Slenska of Beazer (412 208 8867) or me if you have any questions or comments.

Sincerely,

Arcadis U.S., Inc.

David Bessingpas

David Bessingpas
Sr. Project Manager

Contact:

David Bessingpas

Phone:

218 829 4607

Email:

david.bessingpas@
arcadis.com

Our ref:

B0039321.0000

Copies:
Jim Moore, IEPA
Michael Slenska, Beazer
Jeffrey Holden, Arcadis
Keith White, Arcadis
Angie Gatchie, FTS

Beazer East, Inc.

GROUNDWATER MONITORING NETWORK MODIFICATIONS REPORT

Former Koppers Wood-Treating Site
Carbondale, Illinois

February 2016

GROUNDWATER MONITORING NETWORK MODIFICATIONS REPORT

Former Koppers Wood-Treating Site
Carbondale, Illinois

Keith A. White, P.G.
Principal Geologist

David Bessingpas
Certified Project Manager

Kelly Hoehn
Environmental Scientist

Prepared for:

Beazer East, Inc.

Prepared by:
Arcadis U.S., Inc.
430 First Avenue North
Suite 720
Minneapolis
Minnesota 55401
Tel 612 339 9434
Fax 612 336 4538

Our Ref.:

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ACRONYMS AND ABBREVIATIONS

Arcadis	Arcadis, U.S., Inc.
Beazer	Beazer East, Inc.
bgs	below ground surface
FTS	Field & Technical Services, LLC
GMP	Groundwater Monitoring Plan
IEPA	Illinois Environmental Protection Agency
PID	photoionization detector
pg/g	picograms per gram
PVC	polyvinyl chloride
QAPP	Quality Assurance Project Plan
REDI	Roberts Environmental Drilling, Inc.
Site	Former Koppers Wood-Treating Site in Carbondale, Illinois
TCDD	2,3,7,8-tetrachlorodibenzo-p-dioxin
TEQ	toxicity equivalent
USCS	United Soil Classification System
USEPA	United States Environmental Protection Agency

1 INTRODUCTION

On behalf of Beazer East, Inc. (Beazer), Arcadis U.S., Inc. (Arcadis) has prepared this *Groundwater Monitoring Network Modifications Report* to document the completion of groundwater monitoring network modifications at the Former Koppers Wood-Treating Site in Carbondale, Illinois (the Site), conducted in November and December 2015[1]. The groundwater monitoring network modifications were completed in accordance with the final *Groundwater Monitoring Plan* (GMP), which was submitted to the United States Environmental Protection Agency (USEPA) on November 25, 2015 (Arcadis 2015b), and approved by USEPA on December 15, 2015 (USEPA 2015b).

In addition to summarizing the completed groundwater monitoring network modifications, this report also presents the analytical results for soil samples collected during drilling for certain of the new monitoring wells along the southern property boundary of the Site. The soil sampling and analysis work was completed at the request of USEPA, and in accordance with a scope of work submitted to the USEPA on September 17, 2015 (Arcadis 2015a) and conditionally approved by USEPA on September 29, 2015 (USEPA 2015a).

[1] With the exception of development of new piezometer P-10A, all work was completed in November and December 2015. Development of piezometer P-10A was completed on February 5, 2016, after allowing time for sufficient groundwater recharge following installation.

2 SUMMARY OF WORK

2.1 Overview

The groundwater monitoring network modifications activities completed at the Site consisted of the following:

- Drilling soil borings for new A/B-Unit monitoring well and piezometer[2] installations
- Collecting and analyzing soil samples from pre-designated boring locations
- Installing and developing A/B-Unit monitoring wells and piezometers
- Decommissioning all existing C-Unit monitoring wells
- Installing surface water gauges

These tasks were conducted in accordance with the procedures outlined in the final GMP (Arcadis 2015b). Additional details regarding the completed scope of work are provided in Sections 2.2 through 2.7 below.

Soil boring drilling, monitoring well/piezometer installation, and monitoring well decommissioning were conducted by Roberts Environmental Drilling, Inc. (REDI) of Millstadt, Illinois, under the direction of Arcadis. Soil sampling and well development were conducted by Arcadis. Surface water gauges were installed by Wheetley Construction Company, LLC of Carbondale, Illinois, under the direction of Field & Technical Services, LLC (FTS). Survey of the newly installed monitoring wells, piezometers, and surface water gauges was conducted by Shawnee Professional Services of Vienna, Illinois.

Investigation-derived wastes generated during the field activities were managed as follows:

- Disposable investigation equipment, disposable personal protective equipment, and soil cuttings from hollow-stem auger soil borings were placed in 55-gallon drums and shipped off Site for disposal.
- Equipment cleaning fluids and purge water from well development were temporarily placed into 55-gallon drums and subsequently discharged to the on-Site waste water treatment system.
- Steel protective casing and stainless steel riser sections from the decommissioned C-Unit monitoring wells were placed into a 10-cubic yard roll-off container and shipped off Site for disposal.
- Concrete pads from the decommissioned C-Unit monitoring wells were crushed on Site for reuse.

2.2 Soil Borings

Soil borings were drilled at 14 locations (Figure 1) between November 16 and 24, 2015. An all-terrain vehicle-mounted hollow-stem auger drill rig was used. Down-hole tooling consisted of a nominal 4.25-inch inside diameter hollow-stem auger to drill the borings, and nominal 2-inch outside diameter split-spoons

[2] While there is no difference in the construction of the monitoring wells and piezometers, the nomenclature “monitoring well” was used for locations that are designated for both water level measurement and sampling in the GMP, and the nomenclature “piezometer” was used for locations that are designated for water level measurement only in the GMP.

for soil sampling. Eight of the 14 borings were drilled to depths of 15 to 16 feet below ground surface (bgs), for the installation of "A-Unit" monitoring wells or piezometers[3]. The remaining six borings were drilled to depths of 36 to 48 feet bgs, for the installation of "B-Unit" monitoring wells. These B-Unit borings were advanced until split-spoon soil samples representative of the C-Unit (generally evidenced by dark gray silty clay) were obtained, at which point the borings were terminated.

With the exception of the borings drilled for A-Unit monitoring wells, which were blind-drilled following drilling of the adjacent borings for B-Unit monitoring wells, continuous soil samples were recovered from each boring. Recovered samples were screened with a photoionization detector (PID) and logged for soil type (using the United Soil Classification System [USCS]) and visual/olfactory evidence of impacts. Soil boring logs documenting the observations recorded during drilling are provided in Appendix A. No creosote-like product or creosote-like odors were observed during drilling of the soil borings.

As further discussed in Section 2.4, following drilling, all soil borings were converted to either monitoring wells or piezometers.

2.3 Soil Sampling and Analysis

At soil boring locations OW-210B, OW-211B, and P-11A (Figure 1), soil samples were collected for laboratory analysis from the 0- to 2-, 2- to 4-, 4- to 6-, 6- to 8-, and 8- to 10-foot bgs depth intervals. An additional sample was collected from the midpoint between 10 feet and the final boring depth at locations OW-210B (28-30 feet bgs) and OW-211B (26-28 feet bgs). Two blind duplicate samples were collected: DUP-01 (20151117) was collected from the 0- to 2-foot depth interval at P-11A, and DUP-02 (20151119) was collected from the 4- to 6-foot depth interval at OW-211B. Soil samples were submitted to Vista Analytical Laboratory in El Dorado Hills, California, for analysis of dioxins and furans using USEPA Method 8290. Samples were shipped to the laboratory using appropriate chain-of-custody procedures.

The dioxin/furan analytical results are summarized in Table 1, and the associated laboratory report is provided in Appendix B. The analytical data were reviewed for quality and completeness in accordance with the *Quality Assurance Project Plan* (QAPP; Arcadis 2008). A data review report (including completed chain-of-custody forms and corrected laboratory analytical data sheets) is provided in Appendix C. All results were deemed useable for their intended purpose.

As indicated in Table 1, one or more dioxin/furan congeners were detected in all 19 soil samples. 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) toxicity equivalent (TEQ) concentrations ranged from 0.03 to 127 picograms per gram (pg/g). As indicated in Table 1 and the summary table below, TCDD TEQ concentrations generally decrease as a function of depth:

[3] As discussed in the GMP (Arcadis 2015b), the "A/B-Unit" represents a single hydrostratigraphic unit, and consists mainly of fractured silty clay with frequent organics and occasional, discontinuous sand stringers. Consistent with prior convention, "A-Unit" wells and piezometers screen the water table in the upper portion of the A/B-Unit, while "B-Unit" wells and piezometers screen the bottom 10 feet of the A/B-Unit.

Depth Interval (feet bgs)	TCDD TEQ Concentrations (pg/g)		
	OW-210B	OW-211B	P-11A
0-2	15.3	97.2	46.7 [127]
2-4	3.48	17.7	13.4
4-6	2.06	4.84 [3.89]	3.56
6-8	0.292	0.419	0.665
8-10	0.0567	0.855	0.218
26-28	N/A	0.0332	N/A
28-30	0.319	N/A	N/A

Notes: [ ] = duplicate sample result, N/A = not applicable

2.4 Monitoring Well/Piezometer Installation

A total of five A-Unit monitoring wells (OW-208A, OW-209A, OW-210A, OW-211A, and OW-212A), three A-Unit piezometers (P-9A, P-10A, and P-11A), and six B-Unit monitoring wells (OW-207B, OW-208B, OW-209B, OW-210B, OW-211B, and OW-212B) were installed between November 16 and 24, 2015 (see Figure 1 for locations). The monitoring wells and piezometers were installed through the hollow-stem augers once the targeted depth was reached, in accordance with the procedures outlined in the *Monitoring Well Drilling and Installation Standard Operating Procedure*, which was provided as Appendix D to the final GMP (Arcadis 2015b).

Monitoring wells and piezometers were constructed with 2-inch diameter, 10-foot long, 0.010-inch slotted Schedule 40 polyvinyl chloride (PVC) screens, along with Schedule 40 PVC riser extending from the top of the screen to approximately 2 to 3 feet above ground surface. Each monitoring well and piezometer had a #10-20 filter sand pack extending from the bottom of the well to approximately 1 to 2 feet above the top of the screened interval. A 1- to 2-foot thick bentonite seal was placed over the sand pack, and the remaining annulus was sealed with cement grout to the ground surface.

The surface completions for the monitoring wells and piezometers consisted of an above-grade steel well protective casing, locking cover, and concrete pad. In addition, bollards (i.e., concrete-filled steel casings) were installed surrounding new monitoring wells OW-207B, OW-208A, and OW-208B, and existing wells OW-205A, OW-205B, OW-206A, and OW-207A, as protection from floating debris during Glade Creek flood events.

Construction details for each monitoring well and piezometer are summarized in Table 2. Well construction details are also included on the soil boring logs in Appendix A. Illinois Environmental Protection Agency (IEPA) Well Completion Reports were submitted to the IEPA on January 26, 2016, and are provided in Appendix D.

The locations, ground surface elevations, and top-of-inner casing elevations at the new monitoring wells and piezometers were surveyed on December 8, 2015. The surveyed locations are shown on Figure 1. The survey data are included in Table 2 and on the boring logs in Appendix A.

2.5 Monitoring Well/Piezometer Development

Following installation, the monitoring wells and piezometers were developed in accordance with the bailer method as outlined in Appendix E to the final GMP (Arcadis 2015b). The development process involved surging the well screens followed by repeated bailing to remove at least three well volumes of water, along with any entrained solids. The monitoring wells and piezometers were developed between December 7 and 9, 2015, with the exception of P-10A, which was developed on February 5, 2016, after allowing time for sufficient groundwater recharge following installation. Details of the monitoring well and piezometer development are presented in Table 3.

2.6 Monitoring Well Decommissioning

Seven C-Unit monitoring wells (OW-17C, OW-23C, OW-27C, OW-35C, OW-36C, R-13C, and R-14C)[4] were decommissioned between November 21 and 25, 2015. Well decommissioning was performed via abandonment-in-place in accordance with Section 920.120 of the Illinois Water Well Construction Code, as well as the *Monitoring Well Decommissioning Standard Operating Procedure,* which was provided as Appendix A to the final GMP (Arcadis 2015b). This generally involved removal of the casing down to 2 feet bgs and tremie-grouting Portland cement to the surface. The concrete pad, protective casing, and concrete bollards were removed and the ground surface was restored to match the surrounding area. Illinois Department of Public Health Water Well Sealing Forms were submitted to the Jackson County Health Department on December 22, 2015, and are provided in Appendix E.

2.7 Surface Water Gauge Installation

Two new surface water gauges (GC-4 and GC-5; Figure 1) were installed on November 11, 2015. These two surface water gauges consist of concrete blocks (approximately 1-foot wide by 2-feet long by 2-feet tall) set into the bottom/side of Glade Creek. A new surface water monitoring point was also established at GC-3; Figure 1); however, the surface water elevation measuring point at this location was established as the top of an existing concrete culvert, so a concrete block was not needed at this location.

The locations and measuring point elevations of GC-3, GC-4, and GC-5 were surveyed on December 8, 2015. The surveyed locations are shown on Figure 1.

[4] These represent all C-Unit monitoring wells that previously existed at the Site.

3 REFERENCES

Arcadis. 2008. *Quality Assurance Project Plan*. February 8.

Arcadis. 2015a. Email from D. Bessingpas (Arcadis) to C. Bury (USEPA) re: Carbondale Site – Well Network Modifications and Dioxin/Furan Soil Sampling SOW. September 17.

Arcadis. 2015b. *Groundwater Monitoring Plan*. Beazer East, Inc. Former Koppers Wood-Treating Site, Carbondale, Illinois. November 25.

USEPA. 2015a. Letter from C. Bury (USEPA) M. Slenska (Beazer) re: Proposed New Well, Piezometer, SW Gauge Locations; Soil Sampling of Soil Borings. September 29.

USEPA. 2015b. Letter from C. Bury (USEPA) to M. Slenska (Beazer) re: Approval of November 25, 2015 Groundwater Monitoring Plan. December 15.

TABLES

Table 1
Validated Soil Sample Analytical Data Summary
Former Koppers Wood-Treating Site
Carbondale, Illinois

Sample ID Depth (feet bgs) Sample Date	Units	OW-210B 0 - 2 11/16/15	OW-210B 2 - 4 11/16/15	OW-210B 4 - 6 11/16/15	OW-210B 6 - 8 11/16/15	OW-210B 8 - 10 11/16/15	OW-210B 28 - 30 11/16/15	OW-211B 0 - 2 11/19/15	OW-211B 2 - 4 11/19/15	OW-211B 4 - 6 11/19/15	OW-211B 6 - 8 11/19/15	OW-211B 8 - 10 11/19/15	OW-211B 26 - 28 11/19/15	P-11A 0 - 2 11/17/15
1,2,3,4,6,7,8-HpCDD	pg/g	606	61.4	43.9	10.2	2.15 J	11.0	3,680 EJ	380	121 [108]	11.1	22.7	1.71 J	2,250 [6,660 D]
1,2,3,4,6,7,8-HpCDF	pg/g	43.9	0.797 J	1.13 J	0.725 J	0.115 J	0.251 J	735	8.61	2.60 [4.51]	0.452 J	1.14 J	0.217 U	293 [605]
1,2,3,4,7,8,9-HpCDF	pg/g	3.48	0.0982 U	0.117 U	0.120 U	0.0817 U	0.0956 U	45.6	0.678 J	0.138 U [0.272 U]	0.138 U	0.168 U	0.210 U	24.0 [44.5]
1,2,3,4,7,8-HxCDD	pg/g	2.99	0.198 U	0.192 U	0.112 U	0.129 U	0.162 U	29.5	1.80 J	0.732 J [0.666 J]	0.201 U	0.244 U	0.190 U	6.92 J [23.1 J]
1,2,3,4,7,8-HxCDF	pg/g	2.30 J	0.0957 U	0.0841 U	0.0871 U	0.0758 U	0.0902 U	27.6	0.351 J	0.0853 U [0.156 UX]	0.132 U	0.0939 U	0.0725 U	15.2 [33.8]
1,2,3,6,7,8-HxCDD	pg/g	9.93	0.263 J	0.196 U	0.117 U	0.128 U	0.167 U	101	3.14	0.971 J [1.20 J]	0.197 U	0.363 J	0.198 U	40.3 [99.0]
1,2,3,6,7,8-HxCDF	pg/g	0.873 J	0.0994 U	0.0882 U	0.0922 U	0.0707 U	0.0944 U	15.5	0.178 UX	0.0861 U [0.100 U]	0.136 U	0.0978 U	0.0711 U	5.35 [9.52]
1,2,3,7,8,9-HxCDD	pg/g	5.65	0.221 U	0.212 U	0.131 U	0.145 U	0.854 J	57.3	3.39	1.10 J [0.985 J]	0.231 U	0.280 U	0.227 U	12.0 J [40.2 J]
1,2,3,7,8,9-HxCDF	pg/g	0.441 J	0.151 U	0.126 U	0.128 U	0.108 U	0.131 U	5.07	0.195 U	0.127 U [0.152 U]	0.209 U	0.156 U	0.103 U	2.89 [6.65]
1,2,3,7,8-PeCDD	pg/g	1.73 J	0.118 U	0.181 U	0.130 UX	0.0986 U	0.118 U	12.2	0.740 J	0.188 UX [0.212 J]	0.118 J	0.155 UX	0.117 U	2.80 [6.25]
1,2,3,7,8-PeCDF	pg/g	1.22 J	0.0716 U	0.0832 U	0.0537 U	0.0509 U	0.0610 U	2.08 J	0.0598 U	0.0647 U [0.0782 U]	0.0537 U	0.0601 U	0.0515 U	6.89 [2.36 J]
2,3,4,6,7,8-HxCDF	pg/g	0.720 J	0.104 U	0.0877 U	0.0877 U	0.0780 U	0.0930 U	26.2	0.307 J	0.126 J [0.193 J]	0.148 U	0.0989 U	0.0740 U	4.47 [13.2]
2,3,4,7,8-PeCDF	pg/g	0.937 J	0.0674 U	0.0744 U	0.0492 U	0.0470 U	0.0608 U	5.88	0.0940 UX	0.0627 U [0.0827 U]	0.0549 U	0.0599 U	0.0443 U	4.37 [7.41]
2,3,7,8-TCDD	pg/g	0.355 UX	0.113 U	0.121 U	0.155 UX	0.0918 U	0.109 U	1.32	0.346 J	0.279 J [0.155 UX]	0.327 UX	0.248 UX	0.0842 U	0.607 [0.951]
2,3,7,8-TCDF	pg/g	0.838	0.0929 U	0.104 U	0.0870 U	0.0733 U	0.0941 U	1.12	0.0814 U	0.0700 U [0.0659 U]	0.0623 U	0.0750 U	0.0591 U	3.62 J [1.21 J]
OCDD	pg/g	14,300 EJ	9,440 EJ	5,370	604	113	401	33,500 EJ	39,400 EJ	10,100 EJ [7,480 EJ]	618	1,930	53.3	21,300 EJ [68,500 DJ]
OCDF	pg/g	314	5.42	6.68	4.51 J	0.378 J	1.19 J	3,040	40.0	11.4 [20.6]	1.78 J	4.58 J	0.319 J	2,020 [3,770]
Total HpCDD	pg/g	1,420	122	92.2	21.6	5.73	24.2	7,530	744	243 [212]	23.3	48.9	4.45	4,980 J [19,300 J]
Total HpCDF	pg/g	215	3.62	4.72	3.20	0.115	0.975	2,860	30.9	9.21 [16.4]	1.56	3.94	0.215	1,460 [2,980]
Total HxCDD	pg/g	156	2.87	5.88	7.91	2.81	2.55	851	31.7	23.3 [16.1]	18.2	11.1	0.889	559 [1,440]
Total HxCDF	pg/g	33.5	0.402	0.584	0.163	0.108 U	0.131	713	7.62	2.43 [3.90]	0.455	1.08	0.103 U	215 [538]
Total PeCDD	pg/g	34.1	0.118 U	1.13	0.872	1.36	0.412 UX	107	4.00	8.40 [4.10]	20.0	5.64	0.117 U	43.3 [82.5]
Total PeCDF	pg/g	10.2	0.0716 U	0.0832 U	0.0537 U	0.0509 U	0.0610 U	133	0.858	0.254 [0.448]	0.0650 UX	0.136	0.0515 U	48.4 [71.5]
Total TCDD	pg/g	34.4	0.113 U	0.121 U	0.950	0.675	0.395 UX	46.0	1.35	1.95 [1.65]	5.96	0.815	1.33	21.2 [29.2]
Total TCDF	pg/g	11.0	0.0929 U	0.272 UX	0.0870 U	0.0733 U	0.0941 U	26.6	0.437 UX	0.287 [0.138]	0.0623 U	0.106	0.0591 U	55.2 [20.6]
TCDD-TEQ	pg/g	15.3	3.48	2.06	0.292	0.0567	0.319	97.2	17.7	4.84 [3.89]	0.419	0.855	0.0332	46.7 [127]

Table 1
Validated Soil Sample Analytical Data Summary
Former Koppers Wood-Treating Site
Carbondale, Illinois

Sample ID Depth (feet bgs) Sample Date	Units	P-11A 2 - 4 11/17/15	P-11A 4 - 6 11/17/15	P-11A 6 - 8 11/17/15	P-11A 8 - 10 11/17/15
1,2,3,4,6,7,8-HpCDD	pg/g	217	112	22.4	12.7
1,2,3,4,6,7,8-HpCDF	pg/g	3.41	8.56	2.14 J	1.05 J
1,2,3,4,7,8,9-HpCDF	pg/g	0.237 J	0.680 J	0.173 J	0.145 U
1,2,3,4,7,8-HxCDD	pg/g	0.636 J	0.574 J	0.199 U	0.169 U
1,2,3,4,7,8-HxCDF	pg/g	0.163 J	0.379 J	0.0870 U	0.0725 U
1,2,3,6,7,8-HxCDD	pg/g	1.07 J	1.53 J	0.571 J	0.171 U
1,2,3,6,7,8-HxCDF	pg/g	0.112 U	0.0837 U	0.0885 U	0.0752 U
1,2,3,7,8,9-HxCDD	pg/g	0.936 J	0.886 J	0.478 J	0.194 U
1,2,3,7,8,9-HxCDF	pg/g	0.156 U	0.122 U	0.139 U	0.113 U
1,2,3,7,8-PeCDD	pg/g	0.291 UX	0.263 J	0.213 J	0.113 UX
1,2,3,7,8-PeCDF	pg/g	0.0763 U	0.0645 U	0.0600 U	0.0545 U
2,3,4,6,7,8-HxCDF	pg/g	0.119 U	0.218 J	0.0947 U	0.0760 U
2,3,4,7,8-PeCDF	pg/g	0.0596 U	0.103 UX	0.0611 U	0.0597 U
2,3,7,8-TCDD	pg/g	0.118 U	0.295 J	0.100 U	0.210 UX
2,3,7,8-TCDF	pg/g	0.0881 U	0.0781 U	0.0857 U	0.0795 U
OCDD	pg/g	36,400 EJ	4,720	320	262 J
OCDF	pg/g	22.4	55.8	13.9	6.50
Total HpCDD	pg/g	483	268	52.9	31.5
Total HpCDF	pg/g	16.3	40.3	10.3	4.58
Total HxCDD	pg/g	12.7	21.0	21.0	6.27
Total HxCDF	pg/g	3.06	7.20	1.71	0.611
Total PeCDD	pg/g	0.252	1.23	18.9	4.25
Total PeCDF	pg/g	0.130	0.773 UX	0.136	0.0597 U
Total TCDD	pg/g	0.118 U	2.62	3.05	1.55
Total TCDF	pg/g	0.0881 U	1.64	0.0857 U	0.0795 U
TCDD-TEQ	pg/g	13.4	3.56	0.665	0.218

Definitions:

pg/g	picograms per gram, or parts per trillion (ppt)
bgs	below ground surface
TCDD	2,3,7,8 tetrachlorodibenzo-p-dioxin
TEQ	Toxicity Equivalent, calculated using 2005 World Health Organization (WHO) Toxicity Equivalent Factors (TEFs), and assuming non-detects equal zero
[ ]	Analytical result for duplicate sample

Laboratory Qualifiers:

D	The result is based on analysis of a diluted sample
J	The amount detected is below the Low Calibration Limit
U	Compound not detected; reported value is the sample-specific estimated detection limit

Validation Qualifiers:

DJ	The result is based on analysis of a diluted sample and the amount detected is below the Low Calibration Limit; estimated value
EJ	The amount detected is above the High Calibration Limit; estimated value
J	Estimated value
UX	Compound not detected; reported value is the estimated maximum possible concentration

Table 2
Monitoring Well and Piezometer Construction Summary
Former Koppers Wood-Treating Site
Carbondale, Illinois

Well/ Piezometer ID	Date Installed	Northing[1]	Easting[1]	Surface Elevation (feet AMSL)	Top of Casing Elevation (feet AMSL)	Top of Bentonite Seal (feet bgs)	Top of Primary Filter Pack[2] (feet bgs)	Top of Screen (feet bgs)	Bottom of Screen (feet bgs)	Well Diameter (inches)	Slot Size (inches)	Well Construction Materials
OW-207B	11/24/15	5609.993	8723.535	369.95	372.66	20.5	22.5	24.7	34.2	2	0.010	Schedule 40 PVC
OW-208A	11/23/15	5157.457	8978.953	368.10	370.58	2.5	4	5.2	14.7	2	0.010	Schedule 40 PVC
OW-208B	11/23/15	5153.611	8984.426	368.08	370.78	24	26	28.2	37.7	2	0.010	Schedule 40 PVC
OW-209A	11/18/15	4654.314	6340.697	395.27	398.00	2.5	4	5.2	14.7	2	0.010	Schedule 40 PVC
OW-209B	11/18/15	4651.993	6334.451	395.10	397.75	24.5	26.5	28.7	38.2	2	0.010	Schedule 40 PVC
OW-210A	11/17/15	3793.738	4156.199	393.81	396.40	3	4	5.2	14.7	2	0.010	Schedule 40 PVC
OW-210B	11/16/15	3797.299	4163.811	393.77	395.59	29	31	33.2	42.7	2	0.010	Schedule 40 PVC
OW-211A	11/19/15	3634.265	3764.454	394.55	397.04	2.5	3.5	5.2	14.7	2	0.010	Schedule 40 PVC
OW-211B	11/19/15	3630.876	3756.676	394.44	396.87	31	33	34.7	44.2	2	0.010	Schedule 40 PVC
OW-212A	11/20/15	5547.079	5033.001	390.50	393.24	2.5	4	5.2	14.7	2	0.010	Schedule 40 PVC
OW-212B	11/20/15	5548.232	5039.024	390.73	392.92	23.5	26	28.2	37.7	2	0.010	Schedule 40 PVC
P-9A	11/18/15	5248.840	7812.631	385.56	388.43	2.5	4	5.2	14.7	2	0.010	Schedule 40 PVC
P-10A	11/20/15	5123.623	7282.335	395.05	397.68	2.5	4	5.2	14.7	2	0.010	Schedule 40 PVC
P-11A	11/17/15	4089.851	4890.487	394.76	397.38	2.5	4	5.2	14.7	2	0.010	Schedule 40 PVC

Notes:

AMSL above mean sea level (elevations based on the North American Vertical Datum of 1988)
bgs below ground surface
PVC polyvinyl chloride

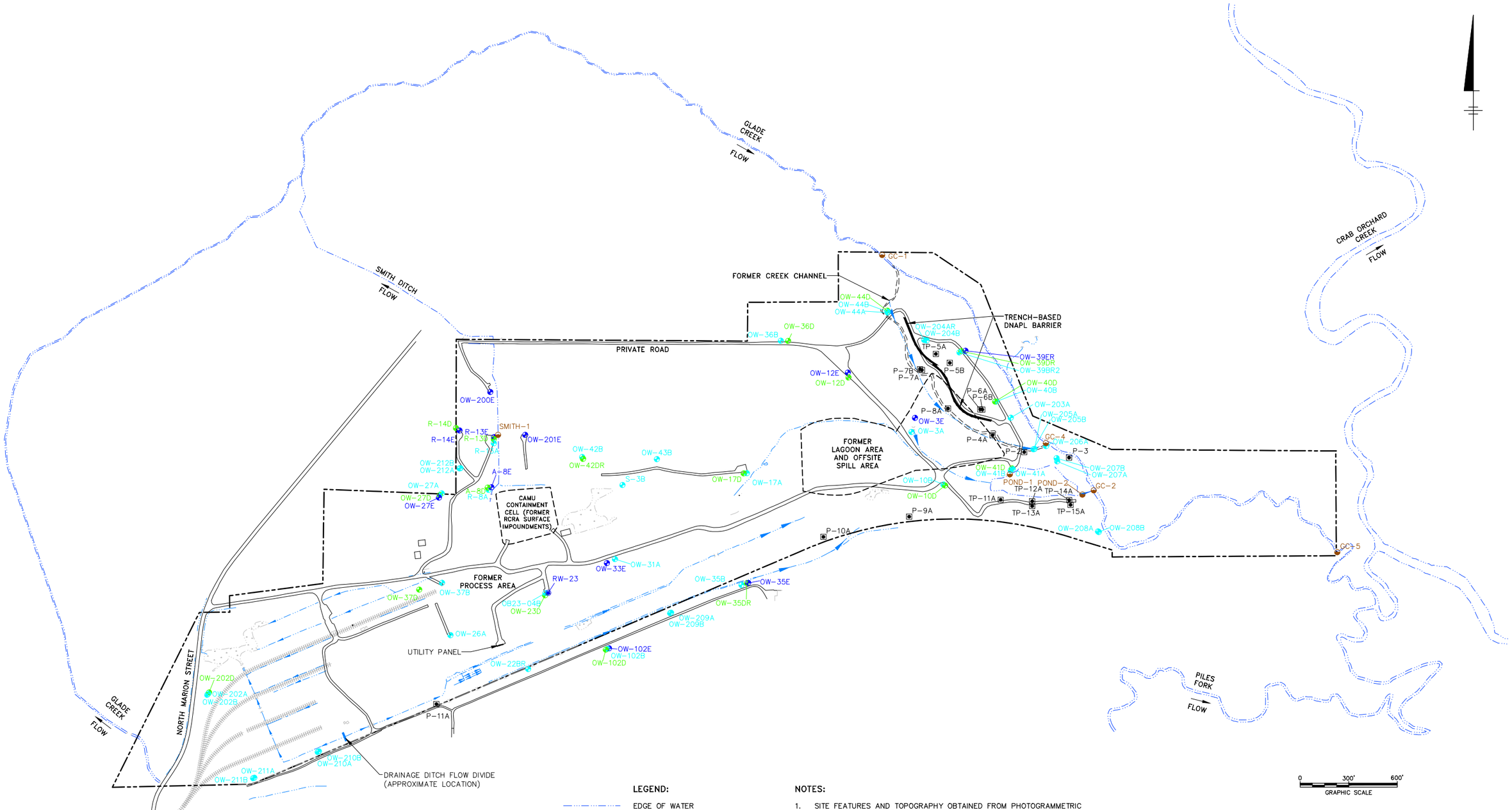
1. Northing and easting based on a Site-specific coordinate system.
2. Primary filter pack consisted of #10-20 filter sand.

Table 3
Monitoring Well and Piezometer Development Summary
Former Koppers Wood-Treating Site
Carbondale, Illinois

Well/ Piezometer ID	Development Date	Pre-Development Water Level (feet btoc)	Pre-Development Total Depth (feet btoc)	Well Volume (gallons)	Volume Removed (gallons)	Well Volumes Removed	Post-Development Water Level (feet btoc)	Post-Development Total Depth (feet btoc)	Observations/Notes
OW-207B	12/09/15	5.61	36.54	4.9	25.0	5.1	32.14	37.33	Cloudy and turbid groundwater during development.
OW-208A	12/07/15	2.26	18.14	2.5	12.5	5.0	16.84	18.14	Slightly turbid groundwater during development.
OW-208B	12/09/15	1.35	41.30	6.4	30.0	4.7	34.91	41.35	Turbid to slightly turbid during development. Well developed dry.
OW-209A	12/07/15	4.02	18.16	2.4	11.5	4.8	13.45	18.16	Slightly turbid to clear groundwater during development.
OW-209B	12/09/15	3.87	37.44	5.4	26.0	4.8	26.34	41.13	Very turbid to less turbid groundwater during development.
OW-210A	12/07/15	6.99	18.00	1.8	10.5	5.8	16.41	18.01	Light brown, turbid groundwater during development.
OW-210B	12/08/15	5.35	44.35	6.2	32.0	5.2	28.32	45.97	Turbid to less turbid groundwater during development.
OW-211A	12/07/15	12.86	17.94	0.8	4.0	5.0	17.22	17.95	Clear groundwater during development.
OW-211B	12/08/15	8.74	44.60	5.7	30.0	5.3	23.44	47.37	Turbid groundwater during development.
OW-212A	12/08/15	6.73	18.27	1.8	9.0	5.0	14.51	18.27	Clear groundwater during development.
OW-212B	12/08/15	6.49	41.10	5.5	25.0	4.5	40.17	41.14	Cloudy turbid groundwater during development.
P-9A	12/07/15	11.66	18.16	1.0	5.5	5.5	15.44	18.16	Turbid groundwater during development.
P-10A	02/05/16	15.34	17.91	0.4	2.2	5.5	17.49	17.91	Slightly turbid to clear groundwater during development.
P-11A	12/07/15	12.53	17.74	0.8	4.5	5.6	16.80	17.75	Clear groundwater during development.

Note:
btoc below top of casing

FIGURE



LEGEND:

- EDGE OF WATER
- DRAINAGE DITCH AND DIRECTION OF FLOW
- PROPERTY BOUNDARY (SEE NOTE 2)
- "A/B" UNIT MONITORING WELL
- "D" UNIT MONITORING WELL
- "E" UNIT MONITORING WELL
- PIEZOMETER
- SURFACE WATER GAUGE
- RECOVERY WELL

NOTES:

1. SITE FEATURES AND TOPOGRAPHY OBTAINED FROM PHOTOGRAMMETRIC MAPPING PROVIDED BY LOCKWOOD MAPPING COMPANY IN SEPTEMBER 2001 AND SURVEY DATA PROVIDED BY ENGINEERING DESIGN SOURCE, INC. IN JANUARY 2004. AND BASED ON AERIAL PHOTOGRAPHY PROVIDED BY LOCKWOOD MAPPING, INC. TAKEN ON NOVEMBER 22, 1996 AT AN APPROXIMATE SCALE OF 1'=500'. CERTAIN SOUTH DRAINAGE DITCH FEATURES ADDED BASED ON 11/01 AND 11/02/05 RECONNAISSANCE.
2. PROPERTY BOUNDARY IS APPROXIMATE; OBTAINED FROM A COMBINATION OF SITE SURVEY DATA, HISTORICAL MAPS AND TAX MAPS.

BEAZER EAST, INC.
FORMER KOPPERS WOOD-TREATING SITE
CARBONDALE, ILLINOIS

SITE PLAN

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FIGURE
1

CITY: SYRACUSE, NY DIV/GROUP: EBC-IM/DV DB: L. POSENAUER PIC: J. HOLDEN PM/TM: D. BESSINGPAS LYR: ON=*; OFF=*REF*
G:\ENVCAD\SYRACUSE\ACT\B0039321\0000\00002\SITE\39314G01.dwg LAYOUT: 1 SAVED: 2/8/2016 2:53 PM ACADVER: 19.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 2/8/2016 2:54 PM BY: POSENAUER, LISA
XREFS: 39314X00 39200X01 IMAGES:

APPENDICES

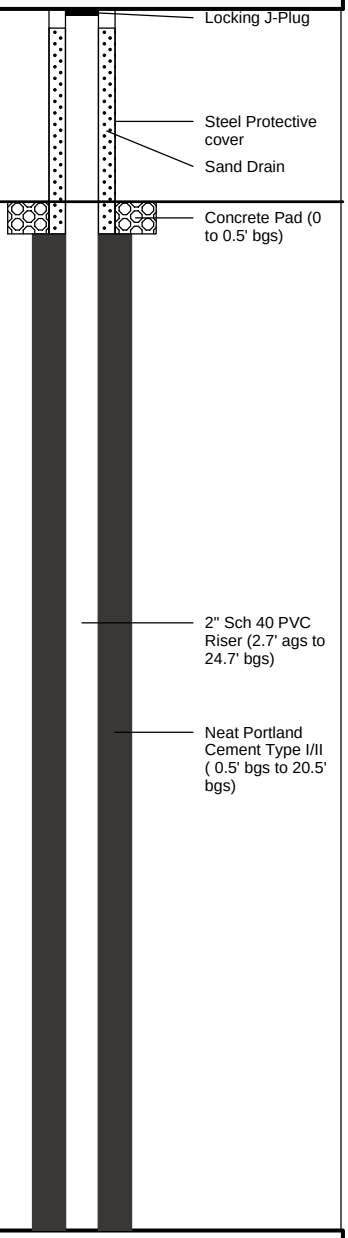
APPENDIX A

Soil Boring and Monitoring Well/Piezometer Construction Logs

Date Start/Finish: 11/23/2015-11/24/2015 **Drilling Company:** Roberts Environmental Drilling,Inc. **Driller's Name:** Brian Schilling **Drilling Method:** Hollow Stem Auger **Auger Size:** 4.25" Inside Diameter **Rig Type:** ATV Mounted CME 75 **Sampling Method:** 2'x2" Split Spoons	**Northing:** 5609.993 **Easting:** 8723.535 **Casing Elevation:** 372.65' AMSL **Borehole Depth:** 36' **Surface Elevation:** 369.95' AMSL **Descriptions By:** Will Stephens	**Well/Boring ID:** **OW-207B** **Client:** Beazer East, Inc. **Location:** Former Koppers Wood-Treating Site Carbondale, Illinois

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
0	370									
		1	0-2	0.6	WH WH WH 7	NA	0.0			Dark brown Silty CLAY, little Organics (leaves, roots), soft, moist.
										Light gray-brown soft Silty CLAY, trace Organics, plastic, soft, moist.
		2	2-4	1.3	4 3 3 4	6	0.0			
5	365	3	4-6	1.5	2 3 4 5	7	0.1			
		4	6-8	1.8	2 4 4 6	8	0.0			Gray-brown Silty CLAY, trace fine subangular Gravel, trace oxidized lenses, nonplastic, moist.
		5	8-10	1.7	2 3 4 5	7	0.0			Light gray-brown Silty CLAY, trace fine subangular Gravel, trace fine Sand, trace Oxidized lenses, nonplastic, moist.
10	360	6	10-12	1.6	2 2 4 4	6	0.0			Light gray-brown Silty CLAY, trace fine subangular Gravel, trace Oxidized lenses, trace Organics (root scars), nonplastic, moist.
		7	12-14	2.0	1 3 3 5	6	0.0			Gray-brown Silty CLAY, trace oxidized lenses, plastic, soft, moist.
15	355	8	14-16	2.0	2 3 5 8	8	0.0			Light gray Silty CLAY, trace fine angular Gravel, trace oxidized lenses, firm, moist.

Well/Boring Construction



Remarks: ags= above ground surface; bgs = below ground surface; NA = Not Applicable/Available; WH= Weight of Hammer; AMSL= Above Mean Sea Level; ppm= parts per million Elevations reference to NAVD 88. Northing and Easting based on a Site-specific coordinate system.

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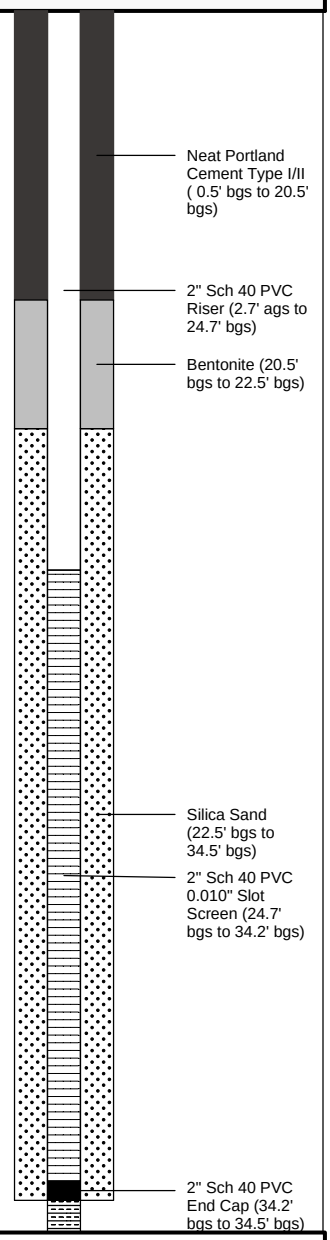
Date Start/Finish: 11/23/2015-11/24/2015 **Drilling Company:** Roberts Environmental Drilling,Inc. **Driller's Name:** Brian Schilling **Drilling Method:** Hollow Stem Auger **Auger Size:** 4.25" Inside Diameter **Rig Type:** ATV Mounted CME 75 **Sampling Method:** 2'x2" Split Spoons	**Northing:** 5609.993 **Easting:** 8723.535 **Casing Elevation:** 372.65' AMSL **Borehole Depth:** 36' **Surface Elevation:** 369.95' AMSL **Descriptions By:** Will Stephens	**Well/Boring ID:** **OW-207B** **Client:** Beazer East, Inc. **Location:** Former Koppers Wood-Treating Site Carbondale, Illinois

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
		9	16-18	2.0	2 3 6 6	9	0.0			
		10	18-20	2.0	2 3 4 7	7	0.0			
20	350	11	20-22	2.0	3 4 4 3	8	0.0			Gray-brown Silty CLAY, oxidized lens with fine subangular Gravel at 22.4' , firm, low plasticity, moist.
		12	22-24	2.0	4 7 7 8	14	0.0			
25	345	13	24-26	2.0	4 7 9 10	16	0.0			Reddish brown to gray Silty CLAY, trace black Organics, stiff, low plasticity, moist.
		14	26-28	2.0	6 6 7 9	13	0.0			
		15	28-30	2.0	5 5 5 5	10	0.0			Reddish brown to gray Silty CLAY, trace black Organics, trace fine subangular Gravel, stiff, low plasticity, moist.
30	340	16	30-32	2.0	3 2 3 4	5	0.0			Reddish brown to gray Silty CLAY, trace black Organics, trace fine subangular Gravel, light gray lenses of Clay, stiff, low plasticity, moist.
		17	32-34	2.0	3 3 4 7	7	0.0			Reddish brown to gray Silty CLAY, trace black Organics, trace fine subangular Gravel, light gray lenses of Clay, soft, low plasticity, moist.
										Reddish brown to gray Silty CLAY, trace black Organics, trace fine subangular Gravel, light gray lenses of Clay, soft, non-plastic, moist.
		18	34-36	2.0	4 4	7	0.0			Dark Gray Silty CLAY, massive, non-plastic, soft to firm, moist.

Well/Boring Construction



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Date Start/Finish: 11/23/2015-11/24/2015 **Drilling Company:** Roberts Environmental Drilling,Inc. **Driller's Name:** Brian Schilling **Drilling Method:** Hollow Stem Auger **Auger Size:** 4.25" Inside Diameter **Rig Type:** ATV Mounted CME 75 **Sampling Method:** 2'x2" Split Spoons	**Northing:** 5609.993 **Easting:** 8723.535 **Casing Elevation:** 372.65' AMSL **Borehole Depth:** 36' **Surface Elevation:** 369.95' AMSL **Descriptions By:** Will Stephens	**Well/Boring ID:** **OW-207B** **Client:** Beazer East, Inc. **Location:** Former Koppers Wood-Treating Site Carbondale, Illinois

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
		18	34-36	2.0	4 5	8	0.0				Native material collapse (34.5' bgs to 36' bgs)
										End of boring at 36.0' bgs.	
40	330										
45	325										
50	320										

Remarks: ags= above ground surface; bgs = below ground surface; NA = Not Applicable/Available; WH= Weight of Hammer; AMSL= Above Mean Sea Level; ppm= parts per million Elevations reference to NAVD 88. Northing and Easting based on a Site-specific coordinate system.

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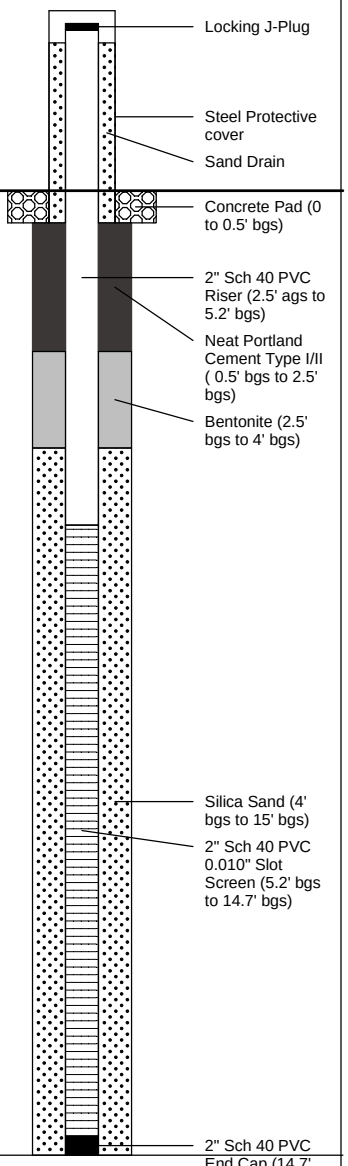
Date Start/Finish: 11/23/2015 **Drilling Company:** Roberts Environmental Drilling, Inc **Driller's Name:** Brian Schilling **Drilling Method:** Hollow Stem Auger **Auger Size:** 4.25" Inside Diameter **Rig Type:** ATV Mounted CME 75 **Sampling Method:** 2'x2" Split Spoons	**Northing:** 5157.457 **Easting:** 8978.953 **Casing Elevation:** 370.58' AMSL **Borehole Depth:** 15' **Surface Elevation:** 368.10' AMSL **Descriptions By:** Will Stephens	**Well/Boring ID:** **OW-208A** **Client:** Beazer East, Inc. **Location:** Former Koppers Wood-Treating Site Carbondale, Illinois

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
	370									
0										Blind drilled to 15' bgs and installed monitoring well. Refer to OW-208B for the lithologic description.
	365									
5		NA	NA	NA	NA	NA	NA			
	360									
10										
	355									
15										End of boring at 15.0' bgs.

Well/Boring Construction



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Elevations reference to NAVD 88. Northing and Easting based on a Site-specific coordinate system.

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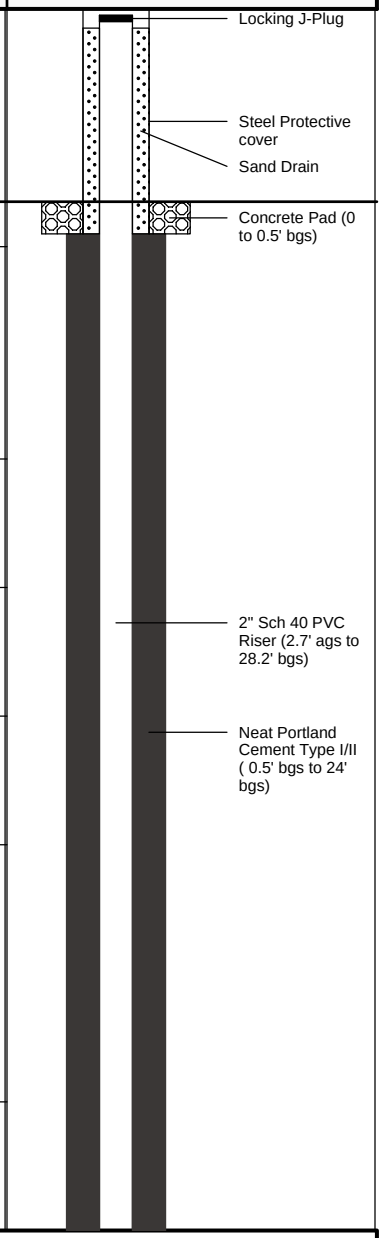
Date Start/Finish: 11/23/2015 **Drilling Company:** Roberts Environmental Drilling,Inc. **Driller's Name:** Brian Schilling **Drilling Method:** Hollow Stem Auger **Auger Size:** 4.25" Inside Diameter **Rig Type:** ATV Mounted CME 75 **Sampling Method:** 2'x2" Split Spoons	**Northing:** 5153.611 **Easting:** 8984.426 **Casing Elevation:** 370.78' AMSL **Borehole Depth:** 38' **Surface Elevation:** 368.08' AMSL **Descriptions By:** Will Stephens	**Well/Boring ID:** **OW-208B** **Client:** Beazer East, Inc. **Location:** Former Koppers Wood-Treating Site Carbondale, Illinois

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
	370									
0										
		1	0-2	1.4	WH WH WH 6	NA	0.2			Dark brown Silty CLAY, little Organics (roots), very soft, moist.
										Gray-brown Silty CLAY, trace fine angular Gravel, trace Organics (roots), moist, soft.
	365	2	2-4	1.5	2 2 3 3	5	0.4			
5		3	4-6	2.0	2 4 7 8	11	0.1			Dark gray-brown Silty CLAY, trace Organics, stiff, plastic, becoming wet.
		4	6-8	1.7	3 3 4 4	7	0.2			Dark gray-brown Silty CLAY, trace Organics, stiff, plastic, trace oxidized lenses from 6.0'-7.7' bgs.
	360	5	8-10	1.8	4 6 7 8	13	0.0			Dark gray-brown Silty CLAY, trace fine subangular Gravel from 8.0' to 9.8' bgs, trace Organics, trace oxidized lenses, stiff, plastic.
10		6	10-12	1.8	2 4 4 6	8	0.0			Dark gray-brown Silty CLAY, trace fine subangular Gravel, trace Organics, trace oxidized lenses, firm, plastic.
	355	7	12-14	2.0	3 4 5 7	9	0.0			
15		8	14-16	2.0	3 4 7 8	11	0.0			Gray-brown Silty CLAY, trace fine oxidized Gravel lenses at 14.2' and 15.1' bgs, trace fine Sand, stiff, moist.

Well/Boring Construction



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Elevations reference to NAVD 88. Northing and Easting based on Site-specific coordinate system.

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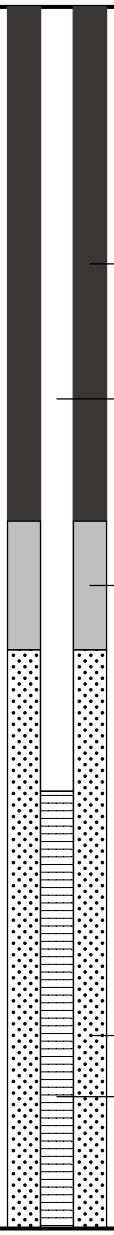
Date Start/Finish: 11/23/2015 **Drilling Company:** Roberts Environmental Drilling,Inc. **Driller's Name:** Brian Schilling **Drilling Method:** Hollow Stem Auger **Auger Size:** 4.25" Inside Diameter **Rig Type:** ATV Mounted CME 75 **Sampling Method:** 2'x2" Split Spoons	**Northing:** 5153.611 **Easting:** 8984.426 **Casing Elevation:** 370.78' AMSL **Borehole Depth:** 38' **Surface Elevation:** 368.08' AMSL **Descriptions By:** Will Stephens	**Well/Boring ID:** **OW-208B** **Client:** Beazer East, Inc. **Location:** Former Koppers Wood-Treating Site Carbondale, Illinois

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
		9	16-18	2.0	3 4 7 9	11	0.0			Gray-brown Silty CLAY, trace oxidized lenses and vertical lenses of light gray Clay, moist.
	350	10	18-20	2.0	4 6 7 9	13	0.0			
20		11	20-22	2.0	4 4 5 5	9	0.0			Reddish-brown Silty CLAY, trace fine subangular Gravel, trace light gray vertical Clay lenses, firm, moist
	345	12	22-24	2.0	5 6 9 9	15	0.0			
25		13	24-26	2.0	7 6 11 11	17	0.0			Reddish-brown CLAY, trace black Organics, trace light gray Clay lenses from 26' to 28' bgs, plastic, stiff, moist.
		14	26-28	2.0	3 4 5 4	9	0.0			
	340	15	28-30	2.0	2 3 4 4	7	0.0			Reddish-brown CLAY, trace fine subangular Gravel, nonplastic, soft, moist.
30		16	30-32	1.8	3 4 4 4	8	0.0			
										Gray Silty CLAY, nonplastic, soft, moist to wet at 32' bgs.
	335	17	32-34	2.0	2 2 3 4	5	0.0			Reddish-brown Silty CLAY, stiff, moist.
		18	34-36	2.0	2 3		0.0			

Well/Boring Construction



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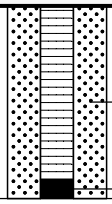
Elevations reference to NAVD 88. Northing and Easting based on Site-specific coordinate system.

ARCADIS Design & Consultancy for natural and built assets

Date Start/Finish: 11/23/2015 **Drilling Company:** Roberts Environmental Drilling,Inc. **Driller's Name:** Brian Schilling **Drilling Method:** Hollow Stem Auger **Auger Size:** 4.25" Inside Diameter **Rig Type:** ATV Mounted CME 75 **Sampling Method:** 2'x2" Split Spoons	**Northing:** 5153.611 **Easting:** 8984.426 **Casing Elevation:** 370.78' AMSL **Borehole Depth:** 38' **Surface Elevation:** 368.08' AMSL **Descriptions By:** Will Stephens	**Well/Boring ID:** **OW-208B** **Client:** Beazer East, Inc. **Location:** Former Koppers Wood-Treating Site Carbondale, Illinois

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
		18	34-36	2.0	4 5	7	0.0			Reddish-brown Silty CLAY, stiff, moist.
		19	36-38	2.0	2 4 6 9	10	0.0			Reddish-brown SILT, little to trace fine Sand, trace fine subangular Gravel, wet.
										Gray to reddish-brown Silty CLAY, trace fine Sand, soft, moist.
	330									Dark Gray Silty CLAY, firm, moist.
										End of boring at 38.0' bgs.
40										
	325									
45										
	320									
50										
	315									

Well/Boring Construction



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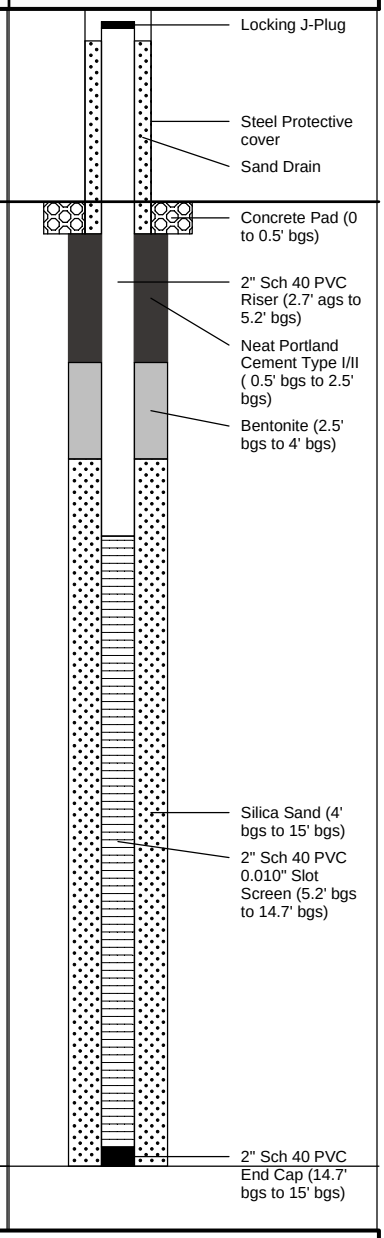
Elevations reference to NAVD 88. Northing and Easting based on Site-specific coordinate system.

ARCADIS Design & Consultancy for natural and built assets

Date Start/Finish: 11/18/2015 **Drilling Company:** Roberts Environmental Drilling, Inc **Driller's Name:** Brian Schilling **Drilling Method:** Hollow Stem Auger **Auger Size:** 4.25" Inside Diameter **Rig Type:** ATV Mounted CME 75 **Sampling Method:** 2'x2" Split Spoons	**Northing:** 4654.314 **Easting:** 6340.697 **Casing Elevation:** 398.00' AMSL **Borehole Depth:** 15' **Surface Elevation:** 395.27' AMSL **Descriptions By:** Will Stephens	**Well/Boring ID:** **OW-209A** **Client:** Beazer East, Inc. **Location:** Former Koppers Wood-Treating Site Carbondale, Illinois

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
0	395	NA	NA	NA	NA	NA	NA			Blind drilled to 15' bgs and installed monitoring well. Refer to OW-208B for the lithologic description.
5	390									
10	385									
15	380									End of boring at 15.0' bgs.

Well/Boring Construction



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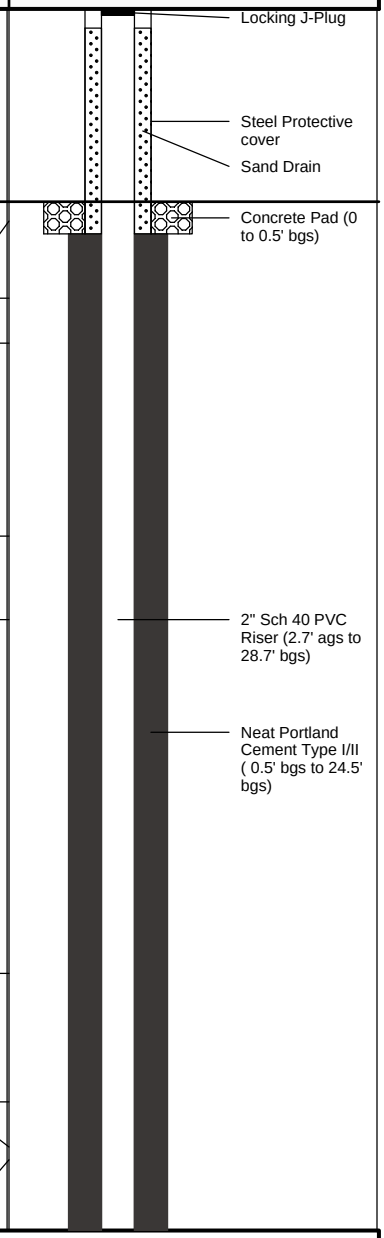
Elevations reference to NAVD 88. Northing and Easting based on a Site-specific coordinate system.

ARCADIS Design & Consultancy for natural and built assets

Date Start/Finish: 11/17/2015 -11/18/2015 **Drilling Company:** Roberts Environmental Drilling, Inc **Driller's Name:** Brian Schilling **Drilling Method:** Hollow Stem Auger **Auger Size:** 4.25" Inside Diameter **Rig Type:** ATV Mounted CME 75 **Sampling Method:** 2'x2" Split Spoons	**Northing:** 4651.993 **Easting:** 6334.451 **Casing Elevation:** 397.75' AMSL **Borehole Depth:** 40' **Surface Elevation:** 395.10' AMSL **Descriptions By:** Will Stephens	**Well/Boring ID:** **OW-209B** **Client:** Beazer East, Inc. **Location:** Former Koppers Wood-Treating Site Carbondale, Illinois

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
0	395	1	0-2	1.7	1 2 4 5	6	0.0			Brown Silty CLAY, some Organics (roots), wet. Black FILL, [Cinders, Slag, red Brick] little fine to medium Sand, moist. Gray-blue Silty CLAY, little fine angular Gravel fragments, soft, moist.
		2	2-4	1.5	1 3 2 4	5	0.0			Brown-gray Silty CLAY, trace thin oxidized root scars, soft, moist.
5	390	3	4-6	1.8	1 3 5 7	8	0.0			Brown-gray Silty CLAY, trace Organics (wood), oxidation, soft, moist.
		4	6-8	2.0	2 3 7 8	10	0.0			Gray-brown Silty CLAY, firm to soft, mottled with oxidized lenses, wet.
		5	8-10	2.0	1 2 3 6	5	0.0			
10	385	6	10-12	1.9	1 3 5 5	8	0.0			
		7	12-14	2.0	1 3 5 6	8	0.0			Gray-brown Silty CLAY, trace Organics (wood), firm to soft, mottled with oxidized lenses.
15	380	8	14-16	1.8	2 2 4 5	6	6.0			Gray-brown Silty CLAY, trace fine Sand, oxidized lenses, soft, moist. Dark Gray Silty CLAY, soft, moist. Gray-brown Silty CLAY, oxidation lenses, soft, moist.

Well/Boring Construction



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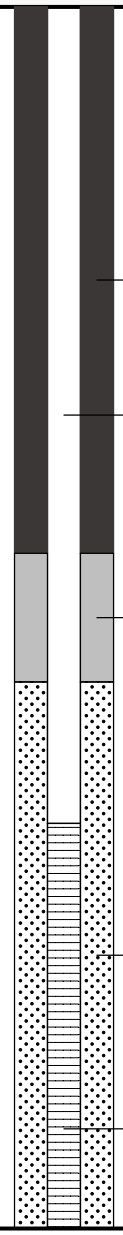
Elevations reference to NAVD 88. Northing and Easting based on Site-specific coordinate system

Date Start/Finish: 11/17/2015 -11/18/2015 **Drilling Company:** Roberts Environmental Drilling, Inc **Driller's Name:** Brian Schilling **Drilling Method:** Hollow Stem Auger **Auger Size:** 4.25" Inside Diameter **Rig Type:** ATV Mounted CME 75 **Sampling Method:** 2'x2" Split Spoons	**Northing:** 4651.993 **Easting:** 6334.451 **Casing Elevation:** 397.75' AMSL **Borehole Depth:** 40' **Surface Elevation:** 395.10' AMSL **Descriptions By:** Will Stephens	**Well/Boring ID:** **OW-209B** **Client:** Beazer East, Inc. **Location:** Former Koppers Wood-Treating Site Carbondale, Illinois

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
		9	16-18	2.0	2 2 5 7	7	0.0			Gray-brown Silty CLAY, oxidation lenses, soft, moist.
		10	18-20	2.0	2 5 7 10	12	0.0			
20	375	11	20-22	1.7	2 3 4 6	7	0.0			
		12	22-24	2.0	2 3 5 7	8	0.0			Trace fine Sand lenses.
		13	24-26	1.7	6 7 12 10	19	0.0			Gray-brown Silty CLAY, trace fine subangular to subround Gravel, trace fine Sand, moist.
25	370	14	26-28	2.0	6 8 12 13	20	0.0			Orange oxidized stiff Silty CLAY, trace fine Sand, trace fine subangular Gravel, moist.
		15	28-30	2.0	6 12 12 16	24	0.0			Orange oxidized to brown Silty CLAY, trace fine Sand, trace fine subangular Gravel, vertical lenses of light gray Clay, soft, moist.
30	365	16	30-32	1.2	4 6 10 8	16	0.0			Medium stiffness from 28' to 30.4' bgs.
		17	32-34	1.5	7 16 16 22	32	0.0			Reddish-brown fine SAND, trace Silt, wet.
		18	34-36	2.0	18 20	40	0.0			Orange-brown very fine Silty SAND, some Silt, dense, wet.
										Brownish-gray Silty CLAY, trace fine subangular Gravel, trace fine Sand, stiff, moist.

Well/Boring Construction



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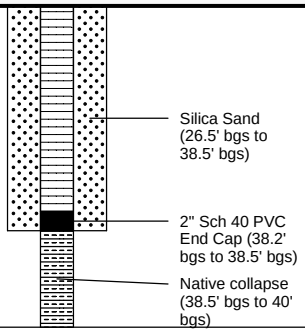
ARCADIS Design & Consultancy for natural and built assets

Date Start/Finish: 11/17/2015 -11/18/2015 **Drilling Company:** Roberts Environmental Drilling, Inc **Driller's Name:** Brian Schilling **Drilling Method:** Hollow Stem Auger **Auger Size:** 4.25" Inside Diameter **Rig Type:** ATV Mounted CME 75 **Sampling Method:** 2'x2" Split Spoons	**Northing:** 4651.993 **Easting:** 6334.451 **Casing Elevation:** 397.75' AMSL **Borehole Depth:** 40' **Surface Elevation:** 395.10' AMSL **Descriptions By:** Will Stephens	**Well/Boring ID:** **OW-209B** **Client:** Beazer East, Inc. **Location:** Former Koppers Wood-Treating Site Carbondale, Illinois

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
	360	18	34-36	2.0	20 23	40	0.0			Brownish-gray Silty CLAY, trace fine subangular Gravel, trace fine Sand, stiff, moist.
		19	36-38	1.8	6 7 13 15	20	0.0			Lenses of dark gray Silty Clay at 36' bgs.
		20	38-40	1.8	15 13 13 20	26	0.0			Dark gray Silty CLAY, stiff, low plasticity, moist. Orange-brown lens of Silty CLAY, stiff, moist. Dark Gray Silty CLAY, stiff, low plasticity, trace Organics (wood), moist.
40	355									End of boring at 40.0' bgs.
45	350									
50	345									

Well/Boring Construction



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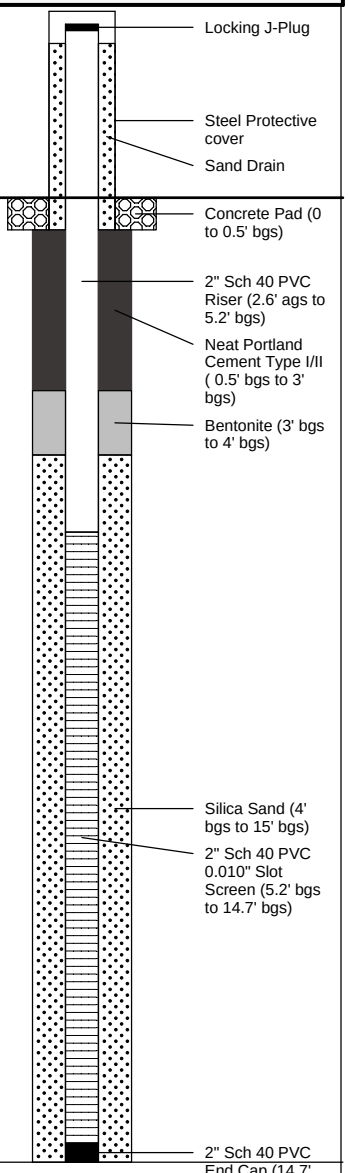
Elevations reference to NAVD 88. Northing and Easting based on Site-specific coordinate system

ARCADIS Design & Consultancy for natural and built assets

Date Start/Finish: 11/17/2015 **Drilling Company:** Roberts Environmental Drilling, Inc **Driller's Name:** Brian Schilling **Drilling Method:** Hollow Stem Auger **Auger Size:** 4.25" Inside Diameter **Rig Type:** ATV Mounted CME 75 **Sampling Method:** 2'x2" Split Spoons	**Northing:** 3793.738 **Easting:** 4156.199 **Casing Elevation:** 396.40' AMSL **Borehole Depth:** 15' **Surface Elevation:** 393.81' AMSL **Descriptions By:** Will Stephens	**Well/Boring ID:** **OW-210A** **Client:** Beazer East, Inc. **Location:** Former Koppers Wood-Treating Site Carbondale, Illinois

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
0	395									
5	390	NA	NA	NA	NA	NA	NA			Blind drilled to 15' bgs and installed monitoring well. Refer to OW-210B for the lithologic descriptions.
10	385									
15	380									End of boring at 15.0' bgs.

Well/Boring Construction



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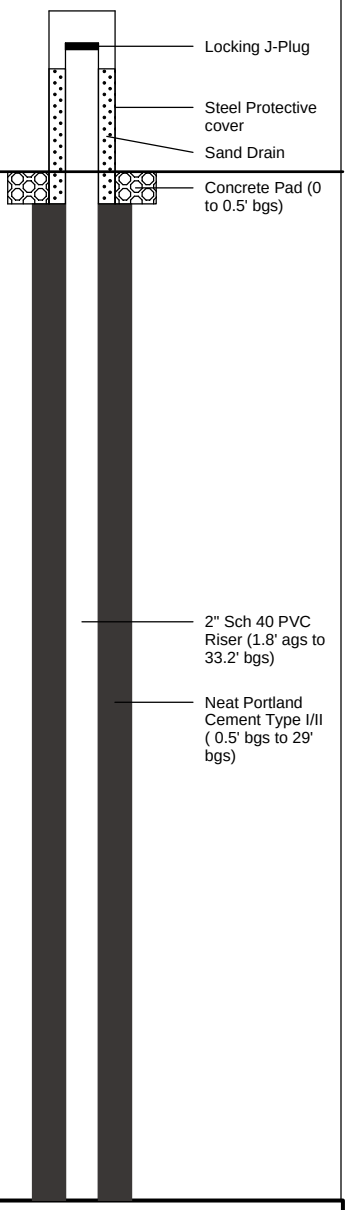
Elevations reference to NAVD 88. Northing and Easting based on a Site-specific coordinate system.

ARCADIS Design & Consultancy for natural and built assets

Date Start/Finish: 11/16/2015-11/17/2015 **Drilling Company:** Roberts Environmental Drilling, Inc **Driller's Name:** Brian Schilling **Drilling Method:** Hollow Stem Auger **Auger Size:** 4.25" Diameter **Rig Type:** ATV Mounted CME 75 **Sampling Method:** 2'x2" Split Spoons	**Northing:** 3797.299 **Easting:** 4163.811 **Casing Elevation:** 395.59' AMSL **Borehole Depth:** 48' **Surface Elevation:** 393.77' AMSL **Descriptions By:** Will Stephens	**Well/Boring ID:** **OW-210B** **Client:** Beazer East, Inc. **Location:** Former Koppers Wood-Treating Site Carbondale, Illinois

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
	395									
0		1	0-2	1.5	1 3 4 5	7	0.1			Dark brown fine to medium SAND, little Silt, little red Brick and Concrete [FILL], moist.
	390	2	2-4	1.5	5 5 5 9	10	1.2			Tan Silty CLAY, little to trace brown Organics, trace orange oxidized lenses, dense, moist.
5		3	4-6	1.8	5 5 9 14	14	5.1			
		4	6-8	1.8	4 4 6 9	10	1.3			Gray-brown Silty CLAY, dense, oxidized lenses, moist, becoming wet.
	385	5	8-10	1.8	2 3 4 6	7	1.9			
10		6	10-12	1.7	2 3 7 9	10	2.3			Tan and gray-brown Silty CLAY, trace Organics, dense, oxidized lenses, moist.
	380	7	12-14	1.9	3 7 8 10	15	4.1			Gray-brown Silty CLAY, trace brown Organics, orange oxidized lenses, moist.
15		8	14-16	2.0	2 5 9 8	14	0.8			

Well/Boring Construction



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Elevations reference to NAVD 88. Northing and Easting based on Site-specific coordinate system.
Soil samples collected from 2' intervals for Dioxin/Furan analysis via US EPA Method 8290

ARCADIS Design & Consultancy for natural and built assets

Date Start/Finish: 11/16/2015-11/17/2015 **Drilling Company:** Roberts Environmental Drilling, Inc **Driller's Name:** Brian Schilling **Drilling Method:** Hollow Stem Auger **Auger Size:** 4.25" Diameter **Rig Type:** ATV Mounted CME 75 **Sampling Method:** 2'x2" Split Spoons	**Northing:** 3797.299 **Easting:** 4163.811 **Casing Elevation:** 395.59' AMSL **Borehole Depth:** 48' **Surface Elevation:** 393.77' AMSL **Descriptions By:** Will Stephens	**Well/Boring ID:** **OW-210B** **Client:** Beazer East, Inc. **Location:** Former Koppers Wood-Treating Site Carbondale, Illinois

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
		9	16-18	2.0	3 5 10 10	15	0.6			Light gray to tan Silty CLAY, trace brown Organics, trace Coal, low plasiticity, moist.
	375	10	18-20	2.0	1 3 5 7	8	0.7			
20		11	20-22	2.0	1 3 3 6	6	0.5			
		12	22-24	2.0	3 4 7 7	11	0.6			
	370	13	24-26	2.0	3 3 7 5	10	0.5			Light brown to light gray Silty CLAY, trace Organics, trace white to light gray medium Gravel, low plasicity, moist.
25										Tan Sandy SILT, loose, wet.
		14	26-28	2.0	2 3 5 5	8	0.5			Light brown to gray Silty CLAY, trace lenses of brown fine Sand at 27.0' bgs, trace lenses of light gray to pink Clay at 27.5' bgs, moist.
	365	15	28-30	2.0	4 8 10 11	18	0.5			Trace Organics.
30										Brown Silty CLAY, trace fine to medium subangular Gravel, trace Organics, moist.
		16	30-32	2.0	5 6 11 11	17	0.5			Brown Silty CLAY, trace Organics, trace fine Sand, moist.
		17	32-34	1.5	4 8 13 11	21	0.5			Light gray and pink vertical lenses of Clay.
	360	18	34-36	2.0	6 12	24	0.5			Light brown Silty CLAY, trace fine subangular Gravel fragments, trace Sand lenses, moist.

Well/Boring Construction

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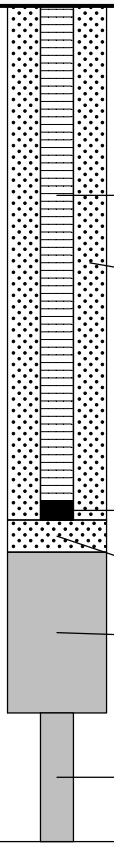
Elevations reference to NAVD 88. Northing and Easting based on Site-specific coordinate system.
Soil samples collected from 2' intervals for Dioxin/Furan analysis via US EPA Method 8290

ARCADIS Design & Consultancy for natural and built assets

Date Start/Finish: 11/16/2015-11/17/2015 **Drilling Company:** Roberts Environmental Drilling, Inc **Driller's Name:** Brian Schilling **Drilling Method:** Hollow Stem Auger **Auger Size:** 4.25" Diameter **Rig Type:** ATV Mounted CME 75 **Sampling Method:** 2'x2" Split Spoons	**Northing:** 3797.299 **Easting:** 4163.811 **Casing Elevation:** 395.59' AMSL **Borehole Depth:** 48' **Surface Elevation:** 393.77' AMSL **Descriptions By:** Will Stephens	**Well/Boring ID:** **OW-210B** **Client:** Beazer East, Inc. **Location:** Former Koppers Wood-Treating Site Carbondale, Illinois

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
		18	34-36	2.0	12 13	24	0.5			
		19	36-38	2.0	6 12 12 12	24	0.5			Light brown to brown Silty CLAY, trace Organics, trace fine Sand lenses, moist.
	355	20	38-40	1.6	3 6 6 9	12	0.5			Gray-brown Silty CLAY, trace fine subangular Gravel, trace fine Sand, moist.
40		21	40-42	1.5	3 3 3 4	6	0.5			
		22	42-44	1.7	8 8 12 14	20	0.5			Transitioning to a gray Silty CLAY at 42.0' bgs. Gray-brown Silty CLAY, trace fine angular Gravel fragments, moist.
	350	23	44-46	2.0	10 12 12 13	24	0.5			Dark gray Silty CLAY, trace fine Gravel fragments, trace pink lenses of Clay, moist.
45		24	46-48	1.5	4 7 9 10	16	0.5			Dark gray Silty CLAY, trace pink lenses of Clay, trace Coal fragments, moderately stiff, moist.
	345									End of boring at 48.0' bgs.
50										
	340									

Well/Boring Construction



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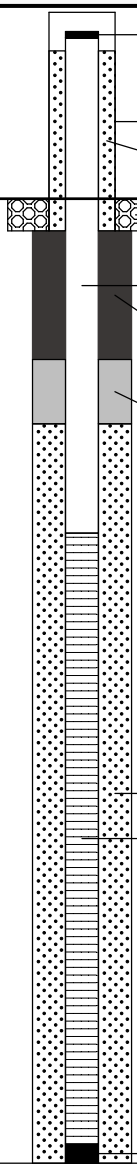
Elevations reference to NAVD 88. Northing and Easting based on Site-specific coordinate system.
Soil samples collected from 2' intervals for Dioxin/Furan analysis via US EPA Method 8290

ARCADIS Design & Consultancy for natural and built assets

Date Start/Finish: 11/19/2015 **Drilling Company:** Roberts Environmental Drilling, Inc **Driller's Name:** Brian Schilling **Drilling Method:** Hollow Stem Auger **Auger Size:** 4.25" Inside Diameter **Rig Type:** ATV Mounted CME 75 **Sampling Method:** 2'x2" Split Spoons	**Northing:** 3634.265 **Easting:** 3764.454 **Casing Elevation:** 397.04' AMSL **Borehole Depth:** 15' **Surface Elevation:** 394.55' AMSL **Descriptions By:** Will Stephens	**Well/Boring ID:** **OW-211A** **Client:** Beazer East, Inc. **Location:** Former Koppers Wood-Treating Site Carbondale, Illinois

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
	395									
0										Blind drilled to 15' bgs and installed monitoring well. Refer to OW-211B for the lithologic descriptions.
	390									
5		NA	NA	NA	NA	NA	NA			
	385									
10										
	380									
15										End of boring at 15.0' bgs.

Well/Boring Construction



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Elevations reference to NAVD 88. Northing and Easting based on a Site-specific coordinate system.

ARCADIS Design & Consultancy for natural and built assets

Date Start/Finish: 11/19/2015 **Drilling Company:** Roberts Environmental Drilling, Inc **Driller's Name:** Brian Schilling **Drilling Method:** Hollow Stem Auger **Auger Size:** 4.25" Inside Diameter **Rig Type:** ATV Mounted CME 75 **Sampling Method:** 2'x2" Split Spoons	**Northing:** 3630.876 **Easting:** 3756.676 **Casing Elevation:** 396.87' AMSL **Borehole Depth:** 46' **Surface Elevation:** 394.44' AMSL **Descriptions By:** Will Stephens	**Well/Boring ID:** **OW-211B** **Client:** Beazer East, Inc. **Location:** Former Koppers Wood-Treating Site Carbondale, Illinois

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
0	395									
		1	0-2	1.6	2 4 7 3	11	0.7			Dark gray fine to coarse SAND, some Fill material [Slag, Cinders, red Brick], loose, moist.
		2	2-4	1.3	5 6 5 5	11	0.2			Tan Silty CLAY, low plasticity,soft, moist.
5	390	3	4-6	1.6	2 3 4 5	7	6.1			Gray-brown Silty CLAY, trace Organics (oxidized root scars), soft, moist.
		4	6-8	1.8	2 3 6 6	9	3.3			
10	385	5	8-10	1.8	1 2 2 2	4	1.2			Light brown-gray Silty CLAY, trace oxidized lenses, soft, wet.
		6	10-12	1.3	3 6 7 6	13	1.3			
		7	12-14	2.0	3 5 6 7	11	0.8			
15	380	8	14-16	2.0	3 6 6 8	12	0.6			Becoming firm and plastic at 14.0' bgs.

Well/Boring Construction

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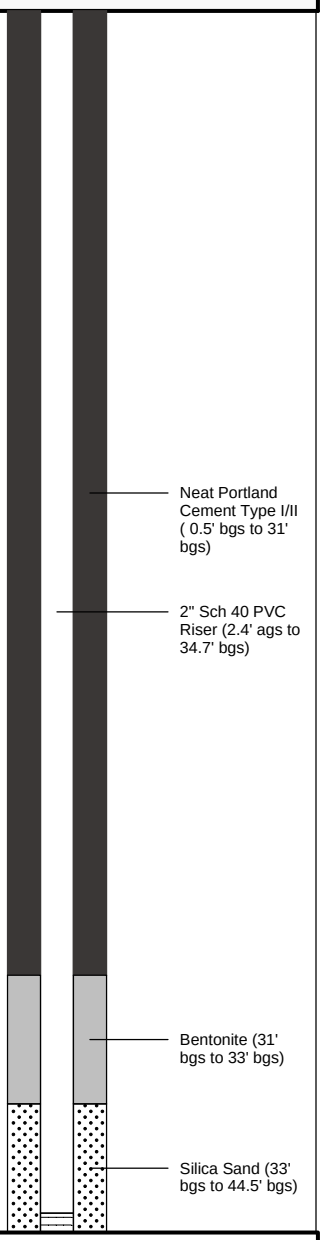
Elevations reference to NAVD 88. Northing and Easting based on a site-specific coordinate system.
Soil samples collected from 2' intervals for Dioxin/Furan analysis via US EPA Method 8290.
DUP-02 collected from 4-6' bgs.

ARCADIS Design & Consultancy for natural and built assets

Date Start/Finish: 11/19/2015 **Drilling Company:** Roberts Environmental Drilling, Inc **Driller's Name:** Brian Schilling **Drilling Method:** Hollow Stem Auger **Auger Size:** 4.25" Inside Diameter **Rig Type:** ATV Mounted CME 75 **Sampling Method:** 2'x2" Split Spoons	**Northing:** 3630.876 **Easting:** 3756.676 **Casing Elevation:** 396.87' AMSL **Borehole Depth:** 46' **Surface Elevation:** 394.44' AMSL **Descriptions By:** Will Stephens	**Well/Boring ID:** **OW-211B** **Client:** Beazer East, Inc. **Location:** Former Koppers Wood-Treating Site Carbondale, Illinois

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
		9	16-18	2.0	4 4 7 7	11	1.2			Light brown-gray Silty CLAY, trace oxidized lenses, wet.
	375	10	18-20	1.8	3 3 5 6	8	0.7			Light brown-gray Silty CLAY, little to trace oxidized lenses, trace Organics and black rounded Gravel, becoming stiff at 20.0' bgs, wet.
20		11	20-22	2.0	3 6 8 10	14	0.3			
		12	22-24	1.8	3 5 7 7	12	0.9			Gray-brown mottled Silty CLAY, trace Coal, oxidized, stiff, moist.
	370	13	24-26	2.0	2 3 5 5	8	0.1			Light gray to blue Silty CLAY with abundant oxidized lenses, stiff, moist.
25		14	26-28	2.0	3 5 6 7	11	0.6	X		Reddish brown Silty CLAY, trace fine Sand stringers, trace brown Organics, trace fine subangular Gravel, moist.
	365	15	28-30	2.0	3 5 6 9	11	0.1			
30		16	30-32	1.9	5 7 7 5	14	0.1			Fine to medium gray Gravel lens at 31.0' bgs.
		17	32-34	2.0	5 7 7 8	14	0.1			
	360	18	34-36	2.0	4 4	11	0.2			

Well/Boring Construction



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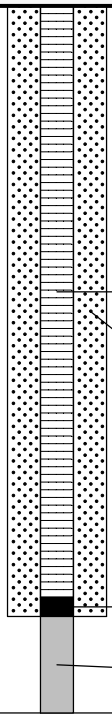
Elevations reference to NAVD 88. Northing and Easting based on a site-specific coordinate system.
Soil samples collected from 2' intervals for Dioxin/Furan analysis via US EPA Method 8290.
DUP-02 collected from 4-6' bgs.

ARCADIS Design & Consultancy for natural and built assets

Date Start/Finish: 11/19/2015 **Drilling Company:** Roberts Environmental Drilling, Inc **Driller's Name:** Brian Schilling **Drilling Method:** Hollow Stem Auger **Auger Size:** 4.25" Inside Diameter **Rig Type:** ATV Mounted CME 75 **Sampling Method:** 2'x2" Split Spoons	**Northing:** 3630.876 **Easting:** 3756.676 **Casing Elevation:** 396.87' AMSL **Borehole Depth:** 46' **Surface Elevation:** 394.44' AMSL **Descriptions By:** Will Stephens	**Well/Boring ID:** **OW-211B** **Client:** Beazer East, Inc. **Location:** Former Koppers Wood-Treating Site Carbondale, Illinois

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
		18	34-36	2.0	7 8	11	0.2			Reddish brown Silty CLAY, trace fine Sand stringers, trace brown Organics, trace fine subangular Gravel, trace light gray vertical Clay lenses, moist.
		19	36-38	2.0	7 12 12 8	24	0.1			Orange-brown Silty CLAY, little fine to medium subangular Gravel, trace fine Sand, trace black Coal, stiff, moist.
	355	20	38-40	2.0	7 9 16 25	25	0.1			
40		21	40-42	1.1	7 9 9 12	18	0.1			Orange-brown fine Silty SAND, little fine subangular Gravel, little Silt, loose, wet.
		22	42-44	2.0	6 8 8 13	16	0.1			Orange-brown Silty CLAY, trace vertical light gray lenses of Clay, trace fine angular Gravel, stiff, moist.
	350	23	44-46	2.0	12 12 14 16	26	0.1			Dark gray Silty CLAY, trace Organics, stiff, moist.
45										
										End of boring at 46.0' bgs.
	345									
50										

Well/Boring Construction



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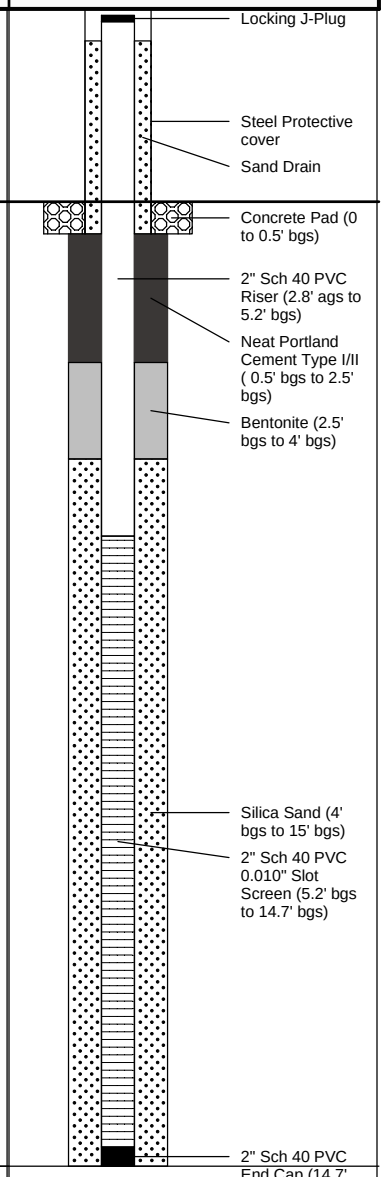
Remarks: ags= above ground surface; bgs = below ground surface; US EPA= United States Environmental Protection Agency; AMSL=Above Mean Sea Level; ppm= parts per million
Elevations reference to NAVD 88. Northing and Easting based on a site-specific coordinate system.
Soil samples collected from 2' intervals for Dioxin/Furan analysis via US EPA Method 8290.
DUP-02 collected from 4-6' bgs.

Date Start/Finish: 11/19/2015 **Drilling Company:** Roberts Environmental Drilling, Inc **Driller's Name:** Brian Schilling **Drilling Method:** Hollow Stem Auger **Auger Size:** 4.25" Inside Diameter **Rig Type:** ATV Mounted CME 75 **Sampling Method:** 2'x2" Split Spoons	**Northing:** 5547.079 **Easting:** 5033.001 **Casing Elevation:** 393.24' AMSL **Borehole Depth:** 15' **Surface Elevation:** 390.50' AMSL **Descriptions By:** Will Stephens	**Well/Boring ID:** **OW-212A** **Client:** Beazer East, Inc. **Location:** Former Koppers Wood-Treating Site Carbondale, Illinois

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
0	390	NA	NA	NA	NA	NA	NA			Blind drilled to 15' bgs and installed monitoring well. Refer to OW-212B for the lithologic descriptions.
5	385									
10	380									
15	375									End of boring at 15.0' bgs.

Well/Boring Construction



Remarks: ags= above ground surface; bgs = below ground surface; NA = Not Applicable/Available; AMSL= Above Mean Sea Level; ppm= parts per million.
Elevations reference to NAVD 88. Northing and Easting based on a Site-specific coordinate system.

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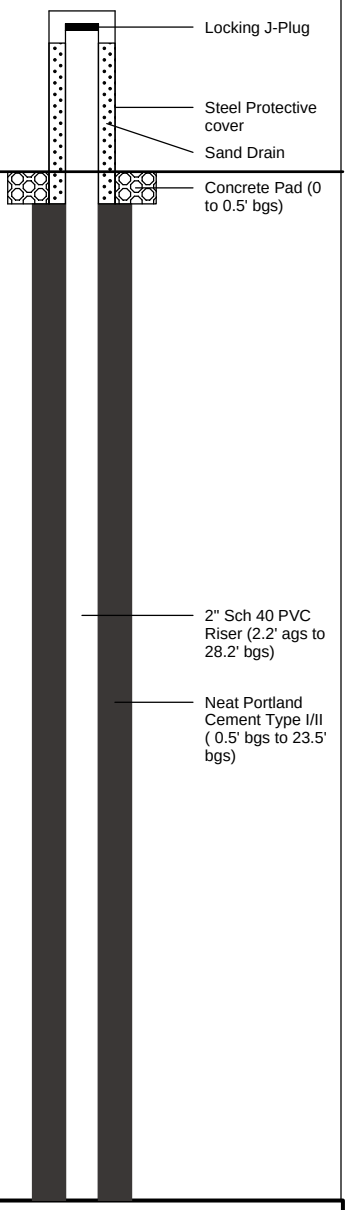
Date Start/Finish: 11/20/2015 **Drilling Company:** Roberts Environmental Drilling, Inc **Driller's Name:** Brian Schilling **Drilling Method:** Hollow Stem Auger **Auger Size:** 4.25" Inside Diameter **Rig Type:** ATV Mounted CME 75 **Sampling Method:** 2'x2" Split Spoons	**Northing:** 5548.232 **Easting:** 5039.024 **Casing Elevation:** 392.92' AMSL **Borehole Depth:** 40' **Surface Elevation:** 390.73' AMSL **Descriptions By:** Will Stephens	**Well/Boring ID:** **OW-212B** **Client:** Beazer East, Inc. **Location:** Former Koppers Wood-Treating Site Carbondale, Illinois

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
0	390	1	0-2	1.6	2 2 2 2	4	0.0			Brown Silty SAND, little fine subangular Gravel, trace Organics (roots, grass), moist. Brown Silty CLAY, trace Organics (roots), soft, moist.
		2	2-4	1.8	2 5 5 6	10	0.0			Gray-brown Silty CLAY, trace Organics (root scars, oxidized lenses), low plasticity, soft, moist.
5	385	3	4-6	1.8	3 4 5 6	9	0.0			
		4	6-8	2.0	2 3 2 3	5	0.0			Gray-brown Silty CLAY, soft, nonplastic, wet.
		5	8-10	2.0	WH 2 2 3	4	0.0			
10	380	6	10-12	1.6	3 5 6 7	11	0.0			Brown Silty CLAY, trace Organics (roots), medium stiff, plastic, moist.
		7	12-14	2.0	2 5 6 8	11	0.0			Trace oxidized lenses
15	375	8	14-16	2.0	3 4 6 9	10	0.0			

Well/Boring Construction



Remarks: ags= above ground surface; bgs = below ground surface; SS=Split Spoon; AMSL= Above Mean Sea Level; WH= weight of hammer; ppm= parts per million
Elevations reference to NAVD 88. Northing and Easting based on Site-specific coordinate system.

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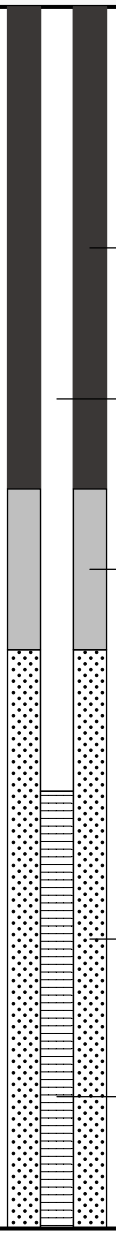
Date Start/Finish: 11/20/2015 **Drilling Company:** Roberts Environmental Drilling, Inc **Driller's Name:** Brian Schilling **Drilling Method:** Hollow Stem Auger **Auger Size:** 4.25" Inside Diameter **Rig Type:** ATV Mounted CME 75 **Sampling Method:** 2'x2" Split Spoons	**Northing:** 5548.232 **Easting:** 5039.024 **Casing Elevation:** 392.92' AMSL **Borehole Depth:** 40' **Surface Elevation:** 390.73' AMSL **Descriptions By:** Will Stephens	**Well/Boring ID:** **OW-212B** **Client:** Beazer East, Inc. **Location:** Former Koppers Wood-Treating Site Carbondale, Illinois

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
		9	16-18	2.0	2 4 6 10	10	0.0			Gray-brown mottled Silty CLAY, medium stiff, increasing abundance of oxidized lenses with depth, plastic, moist.
		10	18-20	2.0	3 4 8 8	12	0.0			
20	370	11	20-22	2.0	3 3 5 5	8	0.0			
		12	22-24	2.0	2 2 3 3	5	0.0			Brown Silty CLAY, trace Organics, soft, wet.
25	365	13	24-26	2.0	3 4 4 8	8	0.0			Brown Silty CLAY, trace fine subangular Gravel, trace Organics (wood), moist.
		14	26-28	2.0	2 3 6 8	9	0.0			
		15	28-30	2.0	5 8 10 11	18	0.0			Orange-brown SILT, little to trace Clay, trace fine Sand, trace fine subangular Gravel, moist.
30	360	16	30-32	1.8	5 5 8 9	13	0.0			Gray-brown Silty CLAY, trace fine subangular Gravel, trace fine Sand, stiff, moist.
		17	32-34	1.9	8 9 12 14	21	0.0			
		18	34-36	2.0	8 10	33	0.0			Trace light gray-blue vertical Clay lenses from 34' to 35.5' bgs.

Well/Boring Construction



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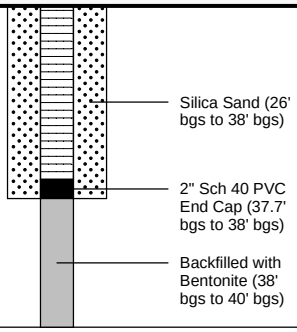
Elevations reference to NAVD 88. Northing and Easting based on Site-specific coordinate system.

ARCADIS Design & Consultancy for natural and built assets

Date Start/Finish: 11/20/2015 **Drilling Company:** Roberts Environmental Drilling, Inc **Driller's Name:** Brian Schilling **Drilling Method:** Hollow Stem Auger **Auger Size:** 4.25" Inside Diameter **Rig Type:** ATV Mounted CME 75 **Sampling Method:** 2'x2" Split Spoons	**Northing:** 5548.232 **Easting:** 5039.024 **Casing Elevation:** 392.92' AMSL **Borehole Depth:** 40' **Surface Elevation:** 390.73' AMSL **Descriptions By:** Will Stephens	**Well/Boring ID:** **OW-212B** **Client:** Beazer East, Inc. **Location:** Former Koppers Wood-Treating Site Carbondale, Illinois

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
		18	34-36	2.0	23 17	33	0.0			Gray-brown Silty CLAY, trace fine subangular Gravel, trace fine Sand, moist. Brown fine SAND, trace Silt, loose, wet.
	355	19	36-38	2.0	10 12 16 13	28	0.0			Dark brown-gray Silty CLAY, trace fine Sand, trace fine subangular Gravel, trace Coal, stiff, moist. Dark gray Silty CLAY, trace fine to medium subangular Gravel, stiff, moist.
		20	38-40	2.0	9 12 14 10	26	0.0			Dark gray Silty CLAY, trace fine angular Gravel, stiff, massive, nonplastic, moist
40										End of boring at 40.0' bgs.
	350									
45	345									
50	340									

Well/Boring Construction



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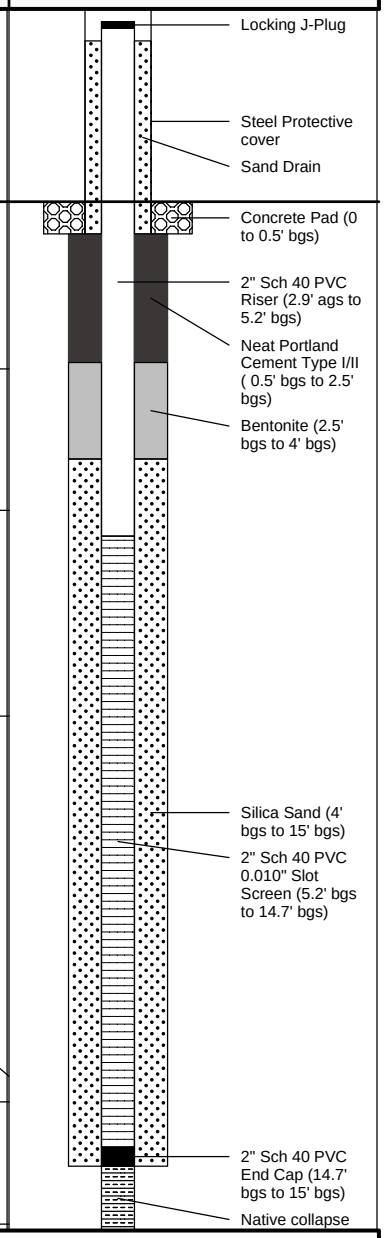
Elevations reference to NAVD 88. Northing and Easting based on Site-specific coordinate system.

ARCADIS Design & Consultancy for natural and built assets

Date Start/Finish: 11/18/2015 **Drilling Company:** Roberts Environmental Drilling, Inc **Driller's Name:** Brian Schilling **Drilling Method:** Hollow Stem Auger **Auger Size:** 4.25" Inside Diameter **Rig Type:** ATV Mounted CME 75 **Sampling Method:** 2'x2" Split Spoons	**Northing:** 5248.84 **Easting:** 7812.631 **Casing Elevation:** 388.43' AMSL **Borehole Depth:** 16' **Surface Elevation:** 385.56' AMSL **Descriptions By:** Will Stephens	**Well/Boring ID:** **P-9A** **Client:** Beazer East, Inc. **Location:** Former Koppers Wood-Treating Site Carbondale, Illinois

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
0	385	1	0-2	1.2	WH WH 1 1	NA	0.0			Light brown Silty CLAY, trace Organics (leaves, roots), very soft, wet.
		2	2-4	1.3	WH 2 3 3	5	0.0			Gray-brown Silty CLAY, soft, nonplastic, trace oxidation, moist.
5	380	3	4-6	1.7	2 4 4 5	8	0.0			Gray Silty CLAY, trace Organics (oxidized brown and black root scars), increasing stiffness with depth, moist.
		4	6-8	1.8	3 5 7 7	12	0.0			
10	375	5	8-10	1.7	2 5 5 7	10	0.0			Gray-brown mottled Silty CLAY, trace Organics (roots), oxidized root scars, moist.
		6	10-12	1.7	2 2 3 3	5	0.0			
		7	12-14	1.8	2 3 3 5	6	0.0			Gray SILT, trace fine Sand, trace Clay, moist.
15	370	8	14-16	1.8	2 2 3 3	5	0.0			Gray-brown mottled Silty CLAY, oxidized root scars, moist. End of boring at 16.0' bgs.

Well/Boring Construction



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Elevations reference to NAVD 88. Northing and Easting based on a Site-specific coordinate system.

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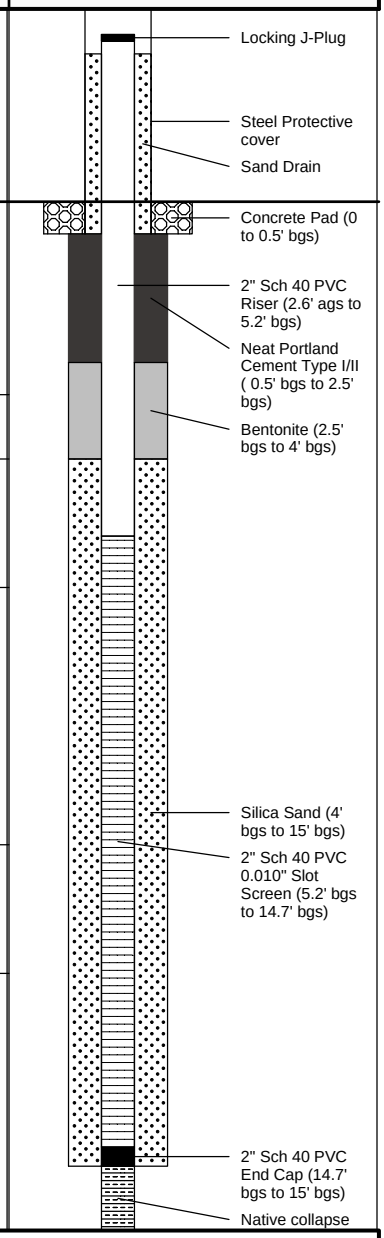
Date Start/Finish: 11/20/2015 **Drilling Company:** Roberts Environmental Drilling, Inc **Driller's Name:** Brian Schilling **Drilling Method:** Hollow Stem Auger **Auger Size:** 4.25" Inside Diameter **Rig Type:** ATV Mounted CME 75 **Sampling Method:** 2'x2" Split Spoons	**Northing:** 5123.623 **Easting:** 7282.335 **Casing Elevation:** 397.68' AMSL **Borehole Depth:** 16' **Surface Elevation:** 395.05' AMSL **Descriptions By:** Will Stephens	**Well/Boring ID:** **P-10A** **Client:** Beazer East, Inc. **Location:** Former Koppers Wood-Treating Site Carbondale, Illinois

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
0	395	1	0-2	1.0	WH WH WH 4	NA	0.0			Brown Silty CLAY, trace Organics (leaves, roots), trace Coal from 2' to 3' bgs, soft, moist. [FILL]
		2	2-4	1.4	2 2 6 7	8	0.0			Brown fine SAND, little Silt, trace fine angular Gravel, dense, moist.
5	390	3	4-6	1.9	3 3 6 6	9	0.0			Gray-brown Silty CLAY, trace Organics (roots), oxidized root scars, moist.
		4	6-8	2.0	5 7 8 11	15	0.0			Gray-brown Silty CLAY, trace Organics (roots), trace black staining 7.0 to 7.1' bgs, soft at 8' bgs, moist.
		5	8-10	1.8	2 2 4 4	6	0.0			
10	385	6	10-12	1.8	3 4 4 5	8	0.0			Reddish-brown Silty CLAY, trace Organics (wood, roots), firm, moist.
		7	12-14	2.0	3 5 6 9	11	0.0			Gray-brown Silty CLAY, trace Organics (wood, roots), moist.
15	380	8	14-16	2.0	3 6 6 8	12	0.0			End of boring at 16.0' bgs.

Well/Boring Construction



Remarks: gs= above ground surface; bgs = below ground surface; NA = Not Applicable/Available; WH= Weight of Hammer; AMSL= Above Mean Sea Level; ppm=parts per million. Elevations reference to NAVD 88. Northing and Easting based on a Site-specific coordinate system.

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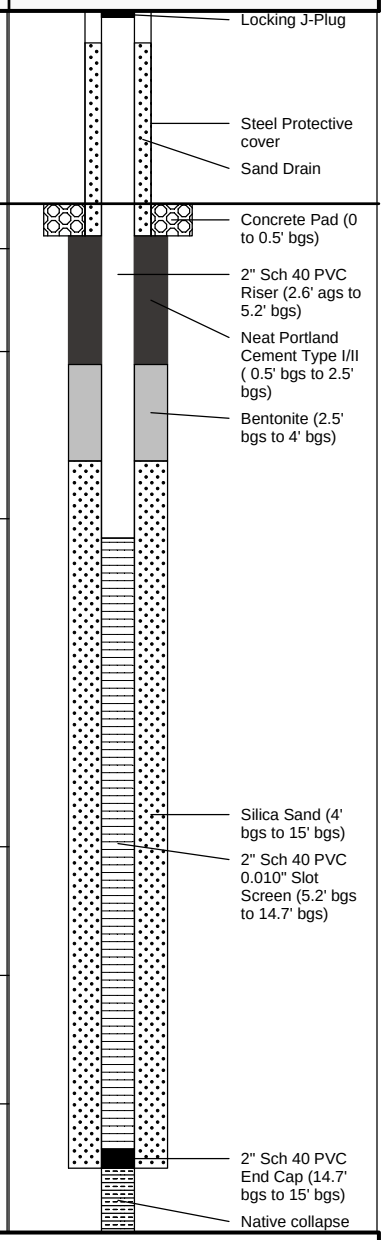
Date Start/Finish: 11/17/2015 **Drilling Company:** Roberts Environmental Drilling, Inc **Driller's Name:** Brian Schilling **Drilling Method:** Hollow Stem Auger **Auger Size:** 4.25" Inside Diameter **Rig Type:** ATV Mounted CME 75 **Sampling Method:** 2'x2" Split Spoons	**Northing:** 4089.851 **Easting:** 4890.487 **Casing Elevation:** 397.38' AMSL **Borehole Depth:** 16' **Surface Elevation:** 394.76' AMSL **Descriptions By:** Will Stephens	**Well/Boring ID:** **P-11A** **Client:** Beazer East, Inc. **Location:** Former Koppers Wood-Treating Site Carbondale, Illinois

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
0	395									
		1	0-2	1.7	7 7 9 8	16	0.0			Gray Silty SAND, some red Brick, trace Organics (roots), wet. [FILL]
										Black COAL, some gray Silty Sand, trace Organics (roots), trace red Brick, moist. [FILL]
		2	2-4	2.0	2 2 3 3	5	0.0			Light gray Silty CLAY, soft, low plasticity, moist.
5	390	3	4-6	1.7	1 3 5 7	8	0.0			Gray-brown Silty CLAY, little brown Organics (roots), trace fine angular Gravel fragments, mottled, nonplastic, moist.
		4	6-8	1.8	1 3 3 7	6	0.0			
		5	8-10	1.7	2 3 4 7	7	0.0			Decreasing Organics
10	385	6	10-12	1.7	2 3 8 7	11	0.0			Gray-brown Silty CLAY, mottled with orange oxidized lenses, moist.
		7	12-14	1.6	3 4 5 10	9	0.0			Gray-brown Silty CLAY, trace brown Organics, mottled with orange oxidized lenses, moist.
15	380	8	14-16	2.0	3 5 9 10	14	0.0			Gray Silty CLAY, trace Organics, mottled, oxidized root scars decreasing with depth, moist.
										End of boring at 16.0' bgs.

Well/Boring Construction



Remarks: ags= above ground surface; bgs = below ground surface; USEPA= United States Environmental Protection Agency; AMSL= Above Mean Sea Level; ppm=parts per million
Elevations reference to NAVD 88. Northing and Easting based on a Site-specific coordinate system.
Soil samples collected from 2' intervals for Dioxin/furan analysis via US EPA Method 8290.
DUP-01 collected from 8-10' bgs.

ARCADIS Design & Consultancy for natural and built assets

APPENDIX B

Laboratory Analytical Report

December 11, 2015

Vista Work Order No. 1501148

Mr. David Bessingpas
ARCADIS
6602 Excelsior Road
Baxter, MN 56425

Dear Mr. Bessingpas,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on November 20, 2015. This sample set was analyzed on a standard turn-around time, under your Project Name 'B0039321.0000.00001'. The work was authorized under your Purchase Order No. B0039275.0000.00002.

Vista Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at mmaier@vista-analytical.com.

Thank you for choosing Vista as part of your analytical support team.

Sincerely,

Martha Maier
Laboratory Director

Vista Analytical Laboratory certifies that the report herein meets all the requirements set forth by NELAP for those applicable test methods. Results relate only to the samples as received by the laboratory. This report should not be reproduced except in full without the written approval of Vista.

Vista Analytical Laboratory 1104 Windfield Way El Dorado Hills, CA 95762 ph: 916-673-1520 fx: 916-673-0106 www.vista-analytical.com

Vista Work Order No. 1501148
Case Narrative

Sample Condition on Receipt:

Nineteen soil samples and three aqueous samples were received in good condition and within the method temperature requirements. The samples were received and stored securely in accordance with Vista standard operating procedures and EPA methodology.

Analytical Notes:

EPA Method 8290

These samples were extracted and analyzed for tetra-through-octa chlorinated dioxins and furans by EPA Method 8290 using a ZB-5MS GC column.

Holding Times

The method holding time criteria were met for these samples.

Quality Control

The Initial Calibration and Continuing Calibration Verifications met the method acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with each preparation batch. No analytes were detected in the Method Blanks. The OPR recoveries were within the method acceptance criteria.

Labeled standard recoveries for all QC and field samples were within method acceptance criteria.

As requested, an MS/MSD was performed on sample "P-11A_8-10 (20151117)". The recoveries and RPD of OCDD were outside the QC limits; the criteria were met for all other analytes.

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Sample Inventory Report

Vista Sample ID	Client Sample ID		Sampled	Received	Components/Containers
1501148-01	OW-210B_0-2 (20151116)		16-Nov-15 12:30	20-Nov-15 09:25	Amber Glass, 120 mL
1501148-02	OW-210B_2-4 (20151116)		16-Nov-15 12:35	20-Nov-15 09:25	Amber Glass, 120 mL
1501148-03	OW-210B_4-6 (20151116)		16-Nov-15 12:45	20-Nov-15 09:25	Amber Glass, 120 mL
1501148-04	OW-210B_6-8 (20151116)		16-Nov-15 12:55	20-Nov-15 09:25	Amber Glass, 120 mL
1501148-05	OW-210B_8-10 (20151116)		16-Nov-15 13:05	20-Nov-15 09:25	Amber Glass, 120 mL
1501148-06	OW-210B_28-30 (20151116)		16-Nov-15 14:25	20-Nov-15 09:25	Amber Glass, 120 mL
1501148-07	P-11A_0-2 (20151117)		17-Nov-15 11:20	20-Nov-15 09:25	Amber Glass, 120 mL
1501148-08	P-11A_2-4 (20151117)		17-Nov-15 11:25	20-Nov-15 09:25	Amber Glass, 120 mL
1501148-09	P-11A_4-6 (20151117)		17-Nov-15 11:32	20-Nov-15 09:25	Amber Glass, 120 mL
1501148-10	P-11A_6-8 (20151117)		17-Nov-15 11:36	20-Nov-15 09:25	Amber Glass, 120 mL
1501148-11	P-11A_8-10 (20151117)	MS/MSD	17-Nov-15 11:45	20-Nov-15 09:25	Amber Glass, 120 mL
		MS/MSD			Amber Glass, 120 mL
1501148-12	DUP-01 (20151117)		17-Nov-15 00:00	20-Nov-15 09:25	Amber Glass, 120 mL
1501148-13	OW-211B_0-2 (20151119)		19-Nov-15 09:05	20-Nov-15 09:25	Amber Glass, 120 mL
1501148-14	OW-211B_2-4 (20151119)		19-Nov-15 09:10	20-Nov-15 09:25	Amber Glass, 120 mL
1501148-15	OW-211B_4-6 (20151119)		19-Nov-15 09:20	20-Nov-15 09:25	Amber Glass, 120 mL
1501148-16	OW-211B_6-8 (20151119)		19-Nov-15 09:28	20-Nov-15 09:25	Amber Glass, 120 mL
1501148-17	OW-211B_8-10 (20151119)		19-Nov-15 09:32	20-Nov-15 09:25	Amber Glass, 120 mL
1501148-18	DUP-02(20151119)		19-Nov-15 00:00	20-Nov-15 09:25	Amber Glass, 120 mL
1501148-19	OW-211B_26-28 (20151119)		19-Nov-15 10:35	20-Nov-15 09:25	Amber Glass, 120 mL
1501148-20	EB-01 (20151116)		16-Nov-15 15:00	20-Nov-15 09:25	Amber Glass NM Bottle, 1L
1501148-21	EB-02 (20151117)		17-Nov-15 12:30	20-Nov-15 09:25	Amber Glass NM Bottle, 1L
1501148-22	EB-03 (20151119)		19-Nov-15 13:30	20-Nov-15 09:25	Amber Glass NM Bottle, 1L

Vista Project: 1501148

Client Project: B0039321.0000.00001

ANALYTICAL RESULTS

Sample ID: Method Blank

EPA Method 8290

Matrix:	Solid	QC Batch:	B5K0138	Lab Sample:	B5K0138-BLK1
Sample Size:	10.0 g	Date Extracted:	30-Nov-2015 9:58	Date Analyzed :	06-Dec-15 09:40 Column: ZB-5MS Analyst: WJL

Analyte	Conc. (pg/g)	DL	EMPC	Qualifiers
2,3,7,8-TCDD	ND	0.0864		
1,2,3,7,8-PeCDD	ND	0.0811		
1,2,3,4,7,8-HxCDD	ND	0.0739		
1,2,3,6,7,8-HxCDD	ND	0.0784		
1,2,3,7,8,9-HxCDD	ND	0.0863		
1,2,3,4,6,7,8-HpCDD	ND	0.105		
OCDD	ND	0.0853		
2,3,7,8-TCDF	ND	0.0766		
1,2,3,7,8-PeCDF	ND	0.0506		
2,3,4,7,8-PeCDF	ND	0.0397		
1,2,3,4,7,8-HxCDF	ND	0.0598		
1,2,3,6,7,8-HxCDF	ND	0.0608		
2,3,4,6,7,8-HxCDF	ND	0.0652		
1,2,3,7,8,9-HxCDF	ND	0.0900		
1,2,3,4,6,7,8-HpCDF	ND	0.0595		
1,2,3,4,7,8,9-HpCDF	ND	0.0581		
OCDF	ND	0.147		
TOTALS				
Total TCDD	ND	0.0506		
Total PeCDD	ND	0.0900		
Total HxCDD	ND	0.0595		
Total HpCDD	ND	0.147		
Total TCDF	ND	0.0766		
Total PeCDF	ND	0.0506		
Total HxCDF	ND	0.0900		
Total HpCDF	ND	0.0595		

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C-2,3,7,8-TCDD	93.3	40 - 135	
	13C-1,2,3,7,8-PeCDD	110	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	108	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	95.6	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	101	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	103	40 - 135	
	13C-OCDD	82.7	40 - 135	
	13C-2,3,7,8-TCDF	95.5	40 - 135	
	13C-1,2,3,7,8-PeCDF	115	40 - 135	
	13C-2,3,4,7,8-PeCDF	125	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	95.8	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	90.3	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	90.8	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	92.1	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	85.6	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	98.8	40 - 135	
	13C-OCDF	80.5	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	87.4	40 - 135	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin	0.00

DL - Sample specifc estimated detection limit

EMPC - Estimated maximum possible concentration

LCL-UCL- Lower control limit - upper control limit

The results are reported in dry weight. The sample size is reported in wet weight.

Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: OPR **EPA Method 8290**

Matrix:	Solid	QC Batch:	B5K0138	Lab Sample:	B5K0138-BS1
Sample Size:	10.0 g	Date Extracted:	30-Nov-2015 9:58	Date Analyzed:	06-Dec-15 06:28 Column: ZB-5MS Analyst: WJL

Analyte	Amt Found (pg/g)	Spike Amt	%R	Limits		Labeled Standard	%R	LCL-UCL
2,3,7,8-TCDD	16.7	20.0	83.5	70 - 130	IS	13C-2,3,7,8-TCDD	98.2	40 - 135
1,2,3,7,8-PeCDD	88.7	100	88.7	70 - 130		13C-1,2,3,7,8-PeCDD	110	40 - 135
1,2,3,4,7,8-HxCDD	88.3	100	88.3	70 - 130		13C-1,2,3,4,7,8-HxCDD	117	40 - 135
1,2,3,6,7,8-HxCDD	89.1	100	89.1	70 - 130		13C-1,2,3,6,7,8-HxCDD	104	40 - 135
1,2,3,7,8,9-HxCDD	88.4	100	88.4	70 - 130		13C-1,2,3,7,8,9-HxCDD	110	40 - 135
1,2,3,4,6,7,8-HpCDD	89.2	100	89.2	70 - 130		13C-1,2,3,4,6,7,8-HpCDD	126	40 - 135
OCDD	178	200	88.9	70 - 130		13C-OCDD	100	40 - 135
2,3,7,8-TCDF	17.0	20.0	85.0	70 - 130		13C-2,3,7,8-TCDF	103	40 - 135
1,2,3,7,8-PeCDF	98.8	100	98.8	70 - 130		13C-1,2,3,7,8-PeCDF	113	40 - 135
2,3,4,7,8-PeCDF	97.3	100	97.3	70 - 130		13C-2,3,4,7,8-PeCDF	122	40 - 135
1,2,3,4,7,8-HxCDF	88.7	100	88.7	70 - 130		13C-1,2,3,4,7,8-HxCDF	96.5	40 - 135
1,2,3,6,7,8-HxCDF	91.8	100	91.8	70 - 130		13C-1,2,3,6,7,8-HxCDF	90.7	40 - 135
2,3,4,6,7,8-HxCDF	88.0	100	88.0	70 - 130		13C-2,3,4,6,7,8-HxCDF	92.8	40 - 135
1,2,3,7,8,9-HxCDF	92.9	100	92.9	70 - 130		13C-1,2,3,7,8,9-HxCDF	96.5	40 - 135
1,2,3,4,6,7,8-HpCDF	89.9	100	89.9	70 - 130		13C-1,2,3,4,6,7,8-HpCDF	91.3	40 - 135
1,2,3,4,7,8,9-HpCDF	91.3	100	91.3	70 - 130		13C-1,2,3,4,7,8,9-HpCDF	126	40 - 135
OCDF	187	200	93.3	70 - 130		13C-OCDF	99.2	40 - 135
					CRS	37Cl-2,3,7,8-TCDD	86.6	40 - 135

LCL-UCL - Lower control limit - upper control limit

Sample ID: OW-210B_0-2 (20151116)

EPA Method 8290

Client Data
Name: ARCADIS
Project: B0039321.0000.00001
Date Collected: 16-Nov-2015 12:30

Sample Data
Matrix: Soil
Sample Size: 15.1 g
% Solids: 66.5

Laboratory Data
Lab Sample: 1501148-01 Date Received: 20-Nov-2015 9:25
QC Batch: B5K0138 Date Extracted: 30-Nov-2015 9:58
Date Analyzed : 06-Dec-15 10:27 Column: ZB-5MS Analyst: WJL
09-Dec-15 15:07 Column: DB-225 Analyst: DB

Analyte	Conc. (pg/g)	DL	EMPC	Qualifiers
2,3,7,8-TCDD	ND		0.355	
1,2,3,7,8-PeCDD	1.73			J
1,2,3,4,7,8-HxCDD	2.99			
1,2,3,6,7,8-HxCDD	9.93			
1,2,3,7,8,9-HxCDD	5.65			
1,2,3,4,6,7,8-HpCDD	606			
OCDD	14300			E
2,3,7,8-TCDF	0.838			
1,2,3,7,8-PeCDF	1.22			J
2,3,4,7,8-PeCDF	0.937			J
1,2,3,4,7,8-HxCDF	2.30			J
1,2,3,6,7,8-HxCDF	0.873			J
2,3,4,6,7,8-HxCDF	0.720			J
1,2,3,7,8,9-HxCDF	0.441			J
1,2,3,4,6,7,8-HpCDF	43.9			
1,2,3,4,7,8,9-HpCDF	3.48			
OCDF	314			
TOTALS				
Total TCDD	34.4		34.8	
Total PeCDD	34.1		34.5	
Total HxCDD	156			
Total HpCDD	1420			
Total TCDF	11.0		12.9	
Total PeCDF	10.2		10.6	
Total HxCDF	33.5			
Total HpCDF	215			

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C-2,3,7,8-TCDD	98.2	40 - 135	
	13C-1,2,3,7,8-PeCDD	104	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	111	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	100	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	103	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	112	40 - 135	
	13C-OCDD	119	40 - 135	
	13C-2,3,7,8-TCDF	96.9	40 - 135	
	13C-1,2,3,7,8-PeCDF	109	40 - 135	
	13C-2,3,4,7,8-PeCDF	114	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	94.7	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	89.1	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	91.8	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	96.6	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	93.7	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	107	40 - 135	
	13C-OCDF	95.0	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	88.1	40 - 135	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin	15.3

DL - Sample specifc estimated detection limit
EMPC - Estimated maximum possible concentration

LCL-UCL- Lower control limit - upper control limit
The results are reported in dry weight. The sample size is reported in wet weight.
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: OW-210B_2-4 (20151116)

EPA Method 8290

Client Data
Name: ARCADIS
Project: B0039321.0000.00001
Date Collected: 16-Nov-2015 12:35

Sample Data
Matrix: Soil
Sample Size: 12.4 g
% Solids: 80.7

Laboratory Data
Lab Sample: 1501148-02 Date Received: 20-Nov-2015 9:25
QC Batch: B5K0138 Date Extracted: 30-Nov-2015 9:58
Date Analyzed : 06-Dec-15 11:15 Column: ZB-5MS Analyst: WJL

Analyte	Conc. (pg/g)	DL	EMPC	Qualifiers
2,3,7,8-TCDD	ND	0.113		
1,2,3,7,8-PeCDD	ND	0.118		
1,2,3,4,7,8-HxCDD	ND	0.198		
1,2,3,6,7,8-HxCDD	0.263			J
1,2,3,7,8,9-HxCDD	ND	0.221		
1,2,3,4,6,7,8-HpCDD	61.4			
OCDD	9440			E
2,3,7,8-TCDF	ND	0.0929		
1,2,3,7,8-PeCDF	ND	0.0716		
2,3,4,7,8-PeCDF	ND	0.0674		
1,2,3,4,7,8-HxCDF	ND	0.0957		
1,2,3,6,7,8-HxCDF	ND	0.0994		
2,3,4,6,7,8-HxCDF	ND	0.104		
1,2,3,7,8,9-HxCDF	ND	0.151		
1,2,3,4,6,7,8-HpCDF	0.797			J
1,2,3,4,7,8,9-HpCDF	ND	0.0982		
OCDF	5.42			
TOTALS				
Total TCDD	ND	0.113		
Total PeCDD	ND	0.118		
Total HxCDD	2.87			
Total HpCDD	122			
Total TCDF	ND	0.0929		
Total PeCDF	ND	0.0716		
Total HxCDF	0.402		0.540	
Total HpCDF	3.62			

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C-2,3,7,8-TCDD	86.4	40 - 135	
	13C-1,2,3,7,8-PeCDD	94.5	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	96.3	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	89.6	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	90.8	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	92.4	40 - 135	
	13C-OCDD	101	40 - 135	
	13C-2,3,7,8-TCDF	89.8	40 - 135	
	13C-1,2,3,7,8-PeCDF	98.2	40 - 135	
	13C-2,3,4,7,8-PeCDF	103	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	86.1	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	82.5	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	84.6	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	85.2	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	80.5	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	91.9	40 - 135	
	13C-OCDF	79.7	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	82.1	40 - 135	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin	3.48

DL - Sample specifc estimated detection limit
EMPC - Estimated maximum possible concentration

LCL-UCL- Lower control limit - upper control limit
The results are reported in dry weight. The sample size is reported in wet weight.
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: OW-210B_4-6 (20151116)

EPA Method 8290

Client Data
Name: ARCADIS
Project: B0039321.0000.00001
Date Collected: 16-Nov-2015 12:45

Sample Data
Matrix: Soil
Sample Size: 12.1 g
% Solids: 82.6

Laboratory Data
Lab Sample: 1501148-03 Date Received: 20-Nov-2015 9:25
QC Batch: B5K0138 Date Extracted: 30-Nov-2015 9:58
Date Analyzed : 06-Dec-15 12:03 Column: ZB-5MS Analyst: WJL

Analyte	Conc. (pg/g)	DL	EMPC	Qualifiers
2,3,7,8-TCDD	ND	0.121		
1,2,3,7,8-PeCDD	ND	0.181		
1,2,3,4,7,8-HxCDD	ND	0.192		
1,2,3,6,7,8-HxCDD	ND	0.196		
1,2,3,7,8,9-HxCDD	ND	0.212		
1,2,3,4,6,7,8-HpCDD	43.9			
OCDD	5370			
2,3,7,8-TCDF	ND	0.104		
1,2,3,7,8-PeCDF	ND	0.0832		
2,3,4,7,8-PeCDF	ND	0.0744		
1,2,3,4,7,8-HxCDF	ND	0.0841		
1,2,3,6,7,8-HxCDF	ND	0.0882		
2,3,4,6,7,8-HxCDF	ND	0.0877		
1,2,3,7,8,9-HxCDF	ND	0.126		
1,2,3,4,6,7,8-HpCDF	1.13			J
1,2,3,4,7,8,9-HpCDF	ND	0.117		
OCDF	6.68			
TOTALS				
Total TCDD	ND	0.121		
Total PeCDD	1.13			
Total HxCDD	5.88			
Total HpCDD	92.2			
Total TCDF	ND		0.272	
Total PeCDF	ND	0.0832		
Total HxCDF	0.584		0.802	
Total HpCDF	4.72			

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C-2,3,7,8-TCDD	77.5	40 - 135	
	13C-1,2,3,7,8-PeCDD	83.4	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	84.7	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	78.2	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	80.4	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	83.6	40 - 135	
	13C-OCDD	79.3	40 - 135	
	13C-2,3,7,8-TCDF	80.3	40 - 135	
	13C-1,2,3,7,8-PeCDF	86.9	40 - 135	
	13C-2,3,4,7,8-PeCDF	90.5	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	74.5	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	70.9	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	73.8	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	76.7	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	70.0	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	84.0	40 - 135	
	13C-OCDF	71.9	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	84.7	40 - 135	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin	2.06

DL - Sample specifc estimated detection limit
EMPC - Estimated maximum possible concentration

LCL-UCL- Lower control limit - upper control limit
The results are reported in dry weight. The sample size is reported in wet weight.
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: OW-210B_6-8 (20151116)

EPA Method 8290

Client Data
Name: ARCADIS
Project: B0039321.0000.00001
Date Collected: 16-Nov-2015 12:55

Sample Data
Matrix: Soil
Sample Size: 12.8 g
% Solids: 78.5

Laboratory Data
Lab Sample: 1501148-04 Date Received: 20-Nov-2015 9:25
QC Batch: B5K0138 Date Extracted: 30-Nov-2015 9:58
Date Analyzed : 06-Dec-15 12:51 Column: ZB-5MS Analyst: WJL

Analyte	Conc. (pg/g)	DL	EMPC	Qualifiers
2,3,7,8-TCDD	ND		0.155	
1,2,3,7,8-PeCDD	ND		0.130	
1,2,3,4,7,8-HxCDD	ND	0.112		
1,2,3,6,7,8-HxCDD	ND	0.117		
1,2,3,7,8,9-HxCDD	ND	0.131		
1,2,3,4,6,7,8-HpCDD	10.2			
OCDD	604			
2,3,7,8-TCDF	ND	0.0870		
1,2,3,7,8-PeCDF	ND	0.0537		
2,3,4,7,8-PeCDF	ND	0.0492		
1,2,3,4,7,8-HxCDF	ND	0.0871		
1,2,3,6,7,8-HxCDF	ND	0.0922		
2,3,4,6,7,8-HxCDF	ND	0.0877		
1,2,3,7,8,9-HxCDF	ND	0.128		
1,2,3,4,6,7,8-HpCDF	0.725			J
1,2,3,4,7,8,9-HpCDF	ND	0.120		
OCDF	4.51			J
TOTALS				
Total TCDD	0.950		2.01	
Total PeCDD	0.872		5.35	
Total HxCDD	7.91			
Total HpCDD	21.6			
Total TCDF	ND	0.0870		
Total PeCDF	ND	0.0537		
Total HxCDF	0.163		0.538	
Total HpCDF	3.20			

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C-2,3,7,8-TCDD	90.8	40 - 135	
	13C-1,2,3,7,8-PeCDD	102	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	101	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	91.6	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	94.8	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	98.5	40 - 135	
	13C-OCDD	82.3	40 - 135	
	13C-2,3,7,8-TCDF	93.7	40 - 135	
	13C-1,2,3,7,8-PeCDF	106	40 - 135	
	13C-2,3,4,7,8-PeCDF	109	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	88.5	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	84.2	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	88.6	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	89.8	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	84.8	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	95.0	40 - 135	
	13C-OCDF	78.9	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	87.3	40 - 135	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin	0.292

DL - Sample specifc estimated detection limit
EMPC - Estimated maximum possible concentration

LCL-UCL- Lower control limit - upper control limit
The results are reported in dry weight. The sample size is reported in wet weight.
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: OW-210B_8-10 (20151116)

EPA Method 8290

Client Data
Name: ARCADIS
Project: B0039321.0000.00001
Date Collected: 16-Nov-2015 13:05

Sample Data
Matrix: Soil
Sample Size: 12.5 g
% Solids: 80.0

Laboratory Data
Lab Sample: 1501148-05 Date Received: 20-Nov-2015 9:25
QC Batch: B5K0138 Date Extracted: 30-Nov-2015 9:58
Date Analyzed : 06-Dec-15 13:39 Column: ZB-5MS Analyst: WJL

Analyte	Conc. (pg/g)	DL	EMPC	Qualifiers
2,3,7,8-TCDD	ND	0.0918		
1,2,3,7,8-PeCDD	ND	0.0986		
1,2,3,4,7,8-HxCDD	ND	0.129		
1,2,3,6,7,8-HxCDD	ND	0.128		
1,2,3,7,8,9-HxCDD	ND	0.145		
1,2,3,4,6,7,8-HpCDD	2.15			J
OCDD	113			
2,3,7,8-TCDF	ND	0.0733		
1,2,3,7,8-PeCDF	ND	0.0509		
2,3,4,7,8-PeCDF	ND	0.0470		
1,2,3,4,7,8-HxCDF	ND	0.0758		
1,2,3,6,7,8-HxCDF	ND	0.0707		
2,3,4,6,7,8-HxCDF	ND	0.0780		
1,2,3,7,8,9-HxCDF	ND	0.108		
1,2,3,4,6,7,8-HpCDF	0.115			J
1,2,3,4,7,8,9-HpCDF	ND	0.0817		
OCDF	0.378			J
TOTALS				
Total TCDD	0.675		0.862	
Total PeCDD	1.36		1.95	
Total HxCDD	2.81		3.28	
Total HpCDD	5.73			
Total TCDF	ND	0.0733		
Total PeCDF	ND	0.0509		
Total HxCDF	ND	0.108		
Total HpCDF	0.115		0.267	

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C-2,3,7,8-TCDD	92.0	40 - 135	
	13C-1,2,3,7,8-PeCDD	97.7	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	98.8	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	92.9	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	96.6	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	97.6	40 - 135	
	13C-OCDD	83.6	40 - 135	
	13C-2,3,7,8-TCDF	93.2	40 - 135	
	13C-1,2,3,7,8-PeCDF	104	40 - 135	
	13C-2,3,4,7,8-PeCDF	106	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	88.4	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	86.4	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	86.5	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	90.0	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	82.6	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	99.3	40 - 135	
	13C-OCDF	80.5	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	81.3	40 - 135	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin	0.0567

DL - Sample specifc estimated detection limit
EMPC - Estimated maximum possible concentration

LCL-UCL- Lower control limit - upper control limit
The results are reported in dry weight. The sample size is reported in wet weight.
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: OW-210B_28-30 (20151116)

EPA Method 8290

Client Data
Name: ARCADIS
Project: B0039321.0000.00001
Date Collected: 16-Nov-2015 14:25

Sample Data
Matrix: Soil
Sample Size: 12.7 g
% Solids: 78.8

Laboratory Data
Lab Sample: 1501148-06 Date Received: 20-Nov-2015 9:25
QC Batch: B5K0138 Date Extracted: 30-Nov-2015 9:58
Date Analyzed : 06-Dec-15 14:27 Column: ZB-5MS Analyst: WJL

Analyte	Conc. (pg/g)	DL	EMPC	Qualifiers
2,3,7,8-TCDD	ND	0.109		
1,2,3,7,8-PeCDD	ND	0.118		
1,2,3,4,7,8-HxCDD	ND	0.162		
1,2,3,6,7,8-HxCDD	ND	0.167		
1,2,3,7,8,9-HxCDD	0.854			J
1,2,3,4,6,7,8-HpCDD	11.0			
OCDD	401			
2,3,7,8-TCDF	ND	0.0941		
1,2,3,7,8-PeCDF	ND	0.0610		
2,3,4,7,8-PeCDF	ND	0.0608		
1,2,3,4,7,8-HxCDF	ND	0.0902		
1,2,3,6,7,8-HxCDF	ND	0.0944		
2,3,4,6,7,8-HxCDF	ND	0.0930		
1,2,3,7,8,9-HxCDF	ND	0.131		
1,2,3,4,6,7,8-HpCDF	0.251			J
1,2,3,4,7,8,9-HpCDF	ND	0.0956		
OCDF	1.19			J
TOTALS				
Total TCDD	ND		0.395	
Total PeCDD	ND		0.412	
Total HxCDD	2.55			
Total HpCDD	24.2			
Total TCDF	ND	0.0941		
Total PeCDF	ND	0.0610		
Total HxCDF	0.131			
Total HpCDF	0.975			

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C-2,3,7,8-TCDD	81.3	40 - 135	
	13C-1,2,3,7,8-PeCDD	87.9	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	93.5	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	84.2	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	90.1	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	91.5	40 - 135	
	13C-OCDD	77.9	40 - 135	
	13C-2,3,7,8-TCDF	82.1	40 - 135	
	13C-1,2,3,7,8-PeCDF	92.8	40 - 135	
	13C-2,3,4,7,8-PeCDF	94.1	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	81.0	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	77.4	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	81.0	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	81.3	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	77.8	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	88.7	40 - 135	
	13C-OCDF	73.0	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	73.9	40 - 135	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin	0.319

DL - Sample specifc estimated detection limit
EMPC - Estimated maximum possible concentration

LCL-UCL- Lower control limit - upper control limit
The results are reported in dry weight. The sample size is reported in wet weight.
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: P-11A_0-2 (20151117)

EPA Method 8290

Client Data
Name: ARCADIS
Project: B0039321.0000.00001
Date Collected: 17-Nov-2015 11:20

Sample Data
Matrix: Soil
Sample Size: 12.5 g
% Solids: 80.0

Laboratory Data
Lab Sample: 1501148-07 Date Received: 20-Nov-2015 9:25
QC Batch: B5K0138 Date Extracted: 30-Nov-2015 9:58
Date Analyzed : 06-Dec-15 15:15 Column: ZB-5MS Analyst: WJL
09-Dec-15 15:41 Column: DB-225 Analyst: DB

Analyte	Conc. (pg/g)	DL	EMPC	Qualifiers
2,3,7,8-TCDD	0.607			
1,2,3,7,8-PeCDD	2.80			
1,2,3,4,7,8-HxCDD	6.92			
1,2,3,6,7,8-HxCDD	40.3			
1,2,3,7,8,9-HxCDD	12.0			
1,2,3,4,6,7,8-HpCDD	2250			
OCDD	21300			E
2,3,7,8-TCDF	3.62			
1,2,3,7,8-PeCDF	6.89			
2,3,4,7,8-PeCDF	4.37			
1,2,3,4,7,8-HxCDF	15.2			
1,2,3,6,7,8-HxCDF	5.35			
2,3,4,6,7,8-HxCDF	4.47			
1,2,3,7,8,9-HxCDF	2.89			
1,2,3,4,6,7,8-HpCDF	293			
1,2,3,4,7,8,9-HpCDF	24.0			
OCDF	2020			
TOTALS				
Total TCDD	21.2		21.4	
Total PeCDD	43.3			
Total HxCDD	559			
Total HpCDD	4980			
Total TCDF	55.2			
Total PeCDF	48.4		49.0	
Total HxCDF	215		216	
Total HpCDF	1460			

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C-2,3,7,8-TCDD	97.7	40 - 135	
	13C-1,2,3,7,8-PeCDD	111	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	108	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	98.7	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	103	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	119	40 - 135	
	13C-OCDD	116	40 - 135	
	13C-2,3,7,8-TCDF	97.0	40 - 135	
	13C-1,2,3,7,8-PeCDF	115	40 - 135	
	13C-2,3,4,7,8-PeCDF	118	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	96.5	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	91.6	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	92.3	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	96.9	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	90.1	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	109	40 - 135	
	13C-OCDF	96.2	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	85.0	40 - 135	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin	46.7

DL - Sample specifc estimated detection limit
EMPC - Estimated maximum possible concentration

LCL-UCL- Lower control limit - upper control limit
The results are reported in dry weight. The sample size is reported in wet weight.
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: P-11A_2-4 (20151117)

EPA Method 8290

Client Data
Name: ARCADIS
Project: B0039321.0000.00001
Date Collected: 17-Nov-2015 11:25

Sample Data
Matrix: Soil
Sample Size: 12.8 g
% Solids: 78.4

Laboratory Data
Lab Sample: 1501148-08 Date Received: 20-Nov-2015 9:25
QC Batch: B5K0138 Date Extracted: 30-Nov-2015 9:58
Date Analyzed : 07-Dec-15 14:15 Column: ZB-5MS Analyst: WJL

Analyte	Conc. (pg/g)	DL	EMPC	Qualifiers
2,3,7,8-TCDD	ND	0.118		
1,2,3,7,8-PeCDD	ND		0.291	
1,2,3,4,7,8-HxCDD	0.636			J
1,2,3,6,7,8-HxCDD	1.07			J
1,2,3,7,8,9-HxCDD	0.936			J
1,2,3,4,6,7,8-HpCDD	217			
OCDD	36400			E
2,3,7,8-TCDF	ND	0.0881		
1,2,3,7,8-PeCDF	ND	0.0763		
2,3,4,7,8-PeCDF	ND	0.0596		
1,2,3,4,7,8-HxCDF	0.163			J
1,2,3,6,7,8-HxCDF	ND	0.112		
2,3,4,6,7,8-HxCDF	ND	0.119		
1,2,3,7,8,9-HxCDF	ND	0.156		
1,2,3,4,6,7,8-HpCDF	3.41			
1,2,3,4,7,8,9-HpCDF	0.237			J
OCDF	22.4			

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C-2,3,7,8-TCDD	86.6	40 - 135	
	13C-1,2,3,7,8-PeCDD	94.0	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	89.2	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	88.9	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	88.0	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	89.2	40 - 135	
	13C-OCDD	102	40 - 135	
	13C-2,3,7,8-TCDF	89.3	40 - 135	
	13C-1,2,3,7,8-PeCDF	91.5	40 - 135	
	13C-2,3,4,7,8-PeCDF	98.3	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	82.1	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	78.9	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	79.3	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	85.4	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	80.2	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	91.8	40 - 135	
	13C-OCDF	81.8	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	82.5	40 - 135	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin	13.4

TOTALS			
Total TCDD	ND	0.118	
Total PeCDD	0.252		1.58
Total HxCDD	12.7		
Total HpCDD	483		
Total TCDF	ND	0.0881	
Total PeCDF	0.130		0.207
Total HxCDF	3.06		
Total HpCDF	16.3		

DL - Sample specifc estimated detection limit
EMPC - Estimated maximum possible concentration

LCL-UCL- Lower control limit - upper control limit
The results are reported in dry weight. The sample size is reported in wet weight.
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: P-11A_4-6 (20151117)

EPA Method 8290

Client Data
Name: ARCADIS
Project: B0039321.0000.00001
Date Collected: 17-Nov-2015 11:32

Sample Data
Matrix: Soil
Sample Size: 13.0 g
% Solids: 77.2

Laboratory Data
Lab Sample: 1501148-09 Date Received: 20-Nov-2015 9:25
QC Batch: B5K0138 Date Extracted: 30-Nov-2015 9:58
Date Analyzed : 07-Dec-15 15:03 Column: ZB-5MS Analyst: WJL

Analyte	Conc. (pg/g)	DL	EMPC	Qualifiers
2,3,7,8-TCDD	0.295			J
1,2,3,7,8-PeCDD	0.263			J
1,2,3,4,7,8-HxCDD	0.574			J
1,2,3,6,7,8-HxCDD	1.53			J
1,2,3,7,8,9-HxCDD	0.886			J
1,2,3,4,6,7,8-HpCDD	112			
OCDD	4720			
2,3,7,8-TCDF	ND	0.0781		
1,2,3,7,8-PeCDF	ND	0.0645		
2,3,4,7,8-PeCDF	ND		0.103	
1,2,3,4,7,8-HxCDF	0.379			J
1,2,3,6,7,8-HxCDF	ND	0.0837		
2,3,4,6,7,8-HxCDF	0.218			J
1,2,3,7,8,9-HxCDF	ND	0.122		
1,2,3,4,6,7,8-HpCDF	8.56			
1,2,3,4,7,8,9-HpCDF	0.680			J
OCDF	55.8			
TOTALS				
Total TCDD	2.62		2.90	
Total PeCDD	1.23		3.52	
Total HxCDD	21.0			
Total HpCDD	268			
Total TCDF	1.64		1.75	
Total PeCDF	ND		0.773	
Total HxCDF	7.20			
Total HpCDF	40.3			

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C-2,3,7,8-TCDD	95.1	40 - 135	
	13C-1,2,3,7,8-PeCDD	102	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	104	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	98.5	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	103	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	104	40 - 135	
	13C-OCDD	98.5	40 - 135	
	13C-2,3,7,8-TCDF	98.0	40 - 135	
	13C-1,2,3,7,8-PeCDF	106	40 - 135	
	13C-2,3,4,7,8-PeCDF	108	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	95.6	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	91.6	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	94.0	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	97.2	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	90.4	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	108	40 - 135	
	13C-OCDF	88.6	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	83.9	40 - 135	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin	3.56

DL - Sample specifc estimated detection limit
EMPC - Estimated maximum possible concentration

LCL-UCL- Lower control limit - upper control limit
The results are reported in dry weight. The sample size is reported in wet weight.
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: P-11A_6-8 (20151117)

EPA Method 8290

Client Data
Name: ARCADIS
Project: B0039321.0000.00001
Date Collected: 17-Nov-2015 11:36

Sample Data
Matrix: Soil
Sample Size: 10.4 g
% Solids: 96.4

Laboratory Data
Lab Sample: 1501148-10 Date Received: 20-Nov-2015 9:25
QC Batch: B5K0138 Date Extracted: 30-Nov-2015 9:58
Date Analyzed : 07-Dec-15 15:51 Column: ZB-5MS Analyst: WJL

Analyte	Conc. (pg/g)	DL	EMPC	Qualifiers
2,3,7,8-TCDD	ND	0.100		
1,2,3,7,8-PeCDD	0.213			J
1,2,3,4,7,8-HxCDD	ND	0.199		
1,2,3,6,7,8-HxCDD	0.571			J
1,2,3,7,8,9-HxCDD	0.478			J
1,2,3,4,6,7,8-HpCDD	22.4			
OCDD	320			
2,3,7,8-TCDF	ND	0.0857		
1,2,3,7,8-PeCDF	ND	0.0600		
2,3,4,7,8-PeCDF	ND	0.0611		
1,2,3,4,7,8-HxCDF	ND	0.0870		
1,2,3,6,7,8-HxCDF	ND	0.0885		
2,3,4,6,7,8-HxCDF	ND	0.0947		
1,2,3,7,8,9-HxCDF	ND	0.139		
1,2,3,4,6,7,8-HpCDF	2.14			J
1,2,3,4,7,8,9-HpCDF	0.173			J
OCDF	13.9			
TOTALS				
Total TCDD	3.05		3.42	
Total PeCDD	18.9		20.5	
Total HxCDD	21.0			
Total HpCDD	52.9			
Total TCDF	ND	0.0857		
Total PeCDF	0.136			
Total HxCDF	1.71			
Total HpCDF	10.3			

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C-2,3,7,8-TCDD	79.2	40 - 135	
	13C-1,2,3,7,8-PeCDD	82.9	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	90.0	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	84.4	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	86.1	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	87.6	40 - 135	
	13C-OCDD	76.4	40 - 135	
	13C-2,3,7,8-TCDF	81.5	40 - 135	
	13C-1,2,3,7,8-PeCDF	86.1	40 - 135	
	13C-2,3,4,7,8-PeCDF	88.9	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	80.0	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	78.4	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	78.1	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	79.8	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	76.1	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	87.8	40 - 135	
	13C-OCDF	73.1	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	82.0	40 - 135	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin	0.665

DL - Sample specifc estimated detection limit
EMPC - Estimated maximum possible concentration

LCL-UCL- Lower control limit - upper control limit
The results are reported in dry weight. The sample size is reported in wet weight.
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: P-11A_8-10 (20151117)

EPA Method 8290

Client Data
Name: ARCADIS
Project: B0039321.0000.00001
Date Collected: 17-Nov-2015 11:45

Sample Data
Matrix: Soil
Sample Size: 12.4 g
% Solids: 80.7

Laboratory Data
Lab Sample: 1501148-11 Date Received: 20-Nov-2015 9:25
QC Batch: B5K0138 Date Extracted: 30-Nov-2015 9:58
Date Analyzed : 07-Dec-15 16:39 Column: ZB-5MS Analyst: WJL

Analyte	Conc. (pg/g)	DL	EMPC	Qualifiers
2,3,7,8-TCDD	ND		0.210	
1,2,3,7,8-PeCDD	ND		0.113	
1,2,3,4,7,8-HxCDD	ND	0.169		
1,2,3,6,7,8-HxCDD	ND	0.171		
1,2,3,7,8,9-HxCDD	ND	0.194		
1,2,3,4,6,7,8-HpCDD	12.7			
OCDD	262			
2,3,7,8-TCDF	ND	0.0795		
1,2,3,7,8-PeCDF	ND	0.0545		
2,3,4,7,8-PeCDF	ND	0.0597		
1,2,3,4,7,8-HxCDF	ND	0.0725		
1,2,3,6,7,8-HxCDF	ND	0.0752		
2,3,4,6,7,8-HxCDF	ND	0.0760		
1,2,3,7,8,9-HxCDF	ND	0.113		
1,2,3,4,6,7,8-HpCDF	1.05			J
1,2,3,4,7,8,9-HpCDF	ND	0.145		
OCDF	6.50			
TOTALS				
Total TCDD	1.55		2.53	
Total PeCDD	4.25		5.86	
Total HxCDD	6.27			
Total HpCDD	31.5			
Total TCDF	ND	0.0795		
Total PeCDF	ND	0.0597		
Total HxCDF	0.611		0.788	
Total HpCDF	4.58			

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C-2,3,7,8-TCDD	88.8	40 - 135	
	13C-1,2,3,7,8-PeCDD	93.9	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	94.3	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	90.0	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	90.9	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	93.1	40 - 135	
	13C-OCDD	76.6	40 - 135	
	13C-2,3,7,8-TCDF	92.0	40 - 135	
	13C-1,2,3,7,8-PeCDF	100	40 - 135	
	13C-2,3,4,7,8-PeCDF	102	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	87.7	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	83.5	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	86.0	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	87.6	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	82.5	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	96.2	40 - 135	
	13C-OCDF	77.6	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	82.8	40 - 135	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin	0.218

DL - Sample specifc estimated detection limit
EMPC - Estimated maximum possible concentration

LCL-UCL- Lower control limit - upper control limit
The results are reported in dry weight. The sample size is reported in wet weight.
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: Matrix Spike **EPA Method 8290**

Source Client ID:	P-11A_8-10 (20151117)	QC Batch:	B5K0138	Lab Sample:	B5K0138-MS1/B5K0138-MSD1
Source LabNumber:	1501148-11	Date Extracted:	30-Nov-2015 9:58	Date Analyzed:	06-Dec-15 07:16 Column: ZB-5MS Analyst: WJL
Matrix:	Solid				06-Dec-15 08:04 Column: ZB-5MS Analyst: WJL
Sample Size:	12.4/12.4 g				

Analyte	Spike-MS (pg/g)	MS %R	MS Qualifiers	Spike-MSD (pg/g)	MSD %R	RPD	MSD Qualifiers
2,3,7,8-TCDD	20.0	87.8		20.0	88.0	0.228	
1,2,3,7,8-PeCDD	100	91.3		100	91.3	0	
1,2,3,4,7,8-HxCDD	100	92.1		100	92.6	0.541	
1,2,3,6,7,8-HxCDD	100	92.7		100	89.8	3.18	
1,2,3,7,8,9-HxCDD	100	91.6		100	91.0	0.657	
1,2,3,4,6,7,8-HpCDD	100	87.3		100	84.4	3.38	
OCDD	200	**43.0**	H	200	**56.9**	**27.8**	H
2,3,7,8-TCDF	20.0	83.7		20.0	84.7	1.19	
1,2,3,7,8-PeCDF	100	100		100	101	0.995	
2,3,4,7,8-PeCDF	100	98.5		100	96.8	1.74	
1,2,3,4,7,8-HxCDF	100	91.5		100	88.8	3.00	
1,2,3,6,7,8-HxCDF	100	95.1		100	92.9	2.34	
2,3,4,6,7,8-HxCDF	100	90.6		100	89.1	1.67	
1,2,3,7,8,9-HxCDF	100	93.0		100	93.9	0.963	
1,2,3,4,6,7,8-HpCDF	100	92.3		100	91.7	0.652	
1,2,3,4,7,8,9-HpCDF	100	90.6		100	89.8	0.887	
OCDF	200	93.3		200	92.2	1.19	

	Labeled Standard	MS %R	MS Qualifiers	MSD %R	MSD Qualifiers
IS	13C-2,3,7,8-TCDD	93.3		91.3	
	13C-1,2,3,7,8-PeCDD	110		107	
	13C-1,2,3,4,7,8-HxCDD	112		108	
	13C-1,2,3,6,7,8-HxCDD	98.6		98.7	
	13C-1,2,3,7,8,9-HxCDD	107		103	
	13C-1,2,3,4,6,7,8-HpCDD	105		102	
	13C-OCDD	88.9		85.3	
	13C-2,3,7,8-TCDF	94.7		92.7	
	13C-1,2,3,7,8-PeCDF	115		116	
	13C-2,3,4,7,8-PeCDF	123		122	
	13C-1,2,3,4,7,8-HxCDF	96.2		91.6	
	13C-1,2,3,6,7,8-HxCDF	88.1		84.9	
	13C-2,3,4,6,7,8-HxCDF	89.2		91.4	
	13C-1,2,3,7,8,9-HxCDF	95.5		90.3	
	13C-1,2,3,4,6,7,8-HpCDF	85.4		80.2	
	13C-1,2,3,4,7,8,9-HpCDF	102		95.8	
	13C-OCDF	82.5		80.1	
CRS	37Cl-2,3,7,8-TCDD	87.3		81.7	

Sample ID: DUP-01 (20151117)

EPA Method 8290

Client Data
Name: ARCADIS
Project: B0039321.0000.00001
Date Collected: 17-Nov-2015 0:00

Sample Data
Matrix: Soil
Sample Size: 12.4 g
% Solids: 80.3

Laboratory Data
Lab Sample: 1501148-12 Date Received: 20-Nov-2015 9:25
QC Batch: B5K0138 Date Extracted: 30-Nov-2015 9:58
Date Analyzed : 07-Dec-15 17:27 Column: ZB-5MS Analyst: WJL
10-Dec-15 11:11 Column: ZB-5MS Analyst: WJL

Analyte	Conc. (pg/g)	DL	EMPC	Qualifiers
2,3,7,8-TCDD	0.951			
1,2,3,7,8-PeCDD	6.25			
1,2,3,4,7,8-HxCDD	23.1			
1,2,3,6,7,8-HxCDD	99.0			
1,2,3,7,8,9-HxCDD	40.2			
1,2,3,4,6,7,8-HpCDD	6660			D
OCDD	68500			D
2,3,7,8-TCDF	1.21			
1,2,3,7,8-PeCDF	2.36			J
2,3,4,7,8-PeCDF	7.41			
1,2,3,4,7,8-HxCDF	33.8			
1,2,3,6,7,8-HxCDF	9.52			
2,3,4,6,7,8-HxCDF	13.2			
1,2,3,7,8,9-HxCDF	6.65			
1,2,3,4,6,7,8-HpCDF	605			
1,2,3,4,7,8,9-HpCDF	44.5			
OCDF	3770			
TOTALS				
Total TCDD	29.2		29.4	
Total PeCDD	82.5		85.4	
Total HxCDD	1440			
Total HpCDD	19300			
Total TCDF	20.6			
Total PeCDF	71.5		72.4	
Total HxCDF	538			
Total HpCDF	2980			

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C-2,3,7,8-TCDD	82.2	40 - 135	
	13C-1,2,3,7,8-PeCDD	85.8	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	88.7	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	80.9	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	82.1	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	91.7	40 - 135	D
	13C-OCDD	89.2	40 - 135	D
	13C-2,3,7,8-TCDF	82.5	40 - 135	
	13C-1,2,3,7,8-PeCDF	86.7	40 - 135	
	13C-2,3,4,7,8-PeCDF	89.7	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	77.9	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	73.2	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	74.9	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	77.4	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	75.2	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	92.3	40 - 135	
	13C-OCDF	84.5	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	74.6	40 - 135	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin	127

DL - Sample specifc estimated detection limit
EMPC - Estimated maximum possible concentration

LCL-UCL- Lower control limit - upper control limit
The results are reported in dry weight. The sample size is reported in wet weight.
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: OW-211B_0-2 (20151119)

EPA Method 8290

Client Data
Name: ARCADIS
Project: B0039321.0000.00001
Date Collected: 19-Nov-2015 9:05

Sample Data
Matrix: Soil
Sample Size: 12.7 g
% Solids: 78.9

Laboratory Data
Lab Sample: 1501148-13 Date Received: 20-Nov-2015 9:25
QC Batch: B5K0138 Date Extracted: 30-Nov-2015 9:58
Date Analyzed : 07-Dec-15 18:15 Column: ZB-5MS Analyst: WJL
09-Dec-15 16:47 Column: DB-225 Analyst: DB

Analyte	Conc. (pg/g)	DL	EMPC	Qualifiers
2,3,7,8-TCDD	1.32			
1,2,3,7,8-PeCDD	12.2			
1,2,3,4,7,8-HxCDD	29.5			
1,2,3,6,7,8-HxCDD	101			
1,2,3,7,8,9-HxCDD	57.3			
1,2,3,4,6,7,8-HpCDD	3680			E
OCDD	33500			E
2,3,7,8-TCDF	1.12			
1,2,3,7,8-PeCDF	2.08			J
2,3,4,7,8-PeCDF	5.88			
1,2,3,4,7,8-HxCDF	27.6			
1,2,3,6,7,8-HxCDF	15.5			
2,3,4,6,7,8-HxCDF	26.2			
1,2,3,7,8,9-HxCDF	5.07			
1,2,3,4,6,7,8-HpCDF	735			
1,2,3,4,7,8,9-HpCDF	45.6			
OCDF	3040			
TOTALS				
Total TCDD	46.0		46.2	
Total PeCDD	107			
Total HxCDD	851			
Total HpCDD	7530			
Total TCDF	26.6			
Total PeCDF	133			
Total HxCDF	713			
Total HpCDF	2860			

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C-2,3,7,8-TCDD	89.9	40 - 135	
	13C-1,2,3,7,8-PeCDD	98.6	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	96.6	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	92.1	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	92.7	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	113	40 - 135	
	13C-OCDD	106	40 - 135	
	13C-2,3,7,8-TCDF	90.2	40 - 135	
	13C-1,2,3,7,8-PeCDF	100	40 - 135	
	13C-2,3,4,7,8-PeCDF	104	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	88.3	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	81.8	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	84.5	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	87.6	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	86.7	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	96.2	40 - 135	
	13C-OCDF	92.0	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	84.8	40 - 135	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin	97.2

DL - Sample specifc estimated detection limit
EMPC - Estimated maximum possible concentration

LCL-UCL- Lower control limit - upper control limit
The results are reported in dry weight. The sample size is reported in wet weight.
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: OW-211B_2-4 (20151119)

EPA Method 8290

Client Data
Name: ARCADIS
Project: B0039321.0000.00001
Date Collected: 19-Nov-2015 9:10

Sample Data
Matrix: Soil
Sample Size: 12.5 g
% Solids: 81.1

Laboratory Data
Lab Sample: 1501148-14 Date Received: 20-Nov-2015 9:25
QC Batch: B5K0138 Date Extracted: 30-Nov-2015 9:58
Date Analyzed : 07-Dec-15 19:03 Column: ZB-5MS Analyst: WJL

Analyte	Conc. (pg/g)	DL	EMPC	Qualifiers
2,3,7,8-TCDD	0.346			J
1,2,3,7,8-PeCDD	0.740			J
1,2,3,4,7,8-HxCDD	1.80			J
1,2,3,6,7,8-HxCDD	3.14			
1,2,3,7,8,9-HxCDD	3.39			
1,2,3,4,6,7,8-HpCDD	380			
OCDD	39400			E
2,3,7,8-TCDF	ND	0.0814		
1,2,3,7,8-PeCDF	ND	0.0598		
2,3,4,7,8-PeCDF	ND		0.0940	
1,2,3,4,7,8-HxCDF	0.351			J
1,2,3,6,7,8-HxCDF	ND		0.178	
2,3,4,6,7,8-HxCDF	0.307			J
1,2,3,7,8,9-HxCDF	ND	0.195		
1,2,3,4,6,7,8-HpCDF	8.61			
1,2,3,4,7,8,9-HpCDF	0.678			J
OCDF	40.0			
TOTALS				
Total TCDD	1.35		1.66	
Total PeCDD	4.00		5.28	
Total HxCDD	31.7			
Total HpCDD	744			
Total TCDF	ND		0.437	
Total PeCDF	0.858		1.44	
Total HxCDF	7.62		7.80	
Total HpCDF	30.9			

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C-2,3,7,8-TCDD	96.0	40 - 135	
	13C-1,2,3,7,8-PeCDD	103	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	105	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	96.6	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	96.8	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	102	40 - 135	
	13C-OCDD	112	40 - 135	
	13C-2,3,7,8-TCDF	95.0	40 - 135	
	13C-1,2,3,7,8-PeCDF	107	40 - 135	
	13C-2,3,4,7,8-PeCDF	110	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	96.3	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	94.1	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	93.1	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	94.3	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	89.7	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	97.3	40 - 135	
	13C-OCDF	88.4	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	86.2	40 - 135	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin	17.7

DL - Sample specifc estimated detection limit
EMPC - Estimated maximum possible concentration

LCL-UCL- Lower control limit - upper control limit
The results are reported in dry weight. The sample size is reported in wet weight.
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: OW-211B_4-6 (20151119)

EPA Method 8290

Client Data
Name: ARCADIS
Project: B0039321.0000.00001
Date Collected: 19-Nov-2015 9:20

Sample Data
Matrix: Soil
Sample Size: 12.8 g
% Solids: 78.6

Laboratory Data
Lab Sample: 1501148-15 Date Received: 20-Nov-2015 9:25
QC Batch: B5K0138 Date Extracted: 30-Nov-2015 9:58
Date Analyzed : 07-Dec-15 19:51 Column: ZB-5MS Analyst: WJL

Analyte	Conc. (pg/g)	DL	EMPC	Qualifiers
2,3,7,8-TCDD	0.279			J
1,2,3,7,8-PeCDD	ND		0.188	
1,2,3,4,7,8-HxCDD	0.732			J
1,2,3,6,7,8-HxCDD	0.971			J
1,2,3,7,8,9-HxCDD	1.10			J
1,2,3,4,6,7,8-HpCDD	121			
OCDD	10100			E
2,3,7,8-TCDF	ND	0.0700		
1,2,3,7,8-PeCDF	ND	0.0647		
2,3,4,7,8-PeCDF	ND	0.0627		
1,2,3,4,7,8-HxCDF	ND	0.0853		
1,2,3,6,7,8-HxCDF	ND	0.0861		
2,3,4,6,7,8-HxCDF	0.126			J
1,2,3,7,8,9-HxCDF	ND	0.127		
1,2,3,4,6,7,8-HpCDF	2.60			
1,2,3,4,7,8,9-HpCDF	ND	0.138		
OCDF	11.4			
TOTALS				
Total TCDD	1.95		2.41	
Total PeCDD	8.40		8.74	
Total HxCDD	23.3		23.6	
Total HpCDD	243			
Total TCDF	0.287			
Total PeCDF	0.254		0.343	
Total HxCDF	2.43			
Total HpCDF	9.21			

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C-2,3,7,8-TCDD	91.5	40 - 135	
	13C-1,2,3,7,8-PeCDD	97.7	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	100	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	90.5	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	95.3	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	95.5	40 - 135	
	13C-OCDD	98.4	40 - 135	
	13C-2,3,7,8-TCDF	93.4	40 - 135	
	13C-1,2,3,7,8-PeCDF	102	40 - 135	
	13C-2,3,4,7,8-PeCDF	102	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	89.9	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	85.3	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	88.0	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	89.2	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	83.8	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	93.3	40 - 135	
	13C-OCDF	81.1	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	78.9	40 - 135	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin	4.84

DL - Sample specifc estimated detection limit
EMPC - Estimated maximum possible concentration

LCL-UCL- Lower control limit - upper control limit
The results are reported in dry weight. The sample size is reported in wet weight.
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: OW-211B_6-8 (20151119)

EPA Method 8290

Client Data
Name: ARCADIS
Project: B0039321.0000.00001
Date Collected: 19-Nov-2015 9:28

Sample Data
Matrix: Soil
Sample Size: 12.7 g
% Solids: 78.7

Laboratory Data
Lab Sample: 1501148-16 Date Received: 20-Nov-2015 9:25
QC Batch: B5K0138 Date Extracted: 30-Nov-2015 9:58
Date Analyzed : 07-Dec-15 20:39 Column: ZB-5MS Analyst: WJL

Analyte	Conc. (pg/g)	DL	EMPC	Qualifiers
2,3,7,8-TCDD	ND		0.327	
1,2,3,7,8-PeCDD	0.118			J
1,2,3,4,7,8-HxCDD	ND	0.201		
1,2,3,6,7,8-HxCDD	ND	0.197		
1,2,3,7,8,9-HxCDD	ND	0.231		
1,2,3,4,6,7,8-HpCDD	11.1			
OCDD	618			
2,3,7,8-TCDF	ND	0.0623		
1,2,3,7,8-PeCDF	ND	0.0537		
2,3,4,7,8-PeCDF	ND	0.0549		
1,2,3,4,7,8-HxCDF	ND	0.132		
1,2,3,6,7,8-HxCDF	ND	0.136		
2,3,4,6,7,8-HxCDF	ND	0.148		
1,2,3,7,8,9-HxCDF	ND	0.209		
1,2,3,4,6,7,8-HpCDF	0.452			J
1,2,3,4,7,8,9-HpCDF	ND	0.138		
OCDF	1.78			J
TOTALS				
Total TCDD	5.96		6.59	
Total PeCDD	20.0		20.5	
Total HxCDD	18.2			
Total HpCDD	23.3			
Total TCDF	ND	0.0623		
Total PeCDF	ND		0.0650	
Total HxCDF	0.455			
Total HpCDF	1.56			

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C-2,3,7,8-TCDD	88.1	40 - 135	
	13C-1,2,3,7,8-PeCDD	92.2	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	96.7	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	91.8	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	93.4	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	96.6	40 - 135	
	13C-OCDD	81.6	40 - 135	
	13C-2,3,7,8-TCDF	89.0	40 - 135	
	13C-1,2,3,7,8-PeCDF	97.0	40 - 135	
	13C-2,3,4,7,8-PeCDF	97.9	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	87.6	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	87.6	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	87.1	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	89.2	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	84.1	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	94.1	40 - 135	
	13C-OCDF	74.7	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	90.6	40 - 135	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin	0.419

DL - Sample specifc estimated detection limit
EMPC - Estimated maximum possible concentration

LCL-UCL- Lower control limit - upper control limit
The results are reported in dry weight. The sample size is reported in wet weight.
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: OW-211B_8-10 (20151119)

EPA Method 8290

Client Data
Name: ARCADIS
Project: B0039321.0000.00001
Date Collected: 19-Nov-2015 9:32

Sample Data
Matrix: Soil
Sample Size: 12.7 g
% Solids: 79.0

Laboratory Data
Lab Sample: 1501148-17 Date Received: 20-Nov-2015 9:25
QC Batch: B5K0138 Date Extracted: 30-Nov-2015 9:58
Date Analyzed : 07-Dec-15 21:26 Column: ZB-5MS Analyst: WJL

Analyte	Conc. (pg/g)	DL	EMPC	Qualifiers
2,3,7,8-TCDD	ND		0.248	
1,2,3,7,8-PeCDD	ND		0.155	
1,2,3,4,7,8-HxCDD	ND	0.244		
1,2,3,6,7,8-HxCDD	0.363			J
1,2,3,7,8,9-HxCDD	ND	0.280		
1,2,3,4,6,7,8-HpCDD	22.7			
OCDD	1930			
2,3,7,8-TCDF	ND	0.0750		
1,2,3,7,8-PeCDF	ND	0.0601		
2,3,4,7,8-PeCDF	ND	0.0599		
1,2,3,4,7,8-HxCDF	ND	0.0939		
1,2,3,6,7,8-HxCDF	ND	0.0978		
2,3,4,6,7,8-HxCDF	ND	0.0989		
1,2,3,7,8,9-HxCDF	ND	0.156		
1,2,3,4,6,7,8-HpCDF	1.14			J
1,2,3,4,7,8,9-HpCDF	ND	0.168		
OCDF	4.58			J
TOTALS				
Total TCDD	0.815		1.28	
Total PeCDD	5.64		6.81	
Total HxCDD	11.1			
Total HpCDD	48.9			
Total TCDF	0.106			
Total PeCDF	0.136			
Total HxCDF	1.08			
Total HpCDF	3.94			

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C-2,3,7,8-TCDD	72.6	40 - 135	
	13C-1,2,3,7,8-PeCDD	78.5	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	80.7	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	75.7	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	77.2	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	79.0	40 - 135	
	13C-OCDD	70.1	40 - 135	
	13C-2,3,7,8-TCDF	75.6	40 - 135	
	13C-1,2,3,7,8-PeCDF	81.8	40 - 135	
	13C-2,3,4,7,8-PeCDF	82.9	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	73.6	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	72.3	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	72.8	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	70.7	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	69.1	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	74.9	40 - 135	
	13C-OCDF	62.7	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	65.5	40 - 135	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin	0.855

DL - Sample specifc estimated detection limit
EMPC - Estimated maximum possible concentration

LCL-UCL- Lower control limit - upper control limit
The results are reported in dry weight. The sample size is reported in wet weight.
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: DUP-02(20151119)

EPA Method 8290

Client Data
Name: ARCADIS
Project: B0039321.0000.00001
Date Collected: 19-Nov-2015 0:00

Sample Data
Matrix: Soil
Sample Size: 12.5 g
% Solids: 80.1

Laboratory Data
Lab Sample: 1501148-18 Date Received: 20-Nov-2015 9:25
QC Batch: B5K0138 Date Extracted: 30-Nov-2015 9:58
Date Analyzed : 07-Dec-15 22:14 Column: ZB-5MS Analyst: WJL

Analyte	Conc. (pg/g)	DL	EMPC	Qualifiers
2,3,7,8-TCDD	ND		0.155	
1,2,3,7,8-PeCDD	0.212			J
1,2,3,4,7,8-HxCDD	0.666			J
1,2,3,6,7,8-HxCDD	1.20			J
1,2,3,7,8,9-HxCDD	0.985			J
1,2,3,4,6,7,8-HpCDD	108			
OCDD	7480			E
2,3,7,8-TCDF	ND	0.0659		
1,2,3,7,8-PeCDF	ND	0.0782		
2,3,4,7,8-PeCDF	ND	0.0827		
1,2,3,4,7,8-HxCDF	ND		0.156	
1,2,3,6,7,8-HxCDF	ND	0.100		
2,3,4,6,7,8-HxCDF	0.193			J
1,2,3,7,8,9-HxCDF	ND	0.152		
1,2,3,4,6,7,8-HpCDF	4.51			
1,2,3,4,7,8,9-HpCDF	ND	0.272		
OCDF	20.6			
TOTALS				
Total TCDD	1.65		1.80	
Total PeCDD	4.10		4.86	
Total HxCDD	16.1			
Total HpCDD	212			
Total TCDF	0.138		0.368	
Total PeCDF	0.448		0.619	
Total HxCDF	3.90		4.42	
Total HpCDF	16.4			

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C-2,3,7,8-TCDD	84.4	40 - 135	
	13C-1,2,3,7,8-PeCDD	88.2	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	90.8	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	86.1	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	88.1	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	87.3	40 - 135	
	13C-OCDD	85.6	40 - 135	
	13C-2,3,7,8-TCDF	87.9	40 - 135	
	13C-1,2,3,7,8-PeCDF	96.6	40 - 135	
	13C-2,3,4,7,8-PeCDF	98.7	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	84.2	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	79.2	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	82.8	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	83.1	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	77.3	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	87.9	40 - 135	
	13C-OCDF	71.7	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	82.3	40 - 135	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin	3.89

DL - Sample specifc estimated detection limit
EMPC - Estimated maximum possible concentration

LCL-UCL- Lower control limit - upper control limit
The results are reported in dry weight. The sample size is reported in wet weight.
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: OW-211B_26-28 (20151119)

EPA Method 8290

Client Data
Name: ARCADIS
Project: B0039321.0000.00001
Date Collected: 19-Nov-2015 10:35

Sample Data
Matrix: Soil
Sample Size: 12.0 g
% Solids: 83.9

Laboratory Data
Lab Sample: 1501148-19 Date Received: 20-Nov-2015 9:25
QC Batch: B5K0138 Date Extracted: 30-Nov-2015 9:58
Date Analyzed : 07-Dec-15 23:02 Column: ZB-5MS Analyst: WJL

Analyte	Conc. (pg/g)	DL	EMPC	Qualifiers
2,3,7,8-TCDD	ND	0.0842		
1,2,3,7,8-PeCDD	ND	0.117		
1,2,3,4,7,8-HxCDD	ND	0.190		
1,2,3,6,7,8-HxCDD	ND	0.198		
1,2,3,7,8,9-HxCDD	ND	0.227		
1,2,3,4,6,7,8-HpCDD	1.71			J
OCDD	53.3			
2,3,7,8-TCDF	ND	0.0591		
1,2,3,7,8-PeCDF	ND	0.0515		
2,3,4,7,8-PeCDF	ND	0.0443		
1,2,3,4,7,8-HxCDF	ND	0.0725		
1,2,3,6,7,8-HxCDF	ND	0.0711		
2,3,4,6,7,8-HxCDF	ND	0.0740		
1,2,3,7,8,9-HxCDF	ND	0.103		
1,2,3,4,6,7,8-HpCDF	ND	0.217		
1,2,3,4,7,8,9-HpCDF	ND	0.210		
OCDF	0.319			J
TOTALS				
Total TCDD	1.33			
Total PeCDD	ND	0.117		
Total HxCDD	0.889			
Total HpCDD	4.45			
Total TCDF	ND	0.0591		
Total PeCDF	ND	0.0515		
Total HxCDF	ND	0.103		
Total HpCDF	0.215			

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C-2,3,7,8-TCDD	77.3	40 - 135	
	13C-1,2,3,7,8-PeCDD	80.2	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	85.8	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	80.1	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	81.6	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	84.1	40 - 135	
	13C-OCDD	67.4	40 - 135	
	13C-2,3,7,8-TCDF	80.1	40 - 135	
	13C-1,2,3,7,8-PeCDF	83.8	40 - 135	
	13C-2,3,4,7,8-PeCDF	86.9	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	76.9	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	75.0	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	76.9	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	78.0	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	72.2	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	82.2	40 - 135	
	13C-OCDF	66.0	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	84.4	40 - 135	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin	0.0332

DL - Sample specifc estimated detection limit
EMPC - Estimated maximum possible concentration

LCL-UCL- Lower control limit - upper control limit
The results are reported in dry weight. The sample size is reported in wet weight.
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: Method Blank

EPA Method 8290

Matrix:	Aqueous	QC Batch:	B5L0014	Lab Sample:	B5L0014-BLK1
Sample Size:	1.00 L	Date Extracted:	03-Dec-2015 8:24	Date Analyzed :	09-Dec-15 13:51 Column: ZB-5MS Analyst: WJL

Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers
2,3,7,8-TCDD	ND	1.47		
1,2,3,7,8-PeCDD	ND	0.826		
1,2,3,4,7,8-HxCDD	ND	0.882		
1,2,3,6,7,8-HxCDD	ND	0.881		
1,2,3,7,8,9-HxCDD	ND	0.982		
1,2,3,4,6,7,8-HpCDD	ND	1.08		
OCDD	ND	1.21		
2,3,7,8-TCDF	ND	1.24		
1,2,3,7,8-PeCDF	ND	0.556		
2,3,4,7,8-PeCDF	ND	0.468		
1,2,3,4,7,8-HxCDF	ND	0.550		
1,2,3,6,7,8-HxCDF	ND	0.577		
2,3,4,6,7,8-HxCDF	ND	0.587		
1,2,3,7,8,9-HxCDF	ND	0.822		
1,2,3,4,6,7,8-HpCDF	ND	0.670		
1,2,3,4,7,8,9-HpCDF	ND	0.600		
OCDF	ND	1.64		
TOTALS				
Total TCDD	ND	1.47		
Total PeCDD	ND	0.826		
Total HxCDD	ND	0.982		
Total HpCDD	ND	1.08		
Total TCDF	ND	1.24		
Total PeCDF	ND	0.556		
Total HxCDF	ND	0.822		
Total HpCDF	ND	0.670		

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C-2,3,7,8-TCDD	95.1	40 - 135	
	13C-1,2,3,7,8-PeCDD	104	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	102	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	93.5	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	95.0	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	102	40 - 135	
	13C-OCDD	76.7	40 - 135	
	13C-2,3,7,8-TCDF	97.8	40 - 135	
	13C-1,2,3,7,8-PeCDF	108	40 - 135	
	13C-2,3,4,7,8-PeCDF	113	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	89.8	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	86.9	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	93.5	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	93.7	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	87.9	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	103	40 - 135	
	13C-OCDF	79.0	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	89.3	40 - 135	
	Toxic Equivalent Quotient (TEQ) Data			
	TEQMinWHO2005Dioxin	0.00		

DL - Sample specifc estimated detection limit

EMPC - Estimated maximum possible concentration

LCL-UCL- Lower control limit - upper control limit

Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: OPR **EPA Method 8290**

Matrix:	Aqueous	QC Batch:	B5L0014	Lab Sample:	B5L0014-BS1
Sample Size:	1.00 L	Date Extracted:	03-Dec-2015 8:24	Date Analyzed:	09-Dec-15 11:27 Column: ZB-5MS Analyst: WJL

Analyte	Amt Found (pg/L)	Spike Amt	%R	Limits		Labeled Standard	%R	LCL-UCL
2,3,7,8-TCDD	183	200	91.3	70 - 130	IS	13C-2,3,7,8-TCDD	89.7	40 - 135
1,2,3,7,8-PeCDD	956	1000	95.6	70 - 130		13C-1,2,3,7,8-PeCDD	102	40 - 135
1,2,3,4,7,8-HxCDD	994	1000	99.4	70 - 130		13C-1,2,3,4,7,8-HxCDD	96.6	40 - 135
1,2,3,6,7,8-HxCDD	949	1000	94.9	70 - 130		13C-1,2,3,6,7,8-HxCDD	95.8	40 - 135
1,2,3,7,8,9-HxCDD	995	1000	99.5	70 - 130		13C-1,2,3,7,8,9-HxCDD	93.3	40 - 135
1,2,3,4,6,7,8-HpCDD	936	1000	93.6	70 - 130		13C-1,2,3,4,6,7,8-HpCDD	107	40 - 135
OCDD	2000	2000	100	70 - 130		13C-OCDD	84.3	40 - 135
2,3,7,8-TCDF	187	200	93.3	70 - 130		13C-2,3,7,8-TCDF	91.5	40 - 135
1,2,3,7,8-PeCDF	1100	1000	110	70 - 130		13C-1,2,3,7,8-PeCDF	99.4	40 - 135
2,3,4,7,8-PeCDF	1050	1000	105	70 - 130		13C-2,3,4,7,8-PeCDF	107	40 - 135
1,2,3,4,7,8-HxCDF	992	1000	99.2	70 - 130		13C-1,2,3,4,7,8-HxCDF	86.5	40 - 135
1,2,3,6,7,8-HxCDF	1030	1000	103	70 - 130		13C-1,2,3,6,7,8-HxCDF	83.6	40 - 135
2,3,4,6,7,8-HxCDF	972	1000	97.2	70 - 130		13C-2,3,4,6,7,8-HxCDF	88.0	40 - 135
1,2,3,7,8,9-HxCDF	1010	1000	101	70 - 130		13C-1,2,3,7,8,9-HxCDF	91.6	40 - 135
1,2,3,4,6,7,8-HpCDF	968	1000	96.8	70 - 130		13C-1,2,3,4,6,7,8-HpCDF	90.7	40 - 135
1,2,3,4,7,8,9-HpCDF	966	1000	96.6	70 - 130		13C-1,2,3,4,7,8,9-HpCDF	111	40 - 135
OCDF	2030	2000	102	70 - 130		13C-OCDF	82.5	40 - 135
					CRS	37Cl-2,3,7,8-TCDD	87.0	40 - 135

LCL-UCL - Lower control limit - upper control limit

Sample ID: EB-01 (20151116)

EPA Method 8290

Client Data
Name: ARCADIS
Project: B0039321.0000.00001
Date Collected: 16-Nov-2015 15:00

Sample Data
Matrix: Aqueous
Sample Size: 0.886 L

Laboratory Data
Lab Sample: 1501148-20 Date Received: 20-Nov-2015 9:25
QC Batch: B5L0014 Date Extracted: 03-Dec-2015 8:24
Date Analyzed : 09-Dec-15 15:27 Column: ZB-5MS Analyst: WJL

Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers
2,3,7,8-TCDD	ND	1.61		
1,2,3,7,8-PeCDD	ND	1.11		
1,2,3,4,7,8-HxCDD	ND	0.977		
1,2,3,6,7,8-HxCDD	ND	0.995		
1,2,3,7,8,9-HxCDD	ND	1.14		
1,2,3,4,6,7,8-HpCDD	ND	1.09		
OCDD	ND		1.08	
2,3,7,8-TCDF	ND	1.31		
1,2,3,7,8-PeCDF	ND	0.556		
2,3,4,7,8-PeCDF	ND	0.508		
1,2,3,4,7,8-HxCDF	ND	0.568		
1,2,3,6,7,8-HxCDF	ND	0.556		
2,3,4,6,7,8-HxCDF	ND	0.568		
1,2,3,7,8,9-HxCDF	ND	0.871		
1,2,3,4,6,7,8-HpCDF	ND	0.645		
1,2,3,4,7,8,9-HpCDF	ND	0.569		
OCDF	ND	1.74		
TOTALS				
Total TCDD	ND	1.61		
Total PeCDD	ND	1.11		
Total HxCDD	ND	1.14		
Total HpCDD	ND	1.09		
Total TCDF	ND	1.31		
Total PeCDF	ND	0.556		
Total HxCDF	ND	0.871		
Total HpCDF	ND	0.645		

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C-2,3,7,8-TCDD	87.9	40 - 135	
	13C-1,2,3,7,8-PeCDD	95.9	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	97.4	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	91.1	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	92.7	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	101	40 - 135	
	13C-OCDD	79.3	40 - 135	
	13C-2,3,7,8-TCDF	92.8	40 - 135	
	13C-1,2,3,7,8-PeCDF	102	40 - 135	
	13C-2,3,4,7,8-PeCDF	106	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	85.1	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	82.5	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	86.0	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	88.9	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	82.8	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	104	40 - 135	
	13C-OCDF	77.7	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	88.6	40 - 135	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin	0.00

DL - Sample specifc estimated detection limit
EMPC - Estimated maximum possible concentration

LCL-UCL- Lower control limit - upper control limit
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: EB-02 (20151117)

EPA Method 8290

Client Data
Name: ARCADIS
Project: B0039321.0000.00001
Date Collected: 17-Nov-2015 12:30

Sample Data
Matrix: Aqueous
Sample Size: 0.931 L

Laboratory Data
Lab Sample: 1501148-21 Date Received: 20-Nov-2015 9:25
QC Batch: B5L0014 Date Extracted: 03-Dec-2015 8:24
Date Analyzed : 09-Dec-15 16:15 Column: ZB-5MS Analyst: WJL

Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers
2,3,7,8-TCDD	ND	1.29		
1,2,3,7,8-PeCDD	ND	0.820		
1,2,3,4,7,8-HxCDD	ND	0.882		
1,2,3,6,7,8-HxCDD	ND	0.865		
1,2,3,7,8,9-HxCDD	ND	0.998		
1,2,3,4,6,7,8-HpCDD	ND	0.950		
OCDD	ND	1.33		
2,3,7,8-TCDF	ND	1.14		
1,2,3,7,8-PeCDF	ND	0.476		
2,3,4,7,8-PeCDF	ND	0.456		
1,2,3,4,7,8-HxCDF	ND	0.556		
1,2,3,6,7,8-HxCDF	ND	0.565		
2,3,4,6,7,8-HxCDF	ND	0.535		
1,2,3,7,8,9-HxCDF	ND	0.839		
1,2,3,4,6,7,8-HpCDF	ND	0.555		
1,2,3,4,7,8,9-HpCDF	ND	0.573		
OCDF	ND	1.42		
TOTALS				
Total TCDD	ND	1.29		
Total PeCDD	ND	0.820		
Total HxCDD	ND	0.998		
Total HpCDD	ND	0.950		
Total TCDF	ND	1.14		
Total PeCDF	ND	0.476		
Total HxCDF	ND	0.839		
Total HpCDF	ND	0.573		

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C-2,3,7,8-TCDD	92.2	40 - 135	
	13C-1,2,3,7,8-PeCDD	101	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	95.6	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	88.9	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	90.9	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	99.4	40 - 135	
	13C-OCDD	77.7	40 - 135	
	13C-2,3,7,8-TCDF	94.5	40 - 135	
	13C-1,2,3,7,8-PeCDF	100	40 - 135	
	13C-2,3,4,7,8-PeCDF	106	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	84.4	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	82.7	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	87.8	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	88.7	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	84.2	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	98.1	40 - 135	
	13C-OCDF	77.3	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	86.8	40 - 135	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin	0.00

DL - Sample specifc estimated detection limit
EMPC - Estimated maximum possible concentration

LCL-UCL- Lower control limit - upper control limit
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: EB-03 (20151119)

EPA Method 8290

Client Data
Name: ARCADIS
Project: B0039321.0000.00001
Date Collected: 19-Nov-2015 13:30

Sample Data
Matrix: Aqueous
Sample Size: 0.904 L

Laboratory Data
Lab Sample: 1501148-22 Date Received: 20-Nov-2015 9:25
QC Batch: B5L0014 Date Extracted: 03-Dec-2015 8:24
Date Analyzed : 10-Dec-15 12:47 Column: ZB-5MS Analyst: WJL

Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers
2,3,7,8-TCDD	ND	0.996		
1,2,3,7,8-PeCDD	ND	0.815		
1,2,3,4,7,8-HxCDD	ND	1.14		
1,2,3,6,7,8-HxCDD	ND	1.18		
1,2,3,7,8,9-HxCDD	ND	1.34		
1,2,3,4,6,7,8-HpCDD	ND	1.60		
OCDD	8.98			J
2,3,7,8-TCDF	ND	0.828		
1,2,3,7,8-PeCDF	ND	0.580		
2,3,4,7,8-PeCDF	ND	0.502		
1,2,3,4,7,8-HxCDF	ND	0.632		
1,2,3,6,7,8-HxCDF	ND	0.641		
2,3,4,6,7,8-HxCDF	ND	0.623		
1,2,3,7,8,9-HxCDF	ND	0.953		
1,2,3,4,6,7,8-HpCDF	ND	0.828		
1,2,3,4,7,8,9-HpCDF	ND	0.797		
OCDF	ND	1.85		
TOTALS				
Total TCDD	ND	0.996		
Total PeCDD	ND	0.815		
Total HxCDD	ND	1.34		
Total HpCDD	ND	1.60		
Total TCDF	ND	0.828		
Total PeCDF	ND	0.580		
Total HxCDF	ND	0.953		
Total HpCDF	ND	0.828		

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C-2,3,7,8-TCDD	84.7	40 - 135	
	13C-1,2,3,7,8-PeCDD	91.2	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	85.6	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	77.2	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	81.6	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	83.2	40 - 135	
	13C-OCDD	67.7	40 - 135	
	13C-2,3,7,8-TCDF	89.3	40 - 135	
	13C-1,2,3,7,8-PeCDF	91.1	40 - 135	
	13C-2,3,4,7,8-PeCDF	97.2	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	74.8	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	70.6	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	78.1	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	78.2	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	68.5	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	76.9	40 - 135	
	13C-OCDF	65.3	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	87.4	40 - 135	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin	0.00269

DL - Sample specifc estimated detection limit
EMPC - Estimated maximum possible concentration
LCL-UCL- Lower control limit - upper control limit
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

DATA QUALIFIERS & ABBREVIATIONS

B	**This compound was also detected in the method blank.**
D	**Dilution**
E	**The associated compound concentration exceeded the calibration range of the instrument.**
H	**Recovery and/or RPD was outside laboratory acceptance limits.**
I	**Chemical Interference**
J	**The amount detected is below the Lower Calibration Limit of the instrument.**
*****	**See Cover Letter**
Conc.	**Concentration**
DL	**Sample-specific estimated detection limit**
MDL	**The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero in the matrix tested.**
EMPC	**Estimated Maximum Possible Concentration**
NA	**Not applicable**
RL	**Reporting Limit – concentrations that correspond to low calibration point**
ND	**Not Detected**
TEQ	**Toxic Equivalency**

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

CERTIFICATIONS

Accrediting Authority	Certificate Number
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2014022
Michigan Department of Natural Resources	9932
Nevada Division of Environmental Protection	CA004132015-1
New Jersey Department of Environmental Protection	CA003
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-003
Pennsylvania Department of Environmental Protection	012
South Carolina Department of Health	87002001
Tennessee Department of Environment & Conservation	TN02996
Texas Commission on Environmental Quality	T104704189-15-6
Virginia Department of General Services	7923
Washington Department of Ecology	C584
Wisconsin Department of Natural Resources	998036160

Vista

CHAIN OF CUSTODY

1 of 3

FOR LABORATORY USE ONLY
Laboratory Project ID: 1501148
Storage ID: WR-2
Storage Secured? Yes ☑ No ☐
Temp 2.4 °C

TAT: (Check One):
Standard: ☑ 21 Days
Rush (surcharge may apply):
○ 14 days ○ 7 days Specify:___

Project I.D.: B0039321.0000.00001 P.O.#_____ Sampler: Will Stephens (Name)

Invoice to: Name David Bessingpass Company ARCADIS Address 6602 Excelsior Rd City Baxter State MN Zip 56425 Ph# 1.218.829.4607 Fax#

Relinquished by: (Signature and Printed Name) Will Stephens Date: 11/19/15 Time: 1715 Received by: (Signature and Printed Name) Betty Benedict B Benedict Date: 11/20/15 Time: 0930

Relinquished by: (Signature and Printed Name) Date: Time: Received by: (Signature and Printed Name) Date: Time:

See "Sample Log-in Checklist" for additional sample information

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 • Fax (916) 673-0106

ATTN:_____

Method of Shipment: FedEx

Tracking No.:

Add Analysis(es) Requested

Sample ID	Date	Time	Location/Sample Description	Quantity	Type	Matrix	EPA1613 2378-TCDD	EPA1613 2378-TCDD/TCDF	EPA1613 PCDD/PCDF	EPA8290 2378-TCDD	EPA8290 2378-TCDD/TCDF	EPA8290 PCDD/PCDF	EPA8280 2378-TCDD	EPA8280 2378-TCDD/TCDF	EPA8280 PCDD/PCDF	EPA8280 TOTALS	EPA1668 COPLANAR PCB's	EPA1668 209 CONGENERS	EPA1668 PBDE	EPA1614 PAH	CARB429 WHO-29
OW-210B_0-2(20151116)	11/16/15	1230	Soil Sample	1	G	SO							X								
OW-210B_2-4(20151116)	↓	1235	↓	1	G	SO							X								
OW-210B_4-6(20151116)		1245		1	G	SO							X								
OW-210B_6-8(20151116)		1255		1	G	SO							X								
OW-210B_8-10(20151116)		1305		1	G	SO							X								
OW-210B_28-30(20151116)	✓	1425		1	G	SO							X								
P-11A_0-2(20151117)	11/17/15	1120		1	G	SO							X								
P-11A_2-4(20151117)	↓	1125		1	G	SO							X								
P-11A_4-6(20151117)		1132		1	G	SO							X								
P-11A_6-8(20151117)	✓	1136	✓	1	G	SO							X								

Special Instructions/Comments:_____

Former Koppers Wood Treating Site Carbondale, IL

SEND DOCUMENTATION AND RESULTS TO:

Name: Kelly Hoehn
Company: ARCADIS
Address: 430 First Ave. North Suite 720
City: Minneapolis State: MN Zip: 55401
Phone: 612.339.9434 Fax:
Email: Kelly.hoehn@arcadis.com

Container Types: A = 1 Liter Amber, G = Glass Jar
P = PUF, T = MM5 Train, O= Other_____

*Bottle Preservative Type: T = Thiosulfate,
O = Other_____

Matrix Types: DW = Drinking Water, EF = Effluent, PP = Pulp/Paper,
SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum
AQ = Aqueous, O = Other_____

WHITE - ORIGINAL YELLOW - ARCHIVE PINK - COPY

Vista

CHAIN OF CUSTODY

2 of 3

FOR LABORATORY USE ONLY
Laboratory Project ID: 1501148
Storage ID: WR-2
Storage Secured: Yes ☑ No ☐
Temp: 2.4 °C

TAT: (Check One):
Standard: ☑ 21 Days
Rush (surcharge may apply):
○ 14 days ○ 7 days Specify:

Project I.D.: B0039321.0000.00001 P.O.#: Sampler: Will Stephens (Name)

Invoice to: Name: David Bessingpass Company: ARCADIS Address: 6602 Excelsior Rd City: Baxter State: MN Zip: 56425 Ph#: 218.829.4607 Fax#:

Relinquished by: (Signature and Printed Name) Will Stephens Date: 11/19/15 Time: 1715 Received by: (Signature and Printed Name) B. Benedict Date: 11/20/15 Time: 0930

Relinquished by: (Signature and Printed Name) Date: Time: Received by: (Signature and Printed Name) Date: Time:

See "Sample Log-in Checklist" for additional sample information

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 • Fax (916) 673-0106

ATTN:

Method of Shipment: Fed Ex

Tracking No.:

Add Analysis(es) Requested

Sample ID	Date	Time	Location/Sample Description	Container(s) Quantity	Type	Matrix	EPA1613 2378-TCDD	EPA1613 2378-TCDD/TCDF	EPA1613 PCDD/PCDF	EPA8290 2378-TCDD	EPA8290 2378-TCDD/TCDF	EPA8290 PCDD/PCDF	EPA8280 2378-TCDD	EPA8280 2378-TCDD/TCDF	EPA8280 PCDD/PCDF	EPA1668 TOTALS	EPA1668 COPLANAR PCB's	EPA1668 209 CONGENERS	EPA1614 PBDE	CARB429 PAH	CARB429 WHO-29
P-11A_8-10(20151117)	11/17/15	1145	Soil Sample	1	G	SO							X								
P-11A_8-10(20151117)MS/MSD	↓	1145	↓	1	G	SO							X								
DUP-01(20151117)	↓	—	↓	1	G	SO							X								
EB-01(20151116)	11/16/15	1500	Equipment Blanks	1	A	AQ							X								
EB-02(20151117)	11/17/15	1230	↓	1	A	AQ							X								
EB-03(20151119)	11/19/15	1330	↓	1	A	AQ							X								
OW-211B_0-2(20151119)	↓	0905	Soil Sample	1	G	SO							X								
OW-211B_2-4(20151119)	↓	0910	↓	1	G	SO							X								
OW-211B_4-6(20151119)	↓	0920	↓	1	G	SO							X								
OW-211B_6-8(20151119)	↓	0926	↓	1	G	SO							X								

Special Instructions/Comments:

Former Koppers Wood Treating Site Carbondale, IL

SEND DOCUMENTATION AND RESULTS TO:

Name: Kelly Hoehn
Company: ARCADIS
Address: 430 First Ave. North Suite 720
City: Minneapolis State: MN Zip: 55401
Phone: 612.339.9434 Fax:
Email: Kelly.hoehn@arcadis.com

Container Types: A = 1 Liter Amber, G = Glass Jar
P = PUF, T = MM5 Train, O= Other

*Bottle Preservative Type: T = Thiosulfate,
O = Other

Matrix Types: DW = Drinking Water, EF = Effluent, PP = Pulp/Paper,
SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum
AQ = Aqueous, O = Other

WHITE - ORIGINAL YELLOW - ARCHIVE PINK - COPY

Vista

CHAIN OF CUSTODY

3 of 3

FOR LABORATORY USE ONLY
Laboratory Project ID: 1501148
Storage ID: WR-8
Storage Secured: Yes ☑ No ☐
Temp 2.4 °C

TAT: (Check One):
Standard: ☒ 21 Days
Rush (surcharge may apply):
○ 14 days ○ 7 days Specify:___

Project I.D.: BOO 34321.0000.00001 P.O.#_____ Sampler: Will Stephens (Name)

Invoice to: Name: Dave Bessingpass Company: ARCADIS Address: City: State: Zip: Ph#: Fax#:

Relinquished by: (Signature and Printed Name) Will Stephens Date: 11/19/15 Time: 1715 Received by: (Signature and Printed Name) B. Benedict Date: 11/20/15 Time: 0930

Relinquished by: (Signature and Printed Name) Date: Time: Received by: (Signature and Printed Name) Date: Time:

See "Sample Log-in Checklist" for additional sample information

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 • Fax (916) 673-0106

ATTN:_____

Method of Shipment: _____

Tracking No.: _____

Add Analysis(es) Requested

Sample ID	Date	Time	Location/Sample Description	Container(s) Quantity	Type	Matrix	EPA1613 2378-TCDD	2378-TCDD/TCDF	PCDD/PCDF	EPA8290 2378-TCDD	2378-TCDD/TCDF	PCDD/PCDF	EPA8280 2378-TCDD	2378-TCDD/TCDF	PCDD/PCDF	EPA1668 TOTALS	COPLANAR PCB's	209 CONGENERS	PBDE	EPA1614 PAH	CARB429 WHO-29
OW-211B_8-10 (20151119)	11/19/15	0932	Soil Sample	1	G	SO						X									
DUP-02 (20151119)	↓	—	↓	1	G	SO						X									
OW-211B_26-28 (20151119)	↓	1035	↓	1	G	SO						X									

Special Instructions/Comments:_____

Former Koppers Wood Treating Site Carbondale, IL

SEND DOCUMENTATION AND RESULTS TO:

Name: Kelly Hoehn
Company: ARCADIS
Address: 430 First Ave. North Suite 720
City: Minneapolis State: MN Zip: 55401
Phone: 612.339.9434 Fax:_____
Email: kelly.hoehn@arcadis.com

Container Types: A = 1 Liter Amber, G = Glass Jar
P = PUF, T = MM5 Train, O= Other_____

*Bottle Preservative Type: T = Thiosulfate,
O = Other_____

Matrix Types: DW = Drinking Water, EF = Effluent, PP = Pulp/Paper,
SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum
AQ = Aqueous, O = Other_____

WHITE - ORIGINAL YELLOW - ARCHIVE PINK - COPY

SAMPLE LOG-IN CHECKLIST

Vista Analytical Laboratory

Vista Project #: 1501148 TAT Std

Samples Arrival:	**Date/Time** 11/20/15 0925	**Initials:** UBLB	**Location:** WR-2 **Shelf/Rack:** NA
Logged In:	**Date/Time** 11/21/15 1048	**Initials:** UBLB	**Location:** WR-2 **Shelf/Rack:** E6 / BA

Delivered By:	FedEx	UPS	On Trac	DHL	Hand Delivered	Other
Preservation:	Ice	Blue Ice	Dry Ice	None		

Temp °C: 2.5 (uncorrected)	**Time:** 0931	**Thermometer ID:** IR-2	
Temp °C: 2.4 (corrected)			

	YES	NO	NA
Adequate Sample Volume Received?	✓		
Holding Time Acceptable?	✓		
Shipping Container(s) Intact?	✓		
Shipping Custody Seals Intact?	✓		
Shipping Documentation Present?	✓		
Airbill Trk # 808849179778	✓		
Sample Container Intact?	✓		
Sample Custody Seals Intact?			✓
Chain of Custody / Sample Documentation Present?	✓		
COC Anomaly/Sample Acceptance Form completed?		✓	
If Chlorinated or Drinking Water Samples, Acceptable Preservation?			✓

$Na_2S_2O_3$ Preservation Documented?	COC	Sample Container	None		
Shipping Container	Vista	Client	Retain	Return	Dispose

Comments:

Sample Login 11/2013 ckt

APPENDIX C

Data Review Report

Beazer East Inc.

Former Koppers Wood-Treating Site

Data Review

CARBONDALE, ILLINOIS

Polychlorinated Dibenzo-Dioxins and Polychlorinated
Dibenzo-Furans (PCDDs/PCDFs) Analyses

SDG #: 1501148

Analyses Performed By:
Vista Analytical Laboratory
El Dorado Hills, California

Report #: 24915R
Review Level: Tier III
Project: B0039321.0000.00002

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) # 1501148 for samples collected in association with the Beazer East Inc. Former Koppers Wood-Treating site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis				
					VOC	SVOC	PCDDs/ PCDFs	MET	MISC
OW-210B_0-2 (20151116)	1501148-01	Soil	11/16/2015				X		
OW-210B_2-4 (20151116)	1501148-02	Soil	11/16/2015				X		
OW-210B_4-6 (20151116)	1501148-03	Soil	11/16/2015				X		
OW-210B_6-8 (20151116)	1501148-04	Soil	11/16/2015				X		
OW-210B_8-10 (20151116)	1501148-05	Soil	11/16/2015				X		
OW-210B_28-30 (20151116)	1501148-06	Soil	11/16/2015				X		
P-11A_0-2 (20151117)	1501148-07	Soil	11/17/2015				X		
P-11A_2-4 (20151117)	1501148-08	Soil	11/17/2015				X		
P-11A_4-6 (20151117)	1501148-09	Soil	11/17/2015				X		
P-11A_6-8 (20151117)	1501148-10	Soil	11/17/2015				X		
P-11A_8-10 (20151117)	1501148-11	Soil	11/17/2015				X		
DUP-01 (20151117)	1501148-12	Soil	11/17/2015	P-11A_0-2 (20151117)			X		
OW-211B_0-2 (20151119)	1501148-13	Soil	11/19/2015				X		
OW-211B_2-4 (20151119)	1501148-14	Soil	11/19/2015				X		
OW-211B_4-6 (20151119)	1501148-15	Soil	11/19/2015				X		
OW-211B_6-8 (20151119)	1501148-16	Soil	11/19/2015				X		
OW-211B_8-10 (20151119)	1501148-17	Soil	11/19/2015				X		
DUP-02 (20151119)	1501148-18	Soil	11/19/2015	OW-211B_4-6 (20151119)			X		
OW-211B_26-28 (20151119)	1501148-19	Soil	11/19/2015				X		

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis				
					VOC	SVOC	PCDDs/ PCDFs	MET	MISC
EB-01 (20151116)	1501148-20	Water	11/16/2015				X		
EB-02 (20151117)	1501148-21	Water	11/17/2015				X		
EB-03 (20151119)	1501148-22	Water	11/19/2015				X		

Note: Soil sample results were reported on a dry weight basis.

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

QA - Quality Assurance

ORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Method 8290. Data were reviewed in accordance with USEPA National Functional Guidelines of October 1999 and USEPA Region II standard operating procedure (SOP) associated with USEPA SW-846 Method 8290 Validating Polychlorinated Dibenzo-Dioxins and Polychlorinated Dibenzo-Furans by High Resolution Gas-Chromatograph/Mass-Spectrometry (GC/MS) (SOP #HW-19 Revision 1, October 2006).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

  U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.

  B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.

- Quantitation (Q) Qualifiers

  E The compound was quantitated above the calibration range.

  D Concentration is based on a diluted sample analysis.

- Validation Qualifiers

  J The compound was positively identified; however, the associated numerical value is an estimated concentration only.

  UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.

  JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.

  UB Compound considered non-detect at the listed value due to associated blank contamination.

  N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.

  R The sample results are rejected as unusable. The compound may or may not be present in the sample.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and

provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

POLYCHLORINATED DIBENZODIOXINS AND POLYCHLORINATED DIBENZOFURANS (PCDD/PCDF) ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 8290	Water	30 days from collection to extraction and 45 days from extraction to analysis	Cool to < 6 °C
	Soil	30 days from collection to extraction and 45 days from extraction to analysis	Cool to < 6 °C

All samples were extracted and analyzed within the specified holding time criteria.

2. Blank Contamination

QA blanks (i.e., laboratory method blanks and equipment rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Target compounds were detected in the associated QA blanks; however, the associated sample results were greater than the BAL. Therefore, sample results greater than the BAL resulted in the removal of any laboratory qualifiers applied (i.e., "B"). No qualification of the sample results was required.

3. Mass Spectrometer Tuning

Mass spectrometer performance including instrument sensitivity and mass resolution were acceptable.

Overall system performance and gas chromatographic column resolution were acceptable.

4. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

4.1 Initial Calibration

All compounds associated with the initial calibration standards must exhibit signal-to-noise ratios (S/N) of at least 2.5, isotopic ratios within the limits listed in table 8 of the method, and percent relative standard

deviations (%RSDs) of the relative response factors (RRFs) less than 20% for the labeled standards and less than 30% for the target compounds.

4.2 Continuing Calibration

Instrument performance must be verified at 12-hour periods after successful tune verifications. All compounds associated with the continuing calibration standard must exhibit S/N of at least 2.5, isotopic ratios within the limits listed in table 8 of the method, and percent differences (%D) of the RRFs less than 30% for the labeled standards and less than 20% for the target compounds.

All initial and continuing calibration criteria were within the control limits.

5. Injection Internal Standard Performance

Injection internal standards are added to all extracts prior to instrumental analysis. The injection internal standard performance criteria ensure that the GC/MS sensitivity and response are stable during every sample analysis. The criteria require the injection internal standard compounds exhibit a S/N ratio of at least 10 and elute within ± 15 seconds of the retention times (RTs) established during calibration. The acceptance criteria also specify that each injection internal standard exhibit a ratio of the two identifying masses (m/z) within the method specified limits.

All injection internal standard S/N, RT, and m/z ratios were within established limits.

6. Surrogate Internal Standard Compounds

All field samples, blanks, laboratory control samples (LCS), and matrix spike/matrix spike duplicate samples (MS/MSD) are spiked with surrogate internal standard compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. The acceptance criteria require that the surrogate internal standard compounds exhibit a S/N ratio of at least 10 and elute within ± 15 seconds of the RTs established during calibration. The acceptance criteria also specify that each surrogate internal standard exhibit a calculated recovery and an m/z ratio within the method specified limits.

All sample surrogate internal standard compounds exhibited recoveries within the control limits.

7. Clean-up Recovery Surrogate Performance

All field samples, blanks, LCS, and MS/MSD are spiked with recovery surrogates prior to extract clean-up. Recovery surrogate acceptance criteria require that their calculated recoveries, S/N, m/z ratios, and relative retention times (RRTs) be within the method-specified acceptance limits.

All recovery surrogate recoveries S/N, m/z ratios, and RRTs were within the control limits.

8. MS/MSD Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the (optional) MS/MSD analysis should exhibit recoveries within the method-specified acceptance limits of 80-120%. The relative percent difference (RPD) between the MS and MSD results should be within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater. Sample results associated with MS/MSD exceedances where the parent samples are not site-specific are not qualified.

Sample location P-11A_8-10 (20151117) was used for the MS/MSD analysis. Sample locations associated with the MS/MSD exhibiting recoveries outside of the control limits are presented in the following table.

Sample Location	Compound	MS Recovery	MSD Recovery
P-11A_8-10 (20151117)	OCDD	< LL but > 10%	< LL but > 10%

The criteria used to evaluate the MS/MSD recoveries are presented in the following table. In the case of MS/MSD deviations, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> the upper control limit (UL)	Non-detect	No Action
	Detect	J
< the lower control limit (LL) but > 10%	Non-detect	UJ
	Detect	J
< 10%	Non-detect	R
	Detect	J
Parent sample concentration > 4x the MS/MSD spiking solution concentration.	Detect	No Action
	Non-detect	

9. Ongoing Precision and Recovery (OPR) Sample Analysis

The OPR analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the OPR analysis must exhibit a percent recovery within the method-specified acceptance limits.

All compounds associated with the OPR analyses exhibited recoveries within the control limits.

10. Field Duplicate Sample Analysis

Field duplicate sample analysis is used to assess the precision of the field sampling procedures and analytical method. A control limit of 50% for water matrices and 100% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to five times the reporting limit (RL), a control limit of two times the RL for water matrices or three times the RL for soil matrices is applied.

Detected results in picograms/gram (pg/g) for the field duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
P-11A_0-2 (20151117) / DUP-01 (20151117)	2,3,7,8-TCDD	0.607	0.951	44.2 %
	1,2,3,7,8-PeCDD	2.80	6.25	76.2 %
	1,2,3,4,7,8-HxCDD	6.92	23.1	107.8 %
	1,2,3,6,7,8-HxCDD	40.3	99.0	84.3 %
	1,2,3,7,8,9-HxCDD	12.0	40.2	108.0 %
	1,2,3,4,6,7,8-HpCDD	2250	6660 D	99.0 %
	OCDD	21300 E	68500 D	105.1 %
	2,3,7,8-TCDF	3.62	1.21	99.8 %
	1,2,3,7,8-PeCDF	6.89	2.36 J	97.9 %
	2,3,4,7,8-PeCDF	4.37	7.41	51.6 %
	1,2,3,4,7,8-HxCDF	15.2	33.8	75.9 %
	1,2,3,6,7,8-HxCDF	5.35	9.52	56.1 %
	2,3,4,6,7,8-HxCDF	4.47	13.2	98.8 %
	1,2,3,7,8,9-HxCDF	2.89	6.65	78.8 %
	1,2,3,4,6,7,8-HpCDF	293	605	69.5 %
	1,2,3,4,7,8,9-HpCDF	24.0	44.5	59.9 %
	OCDF	2020	3770	60.4 %
	Total TCDD	21.2	29.2	31.7 %
	Total PeCDD	43.3	82.5	62.3 %
	Total HxCDD	559	1440	88.1 %
	Total HpCDD	4980	19300	118.0 %
	Total TCDF	55.2	20.6	91.3 %
	Total PeCDF	48.4	71.5	38.5 %
	Total HxCDF	215	538	85.8 %
	Total HpCDF	1460	2980	68.5 %
	TEQMinWHO2005Dioxin	46.7	127	92.5 %
OW-211B_4-6 (20151119) / DUP-02(20151119)	2,3,7,8-TCDD	0.279 J	0.155 EMPC	AC
	1,2,3,7,8-PeCDD	0.188 EMPC	0.212 J	AC
	1,2,3,4,7,8-HxCDD	0.732 J	0.666 J	9.4 %
	1,2,3,6,7,8-HxCDD	0.971 J	1.20 J	21.1 %
	1,2,3,7,8,9-HxCDD	1.10 J	0.985 J	11.0 %
	1,2,3,4,6,7,8-HpCDD	121	108	11.4 %
	OCDD	10100 E	7480 E	29.8 %
	2,3,4,6,7,8-HxCDF	0.126 J	0.193 J	42.0 %
	1,2,3,4,6,7,8-HpCDF	2.60	4.51	53.7 %
	OCDF	11.4	20.6	57.5 %
	Total TCDD	1.95	1.65	16.7 %

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
OW-211B_4-6 (20151119) / DUP-02(20151119)	Total PeCDD	8.40	4.10	68.8 %
	Total HxCDD	23.3	16.1	36.5 %
	Total HpCDD	243	212	13.6 %
	Total TCDF	0.287	0.138	70.1 %
	Total PeCDF	0.254	0.448	55.3 %
	Total HxCDF	2.43	3.90	46.4 %
	Total HpCDF	9.21	16.4	56.1 %
	TEQMinWHO2005Dioxin	4.84	3.89	21.8 %

AC Acceptable
D Result is from a dilution analysis
E Concentration is estimated due to exceedance of calibration range
J Estimated (result is < RL)
U Not detected

The 1,2,3,4,7,8-HxCDD, 1,2,3,7,8,9-HxCDD, OCDD, and total HpCDD results for field duplicate samples P-11A_0-2 (20151117) and DUP-01 (20151117) exhibited a RPD greater than the control limit. The 1,2,3,4,7,8-HxCDD, 1,2,3,7,8,9-HxCDD, OCDD, and total HpCDD results for P-11A_0-2 (20151117) and DUP-01 (20151117) were qualified as estimated.

11. Compound Identification

PCDD/PCDF compounds are identified by using the compound's ion abundance ratios, S/N values, and RRTs.

An estimated maximum possible concentration (EMPC) designation is given to compounds which have signals eluting within the established retention time window which would, if positively identified, be greater than the detection limit. The signals do not, however, meet the ion abundance ratio criteria and therefore cannot be identified as the compound of interest. The EMPC value is the estimated concentration of the interference quantitated "as the compound of interest". This value should be considered an elevated detection limit based on potential compound identification and quantitation interference. The "UX" qualifier has been added to the following sample results (in pg/g) to indicate the elevated detection limit as EMPC.

Sample ID	Compound	Laboratory Result	Reported Result
OW-210B_0-2 (20151116)	2,3,7,8-TCDD	0.355 EMPC	0.355 UX
OW-210B_4-6 (20151116)	Total TCDF	0.272 EMPC	0.272 UX
OW-210B_6-8 (20151116)	2,3,7,8-TCDD	0.155 EMPC	0.155 UX
	1,2,3,7,8-PeCDD	0.130 EMPC	0.130 UX
OW-210B_28-30 (20151116)	Total TCDD	0.395 EMPC	0.395 UX
	Total PeCDD	0.412 EMPC	0.412 UX
P-11A_2-4 (20151117)	1,2,3,7,8-PeCDD	0.291 EMPC	0.291 UX
P-11A_4-6 (20151117)	2,3,4,7,8-PeCDF	0.103 EMPC	0.103 UX
	Total PeCDF	0.773 EMPC	0.773 UX
P-11A_8-10 (20151117)	2,3,7,8-TCDD	0.210 EMPC	0.210 UX

Sample ID	Compound	Laboratory Result	Reported Result
	1,2,3,7,8-PeCDD	0.113 EMPC	0.113 UX
OW-211B_2-4 (20151119)	2,3,4,7,8-PeCDF	0.0940 EMPC	0.0940 UX
	1,2,3,6,7,8-HxCDF	0.178 EMPC	0.178 UX
	Total TCDF	0.437 EMPC	0.437 UX
OW-211B_4-6 (20151119)	1,2,3,7,8-PeCDD	0.188 EMPC	0.188 UX
OW-211B_6-8 (20151119)	2,3,7,8-TCDD	0.327 EMPC	0.327 UX
	Total PeCDF	0.0650 EMPC	0.0650 UX
OW-211B_8-10 (20151119)	2,3,7,8-TCDD	0.248 EMPC	0.248 UX
	1,2,3,7,8-PeCDD	0.155 EMPC	0.155 UX
DUP-02(20151119)	2,3,7,8-TCDD	0.155 EMPC	0.155 UX
	1,2,3,4,7,8-HxCDF	0.156 EMPC	0.156 UX
EB-01 (20151116)	OCDD	1.08 EMPC	1.08 UX

Sample results associated with compounds that exhibited a concentration greater than the linear range of the instrument calibration are summarized in the following table.

Sample ID	Compound	Original Analysis	Diluted Analysis	Reported Analysis
OW-210B_0-2 (20151116)	OCDD	14300 E	---	14300 EJ
OW-210B_2-4 (20151116)	OCDD	9440 E	---	9440 EJ
P-11A_0-2 (20151117)	OCDD	21300 E	---	21300 EJ
P-11A_2-4 (20151117)	OCDD	36400 E	---	36400 EJ
OW-211B_0-2 (20151119)	1,2,3,4,6,7,8-HpCDD	3680 E	---	3680 EJ
	OCDD	33500 E	---	33500 EJ
OW-211B_2-4 (20151119)	OCDD	39400 E	---	39400 EJ
OW-211B_4-6 (20151119)	OCDD	10100 E	---	10100 EJ
DUP-02(20151119)	OCDD	7480 E	---	7480 EJ

Note: In the instance where both the original analysis and the diluted analysis sample results exhibited a concentration greater than or less than the calibration linear range of the instrument; the sample result exhibiting the greatest concentration will be reported as the final result.

Sample results associated with compounds exhibiting a concentration greater than the linear range were qualified as documented in the table below.

Reported Sample Results	Qualification
Diluted sample result within the calibration range	D
Diluted sample result < the calibration range	DJ

Reported Sample Results	Qualification
Diluted sample result > the calibration range	EDJ
Original sample result > the calibration range	EJ

12. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR PCDD/PCDF

PCDDs/PCDFs; SW-846 8290	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X		X	
B. Equipment blanks		X	X		
Ongoing Precision and Accuracy (OPR) Accuracy (%R)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R		X	X		
MS/MSD RPD		X		X	
Field/Laboratory Duplicate Sample RPD		X	X		
Surrogate Internal Standard Spike %R		X		X	
Recovery Surrogate Standard Spike %R		X		X	
Dilution Factor		X		X	
Moisture Content		X		X	
Tier III Validation					
System performance and column resolution		X		X	
Initial calibration %RSD		X		X	
Continuing calibration %D		X		X	
Instrument tune and performance check		X		X	
Ion abundance criteria for each instrument used		X		X	
Signal-to-noise ratio		X		X	
Injection Internal Standard performance		X		X	
Recovery standard performance		X		X	
Compound identification and quantitation					
A. Reconstructed ion chromatograms		X		X	
B. Quantitation Reports		X		X	
C. RT of sample compounds within the established RT windows		X		X	
D. Transcription/calculation errors present		X		X	
E. Reporting limits adjusted for sample dilutions		X		X	
F. Compound quantification		X	X		

RSD – relative standard deviation
%R - percent recovery
RPD - relative percent difference
%D – difference

SAMPLE COMPLIANCE REPORT

Sampling Date	Protocol	Sample ID	Matrix	Compliancy[1]					Noncompliance
				VOC	SVOC	PCDDs/ PCDFs	MET	MISC	
11/16/2015	SW846	OW-210B_0-2 (20151116)	Soil	--	--	No	--	--	EMPC; Calibration range exceedance
11/16/2015	SW846	OW-210B_2-4 (20151116)	Soil	--	--	No	--	--	Calibration range exceedance
11/16/2015	SW846	OW-210B_4-6 (20151116)	Soil	--	--	No	--	--	EMPC
11/16/2015	SW846	OW-210B_6-8 (20151116)	Soil	--	--	No	--	--	EMPC
11/16/2015	SW846	OW-210B_8-10 (20151116)	Soil	--	--	Yes	--	--	--
11/16/2015	SW846	OW-210B_28-30 (20151116)	Soil	--	--	No	--	--	EMPC
11/17/2015	SW846	P-11A_0-2 (20151117)	Soil	--	--	No	--	--	Field duplicate RPD > CL; Calibration range exceedance
11/17/2015	SW846	P-11A_2-4 (20151117)	Soil	--	--	No	--	--	EMPC; Calibration range exceedance
11/17/2015	SW846	P-11A_4-6 (20151117)	Soil	--	--	No	--	--	EMPC
11/17/2015	SW846	P-11A_6-8 (20151117)	Soil	--	--	Yes	--	--	--
11/17/2015	SW846	P-11A_8-10 (20151117)	Soil	--	--	No	--	--	EMPC; MS/MSD %R < LL
11/17/2015	SW846	DUP-01 (20151117)	Soil	--	--	No	--	--	Field duplicate RPD > CL
11/19/2015	SW846	OW-211B_0-2 (20151119)	Soil	--	--	No	--	--	Calibration range exceedance
11/19/2015	SW846	OW-211B_2-4 (20151119)	Soil	--	--	No	--	--	EMPC; Calibration range exceedance
11/19/2015	SW846	OW-211B_4-6 (20151119)	Soil	--	--	No	--	--	EMPC; Calibration range exceedance
11/19/2015	SW846	OW-211B_6-8 (20151119)	Soil	--	--	No	--	--	EMPC
11/19/2015	SW846	OW-211B_8-10 (20151119)	Soil	--	--	No	--	--	EMPC
11/19/2015	SW846	DUP-02(20151119)	Soil	--	--	No	--	--	EMPC; Calibration range exceedance
11/19/2015	SW846	OW-211B_26-28 (20151119)	Soil	--	--	Yes	--	--	--
11/16/2015	SW846	EB-01 (20151116)	Water	--	--	No	--	--	EMPC
11/17/2015	SW846	EB-02 (20151117)	Water	--	--	Yes	--	--	--
11/19/2015	SW846	EB-03 (20151119)	Water	--	--	Yes	--	--	--

1 Samples which are compliant with no added validation qualifiers are listed as "yes". Samples which are non-compliant or which have added qualifiers are listed as "no". A "no" designation does not necessarily indicate that the data have been rejected or are otherwise unusable.

Validation Performed By: Dennis Dyke

Signature:

Date: January 19, 2016

Peer Review: Dennis Capria

Date: January 20, 2016

CHAIN OF CUSTODY /
LABORATORY QUALIFIERS /
CORRECTED SAMPLE ANALYSIS DATA SHEETS

Vista

CHAIN OF CUSTODY

1 of 3

FOR LABORATORY USE ONLY
Laboratory Project ID: 1501148
Storage ID: WR-2
Storage Secured? Yes ☑ No ☐
Temp 2.4 °C

TAT: (Check One):
Standard: ☑ 21 Days
Rush (surcharge may apply):
○ 14 days ○ 7 days Specify:___

Project I.D.: B0039321.0000.00001 P.O.#_____ Sampler: Will Stephens (Name)

Invoice to: Name David Bessingpass Company ARCADIS Address 6602 Excelsior Rd City Bowler State MN Zip 55425 Ph# 1.218.829.4607 Fax#

Relinquished by: (Signature and Printed Name) Will Stephens Date: 11/19/15 Time: 1715 Received by: (Signature and Printed Name) Betty Benedict B Benedict Date: 11/20/15 Time: 0930

Relinquished by: (Signature and Printed Name) Date: Time: Received by: (Signature and Printed Name) Date: Time:

See "Sample Log-in Checklist" for additional sample information

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 • Fax (916) 673-0106

ATTN:_____

Method of Shipment: FedEx

Tracking No.:

Add Analysis(es) Requested

Sample ID	Date	Time	Location/Sample Description	Quantity	Type	Matrix	EPA1613 2378-TCDD	EPA1613 2378-TCDD/TCDF	EPA1613 PCDD/PCDF	EPA8290 2378-TCDD	EPA8290 2378-TCDD/TCDF	EPA8290 PCDD/PCDF	EPA8280 2378-TCDD	EPA8280 2378-TCDD/TCDF	EPA8280 PCDD/PCDF	EPA8280 TOTALS	EPA1668 COPLANAR PCB's	EPA1668 209 CONGENERS	EPA1668 PBDE	EPA1614 PAH	CARB429 WHO-29
OW-210B_0-2(20151116)	11/16/15	1230	Soil Sample	1	G	SO							X								
OW-210B_2-4(20151116)	↓	1235	↓	1	G	SO							X								
OW-210B_4-6(20151116)		1245		1	G	SO							X								
OW-210B_6-8(20151116)		1255		1	G	SO							X								
OW-210B_8-10(20151116)		1305		1	G	SO							X								
OW-210B_28-30(20151116)	✓	1425		1	G	SO							X								
P-11A_0-2(20151117)	11/17/15	1120		1	G	SO							X								
P-11A_2-4(20151117)	↓	1125		1	G	SO							X								
P-11A_4-6(20151117)		1132		1	G	SO							X								
P-11A_6-8(20151117)	✓	1136	↓	1	G	SO							X								

Special Instructions/Comments:_____

Former Koppers Wood Treating Site Carbondale, IL

SEND DOCUMENTATION AND RESULTS TO:

Name: Kelly Hoehn
Company: ARCADIS
Address: 430 First Ave. North Suite 720
City: Minneapolis State: MN Zip: 55401
Phone: 612.339.9434 Fax:_____
Email: Kelly.hoehn@arcadis.com

Container Types: A = 1 Liter Amber, G = Glass Jar
P = PUF, T = MM5 Train, O= Other_____

*Bottle Preservative Type: T = Thiosulfate,
O = Other_____

Matrix Types: DW = Drinking Water, EF = Effluent, PP = Pulp/Paper,
SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum
AQ = Aqueous, O = Other_____

WHITE - ORIGINAL YELLOW - ARCHIVE PINK - COPY

Vista

CHAIN OF CUSTODY

2 of 3

FOR LABORATORY USE ONLY
Laboratory Project ID: 1501148
Storage ID: WR-2
Storage Secured: Yes ☑ No ☐
Temp: 2.4 °C

TAT: (Check One):
Standard: ☑ 21 Days
Rush (surcharge may apply):
○ 14 days ○ 7 days Specify:

Project I.D.: B0039321.0000.00001 P.O.#: Sampler: Will Stephens (Name)

Invoice to: Name: David Bessingpass Company: ARCADIS Address: 6602 Excelsior Rd City: Baxter State: MN Zip: 56425 Ph#: 218.829.4607 Fax#:

Relinquished by: (Signature and Printed Name) Will Stephens Date: 11/19/15 Time: 1715 Received by: (Signature and Printed Name) B. Benedict Date: 11/20/15 Time: 0930

Relinquished by: (Signature and Printed Name) Date: Time: Received by: (Signature and Printed Name) Date: Time:

See "Sample Log-in Checklist" for additional sample information

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 • Fax (916) 673-0106

ATTN:

Method of Shipment: Fed Ex

Tracking No.:

Add Analysis(es) Requested

Sample ID	Date	Time	Location/Sample Description	Quantity	Type	Matrix	EPA1613 2378-TCDD	EPA1613 2378-TCDD/TCDF	EPA1613 PCDD/PCDF	EPA8290 2378-TCDD	EPA8290 2378-TCDD/TCDF	EPA8290 PCDD/PCDF	EPA8280 2378-TCDD	EPA8280 2378-TCDD/TCDF	EPA8280 PCDD/PCDF	EPA1668 TOTALS	EPA1668 COPLANAR PCB's	EPA1668 209 CONGENERS	EPA1614 PBDE	CARB429 PAH	CARB429 WHO-29
P-11A_8-10(20151117)	11/17/15	1145	Soil Sample	1	G	SO							X								
P-11A_8-10(20151117)MS/MSD	↓	1145	↓	1	G	SO							X								
DUP-01(20151117)	↓	—	↓	1	G	SO							X								
EB-01(20151116)	11/16/15	1500	Equipment Blanks	1	A	AQ							X								
EB-02(20151117)	11/17/15	1230	↓	1	A	AQ							X								
EB-03(20151119)	11/19/15	1330	↓	1	A	AQ							X								
OW-211B_0-2(20151119)	↓	0905	Soil Sample	1	G	SO							X								
OW-211B_2-4(20151119)	↓	0910	↓	1	G	SO							X								
OW-211B_4-6(20151119)	↓	0920	↓	1	G	SO							X								
OW-211B_6-8(20151119)	↓	0928	↓	1	G	SO							X								

Special Instructions/Comments:

Former Koppers Wood Treating Site Carbondale, IL

SEND DOCUMENTATION AND RESULTS TO:

Name: Kelly Hoehn
Company: ARCADIS
Address: 430 First Ave. North Suite 720
City: Minneapolis State: MN Zip: 55401
Phone: 612.339.9434 Fax:
Email: Kelly.hoehn@arcadis.com

Container Types: A = 1 Liter Amber, G = Glass Jar
P = PUF, T = MM5 Train, O= Other

*Bottle Preservative Type: T = Thiosulfate,
O = Other

Matrix Types: DW = Drinking Water, EF = Effluent, PP = Pulp/Paper,
SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum
AQ = Aqueous, O = Other

WHITE - ORIGINAL YELLOW - ARCHIVE PINK - COPY

Vista

CHAIN OF CUSTODY

3 of 3

FOR LABORATORY USE ONLY
Laboratory Project ID: 1501148
Storage ID: WR-8
Storage Secured: Yes ☑ No ☐
Temp 2.4 °C

TAT: (Check One):
Standard: ☒ 21 Days
Rush (surcharge may apply):
○ 14 days ○ 7 days Specify:

Project I.D.: BOO 39321.0000.00001 P.O.#: Sampler: Will Stephens (Name)

Invoice to: Name: Dave Bessingpass Company: ARCADIS Address: City: State: Zip: Ph#: Fax#:

Relinquished by: (Signature and Printed Name) Will Stephens Date: 11/19/15 Time: 1715 Received by: (Signature and Printed Name) B. Benedict Date: 11/20/15 Time: 0930

Relinquished by: (Signature and Printed Name) Date: Time: Received by: (Signature and Printed Name) Date: Time:

See "Sample Log-in Checklist" for additional sample information

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 • Fax (916) 673-0106

ATTN:

Method of Shipment:

Tracking No.:

Add Analysis(es) Requested

Sample ID	Date	Time	Location/Sample Description	Container(s) Quantity	Type	Matrix	EPA1613 2378-TCDD	2378-TCDD/TCDF	PCDD/PCDF	EPA8290 2378-TCDD	2378-TCDD/TCDF	PCDD/PCDF	EPA8280 2378-TCDD	2378-TCDD/TCDF	PCDD/PCDF	TOTALS	EPA1668 COPLANAR PCB's	209 CONGENERS	PBDE	EPA1614 PAH	CARB429 WHO-29
OW-211B_8-10 (20151119)	11/19/15	0932	Soil Sample	1	G	SO								X							
DUP-02 (20151119)	↓	—	↓	1	G	SO								X							
OW-211B_26-28 (20151119)	↓	1035	↓	1	G	SO								X							

Special Instructions/Comments:

Former Koppers Wood Treating Site Carbondale, IL

SEND DOCUMENTATION AND RESULTS TO:

Name: Kelly Hoehn
Company: ARCADIS
Address: 430 First Ave. North Suite 720
City: Minneapolis State: MN Zip: 55401
Phone: 612.339.9434 Fax:
Email: kelly.hoehn@arcadis.com

Container Types: A = 1 Liter Amber, G = Glass Jar
P = PUF, T = MM5 Train, O= Other

*Bottle Preservative Type: T = Thiosulfate,
O = Other

Matrix Types: DW = Drinking Water, EF = Effluent, PP = Pulp/Paper,
SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum
AQ = Aqueous, O = Other

WHITE - ORIGINAL YELLOW - ARCHIVE PINK - COPY

Sample ID: OW-210B_0-2 (20151116)

EPA Method 8290

Client Data
Name: ARCADIS
Project: B0039321.0000.00001
Date Collected: 16-Nov-2015 12:30

Sample Data
Matrix: Soil
Sample Size: 15.1 g
% Solids: 66.5

Laboratory Data
Lab Sample: 1501148-01 Date Received: 20-Nov-2015 9:25
QC Batch: B5K0138 Date Extracted: 30-Nov-2015 9:58
Date Analyzed : 06-Dec-15 10:27 Column: ZB-5MS Analyst: WJL
09-Dec-15 15:07 Column: DB-225 Analyst: DB

Analyte	Conc. (pg/g)	DL	EMPC	Qualifiers
2,3,7,8-TCDD	ND		0.355	UX
1,2,3,7,8-PeCDD	1.73			J
1,2,3,4,7,8-HxCDD	2.99			
1,2,3,6,7,8-HxCDD	9.93			
1,2,3,7,8,9-HxCDD	5.65			
1,2,3,4,6,7,8-HpCDD	606			
OCDD	14300			E J
2,3,7,8-TCDF	0.838			
1,2,3,7,8-PeCDF	1.22			J
2,3,4,7,8-PeCDF	0.937			J
1,2,3,4,7,8-HxCDF	2.30			J
1,2,3,6,7,8-HxCDF	0.873			J
2,3,4,6,7,8-HxCDF	0.720			J
1,2,3,7,8,9-HxCDF	0.441			J
1,2,3,4,6,7,8-HpCDF	43.9			
1,2,3,4,7,8,9-HpCDF	3.48			
OCDF	314			
TOTALS				
Total TCDD	34.4		34.8	
Total PeCDD	34.1		34.5	
Total HxCDD	156			
Total HpCDD	1420			
Total TCDF	11.0		12.9	
Total PeCDF	10.2		10.6	
Total HxCDF	33.5			
Total HpCDF	215			

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C-2,3,7,8-TCDD	98.2	40 - 135	
	13C-1,2,3,7,8-PeCDD	104	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	111	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	100	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	103	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	112	40 - 135	
	13C-OCDD	119	40 - 135	
	13C-2,3,7,8-TCDF	96.9	40 - 135	
	13C-1,2,3,7,8-PeCDF	109	40 - 135	
	13C-2,3,4,7,8-PeCDF	114	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	94.7	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	89.1	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	91.8	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	96.6	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	93.7	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	107	40 - 135	
	13C-OCDF	95.0	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	88.1	40 - 135	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin	15.3

DL - Sample specifc estimated detection limit
EMPC - Estimated maximum possible concentration

LCL-UCL- Lower control limit - upper control limit
The results are reported in dry weight. The sample size is reported in wet weight.
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: OW-210B_2-4 (20151116)

EPA Method 8290

Client Data
Name: ARCADIS
Project: B0039321.0000.00001
Date Collected: 16-Nov-2015 12:35

Sample Data
Matrix: Soil
Sample Size: 12.4 g
% Solids: 80.7

Laboratory Data
Lab Sample: 1501148-02 Date Received: 20-Nov-2015 9:25
QC Batch: B5K0138 Date Extracted: 30-Nov-2015 9:58
Date Analyzed : 06-Dec-15 11:15 Column: ZB-5MS Analyst: WJL

Analyte	Conc. (pg/g)	DL	EMPC	Qualifiers
2,3,7,8-TCDD	ND	0.113		
1,2,3,7,8-PeCDD	ND	0.118		
1,2,3,4,7,8-HxCDD	ND	0.198		
1,2,3,6,7,8-HxCDD	0.263			J
1,2,3,7,8,9-HxCDD	ND	0.221		
1,2,3,4,6,7,8-HpCDD	61.4			
OCDD	9440			E J
2,3,7,8-TCDF	ND	0.0929		
1,2,3,7,8-PeCDF	ND	0.0716		
2,3,4,7,8-PeCDF	ND	0.0674		
1,2,3,4,7,8-HxCDF	ND	0.0957		
1,2,3,6,7,8-HxCDF	ND	0.0994		
2,3,4,6,7,8-HxCDF	ND	0.104		
1,2,3,7,8,9-HxCDF	ND	0.151		
1,2,3,4,6,7,8-HpCDF	0.797			J
1,2,3,4,7,8,9-HpCDF	ND	0.0982		
OCDF	5.42			
TOTALS				
Total TCDD	ND	0.113		
Total PeCDD	ND	0.118		
Total HxCDD	2.87			
Total HpCDD	122			
Total TCDF	ND	0.0929		
Total PeCDF	ND	0.0716		
Total HxCDF	0.402		0.540	
Total HpCDF	3.62			

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C-2,3,7,8-TCDD	86.4	40 - 135	
	13C-1,2,3,7,8-PeCDD	94.5	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	96.3	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	89.6	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	90.8	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	92.4	40 - 135	
	13C-OCDD	101	40 - 135	
	13C-2,3,7,8-TCDF	89.8	40 - 135	
	13C-1,2,3,7,8-PeCDF	98.2	40 - 135	
	13C-2,3,4,7,8-PeCDF	103	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	86.1	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	82.5	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	84.6	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	85.2	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	80.5	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	91.9	40 - 135	
	13C-OCDF	79.7	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	82.1	40 - 135	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin	3.48

DL - Sample specifc estimated detection limit
EMPC - Estimated maximum possible concentration

LCL-UCL- Lower control limit - upper control limit
The results are reported in dry weight. The sample size is reported in wet weight.
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: OW-210B_4-6 (20151116)

EPA Method 8290

Client Data
Name: ARCADIS
Project: B0039321.0000.00001
Date Collected: 16-Nov-2015 12:45

Sample Data
Matrix: Soil
Sample Size: 12.1 g
% Solids: 82.6

Laboratory Data
Lab Sample: 1501148-03 Date Received: 20-Nov-2015 9:25
QC Batch: B5K0138 Date Extracted: 30-Nov-2015 9:58
Date Analyzed : 06-Dec-15 12:03 Column: ZB-5MS Analyst: WJL

Analyte	Conc. (pg/g)	DL	EMPC	Qualifiers
2,3,7,8-TCDD	ND	0.121		
1,2,3,7,8-PeCDD	ND	0.181		
1,2,3,4,7,8-HxCDD	ND	0.192		
1,2,3,6,7,8-HxCDD	ND	0.196		
1,2,3,7,8,9-HxCDD	ND	0.212		
1,2,3,4,6,7,8-HpCDD	43.9			
OCDD	5370			
2,3,7,8-TCDF	ND	0.104		
1,2,3,7,8-PeCDF	ND	0.0832		
2,3,4,7,8-PeCDF	ND	0.0744		
1,2,3,4,7,8-HxCDF	ND	0.0841		
1,2,3,6,7,8-HxCDF	ND	0.0882		
2,3,4,6,7,8-HxCDF	ND	0.0877		
1,2,3,7,8,9-HxCDF	ND	0.126		
1,2,3,4,6,7,8-HpCDF	1.13			J
1,2,3,4,7,8,9-HpCDF	ND	0.117		
OCDF	6.68			
TOTALS				
Total TCDD	ND	0.121		
Total PeCDD	1.13			
Total HxCDD	5.88			
Total HpCDD	92.2			
Total TCDF	ND		0.272	UX
Total PeCDF	ND	0.0832		
Total HxCDF	0.584		0.802	
Total HpCDF	4.72			

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C-2,3,7,8-TCDD	77.5	40 - 135	
	13C-1,2,3,7,8-PeCDD	83.4	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	84.7	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	78.2	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	80.4	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	83.6	40 - 135	
	13C-OCDD	79.3	40 - 135	
	13C-2,3,7,8-TCDF	80.3	40 - 135	
	13C-1,2,3,7,8-PeCDF	86.9	40 - 135	
	13C-2,3,4,7,8-PeCDF	90.5	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	74.5	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	70.9	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	73.8	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	76.7	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	70.0	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	84.0	40 - 135	
	13C-OCDF	71.9	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	84.7	40 - 135	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin	2.06

DL - Sample specifc estimated detection limit
EMPC - Estimated maximum possible concentration

LCL-UCL- Lower control limit - upper control limit
The results are reported in dry weight. The sample size is reported in wet weight.
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: OW-210B_6-8 (20151116)

EPA Method 8290

Client Data
Name: ARCADIS
Project: B0039321.0000.00001
Date Collected: 16-Nov-2015 12:55

Sample Data
Matrix: Soil
Sample Size: 12.8 g
% Solids: 78.5

Laboratory Data
Lab Sample: 1501148-04 Date Received: 20-Nov-2015 9:25
QC Batch: B5K0138 Date Extracted: 30-Nov-2015 9:58
Date Analyzed : 06-Dec-15 12:51 Column: ZB-5MS Analyst: WJL

Analyte	Conc. (pg/g)	DL	EMPC	Qualifiers
2,3,7,8-TCDD	ND		0.155	UX
1,2,3,7,8-PeCDD	ND		0.130	UX
1,2,3,4,7,8-HxCDD	ND	0.112		
1,2,3,6,7,8-HxCDD	ND	0.117		
1,2,3,7,8,9-HxCDD	ND	0.131		
1,2,3,4,6,7,8-HpCDD	10.2			
OCDD	604			
2,3,7,8-TCDF	ND	0.0870		
1,2,3,7,8-PeCDF	ND	0.0537		
2,3,4,7,8-PeCDF	ND	0.0492		
1,2,3,4,7,8-HxCDF	ND	0.0871		
1,2,3,6,7,8-HxCDF	ND	0.0922		
2,3,4,6,7,8-HxCDF	ND	0.0877		
1,2,3,7,8,9-HxCDF	ND	0.128		
1,2,3,4,6,7,8-HpCDF	0.725			J
1,2,3,4,7,8,9-HpCDF	ND	0.120		
OCDF	4.51			J
TOTALS				
Total TCDD	0.950		2.01	
Total PeCDD	0.872		5.35	
Total HxCDD	7.91			
Total HpCDD	21.6			
Total TCDF	ND	0.0870		
Total PeCDF	ND	0.0537		
Total HxCDF	0.163		0.538	
Total HpCDF	3.20			

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C-2,3,7,8-TCDD	90.8	40 - 135	
	13C-1,2,3,7,8-PeCDD	102	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	101	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	91.6	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	94.8	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	98.5	40 - 135	
	13C-OCDD	82.3	40 - 135	
	13C-2,3,7,8-TCDF	93.7	40 - 135	
	13C-1,2,3,7,8-PeCDF	106	40 - 135	
	13C-2,3,4,7,8-PeCDF	109	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	88.5	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	84.2	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	88.6	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	89.8	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	84.8	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	95.0	40 - 135	
	13C-OCDF	78.9	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	87.3	40 - 135	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin	0.292

DL - Sample specifc estimated detection limit
EMPC - Estimated maximum possible concentration

LCL-UCL- Lower control limit - upper control limit
The results are reported in dry weight. The sample size is reported in wet weight.
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: OW-210B_8-10 (20151116)

EPA Method 8290

Client Data
Name: ARCADIS
Project: B0039321.0000.00001
Date Collected: 16-Nov-2015 13:05

Sample Data
Matrix: Soil
Sample Size: 12.5 g
% Solids: 80.0

Laboratory Data
Lab Sample: 1501148-05 Date Received: 20-Nov-2015 9:25
QC Batch: B5K0138 Date Extracted: 30-Nov-2015 9:58
Date Analyzed : 06-Dec-15 13:39 Column: ZB-5MS Analyst: WJL

Analyte	Conc. (pg/g)	DL	EMPC	Qualifiers
2,3,7,8-TCDD	ND	0.0918		
1,2,3,7,8-PeCDD	ND	0.0986		
1,2,3,4,7,8-HxCDD	ND	0.129		
1,2,3,6,7,8-HxCDD	ND	0.128		
1,2,3,7,8,9-HxCDD	ND	0.145		
1,2,3,4,6,7,8-HpCDD	2.15			J
OCDD	113			
2,3,7,8-TCDF	ND	0.0733		
1,2,3,7,8-PeCDF	ND	0.0509		
2,3,4,7,8-PeCDF	ND	0.0470		
1,2,3,4,7,8-HxCDF	ND	0.0758		
1,2,3,6,7,8-HxCDF	ND	0.0707		
2,3,4,6,7,8-HxCDF	ND	0.0780		
1,2,3,7,8,9-HxCDF	ND	0.108		
1,2,3,4,6,7,8-HpCDF	0.115			J
1,2,3,4,7,8,9-HpCDF	ND	0.0817		
OCDF	0.378			J
TOTALS				
Total TCDD	0.675		0.862	
Total PeCDD	1.36		1.95	
Total HxCDD	2.81		3.28	
Total HpCDD	5.73			
Total TCDF	ND	0.0733		
Total PeCDF	ND	0.0509		
Total HxCDF	ND	0.108		
Total HpCDF	0.115		0.267	

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C-2,3,7,8-TCDD	92.0	40 - 135	
	13C-1,2,3,7,8-PeCDD	97.7	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	98.8	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	92.9	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	96.6	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	97.6	40 - 135	
	13C-OCDD	83.6	40 - 135	
	13C-2,3,7,8-TCDF	93.2	40 - 135	
	13C-1,2,3,7,8-PeCDF	104	40 - 135	
	13C-2,3,4,7,8-PeCDF	106	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	88.4	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	86.4	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	86.5	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	90.0	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	82.6	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	99.3	40 - 135	
	13C-OCDF	80.5	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	81.3	40 - 135	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin	0.0567

DL - Sample specifc estimated detection limit
EMPC - Estimated maximum possible concentration

LCL-UCL- Lower control limit - upper control limit
The results are reported in dry weight. The sample size is reported in wet weight.
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: OW-210B_28-30 (20151116)

EPA Method 8290

Client Data
Name: ARCADIS
Project: B0039321.0000.00001
Date Collected: 16-Nov-2015 14:25

Sample Data
Matrix: Soil
Sample Size: 12.7 g
% Solids: 78.8

Laboratory Data
Lab Sample: 1501148-06 Date Received: 20-Nov-2015 9:25
QC Batch: B5K0138 Date Extracted: 30-Nov-2015 9:58
Date Analyzed : 06-Dec-15 14:27 Column: ZB-5MS Analyst: WJL

Analyte	Conc. (pg/g)	DL	EMPC	Qualifiers
2,3,7,8-TCDD	ND	0.109		
1,2,3,7,8-PeCDD	ND	0.118		
1,2,3,4,7,8-HxCDD	ND	0.162		
1,2,3,6,7,8-HxCDD	ND	0.167		
1,2,3,7,8,9-HxCDD	0.854			J
1,2,3,4,6,7,8-HpCDD	11.0			
OCDD	401			
2,3,7,8-TCDF	ND	0.0941		
1,2,3,7,8-PeCDF	ND	0.0610		
2,3,4,7,8-PeCDF	ND	0.0608		
1,2,3,4,7,8-HxCDF	ND	0.0902		
1,2,3,6,7,8-HxCDF	ND	0.0944		
2,3,4,6,7,8-HxCDF	ND	0.0930		
1,2,3,7,8,9-HxCDF	ND	0.131		
1,2,3,4,6,7,8-HpCDF	0.251			J
1,2,3,4,7,8,9-HpCDF	ND	0.0956		
OCDF	1.19			J
TOTALS				
Total TCDD	ND		0.395	UX
Total PeCDD	ND		0.412	UX
Total HxCDD	2.55			
Total HpCDD	24.2			
Total TCDF	ND	0.0941		
Total PeCDF	ND	0.0610		
Total HxCDF	0.131			
Total HpCDF	0.975			

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C-2,3,7,8-TCDD	81.3	40 - 135	
	13C-1,2,3,7,8-PeCDD	87.9	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	93.5	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	84.2	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	90.1	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	91.5	40 - 135	
	13C-OCDD	77.9	40 - 135	
	13C-2,3,7,8-TCDF	82.1	40 - 135	
	13C-1,2,3,7,8-PeCDF	92.8	40 - 135	
	13C-2,3,4,7,8-PeCDF	94.1	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	81.0	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	77.4	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	81.0	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	81.3	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	77.8	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	88.7	40 - 135	
	13C-OCDF	73.0	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	73.9	40 - 135	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin	0.319

DL - Sample specifc estimated detection limit
EMPC - Estimated maximum possible concentration

LCL-UCL- Lower control limit - upper control limit
The results are reported in dry weight. The sample size is reported in wet weight.
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: P-11A_0-2 (20151117)

EPA Method 8290

Client Data
Name: ARCADIS
Project: B0039321.0000.00001
Date Collected: 17-Nov-2015 11:20

Sample Data
Matrix: Soil
Sample Size: 12.5 g
% Solids: 80.0

Laboratory Data
Lab Sample: 1501148-07 Date Received: 20-Nov-2015 9:25
QC Batch: B5K0138 Date Extracted: 30-Nov-2015 9:58
Date Analyzed : 06-Dec-15 15:15 Column: ZB-5MS Analyst: WJL
09-Dec-15 15:41 Column: DB-225 Analyst: DB

Analyte	Conc. (pg/g)	DL	EMPC	Qualifiers
2,3,7,8-TCDD	0.607			
1,2,3,7,8-PeCDD	2.80			
1,2,3,4,7,8-HxCDD	6.92			J
1,2,3,6,7,8-HxCDD	40.3			
1,2,3,7,8,9-HxCDD	12.0			J
1,2,3,4,6,7,8-HpCDD	2250			
OCDD	21300			E J
2,3,7,8-TCDF	3.62			
1,2,3,7,8-PeCDF	6.89			
2,3,4,7,8-PeCDF	4.37			
1,2,3,4,7,8-HxCDF	15.2			
1,2,3,6,7,8-HxCDF	5.35			
2,3,4,6,7,8-HxCDF	4.47			
1,2,3,7,8,9-HxCDF	2.89			
1,2,3,4,6,7,8-HpCDF	293			
1,2,3,4,7,8,9-HpCDF	24.0			
OCDF	2020			
TOTALS				
Total TCDD	21.2		21.4	
Total PeCDD	43.3			
Total HxCDD	559			
Total HpCDD	4980			J
Total TCDF	55.2			
Total PeCDF	48.4		49.0	
Total HxCDF	215		216	
Total HpCDF	1460			

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C-2,3,7,8-TCDD	97.7	40 - 135	
	13C-1,2,3,7,8-PeCDD	111	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	108	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	98.7	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	103	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	119	40 - 135	
	13C-OCDD	116	40 - 135	
	13C-2,3,7,8-TCDF	97.0	40 - 135	
	13C-1,2,3,7,8-PeCDF	115	40 - 135	
	13C-2,3,4,7,8-PeCDF	118	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	96.5	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	91.6	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	92.3	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	96.9	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	90.1	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	109	40 - 135	
	13C-OCDF	96.2	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	85.0	40 - 135	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin	46.7

DL - Sample specifc estimated detection limit
EMPC - Estimated maximum possible concentration

LCL-UCL- Lower control limit - upper control limit
The results are reported in dry weight. The sample size is reported in wet weight.
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: P-11A_2-4 (20151117)

EPA Method 8290

Client Data
Name: ARCADIS
Project: B0039321.0000.00001
Date Collected: 17-Nov-2015 11:25

Sample Data
Matrix: Soil
Sample Size: 12.8 g
% Solids: 78.4

Laboratory Data
Lab Sample: 1501148-08 Date Received: 20-Nov-2015 9:25
QC Batch: B5K0138 Date Extracted: 30-Nov-2015 9:58
Date Analyzed : 07-Dec-15 14:15 Column: ZB-5MS Analyst: WJL

Analyte	Conc. (pg/g)	DL	EMPC	Qualifiers
2,3,7,8-TCDD	ND	0.118		
1,2,3,7,8-PeCDD	ND		0.291	UX
1,2,3,4,7,8-HxCDD	0.636			J
1,2,3,6,7,8-HxCDD	1.07			J
1,2,3,7,8,9-HxCDD	0.936			J
1,2,3,4,6,7,8-HpCDD	217			
OCDD	36400			E J
2,3,7,8-TCDF	ND	0.0881		
1,2,3,7,8-PeCDF	ND	0.0763		
2,3,4,7,8-PeCDF	ND	0.0596		
1,2,3,4,7,8-HxCDF	0.163			J
1,2,3,6,7,8-HxCDF	ND	0.112		
2,3,4,6,7,8-HxCDF	ND	0.119		
1,2,3,7,8,9-HxCDF	ND	0.156		
1,2,3,4,6,7,8-HpCDF	3.41			
1,2,3,4,7,8,9-HpCDF	0.237			J
OCDF	22.4			
TOTALS				
Total TCDD	ND	0.118		
Total PeCDD	0.252		1.58	
Total HxCDD	12.7			
Total HpCDD	483			
Total TCDF	ND	0.0881		
Total PeCDF	0.130		0.207	
Total HxCDF	3.06			
Total HpCDF	16.3			

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C-2,3,7,8-TCDD	86.6	40 - 135	
	13C-1,2,3,7,8-PeCDD	94.0	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	89.2	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	88.9	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	88.0	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	89.2	40 - 135	
	13C-OCDD	102	40 - 135	
	13C-2,3,7,8-TCDF	89.3	40 - 135	
	13C-1,2,3,7,8-PeCDF	91.5	40 - 135	
	13C-2,3,4,7,8-PeCDF	98.3	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	82.1	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	78.9	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	79.3	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	85.4	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	80.2	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	91.8	40 - 135	
	13C-OCDF	81.8	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	82.5	40 - 135	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin	13.4

DL - Sample specifc estimated detection limit
EMPC - Estimated maximum possible concentration

LCL-UCL- Lower control limit - upper control limit
The results are reported in dry weight. The sample size is reported in wet weight.
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: P-11A_4-6 (20151117)

EPA Method 8290

Client Data
Name: ARCADIS
Project: B0039321.0000.00001
Date Collected: 17-Nov-2015 11:32

Sample Data
Matrix: Soil
Sample Size: 13.0 g
% Solids: 77.2

Laboratory Data
Lab Sample: 1501148-09 Date Received: 20-Nov-2015 9:25
QC Batch: B5K0138 Date Extracted: 30-Nov-2015 9:58
Date Analyzed : 07-Dec-15 15:03 Column: ZB-5MS Analyst: WJL

Analyte	Conc. (pg/g)	DL	EMPC	Qualifiers
2,3,7,8-TCDD	0.295			J
1,2,3,7,8-PeCDD	0.263			J
1,2,3,4,7,8-HxCDD	0.574			J
1,2,3,6,7,8-HxCDD	1.53			J
1,2,3,7,8,9-HxCDD	0.886			J
1,2,3,4,6,7,8-HpCDD	112			
OCDD	4720			
2,3,7,8-TCDF	ND	0.0781		
1,2,3,7,8-PeCDF	ND	0.0645		
2,3,4,7,8-PeCDF	ND		0.103	UX
1,2,3,4,7,8-HxCDF	0.379			J
1,2,3,6,7,8-HxCDF	ND	0.0837		
2,3,4,6,7,8-HxCDF	0.218			J
1,2,3,7,8,9-HxCDF	ND	0.122		
1,2,3,4,6,7,8-HpCDF	8.56			
1,2,3,4,7,8,9-HpCDF	0.680			J
OCDF	55.8			
TOTALS				
Total TCDD	2.62		2.90	
Total PeCDD	1.23		3.52	
Total HxCDD	21.0			
Total HpCDD	268			
Total TCDF	1.64		1.75	
Total PeCDF	ND		0.773	UX
Total HxCDF	7.20			
Total HpCDF	40.3			

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C-2,3,7,8-TCDD	95.1	40 - 135	
	13C-1,2,3,7,8-PeCDD	102	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	104	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	98.5	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	103	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	104	40 - 135	
	13C-OCDD	98.5	40 - 135	
	13C-2,3,7,8-TCDF	98.0	40 - 135	
	13C-1,2,3,7,8-PeCDF	106	40 - 135	
	13C-2,3,4,7,8-PeCDF	108	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	95.6	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	91.6	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	94.0	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	97.2	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	90.4	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	108	40 - 135	
	13C-OCDF	88.6	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	83.9	40 - 135	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin	3.56

DL - Sample specifc estimated detection limit
EMPC - Estimated maximum possible concentration

LCL-UCL- Lower control limit - upper control limit
The results are reported in dry weight. The sample size is reported in wet weight.
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: P-11A_6-8 (20151117)

EPA Method 8290

Client Data
Name: ARCADIS
Project: B0039321.0000.00001
Date Collected: 17-Nov-2015 11:36

Sample Data
Matrix: Soil
Sample Size: 10.4 g
% Solids: 96.4

Laboratory Data
Lab Sample: 1501148-10 Date Received: 20-Nov-2015 9:25
QC Batch: B5K0138 Date Extracted: 30-Nov-2015 9:58
Date Analyzed : 07-Dec-15 15:51 Column: ZB-5MS Analyst: WJL

Analyte	Conc. (pg/g)	DL	EMPC	Qualifiers
2,3,7,8-TCDD	ND	0.100		
1,2,3,7,8-PeCDD	0.213			J
1,2,3,4,7,8-HxCDD	ND	0.199		
1,2,3,6,7,8-HxCDD	0.571			J
1,2,3,7,8,9-HxCDD	0.478			J
1,2,3,4,6,7,8-HpCDD	22.4			
OCDD	320			
2,3,7,8-TCDF	ND	0.0857		
1,2,3,7,8-PeCDF	ND	0.0600		
2,3,4,7,8-PeCDF	ND	0.0611		
1,2,3,4,7,8-HxCDF	ND	0.0870		
1,2,3,6,7,8-HxCDF	ND	0.0885		
2,3,4,6,7,8-HxCDF	ND	0.0947		
1,2,3,7,8,9-HxCDF	ND	0.139		
1,2,3,4,6,7,8-HpCDF	2.14			J
1,2,3,4,7,8,9-HpCDF	0.173			J
OCDF	13.9			
TOTALS				
Total TCDD	3.05		3.42	
Total PeCDD	18.9		20.5	
Total HxCDD	21.0			
Total HpCDD	52.9			
Total TCDF	ND	0.0857		
Total PeCDF	0.136			
Total HxCDF	1.71			
Total HpCDF	10.3			

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C-2,3,7,8-TCDD	79.2	40 - 135	
	13C-1,2,3,7,8-PeCDD	82.9	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	90.0	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	84.4	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	86.1	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	87.6	40 - 135	
	13C-OCDD	76.4	40 - 135	
	13C-2,3,7,8-TCDF	81.5	40 - 135	
	13C-1,2,3,7,8-PeCDF	86.1	40 - 135	
	13C-2,3,4,7,8-PeCDF	88.9	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	80.0	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	78.4	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	78.1	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	79.8	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	76.1	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	87.8	40 - 135	
	13C-OCDF	73.1	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	82.0	40 - 135	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin	0.665

DL - Sample specifc estimated detection limit
EMPC - Estimated maximum possible concentration

LCL-UCL- Lower control limit - upper control limit
The results are reported in dry weight. The sample size is reported in wet weight.
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: P-11A_8-10 (20151117)

EPA Method 8290

Client Data
Name: ARCADIS
Project: B0039321.0000.00001
Date Collected: 17-Nov-2015 11:45

Sample Data
Matrix: Soil
Sample Size: 12.4 g
% Solids: 80.7

Laboratory Data
Lab Sample: 1501148-11 Date Received: 20-Nov-2015 9:25
QC Batch: B5K0138 Date Extracted: 30-Nov-2015 9:58
Date Analyzed : 07-Dec-15 16:39 Column: ZB-5MS Analyst: WJL

Analyte	Conc. (pg/g)	DL	EMPC	Qualifiers
2,3,7,8-TCDD	ND		0.210	UX
1,2,3,7,8-PeCDD	ND		0.113	UX
1,2,3,4,7,8-HxCDD	ND	0.169		
1,2,3,6,7,8-HxCDD	ND	0.171		
1,2,3,7,8,9-HxCDD	ND	0.194		
1,2,3,4,6,7,8-HpCDD	12.7			
OCDD	262			J
2,3,7,8-TCDF	ND	0.0795		
1,2,3,7,8-PeCDF	ND	0.0545		
2,3,4,7,8-PeCDF	ND	0.0597		
1,2,3,4,7,8-HxCDF	ND	0.0725		
1,2,3,6,7,8-HxCDF	ND	0.0752		
2,3,4,6,7,8-HxCDF	ND	0.0760		
1,2,3,7,8,9-HxCDF	ND	0.113		
1,2,3,4,6,7,8-HpCDF	1.05			J
1,2,3,4,7,8,9-HpCDF	ND	0.145		
OCDF	6.50			
TOTALS				
Total TCDD	1.55		2.53	
Total PeCDD	4.25		5.86	
Total HxCDD	6.27			
Total HpCDD	31.5			
Total TCDF	ND	0.0795		
Total PeCDF	ND	0.0597		
Total HxCDF	0.611		0.788	
Total HpCDF	4.58			

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C-2,3,7,8-TCDD	88.8	40 - 135	
	13C-1,2,3,7,8-PeCDD	93.9	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	94.3	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	90.0	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	90.9	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	93.1	40 - 135	
	13C-OCDD	76.6	40 - 135	
	13C-2,3,7,8-TCDF	92.0	40 - 135	
	13C-1,2,3,7,8-PeCDF	100	40 - 135	
	13C-2,3,4,7,8-PeCDF	102	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	87.7	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	83.5	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	86.0	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	87.6	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	82.5	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	96.2	40 - 135	
	13C-OCDF	77.6	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	82.8	40 - 135	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin	0.218

DL - Sample specifc estimated detection limit
EMPC - Estimated maximum possible concentration

LCL-UCL- Lower control limit - upper control limit
The results are reported in dry weight. The sample size is reported in wet weight.
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: DUP-01 (20151117)

EPA Method 8290

Client Data
Name: ARCADIS
Project: B0039321.0000.00001
Date Collected: 17-Nov-2015 0:00

Sample Data
Matrix: Soil
Sample Size: 12.4 g
% Solids: 80.3

Laboratory Data
Lab Sample: 1501148-12 Date Received: 20-Nov-2015 9:25
QC Batch: B5K0138 Date Extracted: 30-Nov-2015 9:58
Date Analyzed : 07-Dec-15 17:27 Column: ZB-5MS Analyst: WJL
10-Dec-15 11:11 Column: ZB-5MS Analyst: WJL

Analyte	Conc. (pg/g)	DL	EMPC	Qualifiers
2,3,7,8-TCDD	0.951			
1,2,3,7,8-PeCDD	6.25			
1,2,3,4,7,8-HxCDD	23.1			J
1,2,3,6,7,8-HxCDD	99.0			
1,2,3,7,8,9-HxCDD	40.2			J
1,2,3,4,6,7,8-HpCDD	6660			D
OCDD	68500			D J
2,3,7,8-TCDF	1.21			
1,2,3,7,8-PeCDF	2.36			J
2,3,4,7,8-PeCDF	7.41			
1,2,3,4,7,8-HxCDF	33.8			
1,2,3,6,7,8-HxCDF	9.52			
2,3,4,6,7,8-HxCDF	13.2			
1,2,3,7,8,9-HxCDF	6.65			
1,2,3,4,6,7,8-HpCDF	605			
1,2,3,4,7,8,9-HpCDF	44.5			
OCDF	3770			
TOTALS				
Total TCDD	29.2		29.4	
Total PeCDD	82.5		85.4	
Total HxCDD	1440			
Total HpCDD	19300			J
Total TCDF	20.6			
Total PeCDF	71.5		72.4	
Total HxCDF	538			
Total HpCDF	2980			

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C-2,3,7,8-TCDD	82.2	40 - 135	
	13C-1,2,3,7,8-PeCDD	85.8	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	88.7	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	80.9	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	82.1	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	91.7	40 - 135	D
	13C-OCDD	89.2	40 - 135	D
	13C-2,3,7,8-TCDF	82.5	40 - 135	
	13C-1,2,3,7,8-PeCDF	86.7	40 - 135	
	13C-2,3,4,7,8-PeCDF	89.7	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	77.9	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	73.2	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	74.9	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	77.4	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	75.2	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	92.3	40 - 135	
	13C-OCDF	84.5	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	74.6	40 - 135	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin	127

DL - Sample specifc estimated detection limit
EMPC - Estimated maximum possible concentration

LCL-UCL- Lower control limit - upper control limit
The results are reported in dry weight. The sample size is reported in wet weight.
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: OW-211B_0-2 (20151119)

EPA Method 8290

Client Data
Name: ARCADIS
Project: B0039321.0000.00001
Date Collected: 19-Nov-2015 9:05

Sample Data
Matrix: Soil
Sample Size: 12.7 g
% Solids: 78.9

Laboratory Data
Lab Sample: 1501148-13 Date Received: 20-Nov-2015 9:25
QC Batch: B5K0138 Date Extracted: 30-Nov-2015 9:58
Date Analyzed : 07-Dec-15 18:15 Column: ZB-5MS Analyst: WJL
09-Dec-15 16:47 Column: DB-225 Analyst: DB

Analyte	Conc. (pg/g)	DL	EMPC	Qualifiers
2,3,7,8-TCDD	1.32			
1,2,3,7,8-PeCDD	12.2			
1,2,3,4,7,8-HxCDD	29.5			
1,2,3,6,7,8-HxCDD	101			
1,2,3,7,8,9-HxCDD	57.3			
1,2,3,4,6,7,8-HpCDD	3680			E J
OCDD	33500			E J
2,3,7,8-TCDF	1.12			
1,2,3,7,8-PeCDF	2.08			J
2,3,4,7,8-PeCDF	5.88			
1,2,3,4,7,8-HxCDF	27.6			
1,2,3,6,7,8-HxCDF	15.5			
2,3,4,6,7,8-HxCDF	26.2			
1,2,3,7,8,9-HxCDF	5.07			
1,2,3,4,6,7,8-HpCDF	735			
1,2,3,4,7,8,9-HpCDF	45.6			
OCDF	3040			
TOTALS				
Total TCDD	46.0		46.2	
Total PeCDD	107			
Total HxCDD	851			
Total HpCDD	7530			
Total TCDF	26.6			
Total PeCDF	133			
Total HxCDF	713			
Total HpCDF	2860			

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C-2,3,7,8-TCDD	89.9	40 - 135	
	13C-1,2,3,7,8-PeCDD	98.6	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	96.6	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	92.1	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	92.7	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	113	40 - 135	
	13C-OCDD	106	40 - 135	
	13C-2,3,7,8-TCDF	90.2	40 - 135	
	13C-1,2,3,7,8-PeCDF	100	40 - 135	
	13C-2,3,4,7,8-PeCDF	104	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	88.3	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	81.8	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	84.5	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	87.6	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	86.7	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	96.2	40 - 135	
	13C-OCDF	92.0	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	84.8	40 - 135	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin	97.2

DL - Sample specifc estimated detection limit
EMPC - Estimated maximum possible concentration

LCL-UCL- Lower control limit - upper control limit
The results are reported in dry weight. The sample size is reported in wet weight.
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: OW-211B_2-4 (20151119)

EPA Method 8290

Client Data
Name: ARCADIS
Project: B0039321.0000.00001
Date Collected: 19-Nov-2015 9:10

Sample Data
Matrix: Soil
Sample Size: 12.5 g
% Solids: 81.1

Laboratory Data
Lab Sample: 1501148-14 Date Received: 20-Nov-2015 9:25
QC Batch: B5K0138 Date Extracted: 30-Nov-2015 9:58
Date Analyzed : 07-Dec-15 19:03 Column: ZB-5MS Analyst: WJL

Analyte	Conc. (pg/g)	DL	EMPC	Qualifiers
2,3,7,8-TCDD	0.346			J
1,2,3,7,8-PeCDD	0.740			J
1,2,3,4,7,8-HxCDD	1.80			J
1,2,3,6,7,8-HxCDD	3.14			
1,2,3,7,8,9-HxCDD	3.39			
1,2,3,4,6,7,8-HpCDD	380			
OCDD	39400			E J
2,3,7,8-TCDF	ND	0.0814		
1,2,3,7,8-PeCDF	ND	0.0598		
2,3,4,7,8-PeCDF	ND		0.0940	UX
1,2,3,4,7,8-HxCDF	0.351			J
1,2,3,6,7,8-HxCDF	ND		0.178	UX
2,3,4,6,7,8-HxCDF	0.307			J
1,2,3,7,8,9-HxCDF	ND	0.195		
1,2,3,4,6,7,8-HpCDF	8.61			
1,2,3,4,7,8,9-HpCDF	0.678			J
OCDF	40.0			
TOTALS				
Total TCDD	1.35		1.66	
Total PeCDD	4.00		5.28	
Total HxCDD	31.7			
Total HpCDD	744			
Total TCDF	ND		0.437	UX
Total PeCDF	0.858		1.44	
Total HxCDF	7.62		7.80	
Total HpCDF	30.9			

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C-2,3,7,8-TCDD	96.0	40 - 135	
	13C-1,2,3,7,8-PeCDD	103	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	105	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	96.6	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	96.8	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	102	40 - 135	
	13C-OCDD	112	40 - 135	
	13C-2,3,7,8-TCDF	95.0	40 - 135	
	13C-1,2,3,7,8-PeCDF	107	40 - 135	
	13C-2,3,4,7,8-PeCDF	110	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	96.3	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	94.1	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	93.1	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	94.3	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	89.7	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	97.3	40 - 135	
	13C-OCDF	88.4	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	86.2	40 - 135	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin	17.7

DL - Sample specifc estimated detection limit
EMPC - Estimated maximum possible concentration

LCL-UCL- Lower control limit - upper control limit
The results are reported in dry weight. The sample size is reported in wet weight.
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: OW-211B_4-6 (20151119)

EPA Method 8290

Client Data
Name: ARCADIS
Project: B0039321.0000.00001
Date Collected: 19-Nov-2015 9:20

Sample Data
Matrix: Soil
Sample Size: 12.8 g
% Solids: 78.6

Laboratory Data
Lab Sample: 1501148-15 Date Received: 20-Nov-2015 9:25
QC Batch: B5K0138 Date Extracted: 30-Nov-2015 9:58
Date Analyzed : 07-Dec-15 19:51 Column: ZB-5MS Analyst: WJL

Analyte	Conc. (pg/g)	DL	EMPC	Qualifiers
2,3,7,8-TCDD	0.279			J
1,2,3,7,8-PeCDD	ND		0.188	UX
1,2,3,4,7,8-HxCDD	0.732			J
1,2,3,6,7,8-HxCDD	0.971			J
1,2,3,7,8,9-HxCDD	1.10			J
1,2,3,4,6,7,8-HpCDD	121			
OCDD	10100			E J
2,3,7,8-TCDF	ND	0.0700		
1,2,3,7,8-PeCDF	ND	0.0647		
2,3,4,7,8-PeCDF	ND	0.0627		
1,2,3,4,7,8-HxCDF	ND	0.0853		
1,2,3,6,7,8-HxCDF	ND	0.0861		
2,3,4,6,7,8-HxCDF	0.126			J
1,2,3,7,8,9-HxCDF	ND	0.127		
1,2,3,4,6,7,8-HpCDF	2.60			
1,2,3,4,7,8,9-HpCDF	ND	0.138		
OCDF	11.4			

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C-2,3,7,8-TCDD	91.5	40 - 135	
	13C-1,2,3,7,8-PeCDD	97.7	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	100	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	90.5	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	95.3	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	95.5	40 - 135	
	13C-OCDD	98.4	40 - 135	
	13C-2,3,7,8-TCDF	93.4	40 - 135	
	13C-1,2,3,7,8-PeCDF	102	40 - 135	
	13C-2,3,4,7,8-PeCDF	102	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	89.9	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	85.3	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	88.0	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	89.2	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	83.8	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	93.3	40 - 135	
	13C-OCDF	81.1	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	78.9	40 - 135	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin	4.84

TOTALS		
Total TCDD	1.95	2.41
Total PeCDD	8.40	8.74
Total HxCDD	23.3	23.6
Total HpCDD	243	
Total TCDF	0.287	
Total PeCDF	0.254	0.343
Total HxCDF	2.43	
Total HpCDF	9.21	

DL - Sample specifc estimated detection limit
EMPC - Estimated maximum possible concentration

LCL-UCL- Lower control limit - upper control limit
The results are reported in dry weight. The sample size is reported in wet weight.
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: OW-211B_6-8 (20151119)

EPA Method 8290

Client Data
Name: ARCADIS
Project: B0039321.0000.00001
Date Collected: 19-Nov-2015 9:28

Sample Data
Matrix: Soil
Sample Size: 12.7 g
% Solids: 78.7

Laboratory Data
Lab Sample: 1501148-16 Date Received: 20-Nov-2015 9:25
QC Batch: B5K0138 Date Extracted: 30-Nov-2015 9:58
Date Analyzed : 07-Dec-15 20:39 Column: ZB-5MS Analyst: WJL

Analyte	Conc. (pg/g)	DL	EMPC	Qualifiers
2,3,7,8-TCDD	ND		0.327	UX
1,2,3,7,8-PeCDD	0.118			J
1,2,3,4,7,8-HxCDD	ND	0.201		
1,2,3,6,7,8-HxCDD	ND	0.197		
1,2,3,7,8,9-HxCDD	ND	0.231		
1,2,3,4,6,7,8-HpCDD	11.1			
OCDD	618			
2,3,7,8-TCDF	ND	0.0623		
1,2,3,7,8-PeCDF	ND	0.0537		
2,3,4,7,8-PeCDF	ND	0.0549		
1,2,3,4,7,8-HxCDF	ND	0.132		
1,2,3,6,7,8-HxCDF	ND	0.136		
2,3,4,6,7,8-HxCDF	ND	0.148		
1,2,3,7,8,9-HxCDF	ND	0.209		
1,2,3,4,6,7,8-HpCDF	0.452			J
1,2,3,4,7,8,9-HpCDF	ND	0.138		
OCDF	1.78			J
TOTALS				
Total TCDD	5.96		6.59	
Total PeCDD	20.0		20.5	
Total HxCDD	18.2			
Total HpCDD	23.3			
Total TCDF	ND	0.0623		
Total PeCDF	ND		0.0650	UX
Total HxCDF	0.455			
Total HpCDF	1.56			

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C-2,3,7,8-TCDD	88.1	40 - 135	
	13C-1,2,3,7,8-PeCDD	92.2	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	96.7	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	91.8	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	93.4	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	96.6	40 - 135	
	13C-OCDD	81.6	40 - 135	
	13C-2,3,7,8-TCDF	89.0	40 - 135	
	13C-1,2,3,7,8-PeCDF	97.0	40 - 135	
	13C-2,3,4,7,8-PeCDF	97.9	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	87.6	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	87.6	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	87.1	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	89.2	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	84.1	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	94.1	40 - 135	
	13C-OCDF	74.7	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	90.6	40 - 135	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin	0.419

DL - Sample specifc estimated detection limit
EMPC - Estimated maximum possible concentration

LCL-UCL- Lower control limit - upper control limit
The results are reported in dry weight. The sample size is reported in wet weight.
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: OW-211B_8-10 (20151119)

EPA Method 8290

Client Data
Name: ARCADIS
Project: B0039321.0000.00001
Date Collected: 19-Nov-2015 9:32

Sample Data
Matrix: Soil
Sample Size: 12.7 g
% Solids: 79.0

Laboratory Data
Lab Sample: 1501148-17 Date Received: 20-Nov-2015 9:25
QC Batch: B5K0138 Date Extracted: 30-Nov-2015 9:58
Date Analyzed : 07-Dec-15 21:26 Column: ZB-5MS Analyst: WJL

Analyte	Conc. (pg/g)	DL	EMPC	Qualifiers
2,3,7,8-TCDD	ND		0.248	UX
1,2,3,7,8-PeCDD	ND		0.155	UX
1,2,3,4,7,8-HxCDD	ND	0.244		
1,2,3,6,7,8-HxCDD	0.363			J
1,2,3,7,8,9-HxCDD	ND	0.280		
1,2,3,4,6,7,8-HpCDD	22.7			
OCDD	1930			
2,3,7,8-TCDF	ND	0.0750		
1,2,3,7,8-PeCDF	ND	0.0601		
2,3,4,7,8-PeCDF	ND	0.0599		
1,2,3,4,7,8-HxCDF	ND	0.0939		
1,2,3,6,7,8-HxCDF	ND	0.0978		
2,3,4,6,7,8-HxCDF	ND	0.0989		
1,2,3,7,8,9-HxCDF	ND	0.156		
1,2,3,4,6,7,8-HpCDF	1.14			J
1,2,3,4,7,8,9-HpCDF	ND	0.168		
OCDF	4.58			J
TOTALS				
Total TCDD	0.815		1.28	
Total PeCDD	5.64		6.81	
Total HxCDD	11.1			
Total HpCDD	48.9			
Total TCDF	0.106			
Total PeCDF	0.136			
Total HxCDF	1.08			
Total HpCDF	3.94			

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C-2,3,7,8-TCDD	72.6	40 - 135	
	13C-1,2,3,7,8-PeCDD	78.5	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	80.7	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	75.7	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	77.2	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	79.0	40 - 135	
	13C-OCDD	70.1	40 - 135	
	13C-2,3,7,8-TCDF	75.6	40 - 135	
	13C-1,2,3,7,8-PeCDF	81.8	40 - 135	
	13C-2,3,4,7,8-PeCDF	82.9	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	73.6	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	72.3	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	72.8	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	70.7	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	69.1	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	74.9	40 - 135	
	13C-OCDF	62.7	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	65.5	40 - 135	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin	0.855

DL - Sample specifc estimated detection limit
EMPC - Estimated maximum possible concentration

LCL-UCL- Lower control limit - upper control limit
The results are reported in dry weight. The sample size is reported in wet weight.
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: DUP-02(20151119)

EPA Method 8290

Client Data
Name: ARCADIS
Project: B0039321.0000.00001
Date Collected: 19-Nov-2015 0:00

Sample Data
Matrix: Soil
Sample Size: 12.5 g
% Solids: 80.1

Laboratory Data
Lab Sample: 1501148-18 Date Received: 20-Nov-2015 9:25
QC Batch: B5K0138 Date Extracted: 30-Nov-2015 9:58
Date Analyzed : 07-Dec-15 22:14 Column: ZB-5MS Analyst: WJL

Analyte	Conc. (pg/g)	DL	EMPC	Qualifiers
2,3,7,8-TCDD	ND		0.155	UX
1,2,3,7,8-PeCDD	0.212			J
1,2,3,4,7,8-HxCDD	0.666			J
1,2,3,6,7,8-HxCDD	1.20			J
1,2,3,7,8,9-HxCDD	0.985			J
1,2,3,4,6,7,8-HpCDD	108			
OCDD	7480			E J
2,3,7,8-TCDF	ND	0.0659		
1,2,3,7,8-PeCDF	ND	0.0782		
2,3,4,7,8-PeCDF	ND	0.0827		
1,2,3,4,7,8-HxCDF	ND		0.156	UX
1,2,3,6,7,8-HxCDF	ND	0.100		
2,3,4,6,7,8-HxCDF	0.193			J
1,2,3,7,8,9-HxCDF	ND	0.152		
1,2,3,4,6,7,8-HpCDF	4.51			
1,2,3,4,7,8,9-HpCDF	ND	0.272		
OCDF	20.6			

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C-2,3,7,8-TCDD	84.4	40 - 135	
	13C-1,2,3,7,8-PeCDD	88.2	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	90.8	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	86.1	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	88.1	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	87.3	40 - 135	
	13C-OCDD	85.6	40 - 135	
	13C-2,3,7,8-TCDF	87.9	40 - 135	
	13C-1,2,3,7,8-PeCDF	96.6	40 - 135	
	13C-2,3,4,7,8-PeCDF	98.7	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	84.2	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	79.2	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	82.8	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	83.1	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	77.3	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	87.9	40 - 135	
	13C-OCDF	71.7	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	82.3	40 - 135	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin	3.89

TOTALS		
Total TCDD	1.65	1.80
Total PeCDD	4.10	4.86
Total HxCDD	16.1	
Total HpCDD	212	
Total TCDF	0.138	0.368
Total PeCDF	0.448	0.619
Total HxCDF	3.90	4.42
Total HpCDF	16.4	

DL - Sample specifc estimated detection limit
EMPC - Estimated maximum possible concentration

LCL-UCL- Lower control limit - upper control limit
The results are reported in dry weight. The sample size is reported in wet weight.
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: OW-211B_26-28 (20151119)

EPA Method 8290

Client Data
Name: ARCADIS
Project: B0039321.0000.00001
Date Collected: 19-Nov-2015 10:35

Sample Data
Matrix: Soil
Sample Size: 12.0 g
% Solids: 83.9

Laboratory Data
Lab Sample: 1501148-19 Date Received: 20-Nov-2015 9:25
QC Batch: B5K0138 Date Extracted: 30-Nov-2015 9:58
Date Analyzed : 07-Dec-15 23:02 Column: ZB-5MS Analyst: WJL

Analyte	Conc. (pg/g)	DL	EMPC	Qualifiers
2,3,7,8-TCDD	ND	0.0842		
1,2,3,7,8-PeCDD	ND	0.117		
1,2,3,4,7,8-HxCDD	ND	0.190		
1,2,3,6,7,8-HxCDD	ND	0.198		
1,2,3,7,8,9-HxCDD	ND	0.227		
1,2,3,4,6,7,8-HpCDD	1.71			J
OCDD	53.3			
2,3,7,8-TCDF	ND	0.0591		
1,2,3,7,8-PeCDF	ND	0.0515		
2,3,4,7,8-PeCDF	ND	0.0443		
1,2,3,4,7,8-HxCDF	ND	0.0725		
1,2,3,6,7,8-HxCDF	ND	0.0711		
2,3,4,6,7,8-HxCDF	ND	0.0740		
1,2,3,7,8,9-HxCDF	ND	0.103		
1,2,3,4,6,7,8-HpCDF	ND	0.217		
1,2,3,4,7,8,9-HpCDF	ND	0.210		
OCDF	0.319			J
TOTALS				
Total TCDD	1.33			
Total PeCDD	ND	0.117		
Total HxCDD	0.889			
Total HpCDD	4.45			
Total TCDF	ND	0.0591		
Total PeCDF	ND	0.0515		
Total HxCDF	ND	0.103		
Total HpCDF	0.215			

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C-2,3,7,8-TCDD	77.3	40 - 135	
	13C-1,2,3,7,8-PeCDD	80.2	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	85.8	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	80.1	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	81.6	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	84.1	40 - 135	
	13C-OCDD	67.4	40 - 135	
	13C-2,3,7,8-TCDF	80.1	40 - 135	
	13C-1,2,3,7,8-PeCDF	83.8	40 - 135	
	13C-2,3,4,7,8-PeCDF	86.9	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	76.9	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	75.0	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	76.9	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	78.0	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	72.2	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	82.2	40 - 135	
	13C-OCDF	66.0	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	84.4	40 - 135	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin	0.0332

DL - Sample specifc estimated detection limit
EMPC - Estimated maximum possible concentration

LCL-UCL- Lower control limit - upper control limit
The results are reported in dry weight. The sample size is reported in wet weight.
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: EB-01 (20151116)

EPA Method 8290

Client Data
Name: ARCADIS
Project: B0039321.0000.00001
Date Collected: 16-Nov-2015 15:00

Sample Data
Matrix: Aqueous
Sample Size: 0.886 L

Laboratory Data
Lab Sample: 1501148-20 Date Received: 20-Nov-2015 9:25
QC Batch: B5L0014 Date Extracted: 03-Dec-2015 8:24
Date Analyzed : 09-Dec-15 15:27 Column: ZB-5MS Analyst: WJL

Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers
2,3,7,8-TCDD	ND	1.61		
1,2,3,7,8-PeCDD	ND	1.11		
1,2,3,4,7,8-HxCDD	ND	0.977		
1,2,3,6,7,8-HxCDD	ND	0.995		
1,2,3,7,8,9-HxCDD	ND	1.14		
1,2,3,4,6,7,8-HpCDD	ND	1.09		
OCDD	ND		1.08	UX
2,3,7,8-TCDF	ND	1.31		
1,2,3,7,8-PeCDF	ND	0.556		
2,3,4,7,8-PeCDF	ND	0.508		
1,2,3,4,7,8-HxCDF	ND	0.568		
1,2,3,6,7,8-HxCDF	ND	0.556		
2,3,4,6,7,8-HxCDF	ND	0.568		
1,2,3,7,8,9-HxCDF	ND	0.871		
1,2,3,4,6,7,8-HpCDF	ND	0.645		
1,2,3,4,7,8,9-HpCDF	ND	0.569		
OCDF	ND	1.74		
TOTALS				
Total TCDD	ND	1.61		
Total PeCDD	ND	1.11		
Total HxCDD	ND	1.14		
Total HpCDD	ND	1.09		
Total TCDF	ND	1.31		
Total PeCDF	ND	0.556		
Total HxCDF	ND	0.871		
Total HpCDF	ND	0.645		

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C-2,3,7,8-TCDD	87.9	40 - 135	
	13C-1,2,3,7,8-PeCDD	95.9	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	97.4	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	91.1	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	92.7	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	101	40 - 135	
	13C-OCDD	79.3	40 - 135	
	13C-2,3,7,8-TCDF	92.8	40 - 135	
	13C-1,2,3,7,8-PeCDF	102	40 - 135	
	13C-2,3,4,7,8-PeCDF	106	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	85.1	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	82.5	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	86.0	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	88.9	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	82.8	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	104	40 - 135	
	13C-OCDF	77.7	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	88.6	40 - 135	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin	0.00

DL - Sample specifc estimated detection limit
EMPC - Estimated maximum possible concentration

LCL-UCL- Lower control limit - upper control limit
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: EB-02 (20151117)

EPA Method 8290

Client Data
Name: ARCADIS
Project: B0039321.0000.00001
Date Collected: 17-Nov-2015 12:30

Sample Data
Matrix: Aqueous
Sample Size: 0.931 L

Laboratory Data
Lab Sample: 1501148-21 Date Received: 20-Nov-2015 9:25
QC Batch: B5L0014 Date Extracted: 03-Dec-2015 8:24
Date Analyzed : 09-Dec-15 16:15 Column: ZB-5MS Analyst: WJL

Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers
2,3,7,8-TCDD	ND	1.29		
1,2,3,7,8-PeCDD	ND	0.820		
1,2,3,4,7,8-HxCDD	ND	0.882		
1,2,3,6,7,8-HxCDD	ND	0.865		
1,2,3,7,8,9-HxCDD	ND	0.998		
1,2,3,4,6,7,8-HpCDD	ND	0.950		
OCDD	ND	1.33		
2,3,7,8-TCDF	ND	1.14		
1,2,3,7,8-PeCDF	ND	0.476		
2,3,4,7,8-PeCDF	ND	0.456		
1,2,3,4,7,8-HxCDF	ND	0.556		
1,2,3,6,7,8-HxCDF	ND	0.565		
2,3,4,6,7,8-HxCDF	ND	0.535		
1,2,3,7,8,9-HxCDF	ND	0.839		
1,2,3,4,6,7,8-HpCDF	ND	0.555		
1,2,3,4,7,8,9-HpCDF	ND	0.573		
OCDF	ND	1.42		
TOTALS				
Total TCDD	ND	1.29		
Total PeCDD	ND	0.820		
Total HxCDD	ND	0.998		
Total HpCDD	ND	0.950		
Total TCDF	ND	1.14		
Total PeCDF	ND	0.476		
Total HxCDF	ND	0.839		
Total HpCDF	ND	0.573		

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C-2,3,7,8-TCDD	92.2	40 - 135	
	13C-1,2,3,7,8-PeCDD	101	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	95.6	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	88.9	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	90.9	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	99.4	40 - 135	
	13C-OCDD	77.7	40 - 135	
	13C-2,3,7,8-TCDF	94.5	40 - 135	
	13C-1,2,3,7,8-PeCDF	100	40 - 135	
	13C-2,3,4,7,8-PeCDF	106	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	84.4	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	82.7	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	87.8	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	88.7	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	84.2	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	98.1	40 - 135	
	13C-OCDF	77.3	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	86.8	40 - 135	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin	0.00

DL - Sample specifc estimated detection limit
EMPC - Estimated maximum possible concentration

LCL-UCL- Lower control limit - upper control limit
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: EB-03 (20151119)

EPA Method 8290

Client Data
Name: ARCADIS
Project: B0039321.0000.00001
Date Collected: 19-Nov-2015 13:30

Sample Data
Matrix: Aqueous
Sample Size: 0.904 L

Laboratory Data
Lab Sample: 1501148-22 Date Received: 20-Nov-2015 9:25
QC Batch: B5L0014 Date Extracted: 03-Dec-2015 8:24
Date Analyzed : 10-Dec-15 12:47 Column: ZB-5MS Analyst: WJL

Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers
2,3,7,8-TCDD	ND	0.996		
1,2,3,7,8-PeCDD	ND	0.815		
1,2,3,4,7,8-HxCDD	ND	1.14		
1,2,3,6,7,8-HxCDD	ND	1.18		
1,2,3,7,8,9-HxCDD	ND	1.34		
1,2,3,4,6,7,8-HpCDD	ND	1.60		
OCDD	8.98			J
2,3,7,8-TCDF	ND	0.828		
1,2,3,7,8-PeCDF	ND	0.580		
2,3,4,7,8-PeCDF	ND	0.502		
1,2,3,4,7,8-HxCDF	ND	0.632		
1,2,3,6,7,8-HxCDF	ND	0.641		
2,3,4,6,7,8-HxCDF	ND	0.623		
1,2,3,7,8,9-HxCDF	ND	0.953		
1,2,3,4,6,7,8-HpCDF	ND	0.828		
1,2,3,4,7,8,9-HpCDF	ND	0.797		
OCDF	ND	1.85		
TOTALS				
Total TCDD	ND	0.996		
Total PeCDD	ND	0.815		
Total HxCDD	ND	1.34		
Total HpCDD	ND	1.60		
Total TCDF	ND	0.828		
Total PeCDF	ND	0.580		
Total HxCDF	ND	0.953		
Total HpCDF	ND	0.828		

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C-2,3,7,8-TCDD	84.7	40 - 135	
	13C-1,2,3,7,8-PeCDD	91.2	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	85.6	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	77.2	40 - 135	
	13C-1,2,3,7,8,9-HxCDD	81.6	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	83.2	40 - 135	
	13C-OCDD	67.7	40 - 135	
	13C-2,3,7,8-TCDF	89.3	40 - 135	
	13C-1,2,3,7,8-PeCDF	91.1	40 - 135	
	13C-2,3,4,7,8-PeCDF	97.2	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	74.8	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	70.6	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	78.1	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	78.2	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	68.5	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	76.9	40 - 135	
	13C-OCDF	65.3	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	87.4	40 - 135	

Toxic Equivalent Quotient (TEQ) Data

TEQMinWHO2005Dioxin	0.00269

DL - Sample specifc estimated detection limit
EMPC - Estimated maximum possible concentration

LCL-UCL- Lower control limit - upper control limit
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

APPENDIX D

Illinois Environmental Protection Agency Well Completion Reports

Illinois Environmental Protection Agency **Well Completion Report**

Site Number: 0778010002 County: Jackson

Site Name: Former Koppers Wood-Treating Site, Carbondale, IL Well #: OW-207B

State Plane Coordinate: X _____ Y _____ (or) Latitude: 37° 44' 49.8" Longitude: -89° 11' 43.2" Borehole #: N/A

Surveyed by: Shawnee Surveying & Consulting, Inc. IL Registration #: 184-002344

Drilling Contractor: Roberts Environmental Drilling (IL Lic #092-006865) Driller: Brian Schilling

Consulting Firm: ARCADIS Geologist: Will Stephens, ARCADIS

Drilling Method: Hollow Stem Auger (HSA) Drilling Fluid (Type): N/A

Logged By: Will Stephens, ARCADIS Date Started: 11/23/2015 Date Finished: 11/24/2015

Report Form Completed By: Will Stephens, ARCADIS Date: 1/6/2015

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Neat Portland Type I/II Cement

Installation Method: HSA (Tremie)

Setting Time: 15 minutes

Type of Bentonite Seal - - Granular, Pellet, Slurry X
(Choose One)

Installation Method: HSA (Tremie)

Setting Time: _____

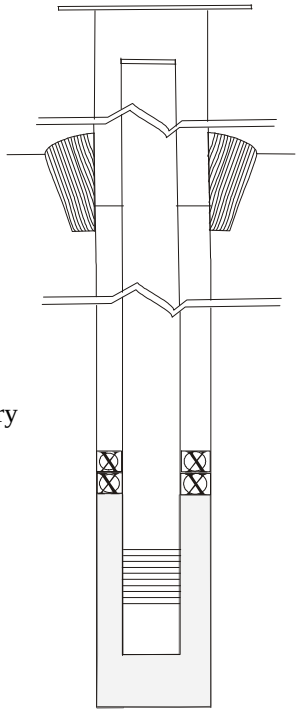
Type of Sand Pack: Silica

Grain Size: FilterSil #1 (Sieve Size)

Installation Method: HSA (Tremie)

Type of Backfill Material: Native Collapse
(if applicable)

Installation Method: _____



Elevations (MSL)*	Depths (BGS)	(.01ft.)
		Top of Protective Casing
372.66	-2.71	Top of Riser Pipe
369.95	0	Ground Surface
369.45	0.5	Top of Annular Sealant
360.63	9.32	Static Water Level (After Completion)
349.45	20.5	Top of Seal
347.45	22.5	Top of Sand Pack
345.26	24.7	Top of Screen
335.76	34.2	Bottom of Screen
335.45	34.5	Bottom of Well
333.95	36	Bottom of Borehole

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIAL
(Choose one type of material for each area)

Protective Casing	SS304, SS316, PTFE, PVC, or Other	X
Riser Pipe Above W.T.	SS304, SS316, PTFE, PVC, or Other	X
Riser Pipe Below W.T.	SS304, SS316, PTFE, PVC, or Other	X
Screen	SS304, SS316, PTFE, PVC, or Other	X

CASING MEASURMENTS

Diameter of Borehole (inches)	4.25(ID)-8.25(OD) HSA
ID of Riser Pipe (inches)	2
Protective Casing Length (feet)	5
Riser Pipe Length (feet)	27.41
Bottom of Screen to End Cap (feet)	0.3
Screen Length (1st slot to last slot) (feet)	9.5
Total Length of Casing (feet)	37.21
Screen Slot Size **	0.010"

**Hand-Slotted Well Screens are Unacceptable

Illinois Environmental Protection Agency **Well Completion Report**

Site Number: 0778010002 County: Jackson

Site Name: Former Koppers Wood-Treating Site, Carbondale, IL Well #: OW-208A

State Plane Coordinate: X _____ Y _____ (or) Latitude: 37° 44' 45.3" Longitude: -89° 11' 40.1" Borehole #: N/A

Surveyed by: Shawnee Surveying & Consulting, Inc. IL Registration #: 184-002344

Drilling Contractor: Roberts Environmental Drilling (IL Lic #092-006865) Driller: Brian Schilling

Consulting Firm: ARCADIS Geologist: Will Stephens, ARCADIS

Drilling Method: Hollow Stem Auger (HSA) Drilling Fluid (Type): N/A

Logged By: Will Stephens, ARCADIS Date Started: 11/23/2015 Date Finished: 11/23/2015

Report Form Completed By: Will Stephens, ARCADIS Date: 1/13/2016

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Neat Portland Type I/II Cement

Installation Method: HSA (Tremie)

Setting Time: 15 minutes

Type of Bentonite Seal - - Granular, Pellet, Slurry (Choose One) X

Installation Method: HSA (Tremie)

Setting Time: _____

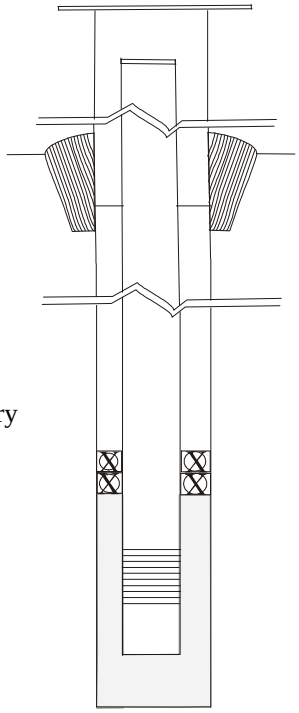
Type of Sand Pack: Silica

Grain Size: FilterSil #1 (Sieve Size)

Installation Method: HSA (Tremie)

Type of Backfill Material: _____ (if applicable)

Installation Method: _____



Elevations (MSL)*	Depths (BGS)	(.01ft.)
		Top of Protective Casing
370.58	-2.49	Top of Riser Pipe
368.10	0	Ground Surface
367.60	0.5	Top of Annular Sealant
360.20	7.89	Static Water Level (After Completion)
365.60	2.5	Top of Seal
364.10	4	Top of Sand Pack
362.90	5.2	Top of Screen
353.40	14.7	Bottom of Screen
353.10	15	Bottom of Well
353.10	15	Bottom of Borehole

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIAL
(Choose one type of material for each area)

Protective Casing	SS304, SS316, PTFE, PVC, or Other X
Riser Pipe Above W.T.	SS304, SS316, PTFE, PVC, or Other X
Riser Pipe Below W.T.	SS304, SS316, PTFE, PVC, or Other X
Screen	SS304, SS316, PTFE, PVC, or Other X

CASING MEASURMENTS

Diameter of Borehole (inches)	4.25(ID)-8.25(OD) HSA
ID of Riser Pipe (inches)	2
Protective Casing Length (feet)	5
Riser Pipe Length (feet)	7.69
Bottom of Screen to End Cap (feet)	0.3
Screen Length (1st slot to last slot) (feet)	9.5
Total Length of Casing (feet)	17.49
Screen Slot Size **	0.010"

**Hand-Slotted Well Screens are Unacceptable

Illinois Environmental Protection Agency **Well Completion Report**

Site Number: 0778010002 County: Jackson

Site Name: Former Koppers Wood-Treating Site, Carbondale, IL Well #: OW-208B

State Plane Coordinate: X _____ Y _____ (or) Latitude: 37° 44' 45.3" Longitude: -89° 11' 40.0" Borehole #: N/A

Surveyed by: Shawnee Surveying & Consulting, Inc. IL Registration #: 184-002344

Drilling Contractor: Roberts Environmental Drilling (IL Lic #092-006865) Driller: Brian Schilling

Consulting Firm: ARCADIS Geologist: Will Stephens, ARCADIS

Drilling Method: Hollow Stem Auger (HSA) Drilling Fluid (Type): N/A

Logged By: Will Stephens, ARCADIS Date Started: 11/23/2015 Date Finished: 11/23/2015

Report Form Completed By: Will Stephens, ARCADIS Date: 1/13/2016

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Neat Portland Type I/II Cement

Installation Method: HSA (Tremie)

Setting Time: 15 minutes

Type of Bentonite Seal - - Granular, Pellet, Slurry (Choose One) X

Installation Method: HSA (Tremie)

Setting Time: _____

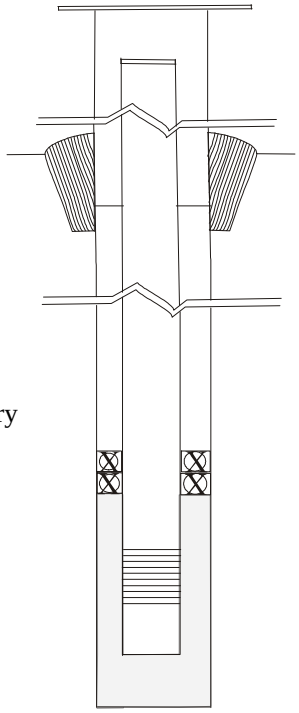
Type of Sand Pack: Silica

Grain Size: FilterSil #1 (Sieve Size)

Installation Method: HSA (Tremie)

Type of Backfill Material: _____ (if applicable)

Installation Method: _____



Elevations (MSL)*	Depths (BGS)	(.01ft.)
		Top of Protective Casing
370.78	-2.70	Top of Riser Pipe
368.08	0	Ground Surface
367.58	0.5	Top of Annular Sealant
367.45	0.63	Static Water Level (After Completion)
344.08	24	Top of Seal
342.08	26	Top of Sand Pack
339.88	28.2	Top of Screen
330.38	37.7	Bottom of Screen
330.08	38	Bottom of Well
330.08	38	Bottom of Borehole

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIAL
(Choose one type of material for each area)

Protective Casing	SS304, SS316, PTFE, PVC, or Other X
Riser Pipe Above W.T.	SS304, SS316, PTFE, PVC, or Other X
Riser Pipe Below W.T.	SS304, SS316, PTFE, PVC, or Other X
Screen	SS304, SS316, PTFE, PVC, or Other X

CASING MEASURMENTS

Diameter of Borehole (inches)	4.25(ID)-8.25(OD) HSA
ID of Riser Pipe (inches)	2
Protective Casing Length (feet)	5
Riser Pipe Length (feet)	30.91
Bottom of Screen to End Cap (feet)	0.3
Screen Length (1st slot to last slot) (feet)	9.5
Total Length of Casing (feet)	40.71
Screen Slot Size **	0.010"

**Hand-Slotted Well Screens are Unacceptable

Illinois Environmental Protection Agency **Well Completion Report**

Site Number: 0778010002 County: Jackson

Site Name: Former Koppers Wood-Treating Site, Carbondale, IL Well #: OW-209A

State Plane Coordinate: X _____ Y _____ (or) Latitude: 37° 44' 40.7" Longitude: -89° 12' 13.0" Borehole #: N/A

Surveyed by: Shawnee Surveying & Consulting, Inc. IL Registration #: 184-002344

Drilling Contractor: Roberts Environmental Drilling (IL Lic #092-006865) Driller: Brian Schilling

Consulting Firm: ARCADIS Geologist: Will Stephens, ARCADIS

Drilling Method: Hollow Stem Auger (HSA) Drilling Fluid (Type): N/A

Logged By: Will Stephens, ARCADIS Date Started: 11/18/2015 Date Finished: 11/18/2015

Report Form Completed By: Will Stephens, ARCADIS Date: 1/13/2015

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Neat Portland Type I/II Cement

Installation Method: HSA (Tremie)

Setting Time: 15 minutes

Type of Bentonite Seal - - Granular, Pellet, Slurry (Choose One) X

Installation Method: HSA (Tremie)

Setting Time: _____

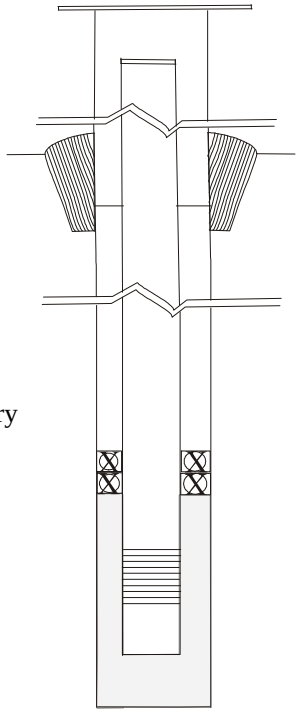
Type of Sand Pack: Silica

Grain Size: FilterSil #1 (Sieve Size)

Installation Method: HSA (Tremie)

Type of Backfill Material: _____ (if applicable)

Installation Method: _____



Elevations (MSL)*	Depths (BGS)	(.01ft.)
		Top of Protective Casing
398.00	-2.73	Top of Riser Pipe
395.27	0	Ground Surface
394.77	0.5	Top of Annular Sealant
392.08	3.19	Static Water Level (After Completion)
392.77	2.5	Top of Seal
391.27	4	Top of Sand Pack
390.07	5.2	Top of Screen
380.57	14.7	Bottom of Screen
380.27	15	Bottom of Well
380.27	15	Bottom of Borehole

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIAL
(Choose one type of material for each area)

Protective Casing	SS304, SS316, PTFE, PVC, or Other X
Riser Pipe Above W.T.	SS304, SS316, PTFE, PVC, or Other X
Riser Pipe Below W.T.	SS304, SS316, PTFE, PVC, or Other X
Screen	SS304, SS316, PTFE, PVC, or Other X

CASING MEASURMENTS

Diameter of Borehole (inches)	4.25(ID)-8.25(OD) HSA
ID of Riser Pipe (inches)	2
Protective Casing Length (feet)	5
Riser Pipe Length (feet)	7.93
Bottom of Screen to End Cap (feet)	0.3
Screen Length (1st slot to last slot) (feet)	9.5
Total Length of Casing (feet)	17.73
Screen Slot Size **	0.010"

**Hand-Slotted Well Screens are Unacceptable

Illinois Environmental Protection Agency **Well Completion Report**

Site Number: 0778010002 County: Jackson

Site Name: Former Koppers Wood-Treating Site, Carbondale, IL Well #: OW-209B

State Plane Coordinate: X _____ Y _____ (or) Latitude: 37° 44' 40.7" Longitude: -89° 12' 13.1" Borehole #: N/A

Surveyed by: Shawnee Surveying & Consulting, Inc. IL Registration #: 184-002344

Drilling Contractor: Roberts Environmental Drilling (IL Lic #092-006865) Driller: Brian Schilling

Consulting Firm: ARCADIS Geologist: Will Stephens, ARCADIS

Drilling Method: Hollow Stem Auger (HSA) Drilling Fluid (Type): N/A

Logged By: Will Stephens, ARCADIS Date Started: 11/17/2015 Date Finished: 11/18/2015

Report Form Completed By: Will Stephens, ARCADIS Date: 1/13/2016

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Neat Portland Type I/II Cement

Installation Method: HSA (Tremie)

Setting Time: 15 minutes

Type of Bentonite Seal - - Granular, Pellet, Slurry X
(Choose One)

Installation Method: HSA (Tremie)

Setting Time: _____

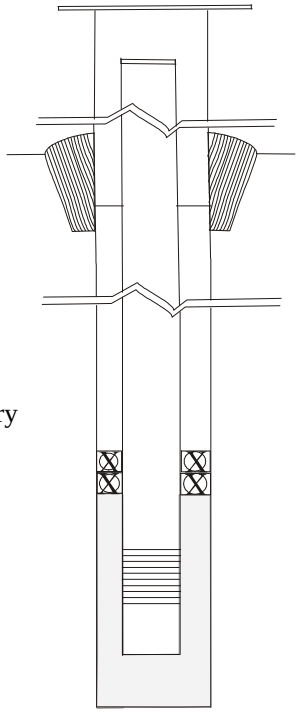
Type of Sand Pack: Silica

Grain Size: FilterSil #1 (Sieve Size)

Installation Method: HSA (Tremie)

Type of Backfill Material: Native collapse
(if applicable)

Installation Method: _____



Elevations (MSL)*	Depths (BGS)	(.01ft.)
		Top of Protective Casing
397.75	-2.65	Top of Riser Pipe
395.10	0	Ground Surface
394.60	0.5	Top of Annular Sealant
393.20	1.90	Static Water Level (After Completion)
370.60	24.5	Top of Seal
368.60	26.5	Top of Sand Pack
366.40	28.7	Top of Screen
356.90	38.2	Bottom of Screen
356.60	38.5	Bottom of Well
355.10	40	Bottom of Borehole

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIAL
(Choose one type of material for each area)

Protective Casing	SS304, SS316, PTFE, PVC, or Other X
Riser Pipe Above W.T.	SS304, SS316, PTFE, PVC, or Other X
Riser Pipe Below W.T.	SS304, SS316, PTFE, PVC, or Other X
Screen	SS304, SS316, PTFE, PVC, or Other X

CASING MEASURMENTS

Diameter of Borehole (inches)	4.25(ID)-8.25(OD) HSA
ID of Riser Pipe (inches)	2
Protective Casing Length (feet)	5
Riser Pipe Length (feet)	31.35
Bottom of Screen to End Cap (feet)	0.3
Screen Length (1st slot to last slot) (feet)	9.5
Total Length of Casing (feet)	41.15
Screen Slot Size **	0.010"

**Hand-Slotted Well Screens are Unacceptable

Illinois Environmental Protection Agency — Well Completion Report

Site Number: 0778010002 County: Jackson

Site Name: Former Koppers Wood-Treating Site, Carbondale, IL Well #: OW-210A

State Plane Coordinate: X _____ Y _____ (or) Latitude: 37° 44' 32.5" Longitude: -89° 12' 40.3" Borehole #: N/A

Surveyed by: Shawnee Surveying & Consulting, Inc. IL Registration #: 184-002344

Drilling Contractor: Roberts Environmental Drilling (IL Lic #092-006865) Driller: Brian Schilling

Consulting Firm: ARCADIS Geologist: Will Stephens, ARCADIS

Drilling Method: Hollow Stem Auger (HSA) Drilling Fluid (Type): N/A

Logged By: Will Stephens, ARCADIS Date Started: 11/17/2015 Date Finished: 11/17/2015

Report Form Completed By: Will Stephens, ARCADIS Date: 1/13/2016

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Neat Portland Type I/II Cement

Installation Method: HSA (Tremie)

Setting Time: 15 minutes

Type of Bentonite Seal - - Granular, Pellet, Slurry (Choose One) X

Installation Method: HSA (Tremie)

Setting Time: _____

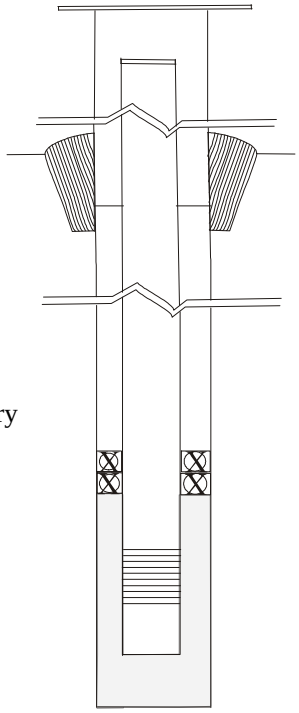
Type of Sand Pack: Silica

Grain Size: FilterSil #1 (Sieve Size)

Installation Method: HSA (Tremie)

Type of Backfill Material: _____ (if applicable)

Installation Method: _____



Elevations (MSL)*	Depths (BGS)	(.01ft.)
		Top of Protective Casing
396.40	-2.59	Top of Riser Pipe
393.81	0	Ground Surface
393.31	0.5	Top of Annular Sealant
387.59	6.22	Static Water Level (After Completion)
390.81	3	Top of Seal
389.81	4	Top of Sand Pack
388.61	5.2	Top of Screen
379.11	14.7	Bottom of Screen
378.81	15	Bottom of Well
378.81	15	Bottom of Borehole

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIAL

(Choose one type of material for each area)

Protective Casing	SS304, SS316, PTFE, PVC, or Other X
Riser Pipe Above W.T.	SS304, SS316, PTFE, PVC, or Other X
Riser Pipe Below W.T.	SS304, SS316, PTFE, PVC, or Other X
Screen	SS304, SS316, PTFE, PVC, or Other X

CASING MEASURMENTS

Diameter of Borehole (inches)	4.25(ID)-8.25(OD) HSA
ID of Riser Pipe (inches)	2
Protective Casing Length (feet)	5
Riser Pipe Length (feet)	7.79
Bottom of Screen to End Cap (feet)	0.3
Screen Length (1st slot to last slot) (feet)	9.5
Total Length of Casing (feet)	17.59
Screen Slot Size **	0.010"

**Hand-Slotted Well Screens are Unacceptable

Illinois Environmental Protection Agency **Well Completion Report**

Site Number: 0778010002 County: Jackson

Site Name: Former Koppers Wood-Treating Site, Carbondale, IL Well #: OW-210B

State Plane Coordinate: X _____ Y _____ (or) Latitude: 37° 44' 32.5" Longitude: -89° 12' 40.2" Borehole #: N/A

Surveyed by: Shawnee Surveying & Consulting, Inc. IL Registration #: 184-002344

Drilling Contractor: Roberts Environmental Drilling (IL Lic #092-006865) Driller: Brian Schilling

Consulting Firm: ARCADIS Geologist: Will Stephens, ARCADIS

Drilling Method: Hollow Stem Auger (HSA) Drilling Fluid (Type): N/A

Logged By: Will Stephens, ARCADIS Date Started: 11/16/2015 Date Finished: 11/17/2015

Report Form Completed By: Will Stephens, ARCADIS Date: 1/13/2016

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Neat Portland Type I/II Cement

Installation Method: HSA (Tremie)

Setting Time: 15 minutes

Type of Bentonite Seal - - Granular, Pellet, Slurry (Choose One) X

Installation Method: HSA (Tremie)

Setting Time: _____

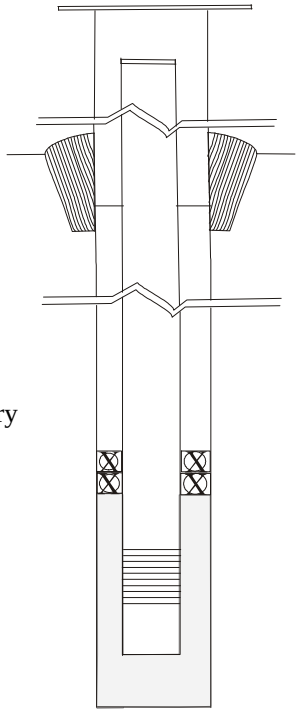
Type of Sand Pack: Silica

Grain Size: FilterSil #1 (Sieve Size)

Installation Method: HSA (Tremie)

Type of Backfill Material: Bentonite (if applicable)

Installation Method: _____



Elevations (MSL)*	Depths (BGS)	(.01ft.)
_____	_____	Top of Protective Casing
395.59	-1.82	Top of Riser Pipe
393.77	0	Ground Surface
393.27	0.5	Top of Annular Sealant
388.24	5.54	Static Water Level (After Completion)
364.77	29	Top of Seal
362.77	31	Top of Sand Pack
360.57	33.2	Top of Screen
351.07	42.7	Bottom of Screen
350.77	43	Bottom of Well
345.77	48	Bottom of Borehole

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIAL
(Choose one type of material for each area)

Protective Casing	SS304, SS316, PTFE, PVC, or Other X
Riser Pipe Above W.T.	SS304, SS316, PTFE, PVC, or Other X
Riser Pipe Below W.T.	SS304, SS316, PTFE, PVC, or Other X
Screen	SS304, SS316, PTFE, PVC, or Other X

CASING MEASURMENTS

Diameter of Borehole (inches)	4.25(ID)-8.25(OD) HSA
ID of Riser Pipe (inches)	2
Protective Casing Length (feet)	5
Riser Pipe Length (feet)	35.02
Bottom of Screen to End Cap (feet)	0.3
Screen Length (1st slot to last slot) (feet)	9.5
Total Length of Casing (feet)	44.82
Screen Slot Size **	0.010"

**Hand-Slotted Well Screens are Unacceptable

Illinois Environmental Protection Agency **Well Completion Report**

Site Number: 0778010002 County: Jackson

Site Name: Former Koppers Wood-Treating Site, Carbondale, IL Well #: OW-211A

State Plane Coordinate: X _____ Y _____ (or) Latitude: 37° 44' 30.9" Longitude: -89° 12' 45.2" Borehole #: N/A

Surveyed by: Shawnee Surveying & Consulting, Inc. IL Registration #: 184-002344

Drilling Contractor: Roberts Environmental Drilling (IL Lic #092-006865) Driller: Brian Schilling

Consulting Firm: ARCADIS Geologist: Will Stephens, ARCADIS

Drilling Method: Hollow Stem Auger (HSA) Drilling Fluid (Type): N/A

Logged By: Will Stephens, ARCADIS Date Started: 11/19/2015 Date Finished: 11/19/2015

Report Form Completed By: Will Stephens, ARCADIS Date: 1/13/2016

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Neat Portland Type I/II Cement

Installation Method: HSA (Tremie)

Setting Time: > 24 hours

Type of Bentonite Seal - - Granular, Pellet, Slurry X
(Choose One)

Installation Method: HSA (Tremie)

Setting Time: _____

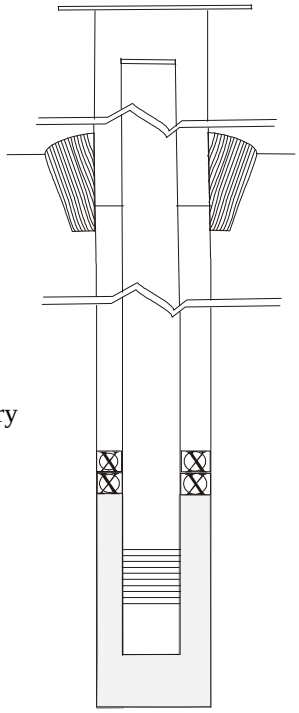
Type of Sand Pack: Silica

Grain Size: FilterSil #1 (Sieve Size)

Installation Method: HSA (Tremie)

Type of Backfill Material: _____
(if applicable)

Installation Method: _____



Elevations (MSL)*	Depths (BGS)	(.01ft.)
		Top of Protective Casing
397.04	-2.49	Top of Riser Pipe
394.55	0	Ground Surface
394.0	0.5	Top of Annular Sealant
379.92	14.62	Static Water Level (After Completion)
392.04	2.5	Top of Seal
391.04	3.5	Top of Sand Pack
389.35	5.2	Top of Screen
379.85	14.7	Bottom of Screen
379.54	15	Bottom of Well
379.54	15	Bottom of Borehole

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIAL
(Choose one type of material for each area)

Protective Casing	SS304, SS316, PTFE, PVC, or Other X
Riser Pipe Above W.T.	SS304, SS316, PTFE, PVC, or Other X
Riser Pipe Below W.T.	SS304, SS316, PTFE, PVC, or Other X
Screen	SS304, SS316, PTFE, PVC, or Other X

CASING MEASURMENTS

Diameter of Borehole (inches)	4.25(ID)-8.25(OD) HSA
ID of Riser Pipe (inches)	2
Protective Casing Length (feet)	5
Riser Pipe Length (feet)	7.69
Bottom of Screen to End Cap (feet)	0.3
Screen Length (1st slot to last slot) (feet)	9.5
Total Length of Casing (feet)	17.49
Screen Slot Size **	0.010"

**Hand-Slotted Well Screens are Unacceptable

Illinois Environmental Protection Agency **Well Completion Report**

Site Number: 0778010002 County: Jackson

Site Name: Former Koppers Wood-Treating Site, Carbondale, IL Well #: OW-211B

State Plane Coordinate: X _____ Y _____ (or) Latitude: 37° 44' 30.9" Longitude: -89° 12' 45.3" Borehole #: N/A

Surveyed by: Shawnee Surveying & Consulting, Inc. IL Registration #: 184-002344

Drilling Contractor: Roberts Environmental Drilling (IL Lic #092-006865) Driller: Brian Schilling

Consulting Firm: ARCADIS Geologist: Will Stephens, ARCADIS

Drilling Method: Hollow Stem Auger (HSA) Drilling Fluid (Type): N/A

Logged By: Will Stephens, ARCADIS Date Started: 11/19/2015 Date Finished: 11/19/2015

Report Form Completed By: Will Stephens, ARCADIS Date: 1/13/2016

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Neat Portland Type I/II Cement

Installation Method: HSA (Tremie)

Setting Time: > 24 hours

Type of Bentonite Seal - - Granular, Pellet, Slurry (Choose One) X

Installation Method: HSA (Tremie)

Setting Time: _____

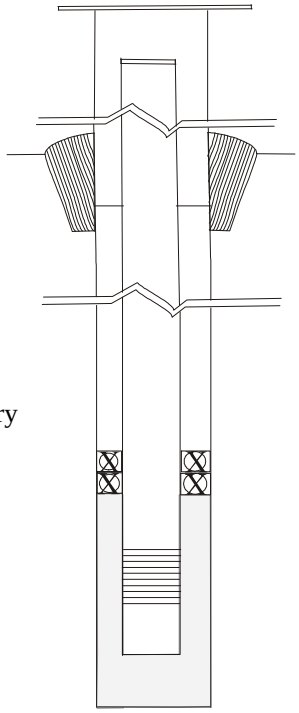
Type of Sand Pack: Silica

Grain Size: FilterSil #1 (Sieve Size)

Installation Method: HSA (Tremie)

Type of Backfill Material: Bentonite (if applicable)

Installation Method: _____



Elevations (MSL)*	Depths (BGS)	(.01ft.)
		Top of Protective Casing
396.87	-2.44	Top of Riser Pipe
394.44	0	Ground Surface
393.94	0.5	Top of Annular Sealant
387.25	7.18	Static Water Level (After Completion)
363.44	31	Top of Seal
361.44	33	Top of Sand Pack
359.74	34.7	Top of Screen
350.24	44.2	Bottom of Screen
349.94	44.5	Bottom of Well
348.44	46	Bottom of Borehole

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIAL
(Choose one type of material for each area)

Protective Casing	SS304, SS316, PTFE, PVC, or Other X
Riser Pipe Above W.T.	SS304, SS316, PTFE, PVC, or Other X
Riser Pipe Below W.T.	SS304, SS316, PTFE, PVC, or Other X
Screen	SS304, SS316, PTFE, PVC, or Other X

CASING MEASURMENTS

Diameter of Borehole (inches)	4.25(ID)-8.25(OD) HSA
ID of Riser Pipe (inches)	2
Protective Casing Length (feet)	5
Riser Pipe Length (feet)	37.14
Bottom of Screen to End Cap (feet)	0.3
Screen Length (1st slot to last slot) (feet)	9.5
Total Length of Casing (feet)	46.94
Screen Slot Size **	0.010"

**Hand-Slotted Well Screens are Unacceptable

Illinois Environmental Protection Agency **Well Completion Report**

Site Number: 0778010002 County: Jackson

Site Name: Former Koppers Wood-Treating Site, Carbondale, IL Well #: OW-212A

State Plane Coordinate: X _____ Y _____ (or) Latitude: 37° 44' 49.7" Longitude: -89° 12' 29.1" Borehole #: N/A

Surveyed by: Shawnee Surveying & Consulting, Inc. IL Registration #: 184-002344

Drilling Contractor: Roberts Environmental Drilling (IL Lic #092-006865) Driller: Brian Schilling

Consulting Firm: ARCADIS Geologist: Will Stephens, ARCADIS

Drilling Method: Hollow Stem Auger (HSA) Drilling Fluid (Type): N/A

Logged By: Will Stephens, ARCADIS Date Started: 11/20/2015 Date Finished: 11/20/2015

Report Form Completed By: Will Stephens, ARCADIS Date: 1/13/2016

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Neat Portland Type I/II Cement

Installation Method: HSA (Tremie)

Setting Time: > 24 hours

Type of Bentonite Seal - - Granular, Pellet, Slurry (Choose One) X

Installation Method: HSA (Tremie)

Setting Time: _____

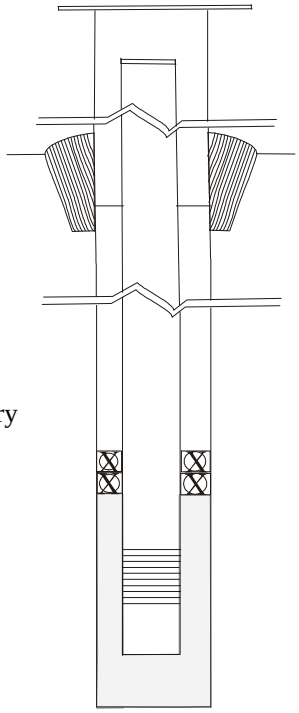
Type of Sand Pack: Silica

Grain Size: FilterSil #1 (Sieve Size)

Installation Method: HSA (Tremie)

Type of Backfill Material: _____ (if applicable)

Installation Method: _____



Elevations (MSL)*	Depths (BGS)	(.01ft.)
		Top of Protective Casing
393.24	-2.74	Top of Riser Pipe
390.50	0	Ground Surface
390.00	0.5	Top of Annular Sealant
385.23	5.27	Static Water Level (After Completion)
388.00	2.5	Top of Seal
386.50	4	Top of Sand Pack
385.30	5.2	Top of Screen
375.80	14.7	Bottom of Screen
375.50	15	Bottom of Well
375.50	15	Bottom of Borehole

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIAL
(Choose one type of material for each area)

Protective Casing	SS304, SS316, PTFE, PVC, or Other X
Riser Pipe Above W.T.	SS304, SS316, PTFE, PVC, or Other X
Riser Pipe Below W.T.	SS304, SS316, PTFE, PVC, or Other X
Screen	SS304, SS316, PTFE, PVC, or Other X

CASING MEASURMENTS

Diameter of Borehole (inches)	4.25(ID)-8.25(OD) HSA
ID of Riser Pipe (inches)	2
Protective Casing Length (feet)	5
Riser Pipe Length (feet)	7.95
Bottom of Screen to End Cap (feet)	0.3
Screen Length (1st slot to last slot) (feet)	9.5
Total Length of Casing (feet)	17.74
Screen Slot Size **	0.010"

**Hand-Slotted Well Screens are Unacceptable

Illinois Environmental Protection Agency **Well Completion Report**

Site Number: 0778010002 County: Jackson

Site Name: Former Koppers Wood-Treating Site, Carbondale, IL Well #: OW-212B

State Plane Coordinate: X _____ Y _____ (or) Latitude: 37° 44' 49.7" Longitude: -89° 12' 29.1" Borehole #: N/A

Surveyed by: Shawnee Surveying & Consulting, Inc. IL Registration #: 184-002344

Drilling Contractor: Roberts Environmental Drilling (IL Lic #092-006865) Driller: Brian Schilling

Consulting Firm: ARCADIS Geologist: Will Stephens, ARCADIS

Drilling Method: Hollow Stem Auger (HSA) Drilling Fluid (Type): N/A

Logged By: Will Stephens, ARCADIS Date Started: 11/20/2015 Date Finished: 11/20/2015

Report Form Completed By: Will Stephens, ARCADIS Date: 1/13/2016

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Neat Portland Type I/II Cement

Installation Method: HSA (Tremie)

Setting Time: > 24 hours

Type of Bentonite Seal - - Granular, Pellet, Slurry (Choose One) X

Installation Method: HSA (Tremie)

Setting Time: _____

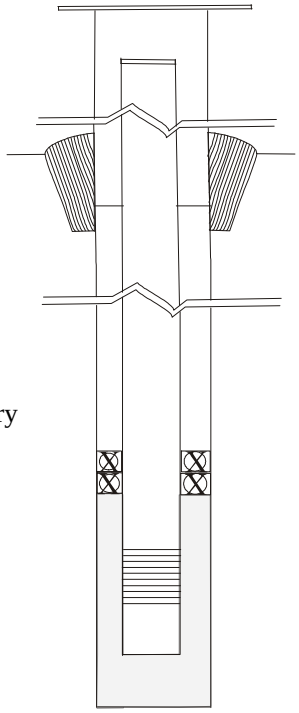
Type of Sand Pack: Silica

Grain Size: FilterSil #1 (Sieve Size)

Installation Method: HSA (Tremie)

Type of Backfill Material: Bentonite (if applicable)

Installation Method: _____



Elevations (MSL)*	Depths (BGS)	(.01ft.)
		Top of Protective Casing
392.92	-2.19	Top of Riser Pipe
390.73	0	Ground Surface
390.23	0.5	Top of Annular Sealant
384.87	5.86	Static Water Level (After Completion)
367.23	23.5	Top of Seal
364.73	26	Top of Sand Pack
362.53	28.2	Top of Screen
353.03	37.7	Bottom of Screen
352.73	38	Bottom of Well
350.73	40	Bottom of Borehole

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIAL
(Choose one type of material for each area)

Protective Casing	SS304, SS316, PTFE, PVC, or Other X
Riser Pipe Above W.T.	SS304, SS316, PTFE, PVC, or Other X
Riser Pipe Below W.T.	SS304, SS316, PTFE, PVC, or Other X
Screen	SS304, SS316, PTFE, PVC, or Other X

CASING MEASURMENTS

Diameter of Borehole (inches)	4.25(ID)-8.25(OD) HSA
ID of Riser Pipe (inches)	2
Protective Casing Length (feet)	5
Riser Pipe Length (feet)	30.39
Bottom of Screen to End Cap (feet)	0.3
Screen Length (1st slot to last slot) (feet)	9.5
Total Length of Casing (feet)	40.19
Screen Slot Size **	0.010"

**Hand-Slotted Well Screens are Unacceptable

Illinois Environmental Protection Agency **Well Completion Report**

Site Number: 0778010002 County: Jackson

Site Name: Former Koppers Wood-Treating Site, Carbondale, IL Well #: P-9A

State Plane Coordinate: X _____ Y _____ (or) Latitude: 37° 44' 46.4" Longitude: -89° 11' 54.6" Borehole #: N/A

Surveyed by: Shawnee Surveying & Consulting, Inc. IL Registration #: 184-002344

Drilling Contractor: Roberts Environmental Drilling (IL Lic #092-006865) Driller: Brian Schilling

Consulting Firm: ARCADIS Geologist: Will Stephens, ARCADIS

Drilling Method: Hollow Stem Auger (HSA) Drilling Fluid (Type): N/A

Logged By: Will Stephens, ARCADIS Date Started: 11/18/2015 Date Finished: 11/18/2015

Report Form Completed By: Will Stephens, ARCADIS Date: 1/13/2016

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Neat Portland Type I/II Cement

Installation Method: HSA (Tremie)

Setting Time: > 24 hours

Type of Bentonite Seal - - Granular, Pellet, Slurry X
(Choose One)

Installation Method: HSA (Tremie)

Setting Time: _____

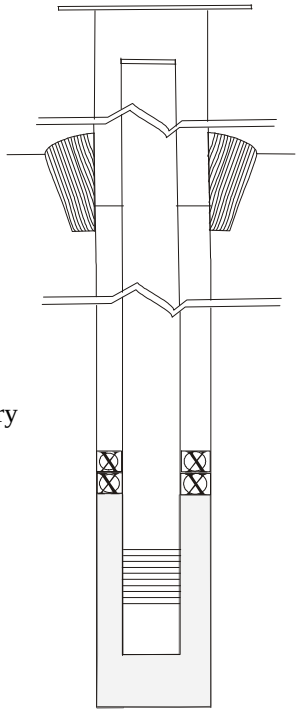
Type of Sand Pack: Silica

Grain Size: FilterSil #1 (Sieve Size)

Installation Method: HSA (Tremie)

Type of Backfill Material: Native Collapse
(if applicable)

Installation Method: _____



Elevations (MSL)*	Depths (BGS)	(.01ft.)
		Top of Protective Casing
388.43	-2.87	Top of Riser Pipe
385.56	0	Ground Surface
385.06	0.5	Top of Annular Sealant
375.18	10.38	Static Water Level (After Completion)
383.06	2.5	Top of Seal
381.56	4	Top of Sand Pack
380.36	5.2	Top of Screen
370.86	14.7	Bottom of Screen
370.56	15	Bottom of Well
369.56	16	Bottom of Borehole

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIAL
(Choose one type of material for each area)

Protective Casing	SS304, SS316, PTFE, PVC, or Other X
Riser Pipe Above W.T.	SS304, SS316, PTFE, PVC, or Other X
Riser Pipe Below W.T.	SS304, SS316, PTFE, PVC, or Other X
Screen	SS304, SS316, PTFE, PVC, or Other X

CASING MEASURMENTS

Diameter of Borehole (inches)	4.25(ID)-8.25(OD) HSA
ID of Riser Pipe (inches)	2
Protective Casing Length (feet)	5
Riser Pipe Length (feet)	8.07
Bottom of Screen to End Cap (feet)	0.3
Screen Length (1st slot to last slot) (feet)	9.5
Total Length of Casing (feet)	17.87
Screen Slot Size **	0.010"

**Hand-Slotted Well Screens are Unacceptable

Illinois Environmental Protection Agency **Well Completion Report**

Site Number: 0778010002 County: Jackson

Site Name: Former Koppers Wood-Treating Site, Carbondale, IL Well #: P-10A

State Plane Coordinate: X _____ Y _____ (or) Latitude: 37° 44' 45.2" Longitude: -89° 12' 01.2" Borehole #: N/A

Surveyed by: Shawnee Surveying & Consulting, Inc. IL Registration #: 184-002344

Drilling Contractor: Roberts Environmental Drilling (IL Lic #092-006865) Driller: Brian Schilling

Consulting Firm: ARCADIS Geologist: Will Stephens, ARCADIS

Drilling Method: Hollow Stem Auger (HSA) Drilling Fluid (Type): N/A

Logged By: Will Stephens, ARCADIS Date Started: 11/20/2015 Date Finished: 11/20/2015

Report Form Completed By: Will Stephens, ARCADIS Date: 1/13/2016

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Neat Portland Type I/II Cement

Installation Method: HSA (Tremie)

Setting Time: > 24 hours

Type of Bentonite Seal - - Granular, Pellet, Slurry (Choose One) X

Installation Method: HSA (Tremie)

Setting Time: _____

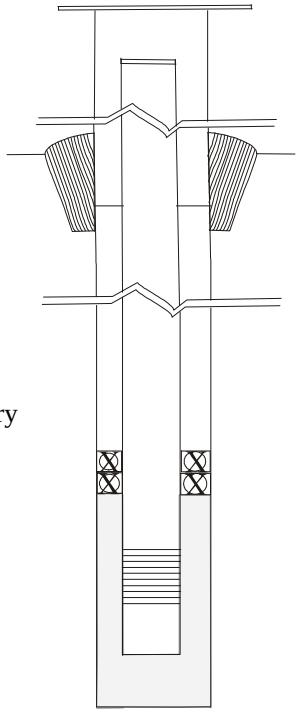
Type of Sand Pack: Silica

Grain Size: FilterSil #1 (Sieve Size)

Installation Method: HSA (Tremie)

Type of Backfill Material: Native collapse (if applicable)

Installation Method: _____



Elevations (MSL)*	Depths (BGS)	(.01ft.)
		Top of Protective Casing
397.68	-2.63	Top of Riser Pipe
395.05	0	Ground Surface
394.55	0.5	Top of Annular Sealant
379.88	15.17	Static Water Level (After Completion)
392.55	2.5	Top of Seal
391.05	4	Top of Sand Pack
389.85	5.2	Top of Screen
380.35	14.7	Bottom of Screen
380.05	15	Bottom of Well
379.05	16	Bottom of Borehole

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIAL
(Choose one type of material for each area)

Protective Casing	SS304, SS316, PTFE, PVC, or Other X
Riser Pipe Above W.T.	SS304, SS316, PTFE, PVC, or Other X
Riser Pipe Below W.T.	SS304, SS316, PTFE, PVC, or Other X
Screen	SS304, SS316, PTFE, PVC, or Other X

CASING MEASURMENTS

Diameter of Borehole (inches)	4.25(ID)-8.25(OD) HSA
ID of Riser Pipe (inches)	2
Protective Casing Length (feet)	5
Riser Pipe Length (feet)	7.83
Bottom of Screen to End Cap (feet)	0.3
Screen Length (1st slot to last slot) (feet)	9.5
Total Length of Casing (feet)	17.63
Screen Slot Size **	0.010"

**Hand-Slotted Well Screens are Unacceptable

Illinois Environmental Protection Agency **Well Completion Report**

Site Number: 0778010002 County: Jackson

Site Name: Former Koppers Wood-Treating Site, Carbondale, IL Well #: P-11A

State Plane Coordinate: X _____ Y _____ (or) Latitude: 37° 44' 35.3" Longitude: -89° 12' 31.1" Borehole #: N/A

Surveyed by: Shawnee Surveying & Consulting, Inc. IL Registration #: 184-002344

Drilling Contractor: Roberts Environmental Drilling (IL Lic #092-006865) Driller: Brian Schilling

Consulting Firm: ARCADIS Geologist: Will Stephens, ARCADIS

Drilling Method: Hollow Stem Auger (HSA) Drilling Fluid (Type): N/A

Logged By: Will Stephens, ARCADIS Date Started: 11/17/2015 Date Finished: 11/17/2015

Report Form Completed By: Will Stephens, ARCADIS Date: 1/13/2016

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Neat Portland Type 1/II Cement

Installation Method: HSA (Tremie)

Setting Time: > 24 hours

Type of Bentonite Seal - - Granular, Pellet, Slurry X
(Choose One)

Installation Method: HSA (Tremie)

Setting Time: _____

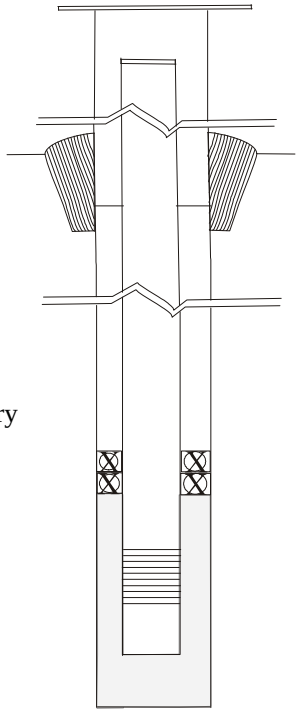
Type of Sand Pack: Silica

Grain Size: FilterSil #1 (Sieve Size)

Installation Method: HSA (Tremie)

Type of Backfill Material: Native collapse
(if applicable)

Installation Method: _____



Elevations (MSL)*	Depths (BGS)	(.01ft.)
		Top of Protective Casing
397.38	-2.61	Top of Riser Pipe
394.76	0	Ground Surface
394.26	0.5	Top of Annular Sealant
381.67	13.10	Static Water Level (After Completion)
392.26	2.5	Top of Seal
390.76	4	Top of Sand Pack
389.56	5.2	Top of Screen
380.06	14.7	Bottom of Screen
379.76	15	Bottom of Well
378.76	16	Bottom of Borehole

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIAL
(Choose one type of material for each area)

Protective Casing	SS304, SS316, PTFE, PVC, or Other X
Riser Pipe Above W.T.	SS304, SS316, PTFE, PVC, or Other X
Riser Pipe Below W.T.	SS304, SS316, PTFE, PVC, or Other X
Screen	SS304, SS316, PTFE, PVC, or Other X

CASING MEASURMENTS

Diameter of Borehole (inches)	4.25(ID)-8.25(OD) HSA
ID of Riser Pipe (inches)	2
Protective Casing Length (feet)	5
Riser Pipe Length (feet)	7.81
Bottom of Screen to End Cap (feet)	0.3
Screen Length (1st slot to last slot) (feet)	9.5
Total Length of Casing (feet)	17.61
Screen Slot Size **	0.010"

**Hand-Slotted Well Screens are Unacceptable

APPENDIX E

Illinois Department of Public Health Water Well Sealing Forms

Print Form

ILLINOIS DEPARTMENT OF PUBLIC HEALTH
DIVISION OF ENVIRONMENTAL HEALTH
525 W. JEFFERSON ST.
SPRINGFIELD, IL 62761

WATER WELL SEALING FORM

PDF FILLABLE/SAVABLE

RETURN ALL COPIES TO IDPH OR LOCAL HEALTH DEPARTMENT

This form shall be submitted to this Department or the local health department not more than 30 days after a water well, boring or monitoring well is sealed. Such wells are to be sealed not more than 30 days after they are abandoned in accordance with the sealing requirements in the Illinois Water Well Construction Code. THE LOCAL HEALTH DEPARTMENT OR REGIONAL PUBLIC HEALTH DEPARTMENT MUST BE NOTIFIED AT LEAST 48 HOURS PRIOR TO SEALING.

1. Ownership (Name of Controlling Party): Beazer East, Inc. (OW-17C)

2. Well Location: Well Site Address: 1555 North Marion Street City: Carbondale Zip: 62901

Lot #: Land I.D.#: County: Jackson Township: 9S

Range: 1W Section: 10 SW Quarter of the SE Quarter of the SW Quarter

GPS: North Degrees: 37 Minutes: 44 Seconds: 49.2 West Degrees: 89 Minutes: 12 Seconds: 7.1

Report decimal minutes to minutes and seconds by multiplying the decimal part of the minutes by 60, e.g. latitude 38 degrees 46.07 minutes N would be latitude 38 degrees 46 minutes 4.2 seconds (0.07 x 60 = 4.2) N. Report GPS coordinates to the nearest 0.1 second.

3. Year Drilled: 1986

4. Drilling Permit Number (and date, if known):

5. Type of Well: Monitoring

6. Total Depth (ft.): 78 Diameter (in.): 2

7. Formation clear of obstruction: Yes

8. Detains of Plugging (bentonite, neat cement or other materials)

Filled with	H.S. Bentonite Grout	From (ft.)	78	to (ft.)	2
Kind of plug	Bentonite Chips	From (ft.)	2	to (ft.)	0
Filled with		From (ft.)		to (ft.)	
Kind of plug		From (ft.)		to (ft.)	
Filled with		From (ft.)		to (ft.)	
Kind of plug		From (ft.)		to (ft.)	

9. CASING RECORD Upper 2 feet of casing removed: Yes

10. Date well was sealed: Nov 25, 2015

11. Licensed water well driller or other person approved by the Department performing well sealing

Name: Charley Roberts/Roberts Env. Drilling Complete License Number: 092-006865

Address: 1107 South Mulberry Street City: Millstadt State: Illinois Zip Code: 62260

This state agency is requesting discolsure of information that is necessary to accomplish the statutory purpose as outlined under Public Act-0863. Disclosure of this information is mandatory. This form has been approved by the Forms Management Center. IL 482-0631- Revised 5/09

Questions regarding the completion of this form should be directed to the local health department or the Illinois Department of Public Health 217-782-5830, TTY (for hearing impaired only) 800-547-0466.

Print Form

ILLINOIS DEPARTMENT OF PUBLIC HEALTH
DIVISION OF ENVIRONMENTAL HEALTH
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SPRINGFIELD, IL 62761

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1. Ownership (Name of Controlling Party): Beazer East, Inc. (OW-23C)

2. Well Location: Well Site Address: 1555 North Marion Street City: Carbondale Zip: 62901

Lot #: Land I.D.#: County: Jackson Township: 9S

Range: 1W Section: 15 NW Quarter of the NW Quarter of the NW Quarter

GPS: North Degrees: 37 Minutes: 44 Seconds: 41.9 West Degrees: 89 Minutes: 12 Seconds: 22.4

Report decimal minutes to minutes and seconds by multiplying the decimal part of the minutes by 60, e.g. latitude 38 degrees 46.07 minutes N would be latitude 38 degrees 46 minutes 4.2 seconds (0.07 x 60 = 4.2) N. Report GPS coordinates to the nearest 0.1 second.

3. Year Drilled: 1986

4. Drilling Permit Number (and date, if known):

5. Type of Well: Monitoring

6. Total Depth (ft.): 91 Diameter (in.): 2

7. Formation clear of obstruction: Yes

8. Detains of Plugging (bentonite, neat cement or other materials)

Filled with	H.S. Bentonite Grout	From (ft.)	91	to (ft.)	2
Kind of plug	Bentonite Chips	From (ft.)	2	to (ft.)	0
Filled with		From (ft.)		to (ft.)	
Kind of plug		From (ft.)		to (ft.)	
Filled with		From (ft.)		to (ft.)	
Kind of plug		From (ft.)		to (ft.)	

9. CASING RECORD Upper 2 feet of casing removed: Yes

10. Date well was sealed: Nov 25, 2015

11. Licensed water well driller or other person approved by the Department performing well sealing

Name: Charley Roberts/Roberts Env. Drilling Complete License Number: 092-006865

Address: 1107 South Mulberry Street City: Millstadt State: Illinois Zip Code: 62260

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1. Ownership (Name of Controlling Party): Beazer East, Inc. (OW-27C)

2. Well Location: Well Site Address: 1555 North Marion Street City: Carbondale Zip: 62901

Lot #: Land I.D.#: County: Jackson Township: 9S

Range: 1W Section: 9 SE Quarter of the SE Quarter of the SE Quarter

GPS: North Degrees: 37 Minutes: 44 Seconds: 47.9 West Degrees: 89 Minutes: 12 Seconds: 30.6

Report decimal minutes to minutes and seconds by multiplying the decimal part of the minutes by 60, e.g. latitude 38 degrees 46.07 minutes N would be latitude 38 degrees 46 minutes 4.2 seconds (0.07 x 60 = 4.2) N. Report GPS coordinates to the nearest 0.1 second.

3. Year Drilled: 1986

4. Drilling Permit Number (and date, if known:

5. Type of Well: Monitoring

6. Total Depth (ft.): 78 Diameter (in.): 2

7. Formation clear of obstruction: Yes

8. Detains of Plugging (bentonite, neat cement or other materials)

Filled with	H.S. Bentonite Grout	From (ft.)	78	to (ft.)	2
Kind of plug	Bentonite Chips	From (ft.)	2	to (ft.)	0
Filled with		From (ft.)		to (ft.)	
Kind of plug		From (ft.)		to (ft.)	
Filled with		From (ft.)		to (ft.)	
Kind of plug		From (ft.)		to (ft.)	

9. CASING RECORD Upper 2 feet of casing removed: Yes

10. Date well was sealed: Nov 25, 2015

11. Licensed water well driller or other person approved by the Department performing well sealing

Name: Charley Roberts/Roberts Env. Drilling Complete License Number: 092-006865

Address: 1107 South Mulberry Street City: Millstadt State: Illinois Zip Code: 62260

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1. Ownership (Name of Controlling Party): Beazer East, Inc. (OW-35C)

2. Well Location: Well Site Address: 1555 North Marion Street City: Carbondale Zip: 62901

Lot #: Land I.D.#: County: Jackson Township: 9S

Range: 1W Section: 15 NW Quarter of the NE Quarter of the NW Quarter

GPS: North Degrees: 37 Minutes: 44 Seconds: 42.4 West Degrees: 89 Minutes: 12 Seconds: 6.9

Report decimal minutes to minutes and seconds by multiplying the decimal part of the minutes by 60, e.g. latitude 38 degrees 46.07 minutes N would be latitude 38 degrees 46 minutes 4.2 seconds (0.07 x 60 = 4.2) N. Report GPS coordinates to the nearest 0.1 second.

3. Year Drilled: 1986

4. Drilling Permit Number (and date, if known):

5. Type of Well: Monitoring

6. Total Depth (ft.): 94 Diameter (in.): 2

7. Formation clear of obstruction: Yes

8. Detains of Plugging (bentonite, neat cement or other materials)

Filled with	H.S. Bentonite Grout	From (ft.)	94	to (ft.)	2
Kind of plug	Bentonite Chips	From (ft.)	2	to (ft.)	0
Filled with		From (ft.)		to (ft.)	
Kind of plug		From (ft.)		to (ft.)	
Filled with		From (ft.)		to (ft.)	
Kind of plug		From (ft.)		to (ft.)	

9. CASING RECORD Upper 2 feet of casing removed: Yes

10. Date well was sealed: Nov 25, 2015

11. Licensed water well driller or other person approved by the Department performing well sealing

Name: Charley Roberts/Roberts Env. Drilling Complete License Number: 092-006865

Address: 1107 South Mulberry Street City: Millstadt State: Illinois Zip Code: 62260

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WATER WELL SEALING FORM

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1. Ownership (Name of Controlling Party): Beazer East, Inc. (OW-36C)

2. Well Location: Well Site Address: 1555 North Marion Street City: Carbondale Zip: 62901

Lot #: Land I.D.#: County: Jackson Township: 9S

Range: 1W Section: 10 NE Quarter of the SE Quarter of the SW Quarter

GPS: North Degrees: 37 Minutes: 44 Seconds: 57.2 West Degrees: 89 Minutes: 12 Seconds: 3.7

Report decimal minutes to minutes and seconds by multiplying the decimal part of the minutes by 60, e.g. latitude 38 degrees 46.07 minutes N would be latitude 38 degrees 46 minutes 4.2 seconds (0.07 x 60 = 4.2) N. Report GPS coordinates to the nearest 0.1 second.

3. Year Drilled: 1986

4. Drilling Permit Number (and date, if known:

5. Type of Well: Monitoring

6. Total Depth (ft.): 94 Diameter (in.): 2

7. Formation clear of obstruction: Yes

8. Detains of Plugging (bentonite, neat cement or other materials)

Filled with	H.S. Bentonite Grout	From (ft.)	94	to (ft.)	2
Kind of plug	Bentonite Chips	From (ft.)	2	to (ft.)	0
Filled with		From (ft.)		to (ft.)	
Kind of plug		From (ft.)		to (ft.)	
Filled with		From (ft.)		to (ft.)	
Kind of plug		From (ft.)		to (ft.)	

9. CASING RECORD Upper 2 feet of casing removed: Yes

10. Date well was sealed: Nov 25, 2015

11. Licensed water well driller or other person approved by the Department performing well sealing

Name: Charley Roberts/Roberts Env. Drilling Complete License Number: 092-006865

Address: 1107 South Mulberry Street City: Millstadt State: Illinois Zip Code: 62260

This state agency is requesting discolsure of information that is necessary to accomplish the statutory purpose as outlined under Public Act-0863. Disclosure of this information is mandatory. This form has been approved by the Forms Management Center. IL 482-0631- Revised 5/09

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DIVISION OF ENVIRONMENTAL HEALTH
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SPRINGFIELD, IL 62761

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1. Ownership (Name of Controlling Party): Beazer East, Inc. (R-13C)

2. Well Location: Well Site Address: 1555 North Marion Street City: Carbondale Zip: 62901

Lot #: Land I.D.#: County: Jackson Township: 9S

Range: 1W Section: 10 SW Quarter of the SW Quarter of the SW Quarter

GPS: North Degrees: 37 Minutes: 44 Seconds: 51.4 West Degrees: 89 Minutes: 12 Seconds: 26.5

Report decimal minutes to minutes and seconds by multiplying the decimal part of the minutes by 60, e.g. latitude 38 degrees 46.07 minutes N would be latitude 38 degrees 46 minutes 4.2 seconds (0.07 x 60 = 4.2) N. Report GPS coordinates to the nearest 0.1 second.

3. Year Drilled: 1986

4. Drilling Permit Number (and date, if known:

5. Type of Well: Monitoring

6. Total Depth (ft.): 75 Diameter (in.): 2

7. Formation clear of obstruction: Yes

8. Detains of Plugging (bentonite, neat cement or other materials)

Filled with	H.S. Bentonite Grout	From (ft.)	75	to (ft.)	2
Kind of plug	Bentonite Chips	From (ft.)	2	to (ft.)	0
Filled with		From (ft.)		to (ft.)	
Kind of plug		From (ft.)		to (ft.)	
Filled with		From (ft.)		to (ft.)	
Kind of plug		From (ft.)		to (ft.)	

9. CASING RECORD Upper 2 feet of casing removed: Yes

10. Date well was sealed: Nov 25, 2015

11. Licensed water well driller or other person approved by the Department performing well sealing

Name: Charley Roberts/Roberts Env. Drilling Complete License Number: 092-006865

Address: 1107 South Mulberry Street City: Millstadt State: Illinois Zip Code: 62260

This state agency is requesting discolsure of information that is necessary to accomplish the statutory purpose as outlined under Public Act-0863. Disclosure of this information is mandatory. This form has been approved by the Forms Management Center. IL 482-0631- Revised 5/09

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1. Ownership (Name of Controlling Party): Beazer East, Inc. (R-14C)

2. Well Location: Well Site Address: 1555 North Marion Street City: Carbondale Zip: 62901

Lot #: Land I.D.#: County: Jackson Township: 9S

Range: 1W Section: 10 NW Quarter of the SW Quarter of the SW Quarter

GPS: North Degrees: 37 Minutes: 44 Seconds: 51.9 West Degrees: 89 Minutes: 12 Seconds: 29.2

Report decimal minutes to minutes and seconds by multiplying the decimal part of the minutes by 60, e.g. latitude 38 degrees 46.07 minutes N would be latitude 38 degrees 46 minutes 4.2 seconds (0.07 x 60 = 4.2) N. Report GPS coordinates to the nearest 0.1 second.

3. Year Drilled: 1988

4. Drilling Permit Number (and date, if known:

5. Type of Well: Monitoring

6. Total Depth (ft.): 80 Diameter (in.): 2

7. Formation clear of obstruction: Yes

8. Detains of Plugging (bentonite, neat cement or other materials)

Filled with	H.S. Bentonite Grout	From (ft.)	80	to (ft.)	2
Kind of plug	Bentonite Chips	From (ft.)	2	to (ft.)	0
Filled with		From (ft.)		to (ft.)	
Kind of plug		From (ft.)		to (ft.)	
Filled with		From (ft.)		to (ft.)	
Kind of plug		From (ft.)		to (ft.)	

9. CASING RECORD Upper 2 feet of casing removed: Yes

10. Date well was sealed: Nov 25, 2015

11. Licensed water well driller or other person approved by the Department performing well sealing

Name: Charley Roberts/Roberts Env. Drilling Complete License Number: 092-006865

Address: 1107 South Mulberry Street City: Millstadt State: Illinois Zip Code: 62260

This state agency is requesting discolsure of information that is necessary to accomplish the statutory purpose as outlined under Public Act-0863. Disclosure of this information is mandatory. This form has been approved by the Forms Management Center. IL 482-0631- Revised 5/09

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Arcadis U.S., Inc.

430 First Avenue North

Suite 720

Minneapolis, Minnesota 55401

Tel 612 339 9434

Fax 612 336 4538

www.arcadis.com