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Environment

Subject:
2017 Plant 2 LNAPL Area 1,4-Dioxane Investigation Summary
RACER Trust, Lansing Plant 2, Lansing Township, Michigan

Date:
July 3, 2017

Contact:
Patrick Curry

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Our ref:
B0064479.2017

Dear Mr. Quackenbush:

This summary report has been prepared by Arcadis on behalf of the Revitalizing Auto Communities Environmental Response (RACER) Trust for Lansing Plant 2 located in Lansing Township, Michigan (Site). This report summarizes the field activities performed during the second quarter of 2017 to evaluate the potential presence of 1,4-dioxane within the Plant 2 light non-aqueous phase liquid area (Plant 2 LNAPL Area).

Work completed was consistent with the scope described in the *RACER Lansing – Combined Second Quarter 2017 Investigation Workplan* (Workplan; Arcadis 2017a) provided to MDEQ on March 24, 2017, and subsequent e-mail correspondence with MDEQ. The revised work plan was approved by MDEQ via an email on April 6, 2017. The location of the investigation area and an overview of the groundwater impacts associated with 1,4-dioxane are presented as **Figure 1**. The location of soil borings completed and monitoring wells sampled as part of this investigation are provided on **Figure 2**.

BACKGROUND

Stratigraphy

The complex sedimentary environment present at Plant 2 includes a thick sequence of glaciofluvial and glacial till sediments consisting predominantly of clays and silts, with discontinuous layers of sand, silty sand, and occasional gravel. At Plant 2 the 1,4-dioxane impacts are encountered in two distinct water-bearing zones:

1. Perched Zone (~5-30 feet below ground surface [bgs]): Consists of predominantly clay with interbedded silt and fine sand zones. The more

permeable zones are typically saturated below 5 feet and generally limited in extent and connectivity.

2. Weathered Bedrock (~65-80 ft bgs): In the lower zone, groundwater is encountered at approximately 65 to 70 feet bgs. The bedrock is capped with a low permeability glacial till that creates semi-confined conditions within the weathered bedrock over much of Plant 2.

Plant 2 LNAPL Area 1,4-Dioxane

The results of the lower 1,4-dioxane toe investigations (Arcadis 2016a, 2016b, 2017b) suggest that although some comingling may occur with the plume that originates from Plant 3, the 1,4-dioxane mass in weathered bedrock below the Plant 2 LNAPL is due, at least in part, to leakage from the perched zone. A cross-section illustrating the toe investigation results as of August 2016 is provided as **Attachment 1**. Samples collected from clayey soils around the perimeter of the LNAPL contained total 1,4-dioxane at concentrations up to 6,500 micrograms per kilogram (µg/kg) (SB-A5.2-OG124_18 ft, fixed-lab duplicate sample), associated with dissolved phase impacts in pore water. Note that actual pore water concentrations would be significantly higher than the total concentration provided by the soil sample. Several other borings (e.g. SB-A5.2-OE130, OB134, OG118) also exhibited elevated concentrations with total 1,4-dioxane generally ranging between 100 and 1,500 µg/kg in in the surrounding clay and underlying till sediments. In addition, 1,4-dioxane was detected in samples collected through the confining till layer and into the vadose zone at concentrations generally ranging from 50 to 500 µg/kg.

The higher concentrations of 1,4-dioxane in weathered bedrock groundwater are generally in line with the core of the plume as it migrates south from Plant 3, east of the Plant 2 LNAPL area. However, VAP samples collected from weathered bedrock around the perimeter of the Plant 2 LNAPL indicate two sub-lobes east of the main plume that may be attributed to leakage from the perched zone. The April 2017 1,4-dioxane groundwater results for weathered bedrock wells installed within the sub-lobes range from 46 µg/L (northeast lobe) to 630 µg/L (southeast lobe, MW-16-81). Well MW-16-81 has shown an increasing concentration trend since it was installed in August 2016. These results may suggest a seasonal trend and will continue to be monitored on a quarterly basis.

Scope of Work

Previously, 1,4-dioxane had not been observed in soil samples collected from within the LNAPL impacted area due to elevated detection limits associated with the standard Method 8260 utilized during the bulk of the RFI sampling activities. Therefore, this investigation was designed to make use of the lowest possible reporting limits using USEPA Method 8270 Selective Ion Monitoring (SIM) to determine if 1,4-dioxane was still present and leachable from LNAPL impacted soils.

The goals of the 2017 Plant 2 LNAPL Area 1,4-Dioxane Investigation were as follows:

1. Determine if leachate analysis can be used to evaluate the Plant 2 LNAPL Area for the presence of 1,4-dioxane, and if so
2. Determine if 1,4-dioxane is present in the LNAPL impacted soils and potentially co-located with TCA impacts in the Plant 2 LNAPL area.

Investigation activities were conducted on April 6 and 7, 2017. The scope of work included completion of five (5) soil borings and collection of LNAPL samples from three (3) monitoring wells as shown on **Figure 2**. The soil borings were completed using direct push drilling methods at locations within the Plant 2 LNAPL Area. The boring logs are included as **Attachment 2**. Details of the investigation are as follows:

- Soil borings were completed up to 25 feet bgs, to a depth consistent with clayey glacial till located below the LNAPL impacts, at locations within the LNAPL footprint where elevated TCA has been observed previously. At each location, the following was completed:
    - Collection of soil samples from the LNAPL impacted zone.
    - At two locations, a second discreet perched LNAPL zone (i.e. deeper LNAPL zone) was encountered and an additional soil sample was collected from the deeper LNAPL zone.
    - Collection of soil samples from the clay located below each LNAPL zone.
    - Although provided for in the work plan, saturated zones suitable for groundwater sampling were not encountered below the LNAPL impacted zones.
- Due to limited soil core volume, priority was given to the collection of 1,4-dioxane samples. 1,4-dioxane soil samples were collected into laboratory provided unpreserved 500 milliliter (mL) jars from each zone of interest. Subsamples for 1,4-dioxane soil and SPLP analyses were taken from the jar by the laboratory.
- VOC soil samples were collected using a clean, disposable, gas-tight syringe in a manner consistent with United States Environmental Protection Agency (USEPA) Method 5035 sampling protocols. The samples were extruded into individual laboratory prepared pre-weighed 40 mL vials containing methanol preservative. A split sample from each interval was collected from the core immediately adjacent to the VOC sample location using a 25-gram EnCore® Sampler for Synthetic Precipitation Leaching Procedure (SPLP) testing. Due to soil core volume limitations, the VOC SPLP sample was offset vertically up to 6-inches below the VOCs soil sample. Note that there was insufficient soil recovery from the deeper LNAPL zone at SB-A5.2-OB118 for a SPLP VOC sample.
- LNAPL samples were collected from three monitoring wells (LWM-12-08, PMW-01 and LMW-14-15D). LNAPL was sampled from the monitoring wells using a peristaltic pump and disposable tubing. The samples were then transferred to unpreserved 40-mL vials provided by the laboratory.
- Samples were submitted to Eurofins Lancaster Laboratories (Eurofins) in Lancaster, Pennsylvania for one or more of the following analyses:
    - VOCs in soil (USEPA Method 8260)
    - 1,4-dioxane in soil (USEPA Method 8270 [SIM])
    - SPLP testing for VOCs (USEPA Methods 1312/8260)
    - SPLP testing for 1,4-dioxane (USEPA Methods 1312/8270 SIM)
    - 1,4-dioxane in LNAPL (USEPA Method 8270 SIM)

Method 8270 SIM method for water, soil and LNAPL samples was selected for the 1,4-dioxane evaluation to reduce detection limits and, in the event of matrix interference, improve the chances of detecting 1,4-dioxane within the LNAPL and soil samples.

RESULTS

Analytical data for the Plant 2 LNAPL 1,4-dioxane investigation are summarized on **Figure 2** and **Tables 1** and **2**. The laboratory analytical report is provided as **Attachment 3**. The results from the LNAPL, soil, and SPLP laboratory testing are discussed below.

LNAPL Results

1,4-Dioxane was not detected above the Method 8270 SIM reporting limit of 200 µg/kg in any of the three LNAPL samples submitted for analysis.

Soil Results

Soil samples for 1,4-dioxane were collected from the LNAPL impacted zones as well as the underlying low permeability till. Concentrations of 1,4-dioxane ranged from <20 µg/kg to 110 µg/kg, with the highest concentrations observed in the low permeability clay underlying the LNAPL impacted zones in 4 of the 5 borings. A cross-section illustrating the analytical results is included as **Figure 3**. Consistent with previous results, elevated concentrations of chlorinated ethanes (TCA and daughter compounds 1,1-dichloroethane [DCA] and chloroethane) were observed in perched zone soils, though not always coincident with 1,4-dioxane. TCA, 1,1-DCA, and chloroethane were observed in soil at concentrations up to 4,000 µg/kg, 2,800 µg/kg, and 730 µg/kg, respectively. Tetrachloroethene (PCE) was also detected in shallow vadose soils at 4,200 µg/kg (SB-A5.2-NY92_1.5-2 ft). Other, generally minor, detections of VOCs in soil include: acetone, benzene, 2-butanone, carbon disulfide, cyclohexane, 1,2-, 1,3-, and 1,4-dichlorobenzene, 1,2-dichoroethane, 1,1-dichlorethene, cis-1,2-dichloroethene, ethylbenzene, isopropyl benzene, methyl acetate, methylcyclohexane, methylene chloride, toluene, 1,2,4-trichlorobenzene, 1,1,2-trichlorethane, trichloroethene, vinyl chloride, and xylenes.

SPLP Results

Soil SPLP testing was completed to evaluate the potential for impacted soils to leach 1,4-dioxane and other VOCs. The SPLP samples were collected from LNAPL impacted zones. 1,4-Dioxane mass partitioning between water, LNAPL, and sorbed phases is complex, with differences in partitioning behavior attributed to heterogeneity of 1,4-dioxane mass distribution, LNAPL pore saturations, and clay content. For weakly sorbing compounds, such as 1,4-dioxane, SPLP methods will under-predict leachate concentrations (New Jersey Department of Environmental Protection [NJDEP] 2013). This is due to the volume of leaching solution relative to soil used in the procedure (20:1 ratio of leaching solution to solid). Therefore, the NJDEP SPLP Spreadsheet, Version 3.1 was used to calculate the leachate concentrations that would be expected under field conditions (corrected field leachate concentrations). Note that corrected field leachate concentrations can only be calculated when both the soil and SPLP samples have detectable 1,4-dioxane concentrations (5 of 7 samples). The NJDEP SPLP spreadsheet output is included as **Attachment 4**. Note that corrected leachate concentrations could not be calculated for VOCs other than 1,4-dioxane because a minimum of three detections of a single compound are required to run the calculations. For other VOCs, there were only single detections of TCA, 1,1-DCA, chloroethane, and 1,1-DCE in SPLP samples.

The 1,4-dioxane corrected field leachate concentrations were compared to a leachate criterion of 115 micrograms per liter (µg/L), calculated by multiplying the MDEQ drinking water criterion of 7.2 µg/L by the MDEQ default dilution attenuation factor (DAF) of 16 (MDEQ, 2005). The DAF accounts for contaminant dilution and attenuation during transport through the saturated zone to a down-gradient compliance point (EPA, 1996). As summarized in **Table 3**, the five corrected field leachate concentrations were all below the calculated leachate criterion of 115 µg/L, suggesting that further leaching of 1,4-dioxane would not contribute 1,4-dioxane to the weathered bedrock at concentrations above the drinking water criteria of 7.2 µg/L. At a minimum, the SPLP data indicates any further leaching of 1,4-dioxane from LNAPL impacted soils will be at lower concentrations than those currently observed in weathered bedrock monitoring wells installed around the perimeter of the Plant 2 LNAPL area.

Of the six SPLP samples submitted for VOC analysis, only two had detections of VOCs. Sample SB-A5.2-OC107_13.5-14 ft had 1,1-DCA, 1,1-DCE, and TCA at concentrations of 83 µg/L, 99 µg/L, and 1,000 µg/L, respectively and chloroethane was detected at 18 µg/L in sample SB-A5.2-NM126_15.5-16 ft. As referenced above, corrected SPLP field leachate concentrations could not be calculated for VOCs due to insufficient number of samples with detections. In general, the SPLP results for VOCs suggest there may be isolated areas where limited leaching of chlorinated compounds occurs, however, previous results for surrounding monitoring wells and soil borings suggest these dissolved impacts are limited and attenuate rapidly due to mechanisms such as anaerobic dechlorination (i.e. TCA to DCA to chloroethane). Other attenuation pathways include hydrolysis, which leads to 1,1-DCE as a daughter product, or co-metabolic degradation with methane, which leads to TCE as a daughter product. Soil samples collected around the perimeter of the Plant 2 LNAPL Area during the toe investigations showed only sporadic detections of TCA, 1,1-DCA and chloroethane in soils at concentrations below drinking water protection criteria. All of these detections were within the upper 50 feet of sediments and no evidence of these compounds has been observed in the weathered bedrock groundwater samples. Therefore, further migration of chlorinated compounds either laterally or vertically, beyond what has already occurred, appears unlikely.

CONCLUSIONS

The 2017 Plant 2 LNAPL Area 1,4-dioxane investigation consisted of five soil borings completed at locations that had the highest concentrations of TCA observed during previous investigations. Three LNAPL samples were also collected from both the shallow and deeper LNAPL zones. The results of the sampling suggest only low-levels of 1,4-dioxane remain within the LNAPL impacted zones and concentrations of 1,4-dioxane are higher within the underlying, low permeability clay till at 4 of the 5 boring locations completed as part of this evaluation.

This data, coupled with the partitioning characteristics of 1,4-dioxane, and elevated concentrations of dissolved 1,4-dioxane observed within the surrounding perched zone, indicate the majority of 1,4-dioxane leaching from LNAPL to groundwater has already occurred. Soil samples collected during the toe investigations (Arcadis 2016a, 2016b, 2016c) indicate concentrations of 1,4-dioxane around the perimeter of the Plant 2 LNAPL, within the underlying glacial till, and within the vadose zone above weathered bedrock, are up to several orders of magnitude higher concentrations those observed in the LNAPL impacted soils evaluated as part of this investigation. Further:

- 1,4-dioxane was not detected within the shallow and deeper LNAPL (<200 µg/kg).

- Concentrations of 1,4-dioxane within the LNAPL impacted soils are low, ranging from <20 µg/kg to 110 µg/kg. At four of the five borings completed as part of this evaluation, the highest concentration of 1,4-dioxane was observed in the clay underlying the more permeable LNAPL impacted zones.
- The corrected field leachate concentrations suggest that 1,4-dioxane arising from further leaching of LNAPL impacted soils will be less than the calculated leachate criterion of 115 µg/L, and therefore, less than 7.2 µg/L within the weathered bedrock. At a minimum, additional 1,4-dioxane leached from LNAPL impacted soils would be a much lower concentration than the 1,4-dioxane currently present in groundwater both within the perched zone and within the weathered bedrock.
- Although other VOCs such as chlorinated ethanes are present in the LNAPL impacted soils, they are not coincident with elevated concentrations of 1,4-dioxane. Concentrations of 1,4-dioxane are consistently low in all samples collected at the five boring locations.
- Of the six SPLP samples submitted for VOC analysis, only two had VOC detections. Although there may be isolated areas where leaching of VOCs such as chlorinated ethanes occurs, surrounding soil and groundwater results indicate these impacts are primarily limited to the perched zone and attenuate rapidly. Soil samples collected around the perimeter of the Plant 2 LNAPL area during the toe investigations showed only sporadic detections of TCA, 1,1-DCA and chloroethane at concentrations below the current Drinking Water Protection Criteria. Further migration of other VOCs in the future either laterally or vertically, beyond what has already occurred, seems unlikely.

The lines of evidence gathered from the toe investigations, and the Plant 2 LNAPL area investigation outlined above, all support a depleted 1,4-dioxane source mass. This is consistent with the age of the LNAPL impacts (likely >30 years) and the partitioning characteristics of 1,4-dioxane. Most of the 1,4-dioxane mass from the LNAPL is already in dissolved phase, much of it as porewater within perched zone clays, or the underlying till. Excavation, or other means to remove the Plant 2 LNAPL, or impacted soils, would not provide meaningful 1,4-dioxane mass removal, or effect the viability and longevity of lower 1,4-dioxane plume remedies being evaluated. However, currently the former courtyard area and other openings through the concrete allow infiltration through the Plant 2 LNAPL area. Placement and maintenance of a cover over the former courtyard and other openings over the Plant 2 LNAPL area will limit infiltration through the perched zone and reduce further vertical migration of 1,4-dioxane impacts.

If you have any questions, please contact Patrick Curry (Arcadis) at 810-225-1926 or Dave Favero (RACER Trust) at 734-879-9525.

Sincerely,

Arcadis of Michigan, LLC

Patrick Curry, PG, CPG

Principal Geologist

Copies:

Dave Favero, RACER Trust

Enclosures:

Tables

1 Summary of LNAPL Sample Analytical Results
2 Summary of Soil and SPLP Sample Analytical Results
3 Summary of 1,4-Dioxane Corrected Field Leachate Concentrations

Figures

1 Site Location and Summary of Groundwater Impacts
2 1,4-Dioxane Leachability Sample Results
3 LNAPL Area 1,4-Dioxane Investigation Cross-Section

Attachments

1 Lower 1,4-Dioxane Toe Investigation Cross-Section
2 Boring Logs
3 Analytical Laboratory Report
4 NJDEP SPLP Spreadsheet

References:

Arcadis. 2016a. Lower 1,4-Dioxane Plume Toe Investigation. RACER Trust, Lansing, Michigan Plant 2. March 11.

Arcadis. 2016b. Supplemental Lower 1,4-Dioxane Toe Investigation Report. RACER Trust, Lansing, Michigan Plant 2. September 21.

Arcadis 2017a.Combined Second Quarter 2017 Investigation Workplan. RACER Trust, Plants 2, 3, & 6, Lansing, Michigan. March 24.

Arcadis. 2017b. Lower 1,4-Dioxane Plume Northeast Lobe Investigation. RACER Trust, Lansing, Michigan Plant 2. February 3.

New Jersey Department of Environmental Protection. 2013. Guidance Document Development of Site-Specific Impact to Ground Water Soil Remediation Standards Using the Synthetic Precipitation Leaching Procedure, Version 3.0.

MDEQ. Remediation and Redevelopment Division Operational Memorandum No. 1. Technical Support Document – Attachment 9 Part 201 Groundwater Protection Criteria Part 213 Tier I Risk-Based Screening Levels. March 2005

USEPA. Soil Screening Guidance: Technical Background Document. Office of Solid Waste and Emergency Response. EPA/540/R95/128. May 1996.

TABLES

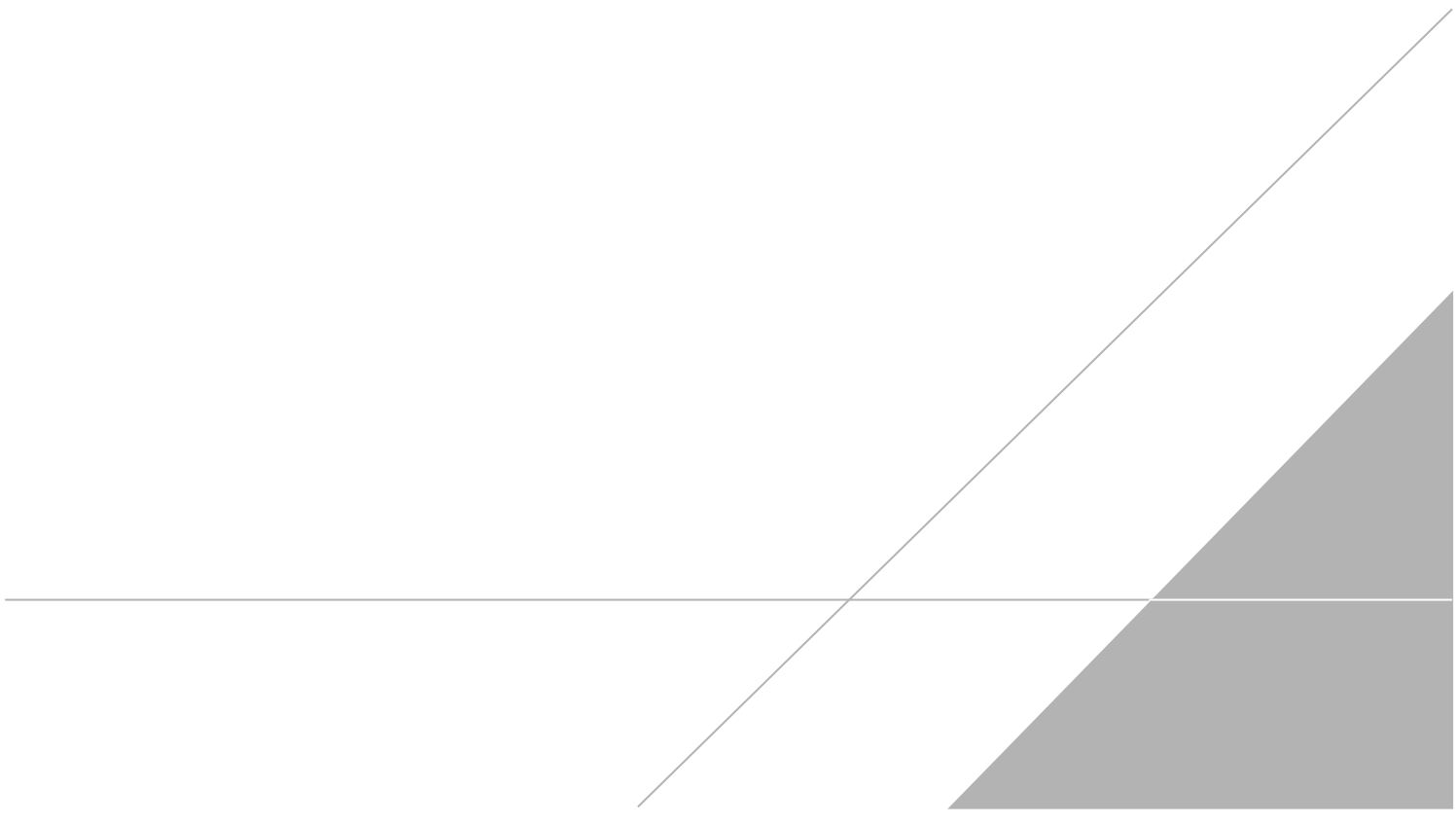


Table 1
Summary of LNAPL Sample Analytical Results
RACER Lansing Plant 2
Lansing, MI

Location ID:		LMW-12-08		LMW-14-15D		PMW-01	
Date Collected:		04/06/17		04/06/17		04/06/17	
Sample Name:	Units	LMW-12-08_040717		LMW-14-15D_040617		PMW-01_040717	
GC/MS Semivolatile Organics USEPA SW-846 8270C SIM							
		MDL	RL	MDL	RL	MDL	RL
1,4-Dioxane	ug/kg	<200	<500	<200	<500	<200	<500

Notes:

< = less than
µg/kg = micrograms per kilogram
GC/MS = gas chromatography/mass spectrometry
USEPA = United States Environmental Protection Agency
SIM = Selective ion monitoring
MDL = Method detection limit
RL = Reporting limit

Table 2
Summary of Soil and SPLP Sample Analytical Results
RACER Lansing Plant 2
Lansing, MI

Location ID:	SB-A5.2-NM126		SB-A5.2-NM126	SB-A5.2-NM126	SB-A5.2-NM126		SB-A5.2-NM126	SB-A5.2-NM126	SB-A5.2-NU129		SB-A5.2-NU129	SB-A5.2-NU129	SB-A5.2-NU129
Sample Depth(ft):	5 - 5.5		5.5 - 6	6.5 - 7	15 - 15.5		15.5 - 16	19.5 - 20	5 - 5.3		5.3 - 5.5	6.5 - 7	19.5 - 20
Date Collected:	04/06/17		04/06/17	04/06/17	04/06/17		04/06/17	04/06/17	04/06/17		04/06/17	04/06/17	04/06/17
Media	Soil	SPLP	SPLP	Soil	Soil	SPLP	SPLP	Soil	Soil	SPLP	SPLP	Soil	Soil
Units	ug/kg	ug/L	ug/L	ug/kg	ug/kg	ug/L	ug/L	ug/kg	ug/kg	ug/L	ug/L	ug/kg	ug/kg
GC/MS Semivolatile Organics USEPA SW-846 8270C SIM													
1,4-Dioxane	<20	**0.27**	NA	**110**	**90**	**4.3**	NA	**30**	<100	**0.55**	NA	**22**	**48**
GC/MS Volatile Organics USEPA SW-846 8260B													
1,2-Dibromo-3-chloropropane (DBCP)	<4	NA	<50	NA	<4	NA	<50	NA	<330	NA	<50	NA	NA
1,2-Dibromoethane (Ethylene dibromide)	<4	NA	<10	NA	<4	NA	<10	NA	<330	NA	<10	NA	NA
1,2-Dichlorobenzene	**3 J**	NA	<50	NA	<4	NA	<50	NA	<330	NA	<50	NA	NA
1,4-Dichlorobenzene	**2 J**	NA	<50	NA	<4	NA	<50	NA	<330	NA	<50	NA	NA
1,1,1-Trichloroethane	<4	NA	<10	NA	<4	NA	<10	NA	**150 J**	NA	<10	NA	NA
2-Hexanone	<8	NA	<100	NA	<7	NA	<100	NA	<670	NA	<100	NA	NA
1,1,2,2-Tetrachloroethane	<4	NA	<10	NA	<4	NA	<10	NA	<330	NA	<10	NA	NA
Acetone	**100**	NA	<200	NA	**22**	NA	<200	NA	<1,300	NA	<200	NA	NA
1,1,2-Trichloroethane	<4	NA	<10	NA	<4	NA	<10	NA	<330	NA	<10	NA	NA
Bromodichloromethane	<4	NA	<10	NA	<4	NA	<10	NA	<330	NA	<10	NA	NA
1,1-Dichloroethane	**3 J**	NA	<10	NA	**1 J**	NA	<10	NA	**200 J**	NA	<10	NA	NA
Bromoform	<4	NA	<40	NA	<4	NA	<40	NA	<330	NA	<40	NA	NA
1,1-Dichloroethene	<4	NA	<10	NA	<4	NA	<10	NA	<330	NA	<10	NA	NA
Bromomethane (Methyl bromide)	<4	NA	<10	NA	<4	NA	<10	NA	<330	NA	<10	NA	NA
1,2-Dichloroethane	<4	NA	<10	NA	<4	NA	<10	NA	<330	NA	<10	NA	NA
Carbon disulfide	**10**	NA	<50	NA	**3 J**	NA	<50	NA	<330	NA	<50	NA	NA
Carbon tetrachloride	<4	NA	<10	NA	<4	NA	<10	NA	<330	NA	<10	NA	NA
cis-1,2-Dichloroethene	<4	NA	<10	NA	<4	NA	<10	NA	<330	NA	<10	NA	NA
Chlorobenzene	<4	NA	<10	NA	<4	NA	<10	NA	<330	NA	<10	NA	NA
trans-1,2-Dichloroethene	<4	NA	<10	NA	<4	NA	<10	NA	<330	NA	<10	NA	NA
Chloroform (Trichloromethane)	<4	NA	<10	NA	<4	NA	<10	NA	<330	NA	<10	NA	NA
Trichloroethene	**6**	NA	<10	NA	**2 J**	NA	<10	NA	<330	NA	<10	NA	NA
Chloromethane (Methyl chloride)	<4	NA	<10	NA	<4	NA	<10	NA	<330	NA	<10	NA	NA
Tetrachloroethene	<4	NA	<10	NA	<4	NA	<10	NA	<330	NA	<10	NA	NA
cis-1,3-Dichloropropene	<4	NA	<10	NA	<4	NA	<10	NA	<330	NA	<10	NA	NA
Vinyl chloride	<4	NA	<10	NA	<4	NA	<10	NA	<330	NA	<10	NA	NA
Chloroethane	**200**	NA	<10	NA	**160**	NA	**18**	NA	**270 J**	NA	<10	NA	NA
Dichlorodifluoromethane (CFC-12)	<4	NA	<10	NA	<4	NA	<10	NA	<330	NA	<10	NA	NA
Benzene	**4**	NA	<10	NA	**2 J**	NA	<10	NA	<330	NA	<10	NA	NA
Methyl acetate	**3 J**	NA	<50	NA	<4	NA	<50	NA	**340**	NA	<50	NA	NA
Ethylbenzene	**8**	NA	<10	NA	**2 J**	NA	<10	NA	<330	NA	<10	NA	NA
Methylene chloride	<4	NA	<40	NA	<4	NA	<40	NA	<330	NA	<40	NA	NA
Styrene	<4	NA	<50	NA	<4	NA	<50	NA	<330	NA	<50	NA	NA
Toluene	**43**	NA	<10	NA	**11**	NA	<10	NA	**160 J**	NA	<10	NA	NA
trans-1,3-Dichloropropene	<4	NA	<10	NA	<4	NA	<10	NA	<330	NA	<10	NA	NA
Xylene (total)	**26**	NA	<10	NA	**7**	NA	<10	NA	**90 J**	NA	<10	NA	NA
Methyl tert butyl ether (MTBE)	<4	NA	<10	NA	<4	NA	<10	NA	<330	NA	<10	NA	NA
Trichlorofluoromethane (CFC-11)	<4	NA	<10	NA	<4	NA	<10	NA	<330	NA	<10	NA	NA
Trifluorotrichloroethane (Freon 113)	<8	NA	<100	NA	<7	NA	<100	NA	<670	NA	<100	NA	NA
2-Butanone (Methyl ethyl ketone) (MEK)	**17**	NA	<100	NA	**3 J**	NA	<100	NA	<670	NA	<100	NA	NA
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	<8	NA	<100	NA	<7	NA	<100	NA	<670	NA	<100	NA	NA
1,2,4-Trichlorobenzene	**5**	NA	<50	NA	**1 J**	NA	<50	NA	<330	NA	<50	NA	NA
1,2-Dichloropropane	<4	NA	<10	NA	<4	NA	<10	NA	<330	NA	<10	NA	NA
1,3-Dichlorobenzene	**2 J**	NA	<50	NA	<4	NA	<50	NA	<330	NA	<50	NA	NA
Cyclohexane	**5**	NA	<50	NA	**2 J**	NA	<50	NA	<330	NA	<50	NA	NA
Methyl cyclohexane	**15**	NA	<50	NA	**6**	NA	<50	NA	<330	NA	<50	NA	NA
Dibromochloromethane	<4	NA	<10	NA	<4	NA	<10	NA	<330	NA	<10	NA	NA
Isopropyl benzene	**5**	NA	<50	NA	**1 J**	NA	<50	NA	<330	NA	<50	NA	NA
General Chemistry													
Percent moisture	16.9	NA	NA	17.0	17.6	NA	NA	11.0	17.8	NA	NA	12.3	13.1

BOLD = compound detected above laboratory reporting limit
< = less than
µg/kg = micrograms per kilogram
µg/L = micrograms per liter
GC/MS = gas chromatography/mass spectrometry
USEPA = United States Environmental Protection Agency
SIM = Selective ion monitoring
MDL = Method detection limit
RL = Reporting limit
J = Estimated value
NA = Not analyzed / Not applicable
SPLP = Synthetic Precipitation Leaching Procedure by USEPA Method 1312

Table 2
Summary of Soil and SPLP Sample Analytical Results
RACER Lansing Plant 2
Lansing, MI

Location ID:	SB-A5.2-NY92		SB-A5.2-NY92	SB-A5.2-NY92	SB-A5.2-NY92	SB-A5.2-OB118		SB-A5.2-OB118	SB-A5.2-OB118	SB-A5.2-OB118		SB-A5.2-OB118
Sample Depth(ft):	1.5 - 2		2 - 2.5	4.5 - 5	14.5 - 15	10.5 - 11		11 - 11.5	14 - 14.5	21 - 21.5		24.5 - 25
Date Collected:	04/06/17		04/06/17	04/06/17	04/06/17	04/06/17		04/06/17	04/06/17	04/06/17		04/06/17
Media	Soil	SPLP	SPLP	Soil	Soil	Soil	SPLP	SPLP	Soil	Soil	SPLP	Soil
Units	ug/kg	ug/L	ug/L	ug/kg	ug/kg	ug/kg	ug/L	ug/L	ug/kg	ug/kg	ug/L	ug/kg
GC/MS Semivolatile Organics USEPA SW-846 8270C SIM												
1,4-Dioxane	**5.1**	**0.24**	NA	**4.5**	**43**	**13**	**0.18 J**	NA	**29**	**35**	**1.4**	**65**
GC/MS Volatile Organics USEPA SW-846 8260B												
1,2-Dibromo-3-chloropropane (DBCP)	<240	NA	<50	NA	NA	<4	NA	<50	NA	<230	NA	NA
1,2-Dibromoethane (Ethylene dibromide)	<240	NA	<10	NA	NA	<4	NA	<10	NA	<230	NA	NA
1,2-Dichlorobenzene	<240	NA	<50	NA	NA	<4	NA	<50	NA	<230	NA	NA
1,4-Dichlorobenzene	<240	NA	<50	NA	NA	<4	NA	<50	NA	<230	NA	NA
1,1,1-Trichloroethane	**2,000**	NA	<10	NA	NA	**24**	NA	<10	NA	**93 J**	NA	NA
2-Hexanone	<490	NA	<100	NA	NA	<9	NA	<100	NA	<460	NA	NA
1,1,2,2-Tetrachloroethane	<240	NA	<10	NA	NA	<4	NA	<10	NA	<230	NA	NA
Acetone	<970	NA	<200	NA	NA	**58**	NA	<200	NA	<920	NA	NA
1,1,2-Trichloroethane	<240	NA	<10	NA	NA	<4	NA	<10	NA	<230	NA	NA
Bromodichloromethane	<240	NA	<10	NA	NA	<4	NA	<10	NA	<230	NA	NA
1,1-Dichloroethane	**2,800**	NA	<10	NA	NA	**14**	NA	<10	NA	**160 J**	NA	NA
Bromoform	<240	NA	<40	NA	NA	<4	NA	<40	NA	<230	NA	NA
1,1-Dichloroethene	**57 J**	NA	<10	NA	NA	**2 J**	NA	<10	NA	<230	NA	NA
Bromomethane (Methyl bromide)	<240	NA	<10	NA	NA	<4	NA	<10	NA	<230	NA	NA
1,2-Dichloroethane	<240	NA	<10	NA	NA	<4	NA	<10	NA	<230	NA	NA
Carbon disulfide	<240	NA	<50	NA	NA	**3 J**	NA	<50	NA	<230	NA	NA
Carbon tetrachloride	<240	NA	<10	NA	NA	<4	NA	<10	NA	<230	NA	NA
cis-1,2-Dichloroethene	<240	NA	<10	NA	NA	**3 J**	NA	<10	NA	<230	NA	NA
Chlorobenzene	<240	NA	<10	NA	NA	<4	NA	<10	NA	<230	NA	NA
trans-1,2-Dichloroethene	<240	NA	<10	NA	NA	<4	NA	<10	NA	<230	NA	NA
Chloroform (Trichloromethane)	<240	NA	<10	NA	NA	<4	NA	<10	NA	<230	NA	NA
Trichloroethene	**74 J**	NA	<10	NA	NA	**6**	NA	<10	NA	<230	NA	NA
Chloromethane (Methyl chloride)	<240	NA	<10	NA	NA	<4	NA	<10	NA	<230	NA	NA
Tetrachloroethene	**4,200**	NA	<10	NA	NA	**8**	NA	<10	NA	<230	NA	NA
cis-1,3-Dichloropropene	<240	NA	<10	NA	NA	<4	NA	<10	NA	<230	NA	NA
Vinyl chloride	<240	NA	<10	NA	NA	<4	NA	<10	NA	<230	NA	NA
Chloroethane	<240	NA	<10	NA	NA	**10**	NA	<10	NA	**730**	NA	NA
Dichlorodifluoromethane (CFC-12)	<240	NA	<10	NA	NA	<4	NA	<10	NA	<230	NA	NA
Benzene	<240	NA	<10	NA	NA	**3 J**	NA	<10	NA	<230	NA	NA
Methyl acetate	**260**	NA	<50	NA	NA	<4	NA	<50	NA	<230	NA	NA
Ethylbenzene	<240	NA	<10	NA	NA	**2 J**	NA	<10	NA	<230	NA	NA
Methylene chloride	<240	NA	<40	NA	NA	<4	NA	<40	NA	<230	NA	NA
Styrene	<240	NA	<50	NA	NA	<4	NA	<50	NA	<230	NA	NA
Toluene	<240	NA	<10	NA	NA	**8**	NA	<10	NA	<230	NA	NA
trans-1,3-Dichloropropene	<240	NA	<10	NA	NA	<4	NA	<10	NA	<230	NA	NA
Xylene (total)	<240	NA	<10	NA	NA	**4 J**	NA	<10	NA	<230	NA	NA
Methyl tert butyl ether (MTBE)	<240	NA	<10	NA	NA	<4	NA	<10	NA	<230	NA	NA
Trichlorofluoromethane (CFC-11)	<240	NA	<10	NA	NA	<4	NA	<10	NA	<230	NA	NA
Trifluorotrichloroethane (Freon 113)	<490	NA	<100	NA	NA	<9	NA	<100	NA	<460	NA	NA
2-Butanone (Methyl ethyl ketone) (MEK)	<490	NA	<100	NA	NA	**7 J**	NA	<100	NA	<460	NA	NA
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	<490	NA	<100	NA	NA	<9	NA	<100	NA	<460	NA	NA
1,2,4-Trichlorobenzene	<240	NA	<50	NA	NA	<4	NA	<50	NA	<230	NA	NA
1,2-Dichloropropane	<240	NA	<10	NA	NA	<4	NA	<10	NA	<230	NA	NA
1,3-Dichlorobenzene	<240	NA	<50	NA	NA	<4	NA	<50	NA	<230	NA	NA
Cyclohexane	<240	NA	<50	NA	NA	**1 J**	NA	<50	NA	<230	NA	NA
Methyl cyclohexane	**170 J**	NA	<50	NA	NA	**2 J**	NA	<50	NA	<230	NA	NA
Dibromochloromethane	<240	NA	<10	NA	NA	<4	NA	<10	NA	<230	NA	NA
Isopropyl benzene	**70 J**	NA	<50	NA	NA	**1 J**	NA	<50	NA	<230	NA	NA
General Chemistry												
Percent moisture	11.2	NA	NA	11.7	16.4	16.0	NA	NA	11.1	16.1	NA	11.1

BOLD = compound detected above laboratory reporting limit
< = less than
µg/kg = micrograms per kilogram
µg/L = micrograms per liter
GC/MS = gas chromatography/mass spectrometry
USEPA = United States Environmental Protection Agency
SIM = Selective ion monitoring
MDL = Method detection limit
RL = Reporting limit
J = Estimated value
NA = Not analyzed / Not applicable
SPLP = Synthetic Precipitation Leaching Procedure by USEPA Method 1312

Table 2
Summary of Soil and SPLP Sample Analytical Results
RACER Lansing Plant 2
Lansing, MI

Location ID:	SB-A5.2-OC107		SB-A5.2-OC107	SB-A5.2-OC107	SB-A5.2-OC107
Sample Depth(ft):	13 - 13.5		13.5 - 14	14.5 - 15	19.5 - 20
Date Collected:	04/06/17		04/06/17	04/06/17	04/06/17
Media	Soil	SPLP	SPLP	Soil	Soil
Units	ug/kg	ug/L	ug/L	ug/kg	ug/kg
GC/MS Semivolatile Organics USEPA SW-846 8270C SIM					
1,4-Dioxane	**17**	**1.1**	NA	**33**	**77**
GC/MS Volatile Organics USEPA SW-846 8260B					
1,2-Dibromo-3-chloropropane (DBCP)	<5	NA	<50	NA	NA
1,2-Dibromoethane (Ethylene dibromide)	<5	NA	<10	NA	NA
1,2-Dichlorobenzene	<5	NA	<50	NA	NA
1,4-Dichlorobenzene	<5	NA	<50	NA	NA
1,1,1-Trichloroethane	**4,000**	NA	**1,000**	NA	NA
2-Hexanone	<10	NA	<100	NA	NA
1,1,2,2-Tetrachloroethane	<5	NA	<10	NA	NA
Acetone	**30**	NA	<200	NA	NA
1,1,2-Trichloroethane	**4 J**	NA	<10	NA	NA
Bromodichloromethane	<5	NA	<10	NA	NA
1,1-Dichloroethane	**1,200**	NA	**83**	NA	NA
Bromoform	<5	NA	<40	NA	NA
1,1-Dichloroethene	**170**	NA	**99**	NA	NA
Bromomethane (Methyl bromide)	<5	NA	<10	NA	NA
1,2-Dichloroethane	**2 J**	NA	<10	NA	NA
Carbon disulfide	<5	NA	<50	NA	NA
Carbon tetrachloride	<5	NA	<10	NA	NA
cis-1,2-Dichloroethene	<5	NA	<10	NA	NA
Chlorobenzene	<5	NA	<10	NA	NA
trans-1,2-Dichloroethene	<5	NA	<10	NA	NA
Chloroform (Trichloromethane)	<5	NA	<10	NA	NA
Trichloroethene	**20**	NA	<10	NA	NA
Chloromethane (Methyl chloride)	<5	NA	<10	NA	NA
Tetrachloroethene	**8**	NA	<10	NA	NA
cis-1,3-Dichloropropene	<5	NA	<10	NA	NA
Vinyl chloride	**1 J**	NA	<10	NA	NA
Chloroethane	**230**	NA	<10	NA	NA
Dichlorodifluoromethane (CFC-12)	<5	NA	<10	NA	NA
Benzene	**4 J**	NA	<10	NA	NA
Methyl acetate	<5	NA	<50	NA	NA
Ethylbenzene	**4 J**	NA	<10	NA	NA
Methylene chloride	**3 J**	NA	<40	NA	NA
Styrene	<5	NA	<50	NA	NA
Toluene	**13**	NA	<10	NA	NA
trans-1,3-Dichloropropene	<5	NA	<10	NA	NA
Xylene (total)	**9**	NA	<10	NA	NA
Methyl tert butyl ether (MTBE)	<5	NA	<10	NA	NA
Trichlorofluoromethane (CFC-11)	<5	NA	<10	NA	NA
Trifluorotrichloroethane (Freon 113)	<10	NA	<100	NA	NA
2-Butanone (Methyl ethyl ketone) (MEK)	**5 J**	NA	<100	NA	NA
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	<10	NA	<100	NA	NA
1,2,4-Trichlorobenzene	<5	NA	<50	NA	NA
1,2-Dichloropropane	<5	NA	<10	NA	NA
1,3-Dichlorobenzene	<5	NA	<50	NA	NA
Cyclohexane	**6**	NA	<50	NA	NA
Methyl cyclohexane	**9**	NA	<50	NA	NA
Dibromochloromethane	<5	NA	<10	NA	NA
Isopropyl benzene	<5	NA	<50	NA	NA
General Chemistry					
Percent moisture	14.4	NA	NA	16.6	9.7

BOLD = compound detected above laboratory reporting limit
< = less than
µg/kg = micrograms per kilogram
µg/L = micrograms per liter
GC/MS = gas chromatography/mass spectrometry
USEPA = United States Environmental Protection Agency
SIM = Selective ion monitoring
MDL = Method detection limit
RL = Reporting limit
J = Estimated value
NA = Not analyzed / Not applicable
SPLP = Synthetic Precipitation Leaching Procedure by USEPA Method 1312

Table 3
Summary of 1,4-Dioxane Corrected Field Leachate Concentrations
RACER Lansing Plant 2
Lansing, MI

Boring ID	Depth (feet bgs)	Zone / Soil Type	Soil 1,4-Dioxane (µg/kg)	SPLP 1,4-Dioxane (µg/L)	Soil-Water Partition Coefficient (Kd) (L/kg)	Corrected Field Leachate SPLP 1,4-Dioxane (µg/L)	1,4-Dioxane Leachate Criterion (µg/L)
SB-A5.2-OB118	10.5-11	Shallow LNAPL / Sand, some silt	13	0.18	52.2	0.25	115
	21-21.5	Deep LNAPL / Sand and Silt	35	1.4	5	6.8	115
SB-A5.2-OC107	13-13.5	Shallow LNAPL / Sand, some silt	17	1.1	0.0001	111	115
SB-A5.2-NM126	5-5.5	Shallow LNAPL / Sand, some silt	<20	0.27	NA	NA	115
	15-15.5	Deep LNAPL / Sand, some silt	90	4.3	0.9	83	115
SB-A5.2-NU129	5-5.3	Shallow LNAPL / Granules	<100	0.55	NA	NA	115
SB-A5.2-NY92	1.5-2	Shallow LNAPL / Sand, some silt	5.1	0.24	1.3	3.6	115

Notes:

< = less than
µg/kg = micrograms per kilogram
µg/L = micrograms per liter
GC/MS = gas chromatography/mass spectrometry
USEPA = United States Environmental Protection Agency
SIM = Selective ion monitoring
NA = Not applicable. Detectable concentrations of 1,4-dioxane in soil and SPLP required to calculate correction factor.
SPLP = Synthetic Precipitation Leaching Procedure by USEPA Method 1312
1,4-Dioxane results by GC/MS Semivolatile Organics USEPA SW-846 8270C SIM
1,4-Dioxane leachate criterion = MDEQ drinking water criterion of 7.2 µg/L x MDEQ default attenuation factor (DAF) of 16 = 115 µg/L
Corrected field leachate concentrations calculated using New Jersey Department of Environmental Protection SPLP Spreadsheet Version 3.1 (Attachment C)

FIGURES

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

LOWER 1,4-DIOXANE TOE AREA

2017 LNAPL AREA 1,4-DIOXANE INVESTIGATION

LEGEND

- PERCHED MONITORING WELL
- LNAPL MONITORING WELL
- DEEP OVERBURDEN MONITORING WEL
- WEATHERED BEDROCK MONITORING WELL
- BEDROCK MONITORING WELL
- DEEP VAP/HPT BORING LOCATION
- APPROXIMATE EXTENT OF LNAPL
- PERCHED 1,4-DIOXANE IMPACTS > PROPOSED DW CRITERIA (7.2 µg/L)
- LOWER 1,4-DIOXANE IMPACTS > PROPOSED DW CRITERIA (7.2 µg/L)
- LOWER 1,4-DIOXANE IMPACTS > DW CRITERIA (72 µg/L)
- PLANT 2
- PLANT 3
- PLANT 6

NOTES:

DW - DRINKING WATER
HPT - HYDRAULIC PROFILING TOOL
LNAPL - LIGHT NON-AQUEOUS PHASE LIQUID
µg/L - MICROGRAMS PER LITER
VAP - VERTICAL AQUIFER PROFILE

0 260 520
SCALE IN FEET

RACER TRUST
PLANTS 2, 3, & 6
LANSING, MICHIGAN

SITE LOCATION AND SUMMARY OF GROUNDWATER IMPACTS

ARCADIS Design & Consultancy for natural and built assets

FIGURE 1

CITY: Novi DIV: ENV DB: TRY PIC: D. KAIDING PM: R. CHRISTENSEN TM: K. TEMPLIN TR: J. SALING
\\corpstorage\Data\ArcGisData\GISProjects_ENV\RACER_Lansing\Docs\2017 Workplan Figures\Leachability Location Map.mxd PLOTTED: 6/26/2017 12:02:05 PM BY: sbell
PROJECT NUMBER: B0064479.2015/B0064480.2015 COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl

Depth (ft bgs)	Soil 1,4-Dioxane (µg/kg)	SPLP 1,4-Dioxane (µg/L)	Soil 1,1,1-TCA (µg/kg)	SPLP 1,1,1-TCA (µg/L)
5-5.5	<20	0.27	<4	--
5.5-6	--	--	--	<10
6.5-7	110	--	--	--
15-15.5	90	4.3	<4	--
15.5-16	--	--	--	<10
19.5-20	30	--	--	--

Depth (ft bgs)	Soil 1,4-Dioxane (µg/kg)	SPLP 1,4-Dioxane (µg/L)	Soil 1,1,1-TCA (µg/kg)	SPLP 1,1,1-TCA (µg/L)
1.5-2	5.1	0.24	2,000	--
2-2.5	--	--	--	<10
4.5-5	4.5	--	--	--
14.5-15	43	--	--	--

Depth (ft bgs)	Soil 1,4-Dioxane (µg/kg)	SPLP 1,4-Dioxane (µg/L)	Soil 1,1,1-TCA (µg/kg)	SPLP 1,1,1-TCA (µg/L)
5-5.3	<100	0.55	150 J	--
5.5-5.5	--	--	--	<10
6.5-7	22	--	--	--
19.5-20	48	--	--	--

Depth (ft bgs)	Soil 1,4-Dioxane (µg/kg)	SPLP 1,4-Dioxane (µg/L)	Soil 1,1,1-TCA (µg/kg)	SPLP 1,1,1-TCA (µg/L)
10.5-11	13	0.18 J	24	--
11-11.5	--	--	--	<10
14-14.5	29	--	--	--
21-21.5	35	1.4	93 J	--
24.5-25	65	--	--	--

Depth (ft bgs)	Soil 1,4-Dioxane (µg/kg)	SPLP 1,4-Dioxane (µg/L)	Soil 1,1,1-TCA (µg/kg)	SPLP 1,1,1-TCA (µg/L)
13-13.5	17	1.1	4,000	--
13.5-14	--	--	--	1,000
14.5-15	33	--	--	--
19.5-20	77	--	--	--

1,4-Dioxane in NAPL (µg/kg)
<200

1,4-Dioxane in NAPL (µg/kg)
<200

1,4-Dioxane in NAPL (µg/kg)
<200

SB-A5.2-NM126
LMW-12-08
AREA 5-2
PMW-01
AREA 5
LMW-14-15D
SB-A5.2-NU129
SB-A5.2-NY92
SB-A5.2-OB118
SB-A5.2-OC107
AREA 5-3

LEGEND

- SOIL BORING LOCATION
- NAPL MONITORING WELL
- MONITORING WELL
- WEATHERED BEDROCK MONITORING WELL
- BEDROCK MONITORING WELL
- APPROXIMATE EXTENT NAPL

NOTES:

-- : NOT ANALYZED
ft bgs: FEET BELOW GROUND SURFACE
NAPL: NON-AQUEOUS PHASE LIQUID
SPLP: SYNTHETIC PRECIPITATION LEACH PROCEDURE
1,1,1-TCA: 1,1,1-TRICHLOROETHANE
µg/kg: MICROGRAMS PER KILOGRAM
µg/L: MICROGRAMS PER LITER

0 40 80
SCALE IN FEET

RACER TRUST
PLANT 2
LANSING, MICHIGAN

1,4-DIOXANE LEACHABILITY SAMPLE RESULTS

ARCADIS Design & Consultancy for natural and built assets

FIGURE 2

CITY: Novi DIV: ENV DB: TRY PIC: PM: TM: TR: PROJECT NUMBER: COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl
\\corpstorage\Data\ArcGisData\GISProjects_ENVIRACER_Lansing\Docs\2017 Workplan Figures\1,4-D Leachability.mxd PLOTTED: 6/26/2017 12:13:59 PM BY: sbell

SB-A5.2-NY92 SB-A5.2-OC107 SB-A5.2-OB118 LMW-14-15D SB-A5.2-NU129 PMW-01 LMW-12-08 SB-A5.2-NM126

A WEST

A' EAST

865 860 855 850 845 840 835

0 100 200 300 400 500

1,4-D = 5.1 (3.6*)
TCA = 2,000 (<10)

1,4-D = 4.5
TCA = NA

1,4-D = 43
TCA = NA

1,4-D = 77
TCA = NA

1,4-D = 17 (111*)
TCA = 4,000 (1,000)

1,4-D = 33
TCA = NA

1,4-D = 35 (6.8*)
TCA = 93 J (NA)

1,4-D = 65
TCA = NA

1,4-D = 13 (0.25*)
TCA = 24 (<10)

1,4-D = 29
TCA = NA

1,4-D = <100 (0.55)
TCA = 150 J (<10)

1,4-D = 22
TCA = NA

1,4-D = <200

1,4-D = 48
TCA = NA

1,4-D = <200

1,4-D = <20 (0.27)
TCA = <4 (<10)

1,4-D = 110
TCA = NA

1,4-D = <200

1,4-D = 90 (83*)
TCA = <4 (<10)

1,4-D = 30
TCA = NA

STRATIGRAPHY

- Topsoil/Asphalt/Concrete
- Fill
- Gravelly Sand
- Sand
- Sandy Silt/Silt
- Silty/Sandy/Gravelly Clay
- Clay

HYDROSTRATIGRAPHY

- Transport zone
- Slow advection zone
- Storage zone

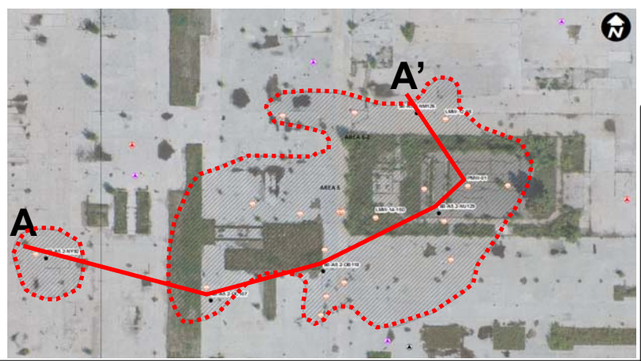
Soil Results (SPLP Results)

LNAPL Results

NOTES:

1. ALL SOIL AND LNAPL SAMPLE RESULTS IN MICROGRAMS PER KILOGRAM (µg/kg).
2. ALL SPLP SAMPLE RESULTS IN MICROGRAMS PER LITER (µg/L). CORRECTED FIELD LEACHATE CONCENTRATIONS CALCULATED WHERE POSSIBLE AND DENOTED BY '*'.

TCA – 1,1,1-Trichloroethane
1,4-D – 1,4-Dioxane
NA – Not Analyzed
J – Estimated Value
[ ] - Sample Interval
- Approximate extent of LNAPL



RACER TRUST
PLANTS 2,3, & 6
LANSING, MICHIGAN

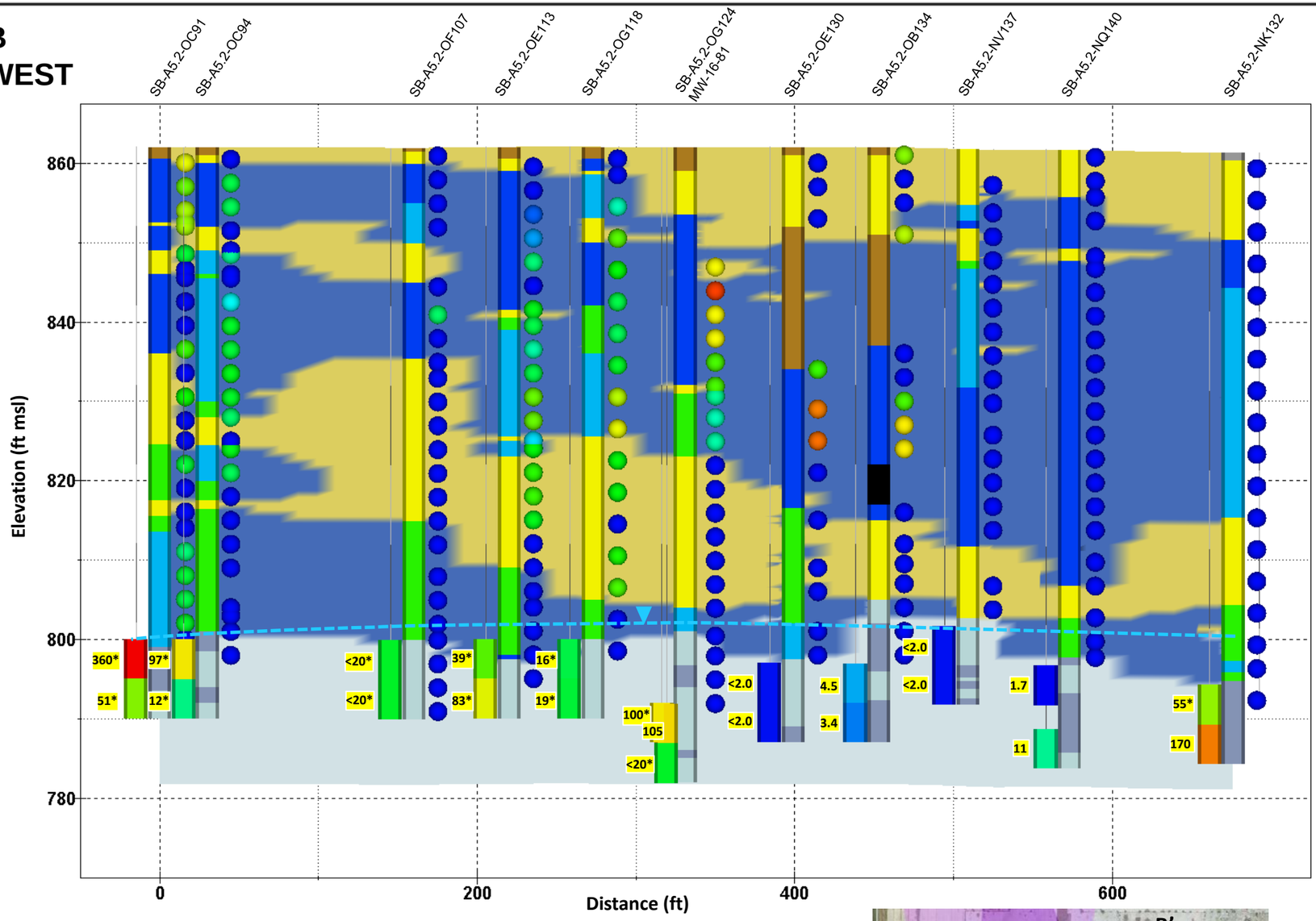
LNAPL AREA 1,4-DIOXANE INVESTIGATION CROSS-SECTION

ARCADIS Design & Consultancy for natural and built assets

FIGURE
3

ATTACHMENT 1

Lower 1,4-Dioxane Toe Investigation Cross-Section



LEGEND

STRATIGRAPHY

- TOPSOIL/ASPHALT/CONCRETE
- FILL
- GRAVELLY SAND
- SAND
- SILTY SAND
- SILTY/SANDY/GRAVELLY CLAY
- CLAY
- PEAT
- BEDROCK (PRIMARILY SANDSTONE)
- BEDROCK (PRIMARILY SHALE)
- NO RECOVERY

HYDROSTRATIGRAPHY

- More Permeable
- Less Permeable
- Bedrock
- Approximate Bedrock Water Table
- Soil Sample Result
- Groundwater Sample Result

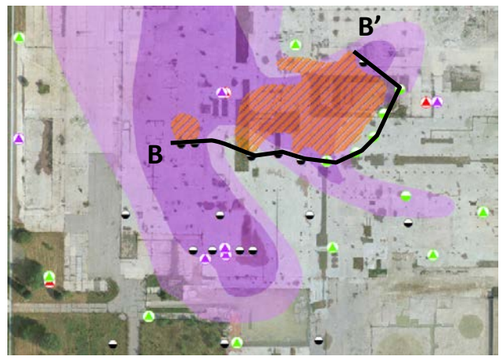
1,4-Dioxane: 5,000 ug/kg; 1,000 ug/kg; 100 ug/kg; 10 ug/kg; 1 ug/kg

1,4-Dioxane: 5,000 ug/L; 1,000 ug/L; 100 ug/L; 10 ug/L; 1 ug/L

NOTE:

1. Soil and groundwater concentrations provided in parts per billion
   - µg/L – micrograms per liter
   - µg/kg – micrograms per kilogram
2. Monitoring well results provided by GC-MS Method 8260 and represent most recent sampling event (June 2016)
3. VAP samples analyzed via GC-MS Method 8260 unless otherwise noted.
4. * - VAP sample analyzed via DSITMS Method 8265
5. Soil samples are provided by DSITMS Method 8265 or GC-MS Method 8260C. Results bias low. Results could potentially be two to four times higher if analyzed using standard Method 8260-SIM.

VAP – Vertical aquifer profiling
DSITMS – Direct ion trap mass spectrometry
GC-MS – Gas chromatography-mass spectrometry
ft msl – feet above mean sea level



RACER LANSING
PLANT 2
LANSING, MICHIGAN

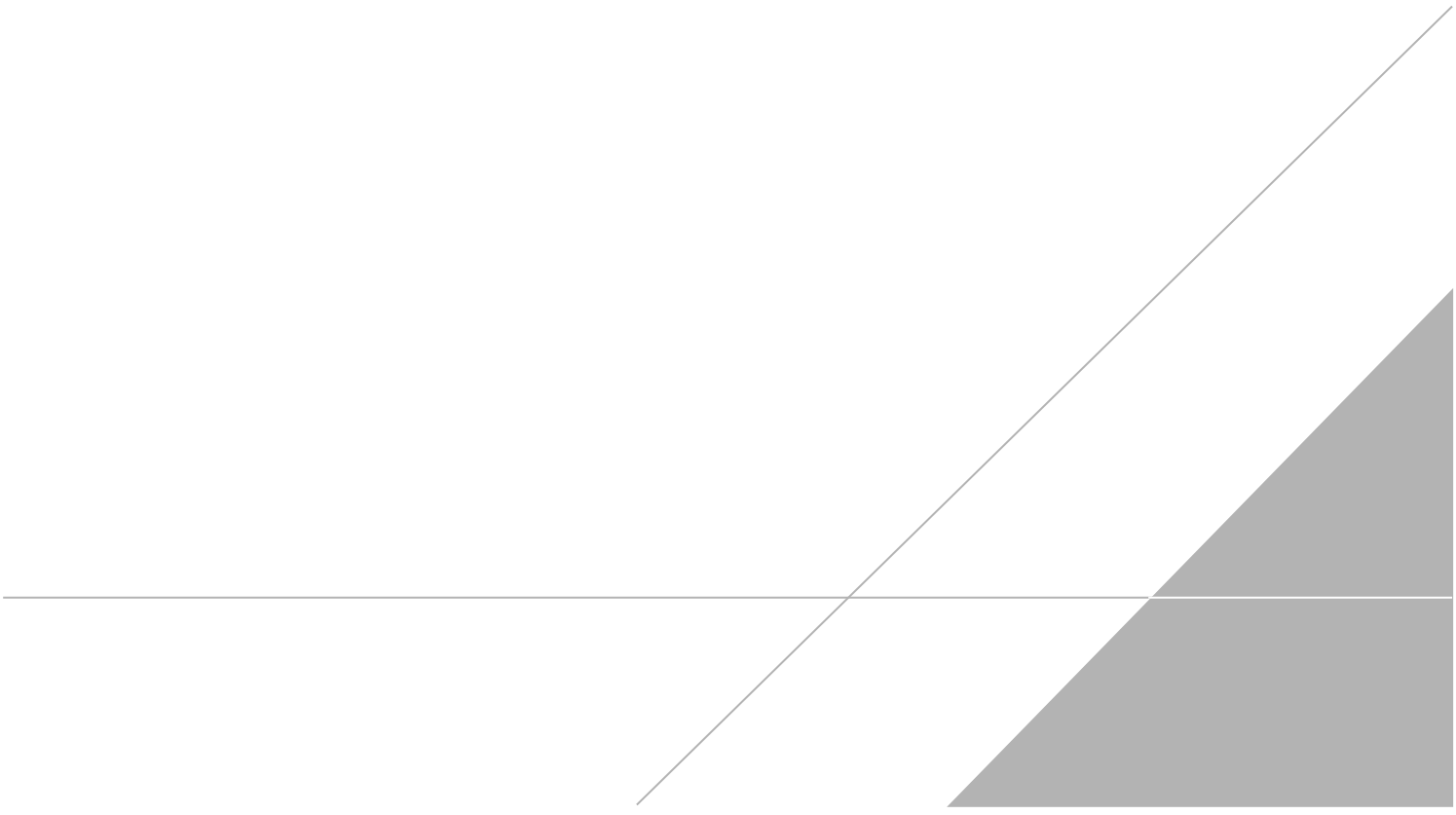
CROSS SECTION B-B'
AUGUST 2016

ARCADIS Design & Consultancy for natural and built assets

FIGURE
A-1

ATTACHMENT 2

Boring Logs



Date Start: 4/6/2017
Date Finish: 4/6/2017
Drilling Company: PME
Driller's Name: Kelly
Drilling Method: Continuous
Sampling Method: 2-1/4' MC
Rig Type: Direct Push
Water Level Start (ft. bgl.): NA
Water Level Finish (ft. btoc.): NA

Northing: NA
Easting: NA
Casing Elevation: NA

Borehole Depth (ft. bgs.): 20.0'
Surface Elevation: NA

Descriptions By: Alex Villhauer

Well/Boring ID: **SB-A5.2-NM126**

Client: RACER

Location: RACER Lansing Plant 2

Weather Conditions: 30s Snow

DEPTH (feet bgl.) / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Water Level (ft. bgl.)	Well/Boring Construction
0 / 0	1	0.0-1.5	NA	NA			(0.0 - 0.5') CONCRETE		
				0.1			(0.5 - 2.5') SAND, fine to medium, trace small pebbles, subround; well sorted; moist; brown (10YR 5/3).		
	2	1.5-5.0	2.5	0.3			(2.5 - 5.5') SAND, fine; some silt; trace small to large pebbles, subrounded; moist; grayish brown (10YR 5/2). Note: trace brick		
				1.0					
				1.2					
5 / -5				1.2			NOTE: At 5.0' - wet; black staining with odor/sheen.		
				1.2			(5.5 - 6.0') SILT, some clay; some fine sand; wet; very dark brown (10YR 3/2) . NOTE: Odor.		
	3	5.0-10.0	5.0	0.4			(6.0 - 11.0') CLAY, little silt, medium plasticity; trace granules to small pebbles, subangular; moist; stiff; dark gray brown (10YR 4/1). NOTE: green staining throughout.		
				0.3					
				0.3					
10 / -10				0.3					
				0.2					
	4	10.0-15.0	2.3	0.3			(11.0 - 15.0') CLAY, and SILT, low plasticity; trace granules, subangular; moist; soft; dark green brown (10YR 4/1).		
				0.2					
				0.5					
15 / -15				0.5					
				0.9			(15.0 - 17.0') SAND, fine; some silt; little clay; trace granules, subround; wet; gray (10YR 5/1). NOTE: odor/visible sheen 15.0'-16.0' bgs.		

ARCADIS Design & Consultancy for natural and built assets

Remarks: bgs = below ground surface

Note: Wet, Black staining, and Odor/Sheen at 5.0' bgs
Note: Green staining from 6.0'-11.0' bgs
Note: Wet from 15.0'-17.0' bgs
Note: Odor/Sheen from 15.0'-16.0' bgs

Date Start: 4/6/2017
Date Finish: 4/6/2017
Drilling Company: PME
Driller's Name: Kelly
Drilling Method: Continuous
Sampling Method: 2-1/4' MC
Rig Type: Direct Push
Water Level Start (ft. bgl.): NA
Water Level Finish (ft. btoc.): NA

Northing: NA
Easting: NA
Casing Elevation: NA

Borehole Depth (ft. bgs.): 20.0'
Surface Elevation: NA

Descriptions By: Alex Villhauer

Well/Boring ID: **SB-A5.2-NM126**

Client: RACER

Location: RACER Lansing Plant 2

Weather Conditions: 30s Snow

DEPTH (feet bgl.) / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Water Level (ft. bgl.)	Well/Boring Construction
	5	15.0-20.0		0.8 0.6 0.2 0.2			(17.0 - 20.0') Low plasticity CLAY; little silt; trace granules, subangular; moist; stiff; dark grayish brown (10YR 4/2).		
20 -20							End of boring at 20.0' bgs.		
25 -25									
30 -30									
35 -35									

ARCADIS Design & Consultancy for natural and built assets

Remarks: bgs = below ground surface

Note: Wet, Black staining, and Odor/Sheen at 5.0' bgs
Note: Green staining from 6.0'-11.0' bgs
Note: Wet from 15.0'-17.0' bgs
Note: Odor/Sheen from 15.0'-16.0' bgs

Date Start: 4/6/2017
Date Finish: 4/6/2017
Drilling Company: PME
Driller's Name: Kelly
Drilling Method: Continuous
Sampling Method: 2-1/4' MC
Rig Type: Direct Push
Water Level Start (ft. bgl.): NA
Water Level Finish (ft. btoc.): NA

Northing: NA
Easting: NA
Casing Elevation: NA

Borehole Depth (ft. bgs.): 20.0'
Surface Elevation: NA

Descriptions By: Alex Villhauer

Well/Boring ID: **SB-A5.2-NU129**

Client: RACER

Location: RACER Lansing Plant 2

Weather Conditions: 30s Snow

DEPTH (feet bgl.) / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Water Level (ft. bgl.)	Well/Boring Construction
0 / 0									
				0.3			(0.0 - 0.3') ASPHALT		
							(0.3 - 1.0') SAND, fine to coarse; some silt; poorly sorted, moist, brown (10YR 5/3).		
				0.3			(1.0 - 5.0') CLAY, some silt, low plasticity; little fine sand; trace medium to small pebbles, subangular to subround; moist; medium stiff; dark grayish brown (10YR 4/2)		
	1	0.0-5.0	3.1	0.4					
				1.9			NOTE: at 3.7' bgs, thin seam of oily gravel; odor		
				1.0			(5.0 - 5.3') PEBBLES, granules to medium, subround; and SAND, fine to coarse; poorly sorted; wet; black (10YR 1/1) . NOTE: Odor; sheen.		
5 / -5				2.8			(5.3 - 20.0') Low plasticity CLAY, little silt; trace granules to medium pebbles, subangular; moist, medium stiff, dark grayish brown (10YR 4/2)		
	2	5.0-10.0	3.5	0.9					
				0.4					
				0.3					
				0.2					
10 / -10									
				0.3					
	3	10.0-15.0	4.1	0.3					
				0.2					
				0.2			NOTE: thin seam of fine SAND at 13.7' bgs.		
				0.2			NOTE: thin seam of fine SAND at 14.5' bgs.		
15 / -15				0.2					

ARCADIS Design & Consultancy for natural and built assets

Remarks: bgs = below ground surface

Note: Thin seam of gravel at 3.7' bgs with odor
Note: Wet, black, odor and NAPL from 5.0'-5.5' bgs

Date Start: 4/6/2017
Date Finish: 4/6/2017
Drilling Company: PME
Driller's Name: Kelly
Drilling Method: Continuous
Sampling Method: 2-1/4' MC
Rig Type: Direct Push
Water Level Start (ft. bgl.): NA
Water Level Finish (ft. btoc.): NA

Northing: NA
Easting: NA
Casing Elevation: NA

Borehole Depth (ft. bgs.): 20.0'
Surface Elevation: NA

Descriptions By: Alex Villhauer

Well/Boring ID: **SB-A5.2-NU129**

Client: RACER

Location: RACER Lansing Plant 2

Weather Conditions: 30s Snow

DEPTH (feet bgl.) / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Water Level (ft. bgl.)	Well/Boring Construction
	4	15.0-20.0	2.9	0.2 0.2 0.2 0.2	X				
20 -20							End of boring at 20.0' bgs.		
25 -25									
30 -30									
35 -35									

ARCADIS Design & Consultancy for natural and built assets

Remarks: bgs = below ground surface

Note: Thin seam of gravel at 3.7' bgs with odor
Note: Wet, black, odor and NAPL from 5.0'-5.5' bgs

Date Start: 4/6/2017
Date Finish: 4/6/2017
Drilling Company: PME
Driller's Name: Kelly
Drilling Method: Continuous
Sampling Method: 2-1/4' MC
Rig Type: Direct Push
Water Level Start (ft. bgl.): NA
Water Level Finish (ft. btoc.): NA

Northing: NA
Easting: NA
Casing Elevation: NA

Borehole Depth (ft. bgs.): 15
Surface Elevation: NA

Descriptions By: Alex Villhauer

Well/Boring ID: **SB-A5.2-NY92**

Client: RACER

Location: RACER Lansing Plant 2

Weather Conditions: 30s Snow

DEPTH (feet bgl.) / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Water Level (ft. bgl.)	Well/Boring Construction
0 / 0	1	0.0-1.5	NA	NA			(0.0 - 1.5') CONCRETE		
				3.6			(1.5 - 2.0') SAND, very fine; some silt; moist, dark grayish brown (10YR 4/2). NOTE: Odor.		
	2	1.5-5.0	4.0	1.0			(2.0 - 2.8') SILT, non-plastic; little clay; little fine sand, fine; moist, dense, grayish brown (10YR5/2).		
				0.4			(2.8 - 5.0') CLAY, low plasticity; little silt; little fine sand, fine; trace granules, subangular; dry, stiff, brown (10YR 4/3).		
				0.3					
5 / -5	3	5.0-10.0	4.5				(5.0 - 5.7') SAND, fine to coarse; some silt; poorly sorted, wet, brown (10YR 4/3)		
				0.2			(5.7 - 12.5') CLAY, low plasticity; little silt; trace granules to small pebbles, subangular; moist, stiff, grayish brown (10YR 5/2).		
				0.3					
				0.2					
				0.2					
				0.2					
10 / -10	4	10.0-15.0	3.9	0.2					
				0.2			NOTE: seam of fine to coarse sand and small pebbles at 11.5'-11.6' bgs.		
				0.2			(12.5 - 15.0') CLAY, high plasticity; moist, soft, dark grayish brown (10YR 4/2).		
				0.2					
				0.2					
15 / -15							End of boring at 15.0' bgs.		

ARCADIS Design & Consultancy for natural and built assets

Remarks: bgs = below ground surface

Note: Odor from 1.5'-2.0' bgs
Note: Wet from 5.0'-5.7' bgs

Date Start: 4/6/2017
Date Finish: 4/6/2017
Drilling Company: PME
Driller's Name: Kelly
Drilling Method: Continuous
Sampling Method: 2-1/4' MC
Rig Type: Direct Push
Water Level Start (ft. bgl.): NA
Water Level Finish (ft. btoc.): NA

Northing: NA
Easting: NA
Casing Elevation: NA

Borehole Depth (ft. bgs.): 25.0'
Surface Elevation: NA

Descriptions By: Alex Villhauer

Well/Boring ID: **SB-A5.2-OB118**

Client: RACER

Location: RACER Lansing Plant 2

Weather Conditions: 30s Snow

DEPTH (feet bgl.) / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Water Level (ft. bgl.)	Well/Boring Construction
0 / 0	1	0.0-2.0	NA				(0.0 - 2.0') CONCRETE		
	2	2.0-5.0	2.5	0.0 0.1 0.1			(2.0 - 3.5') SAND, fine; well sorted; dry; dark brown (10YR 3/3) (3.5 - 10.3') CLAY, little silt, medium plasticity; moist; medium stiff; dark grayish brown (10YR 4/2)		
5 / -5	3	5.0-10.0	2.5	0.3 0.4 0.2 0.2 0.2					
10 / -10	4	10.0-15.0	5.0	0.8 0.9 0.5 0.4 0.3			(10.3 - 12.0') SAND, fine to medium; some silt; trace coarse sand, subangular; wet; dark gray (10YR 4/1) NOTE: strong odor; visible sheen from 10.3'-11.0' bgs. Grain size fining upward. (12.0 - 20.0') CLAY, little silt, low plasticity; little fine sand; trace granules, subangular; moist; stiff; brown (10YR 4/3)		
15 / -15				0.3					

ARCADIS Design & Consultancy for natural and built assets

Remarks: bgs = below ground surface

Note: Wet from 10.3' - 12.0' and 20.0' - 23.0' bgs
Note: Strong odor, visible sheen from 10.3' - 11.0' bgs
Note: Strong odor, poor recovery from 20.0' - 23.0' bgs

Date Start: 4/6/2017 **Date Finish:** 4/6/2017 **Drilling Company:** PME **Driller's Name:** Kelly **Drilling Method:** Continuous **Sampling Method:** 2-1/4' MC **Rig Type:** Direct Push **Water Level Start (ft. bgl.):** NA **Water Level Finish (ft. btoc.):** NA	**Northing:** NA **Easting:** NA **Casing Elevation:** NA **Borehole Depth (ft. bgs.):** 25.0' **Surface Elevation:** NA **Descriptions By:** Alex Villhauer	**Well/Boring ID:SB-A5.2-OB118** **Client:** RACER **Location:** RACER Lansing Plant 2 **Weather Conditions:** 30s Snow

DEPTH (feet bgl.) / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Water Level (ft. bgl.)	Well/Boring Construction
20 -20	5	15.0-20.0	4.5	0.4 0.3 0.3 0.2					
	6	20.0-25.0	2.0	0.5 0.2 0.2			(20.0 - 23.0') SAND, fine; and SILT; slow dilatancy; wet; brown (10YR 4/3) . NOTE: strong odor; poor recovery. (23.0 - 25.0') CLAY, little silt, low plasticity; trace granules to medium pebbles, subangular; moist, soft, gray (10YR 4/1).		
25 -25							End of boring at 25.0' bgs.		
30 -30									
35 -35									

ARCADIS Design & Consultancy for natural and built assets

Remarks: bgs = below ground surface

Note: Wet from 10.3' - 12.0' and 20.0' - 23.0' bgs
Note: Strong odor, visible sheen from 10.3' - 11.0' bgs
Note: Strong odor, poor recovery from 20.0' - 23.0' bgs

Date Start: 4/6/2017
Date Finish: 4/6/2017
Drilling Company: PME
Driller's Name: Kelly
Drilling Method: Continuous
Sampling Method: 2-1/4' MC
Rig Type: Direct Push
Water Level Start (ft. bgl.): NA
Water Level Finish (ft. btoc.): NA

Northing: NA
Easting: NA
Casing Elevation: NA

Borehole Depth (ft. bgs.): 20.0'
Surface Elevation: NA

Descriptions By: Alex Villhauer

Well/Boring ID: **SB-A5.2-OC107**

Client: RACER

Location: RACER Lansing Plant 2

Weather Conditions: 30s Snow

DEPTH (feet bgl.) / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Water Level (ft. bgl.)	Well/Boring Construction
0 / 0				NA			(0.0 - 1.0') CONCRETE		
	1	0.0-5.0	3.5	0.1 0.1 0.2 0.2			(1.0 - 5.0') Low plasticity CLAY, little fine sand; trace granules, subangular; dry; stiff; brown (10YR 4/3)		
5 / -5	2	5.0-10.0	4.3	0.2 0.2 0.2 0.2 0.2			(5.0 - 6.5') SAND, fine to coarse; and SILT; poorly sorted, wet; brown (10YR 4/3) . NOTE: Slight odor. (6.5 - 10.0') CLAY, low plasiticity; little silt; trace fine sand; trace granules to small pebbles, subangular; moist, stiff, brown (10YR 4/3)		
10 / -10	3	10.0-15.0	3.5	0.4 0.5 1.5 1.6 0.3			(10.0 - 14.0') SAND, fine to medium; some silt; trace granules, subrounded; wet, grayish brown (10YR 5/2) NOTE: odor and silt seams at 12' bgs (14.0 - 20.0') CLAY, little silt, low plasticity; trace granules to small pebbles, subangular; moist; stiff; dark grayish brown (10YR4/2)		
15 / -15				0.2					

ARCADIS Design & Consultancy for natural and built assets

Remarks: bgs = below ground surface

Date Start: 4/6/2017
Date Finish: 4/6/2017
Drilling Company: PME
Driller's Name: Kelly
Drilling Method: Continuous
Sampling Method: 2-1/4' MC
Rig Type: Direct Push
Water Level Start (ft. bgl.): NA
Water Level Finish (ft. btoc.): NA

Northing: NA
Easting: NA
Casing Elevation: NA

Borehole Depth (ft. bgs.): 20.0'
Surface Elevation: NA

Descriptions By: Alex Villhauer

Well/Boring ID: **SB-A5.2-OC107**

Client: RACER

Location: RACER Lansing Plant 2

Weather Conditions: 30s Snow

DEPTH (feet bgl.) / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Water Level (ft. bgl.)	Well/Boring Construction
	4	15.0-20.0	4.0	0.2 0.2 0.2 0.2	X				
20 -20							End of boring at 20.0' bgs.		
25 -25									
30 -30									
35 -35									

Remarks: bgs = below ground surface

ARCADIS Design & Consultancy for natural and built assets

ATTACHMENT 3

Analytical Laboratory Report

ANALYTICAL RESULTS

Prepared by:

Eurofins Lancaster Laboratories Environmental
2425 New Holland Pike
Lancaster, PA 17601

Prepared for:

ARCADIS U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch CO 80129

Report Date: April 27, 2017

Project: RACER Lansing Plant 2

Submittal Date: 04/08/2017
Group Number: 1787976
SDG: RLP01
PO Number: B0064479.2017.00102
State of Sample Origin: MI

Client Sample Description	Lancaster Labs (LL) #
SB-A5.2-OB118_10.5-11 Grab Soil	8934222
SB-A5.2-OB118_10.5-11 Grab Soil	8934223
SB-A5.2-OB118_11-11.5 Grab Soil	8934224
SB-A5.2-OB118_14-14.5 Grab Soil	8934225
SB-A5.2-OB118_21-21.5 Grab Soil	8934226
SB-A5.2-OB118_21-21.5 Grab Soil	8934227
SB-A5.2-OB118_24.5-25 Grab Soil	8934228
SB-A5.2-OC107_13-13.5 Grab Soil	8934229
SB-A5.2-OC107_13-13.5 Grab Soil	8934230
SB-A5.2-OC107_13.5-14 Grab Soil	8934231
SB-A5.2-OC107_14.5-15 Grab Soil	8934232
SB-A5.2-OC107_19.5-20 Grab Soil	8934233
SB-A5.2-NY92_1.5-2 Grab Soil	8934234
SB-A5.2-NY92_1.5-2 Grab Soil	8934235
SB-A5.2-NY92_2-2.5 Grab Soil	8934236
SB-A5.2-NY92_4.5-5 Grab Soil	8934237
SB-A5.2-NY92_14.5-15 Grab Soil	8934238
SB-A5.2-NM126_5-5.5 Grab Soil	8934239
SB-A5.2-NM126_5-5.5 Grab Soil	8934240
SB-A5.2-NM126_5.5-6 Grab Soil	8934241
SB-A5.2-NM126_6.5-7 Grab Soil	8934242
SB-A5.2-NM126_15-15.5 Grab Soil	8934243
SB-A5.2-NM126_15-15.5 Grab Soil	8934244
SB-A5.2-NM126_15.5-16 Grab Soil	8934245
SB-A5.2-NM126_19.5-20 Grab Soil	8934246
SB-A5.2-NU129_5-5.3 Grab Soil	8934247
SB-A5.2-NU129_5-5.3 Grab Soil	8934248
SB-A5.2-NU129_5.3-5.5 Grab Soil	8934249
SB-A5.2-NU129_6.5-7 Grab Soil	8934250
SB-A5.2-NU129_19.5-20 Grab Soil	8934251

LMW-14-15D_040617 Grab LNAPL	8934252
LMW-12-08_040717 Grab LNAPL	8934253
PMW-01_040717 Grab LNAPL	8934254

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

Regulatory agencies do not accredit laboratories for all methods, analytes, and matrices. Our current scopes of accreditation can be viewed at http://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/resources/certifications/ . To request copies of prior scopes of accreditation, contact your project manager.

Electronic Copy To	Arcadis	Attn: Patrick Curry
Electronic Copy To	Arcadis	Attn: Alex Villhauer
Electronic Copy To	Arcadis	Attn: Jesse Wright

Respectfully Submitted,

Megan A. Moeller
Senior Specialist

(717) 556-7261

Project Name: RACER Lansing Plant 2
LL Group #: 1787976

General Comments:

Through our technical processes and second person review of data, we have established that our data/deliverables are in compliance with the methods and project requirements unless otherwise noted or previously resolved with the client. The compliance signature is located on the cover page of the Analysis Reports.

See the Laboratory Sample Analysis Record section of the Analysis Report for the method references.

All QC met criteria unless otherwise noted in an Analysis Specific Comment below. Refer to the QC Summary for specific values and acceptance criteria.

Project specific QC samples are not included in this data set

Matrix QC may not be reported if site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

Surrogate recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in an Analysis Specific Comment below.

The samples were received at the appropriate temperature and in accordance with the chain of custody unless otherwise noted.

Analysis Specific Comments:

SW-846 8260B, GC/MS Volatiles

Sample #s: 8934224, 8934231, 8934236, 8934241, 8934245, 8934249

Reporting limits were raised due to interference from the sample matrix.

Sample #s: 8934234

The LCS and/or LCSD recoveries are outside the stated QC window but within the marginal exceedance allowance of +/- 4 standard deviations as defined in the NELAC/DoD Standards. The following analytes are accepted based on this allowance: dichlorodifluoromethane and vinyl chloride.

Sample #s: 8934226, 8934247

The LCS and/or LCSD recoveries are outside the stated QC window but within the marginal exceedance allowance of +/- 4 standard deviations as defined in the NELAC/DoD Standards. The following analytes are accepted based on this allowance: trichlorofluoromethane.

Sample #s: 8934222, 8934229

The recovery for the sample internal standard is outside the QC acceptance limits. The following corrective action was taken: The sample was re-analyzed and the QC is again outside of the acceptance limits, indicating a matrix effect. The data is reported from the initial trial.

Sample #s: 8934243

The recovery for the sample internal standard is outside the QC acceptance limits. The following corrective action was taken: The sample was re-analyzed and the QC is again outside of the acceptance limits, indicating a matrix effect. The data is reported from the initial trial.

The LCS and/or LCSD recoveries are outside the stated QC window but within the marginal exceedance allowance of +/- 4 standard deviations as defined in the NELAC/DoD Standards. The following analytes are accepted based on this allowance: 1,3-dichlorobenzene.

Sample #s: 8934239

The recovery for the sample internal standard is outside the QC acceptance limits. The following corrective action was taken: The secondary vial was analyzed and no valid data was collected during re-analysis. Therefore the matrix effects observed in the initial analysis could not be confirmed. The values reported here are from the initial analysis.

Batch #: Q171031AA (Sample number(s): 8934234)

The recovery(ies) for the following analyte(s) in the LCS and/or LCSD were below the acceptance window: Dichlorodifluoromethane, Vinyl Chloride

Batch #: Q171041AA (Sample number(s): 8934226, 8934247)

The recovery(ies) for the following analyte(s) in the LCS and/or LCSD were below the acceptance window: Trichlorofluoromethane

Batch #: W171081AA (Sample number(s): 8934224, 8934231, 8934236, 8934241, 8934245, 8934249 UNSPK: 8934224)

The recovery(ies) for the following analyte(s) in the MS and/or MSD exceeded the acceptance window indicating a positive bias: Tetrachloroethene, Acetone, 2-Butanone

Batch #: X171031AA (Sample number(s): 8934222, 8934229, 8934239)

The recovery(ies) for one or more surrogates were below the acceptance window for sample(s) 8934222

Batch #: X171041AA (Sample number(s): 8934243 UNSPK: P936524)

The recovery(ies) for the following analyte(s) in the LCS and/or LCSD were below the acceptance window: 1,3-Dichlorobenzene

The recovery(ies) for the following analyte(s) in the MS and/or MSD exceeded the acceptance window indicating a positive bias: Carbon Disulfide, cis-1,2-Dichloroethene

SW-846 8270C SIM, GC/MS Semivolatiles

Sample #s: 8934243

The stated QC limits for 1,4-Dioxane are advisory only.

Sample #s: 8934252, 8934253, 8934254

Due to laboratory error, the incorrect surrogate solution was added to the sample and all QC. The following corredtive action was taken:

The sample was re-extracted outside the method required holding time and the QC is compliant. All results are reported from the first trial. Similar results were obtained in both trials.

Reporting limits were raised due to interference from the sample matrix.

Sample #s: 8934223, 8934244, 8934248

The recovery for the sample internal standard is outside the QC acceptance limits. The following corrective action was taken: The sample was re-analyzed and internal standard areas are again outside of the QC acceptance limits, indicating a matrix effect. The reported data is from the initial analysis of the sample.

Sample #s: 8934225, 8934228, 8934232, 8934233, 8934237, 8934238, 8934239, 8934242, 8934246, 8934247, 8934250, 8934251

The stated QC limits for 1,4-Dioxane are advisory only.

Sample #s: 8934222

The surrogate data is outside the QC limits due to unresolvable matrix problems evident in the sample chromatogram.

The GC/MS semivolatile internal standard peak areas were outside of QC limits. The matrix spike and matrix spike duplicate samples were analyzed and internal standard peak areas were again outside of QC limits, indicating a matrix effect.

The stated QC limits for 1,4-Dioxane are advisory only.

Sample #s: 8934229

The surrogate data is outside the QC limits due to unresolvable matrix problems evident in the sample chromatogram.

The recovery for the sample internal standard is outside the QC acceptance limits. The following corrective action was taken: The sample was re-analyzed and internal standard areas are again outside of the QC acceptance limits, indicating a matrix effect. The reported data is from the initial analysis of the sample.

The stated QC limits for 1,4-Dioxane are advisory only.

Sample #s: 8934226, 8934234

The surrogate data is outside the QC limits due to unresolvable matrix problems evident in the sample chromatogram.

The stated QC limits for 1,4-Dioxane are advisory only.

Batch #: 17103SLE026 (Sample number(s): 8934252-8934254)

The recovery(ies) for one or more surrogates exceeded the acceptance window indicating a positive bias for sample(s) LCS, LCSD

The recovery(ies) for one or more surrogates were below the acceptance window for sample(s) 8934252, 8934253, 8934254, Blank, LCS, LCSD

Batch #: 17103SLI026 (Sample number(s): 8934222, 8934225-8934226, 8934228-8934229, 8934232-8934234, 8934237-8934239, 8934242-8934243, 8934246-8934247, 8934250-8934251 UNSPK: 8934222)

The recovery(ies) for the following analyte(s) in the LCS were below the

acceptance window: 1,4-Dioxane

The recovery(ies) for the following analyte(s) in the MS and/or MSD were below the acceptance window: 1,4-Dioxane

The recovery(ies) for one or more surrogates exceeded the acceptance window indicating a positive bias for sample(s) 8934222, 8934226, 8934229, 8934234, 8934239, 8934242, 8934243, 8934247, MS, MSD

SM 2540 G-1997, Wet Chemistry

Batch #: 17103820007B (Sample number(s): 8934234, 8934237-8934239, 8934242-8934243, 8934246-8934247, 8934250-8934251 BKG: 8934243)

The duplicate RPD for the following analyte(s) exceeded the acceptance window: Moisture

Sample Description: SB-A5.2-OB118_10.5-11 Grab Soil
RACER Lansing Plant 2

LL Sample # SW 8934222
LL Group # 1787976
Account # 03074

Project Name: RACER Lansing Plant 2

Collected: 04/06/2017 11:38 by AV

Submitted: 04/08/2017 10:05
Reported: 04/27/2017 11:07

ARCADIS U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch CO 80129

A2601 SDG#: RLP01-01

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**ug/kg**		**ug/kg**	**ug/kg**	
10237	Acetone	67-64-1	58		6	17	0.73
10237	Benzene	71-43-2	3	J	0.4	4	0.73
10237	Bromodichloromethane	75-27-4	N.D.		0.9	4	0.73
10237	Bromoform	75-25-2	N.D.		0.9	4	0.73
10237	Bromomethane	74-83-9	N.D.		2	4	0.73
10237	2-Butanone	78-93-3	7	J	3	9	0.73
10237	Carbon Disulfide	75-15-0	3	J	0.9	4	0.73
10237	Carbon Tetrachloride	56-23-5	N.D.		0.9	4	0.73
10237	Chlorobenzene	108-90-7	N.D.		0.9	4	0.73
10237	Chloroethane	75-00-3	10		2	4	0.73
10237	Chloroform	67-66-3	N.D.		0.9	4	0.73
10237	Chloromethane	74-87-3	N.D.		2	4	0.73
10237	Cyclohexane	110-82-7	1	J	0.9	4	0.73
10237	1,2-Dibromo-3-chloropropane	96-12-8	N.D.		2	4	0.73
10237	Dibromochloromethane	124-48-1	N.D.		0.9	4	0.73
10237	1,2-Dibromoethane	106-93-4	N.D.		0.9	4	0.73
10237	1,2-Dichlorobenzene	95-50-1	N.D.		0.9	4	0.73
10237	1,3-Dichlorobenzene	541-73-1	N.D.		0.9	4	0.73
10237	1,4-Dichlorobenzene	106-46-7	N.D.		0.9	4	0.73
10237	Dichlorodifluoromethane	75-71-8	N.D.		2	4	0.73
10237	1,1-Dichloroethane	75-34-3	14		0.9	4	0.73
10237	1,2-Dichloroethane	107-06-2	N.D.		0.9	4	0.73
10237	1,1-Dichloroethene	75-35-4	2	J	0.9	4	0.73
10237	cis-1,2-Dichloroethene	156-59-2	3	J	0.9	4	0.73
10237	trans-1,2-Dichloroethene	156-60-5	N.D.		0.9	4	0.73
10237	1,2-Dichloropropane	78-87-5	N.D.		0.9	4	0.73
10237	cis-1,3-Dichloropropene	10061-01-5	N.D.		0.9	4	0.73
10237	trans-1,3-Dichloropropene	10061-02-6	N.D.		0.9	4	0.73
10237	Ethylbenzene	100-41-4	2	J	0.9	4	0.73
10237	Freon 113	76-13-1	N.D.		2	9	0.73
10237	2-Hexanone	591-78-6	N.D.		3	9	0.73
10237	Isopropylbenzene	98-82-8	1	J	0.9	4	0.73
10237	Methyl Acetate	79-20-9	N.D.		2	4	0.73
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.		0.4	4	0.73
10237	4-Methyl-2-pentanone	108-10-1	N.D.		3	9	0.73
10237	Methylcyclohexane	108-87-2	2	J	0.9	4	0.73
10237	Methylene Chloride	75-09-2	N.D.		2	4	0.73
10237	Styrene	100-42-5	N.D.		0.9	4	0.73
10237	1,1,2,2-Tetrachloroethane	79-34-5	N.D.		0.9	4	0.73
10237	Tetrachloroethene	127-18-4	8		0.9	4	0.73
10237	Toluene	108-88-3	8		0.9	4	0.73
10237	1,2,4-Trichlorobenzene	120-82-1	N.D.		0.9	4	0.73
10237	1,1,1-Trichloroethane	71-55-6	24		0.9	4	0.73
10237	1,1,2-Trichloroethane	79-00-5	N.D.		0.9	4	0.73
10237	Trichloroethene	79-01-6	6		0.9	4	0.73
10237	Trichlorofluoromethane	75-69-4	N.D.		2	4	0.73
10237	Vinyl Chloride	75-01-4	N.D.		0.9	4	0.73
10237	Xylene (Total)	1330-20-7	4	J	0.9	4	0.73

The recovery for the sample internal standard is outside the QC acceptance limits. The following corrective action was taken:

*=This limit was used in the evaluation of the final result

Sample Description: SB-A5.2-OB118_10.5-11 Grab Soil
RACER Lansing Plant 2

LL Sample # SW 8934222
LL Group # 1787976
Account # 03074

Project Name: RACER Lansing Plant 2

Collected: 04/06/2017 11:38 by AV

Submitted: 04/08/2017 10:05
Reported: 04/27/2017 11:07

ARCADIS U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch CO 80129

A2601 SDG#: RLP01-01

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
	The sample was re-analyzed and the QC is again outside of the acceptance limits, indicating a matrix effect. The data is reported from the initial trial.					
GC/MS Semivolatiles	**SW-846 8270C SIM**		**ug/kg**	**ug/kg**	**ug/kg**	
10725	1,4-Dioxane	123-91-1	13	0.79	2.0	1
	The surrogate data is outside the QC limits due to unresolvable matrix problems evident in the sample chromatogram.					
	The GC/MS semivolatile internal standard peak areas were outside of QC limits. The matrix spike and matrix spike duplicate samples were analyzed and internal standard peak areas were again outside of QC limits, indicating a matrix effect.					
	The stated QC limits for 1,4-Dioxane are advisory only.					
Wet Chemistry	**SM 2540 G-1997**		**%**	**%**	**%**	
00111	Moisture	n.a.	16.0	0.50	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.					

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs- Solid by 8260B	SW-846 8260B	1	X171031AA	04/14/2017 01:49	Stephen C Nolte	0.73
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	1	201710244925	04/06/2017 11:38	Client Supplied	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	2	201710244925	04/06/2017 11:38	Client Supplied	1
07579	GC/MS-5g Field Preserv.MeOH-NC	SW-846 5035A	1	201710244925	04/06/2017 11:38	Client Supplied	1
10725	1,4-Dioxane in Soil	SW-846 8270C SIM	1	17103SLI026	04/18/2017 12:24	Joseph M Gambler	1
10811	BNA Soil Microwave SIM	SW-846 3546	1	17103SLI026	04/13/2017 17:45	Elizabeth E Donovan	1
00111	Moisture	SM 2540 G-1997	1	17103820007A	04/13/2017 21:52	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: SB-A5.2-OB118_10.5-11 Grab Soil
SPLP NVE
RACER Lansing Plant 2

LL Sample # TL 8934223
LL Group # 1787976
Account # 03074

Project Name: RACER Lansing Plant 2

Collected: 04/06/2017 11:38 by AV

Submitted: 04/08/2017 10:05
Reported: 04/27/2017 11:07

ARCADIS U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch CO 80129

A2602 SDG#: RLP01-02

CAT No.	Analysis Name	CAS Number	Result		Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270C SIM**		**ug/l**		**ug/l**	**ug/l**	
14243	1,4-dioxane	123-91-1	0.18	J	0.050	0.20	1

The recovery for the sample internal standard is outside the QC acceptance limits. The following corrective action was taken: The sample was re-analyzed and internal standard areas are again outside of the QC acceptance limits, indicating a matrix effect. The reported data is from the initial analysis of the sample.

Sample Comments

If the analysis is for determination of Hazardous Waste Characteristics, see Table 1 in EPA Code of Federal Regulations 40 CFR 261.24.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14243	1,4-Dioxane in Water	SW-846 8270C SIM	1	17103WAJ026	04/17/2017 14:38	Linda M Hartenstine	1
10466	BNA Water Extraction SIM	SW-846 3510C	1	17103WAJ026	04/13/2017 21:45	Christine Gleim	1
01567	Synthetic Precipitation Leach	SW-846 1312	1	17102-9169-156 7	04/12/2017 15:30	Craig S Pfautz	n.a.

*=This limit was used in the evaluation of the final result

Sample Description: SB-A5.2-OB118_11-11.5 Grab Soil
SPLP ZHE
RACER Lansing Plant 2

LL Sample # TL 8934224
LL Group # 1787976
Account # 03074

Project Name: RACER Lansing Plant 2

Collected: 04/06/2017 11:40 by AV

Submitted: 04/08/2017 10:05
Reported: 04/27/2017 11:07

ARCADIS U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch CO 80129

A2603 SDG#: RLP01-03

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		ug/l	ug/l	ug/l	
10335	Acetone	67-64-1	N.D.	60	200	10
10335	Benzene	71-43-2	N.D.	5	10	10
10335	Bromodichloromethane	75-27-4	N.D.	5	10	10
10335	Bromoform	75-25-2	N.D.	5	40	10
10335	Bromomethane	74-83-9	N.D.	5	10	10
10335	2-Butanone	78-93-3	N.D.	30	100	10
10335	Carbon Disulfide	75-15-0	N.D.	10	50	10
10335	Carbon Tetrachloride	56-23-5	N.D.	5	10	10
10335	Chlorobenzene	108-90-7	N.D.	5	10	10
10335	Chloroethane	75-00-3	N.D.	5	10	10
10335	Chloroform	67-66-3	N.D.	5	10	10
10335	Chloromethane	74-87-3	N.D.	5	10	10
10335	Cyclohexane	110-82-7	N.D.	20	50	10
10335	1,2-Dibromo-3-chloropropane	96-12-8	N.D.	20	50	10
10335	Dibromochloromethane	124-48-1	N.D.	5	10	10
10335	1,2-Dibromoethane	106-93-4	N.D.	5	10	10
10335	1,2-Dichlorobenzene	95-50-1	N.D.	10	50	10
10335	1,3-Dichlorobenzene	541-73-1	N.D.	10	50	10
10335	1,4-Dichlorobenzene	106-46-7	N.D.	10	50	10
10335	Dichlorodifluoromethane	75-71-8	N.D.	5	10	10
10335	1,1-Dichloroethane	75-34-3	N.D.	5	10	10
10335	1,2-Dichloroethane	107-06-2	N.D.	5	10	10
10335	1,1-Dichloroethene	75-35-4	N.D.	5	10	10
10335	cis-1,2-Dichloroethene	156-59-2	N.D.	5	10	10
10335	trans-1,2-Dichloroethene	156-60-5	N.D.	5	10	10
10335	1,2-Dichloropropane	78-87-5	N.D.	5	10	10
10335	cis-1,3-Dichloropropene	10061-01-5	N.D.	5	10	10
10335	trans-1,3-Dichloropropene	10061-02-6	N.D.	5	10	10
10335	Ethylbenzene	100-41-4	N.D.	5	10	10
10335	Freon 113	76-13-1	N.D.	20	100	10
10335	2-Hexanone	591-78-6	N.D.	30	100	10
10335	Isopropylbenzene	98-82-8	N.D.	10	50	10
10335	Methyl Acetate	79-20-9	N.D.	10	50	10
10335	Methyl Tertiary Butyl Ether	1634-04-4	N.D.	5	10	10
10335	4-Methyl-2-pentanone	108-10-1	N.D.	30	100	10
10335	Methylcyclohexane	108-87-2	N.D.	10	50	10
10335	Methylene Chloride	75-09-2	N.D.	20	40	10
10335	Styrene	100-42-5	N.D.	10	50	10
10335	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	5	10	10
10335	Tetrachloroethene	127-18-4	N.D.	5	10	10
10335	Toluene	108-88-3	N.D.	5	10	10
10335	1,2,4-Trichlorobenzene	120-82-1	N.D.	10	50	10
10335	1,1,1-Trichloroethane	71-55-6	N.D.	5	10	10
10335	1,1,2-Trichloroethane	79-00-5	N.D.	5	10	10
10335	Trichloroethene	79-01-6	N.D.	5	10	10
10335	Trichlorofluoromethane	75-69-4	N.D.	5	10	10
10335	Vinyl Chloride	75-01-4	N.D.	5	10	10
10335	Xylene (Total)	1330-20-7	N.D.	5	10	10

*=This limit was used in the evaluation of the final result

Sample Description: SB-A5.2-OB118_11-11.5 Grab Soil
SPLP ZHE
RACER Lansing Plant 2

LL Sample # TL 8934224
LL Group # 1787976
Account # 03074

Project Name: RACER Lansing Plant 2

Collected: 04/06/2017 11:40 by AV

Submitted: 04/08/2017 10:05
Reported: 04/27/2017 11:07

ARCADIS U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch CO 80129

A2603 SDG#: RLP01-03

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor

Reporting limits were raised due to interference from the sample matrix.

Sample Comments

If the analysis is for determination of Hazardous Waste Characteristics, see Table 1 in EPA Code of Federal Regulations 40 CFR 261.24.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10335	VOCs- 5ml Water by 8260B	SW-846 8260B	1	W171081AA	04/18/2017 16:48	Nicole S Lamoreaux	10
01163	GC/MS VOA Water Prep	SW-846 5030B	1	W171081AA	04/18/2017 16:48	Nicole S Lamoreaux	10
08792	SPLP Volatile Extraction	SW-846 1312	1	17104-12245-8792	04/14/2017 15:57	Tanner E Grumbling	n.a.

*=This limit was used in the evaluation of the final result

Sample Description: SB-A5.2-OB118_14-14.5 Grab Soil
RACER Lansing Plant 2

LL Sample # SW 8934225
LL Group # 1787976
Account # 03074

Project Name: RACER Lansing Plant 2

Collected: 04/06/2017 11:45 by AV

Submitted: 04/08/2017 10:05
Reported: 04/27/2017 11:07

ARCADIS U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch CO 80129

A2604 SDG#: RLP01-04

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270C SIM**		ug/kg	ug/kg	ug/kg	
10725	1,4-Dioxane	123-91-1	29	0.75	1.9	1
	The stated QC limits for 1,4-Dioxane are advisory only.					
Wet Chemistry	**SM 2540 G-1997**		%	%	%	
00111	Moisture	n.a.	11.1	0.50	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.					

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10725	1,4-Dioxane in Soil	SW-846 8270C SIM	1	17103SLI026	04/18/2017 14:03	Joseph M Gambler	1
10811	BNA Soil Microwave SIM	SW-846 3546	1	17103SLI026	04/13/2017 17:45	Elizabeth E Donovan	1
00111	Moisture	SM 2540 G-1997	1	17103820007A	04/13/2017 21:52	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: SB-A5.2-OB118_21-21.5 Grab Soil
RACER Lansing Plant 2

LL Sample # SW 8934226
LL Group # 1787976
Account # 03074

Project Name: RACER Lansing Plant 2

Collected: 04/06/2017 11:50 by AV

Submitted: 04/08/2017 10:05
Reported: 04/27/2017 11:07

ARCADIS U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch CO 80129

A2605 SDG#: RLP01-05

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**ug/kg**		**ug/kg**	**ug/kg**	
10237	Acetone	67-64-1	N.D.		320	920	38.76
10237	Benzene	71-43-2	N.D.		23	230	38.76
10237	Bromodichloromethane	75-27-4	N.D.		46	230	38.76
10237	Bromoform	75-25-2	N.D.		46	230	38.76
10237	Bromomethane	74-83-9	N.D.		92	230	38.76
10237	2-Butanone	78-93-3	N.D.		180	460	38.76
10237	Carbon Disulfide	75-15-0	N.D.		46	230	38.76
10237	Carbon Tetrachloride	56-23-5	N.D.		46	230	38.76
10237	Chlorobenzene	108-90-7	N.D.		46	230	38.76
10237	Chloroethane	75-00-3	730		92	230	38.76
10237	Chloroform	67-66-3	N.D.		46	230	38.76
10237	Chloromethane	74-87-3	N.D.		92	230	38.76
10237	Cyclohexane	110-82-7	N.D.		46	230	38.76
10237	1,2-Dibromo-3-chloropropane	96-12-8	N.D.		92	230	38.76
10237	Dibromochloromethane	124-48-1	N.D.		46	230	38.76
10237	1,2-Dibromoethane	106-93-4	N.D.		46	230	38.76
10237	1,2-Dichlorobenzene	95-50-1	N.D.		46	230	38.76
10237	1,3-Dichlorobenzene	541-73-1	N.D.		46	230	38.76
10237	1,4-Dichlorobenzene	106-46-7	N.D.		46	230	38.76
10237	Dichlorodifluoromethane	75-71-8	N.D.		92	230	38.76
10237	1,1-Dichloroethane	75-34-3	160	J	46	230	38.76
10237	1,2-Dichloroethane	107-06-2	N.D.		46	230	38.76
10237	1,1-Dichloroethene	75-35-4	N.D.		46	230	38.76
10237	cis-1,2-Dichloroethene	156-59-2	N.D.		46	230	38.76
10237	trans-1,2-Dichloroethene	156-60-5	N.D.		46	230	38.76
10237	1,2-Dichloropropane	78-87-5	N.D.		46	230	38.76
10237	cis-1,3-Dichloropropene	10061-01-5	N.D.		46	230	38.76
10237	trans-1,3-Dichloropropene	10061-02-6	N.D.		46	230	38.76
10237	Ethylbenzene	100-41-4	N.D.		46	230	38.76
10237	Freon 113	76-13-1	N.D.		92	460	38.76
10237	2-Hexanone	591-78-6	N.D.		140	460	38.76
10237	Isopropylbenzene	98-82-8	N.D.		46	230	38.76
10237	Methyl Acetate	79-20-9	N.D.		92	230	38.76
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.		23	230	38.76
10237	4-Methyl-2-pentanone	108-10-1	N.D.		140	460	38.76
10237	Methylcyclohexane	108-87-2	N.D.		46	230	38.76
10237	Methylene Chloride	75-09-2	N.D.		92	230	38.76
10237	Styrene	100-42-5	N.D.		46	230	38.76
10237	1,1,2,2-Tetrachloroethane	79-34-5	N.D.		46	230	38.76
10237	Tetrachloroethene	127-18-4	N.D.		46	230	38.76
10237	Toluene	108-88-3	N.D.		46	230	38.76
10237	1,2,4-Trichlorobenzene	120-82-1	N.D.		46	230	38.76
10237	1,1,1-Trichloroethane	71-55-6	93	J	46	230	38.76
10237	1,1,2-Trichloroethane	79-00-5	N.D.		46	230	38.76
10237	Trichloroethene	79-01-6	N.D.		46	230	38.76
10237	Trichlorofluoromethane	75-69-4	N.D.		92	230	38.76
10237	Vinyl Chloride	75-01-4	N.D.		46	230	38.76
10237	Xylene (Total)	1330-20-7	N.D.		46	230	38.76

The LCS and/or LCSD recoveries are outside the stated QC window but within the marginal exceedance allowance of +/- 4 standard deviations as defined in

*=This limit was used in the evaluation of the final result

Sample Description: SB-A5.2-OB118_21-21.5 Grab Soil
RACER Lansing Plant 2

LL Sample # SW 8934226
LL Group # 1787976
Account # 03074

Project Name: RACER Lansing Plant 2

Collected: 04/06/2017 11:50 by AV

Submitted: 04/08/2017 10:05
Reported: 04/27/2017 11:07

ARCADIS U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch CO 80129

A2605 SDG#: RLP01-05

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
	the NELAC/DoD Standards. The following analytes are accepted based on this allowance: trichlorofluoromethane.					
GC/MS Semivolatiles	**SW-846 8270C SIM**		**ug/kg**	**ug/kg**	**ug/kg**	
10725	1,4-Dioxane	123-91-1	35	3.9	9.8	5
	The surrogate data is outside the QC limits due to unresolvable matrix problems evident in the sample chromatogram.					
	The stated QC limits for 1,4-Dioxane are advisory only.					
Wet Chemistry	**SM 2540 G-1997**		**%**	**%**	**%**	
00111	Moisture	n.a.	16.1	0.50	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.					

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs- Solid by 8260B	SW-846 8260B	1	Q171041AA	04/14/2017 14:19	Jennifer K Howe	38.76
06171	GC/MS-5g Field Preserv. MeOH	SW-846 5035A	1	201710244925	04/06/2017 11:50	Client Supplied	1
10725	1,4-Dioxane in Soil	SW-846 8270C SIM	1	17103SLI026	04/19/2017 00:04	William H Saadeh	5
10811	BNA Soil Microwave SIM	SW-846 3546	1	17103SLI026	04/13/2017 17:45	Elizabeth E Donovan	1
00111	Moisture	SM 2540 G-1997	1	17103820007A	04/13/2017 21:52	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: SB-A5.2-OB118_21-21.5 Grab Soil
SPLP NVE
RACER Lansing Plant 2

LL Sample # TL 8934227
LL Group # 1787976
Account # 03074

Project Name: RACER Lansing Plant 2

Collected: 04/06/2017 11:50 by AV

Submitted: 04/08/2017 10:05
Reported: 04/27/2017 11:07

ARCADIS U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch CO 80129

A2606 SDG#: RLP01-06

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270C SIM**		**ug/l**	**ug/l**	**ug/l**	
14243	1,4-dioxane	123-91-1	1.4	0.051	0.20	1

Sample Comments

If the analysis is for determination of Hazardous Waste Characteristics, see Table 1 in EPA Code of Federal Regulations 40 CFR 261.24.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14243	1,4-Dioxane in Water	SW-846 8270C SIM	1	17103WAJ026	04/17/2017 15:06	Linda M Hartenstine	1
10466	BNA Water Extraction SIM	SW-846 3510C	1	17103WAJ026	04/13/2017 21:45	Christine Gleim	1
01567	Synthetic Precipitation Leach	SW-846 1312	1	17102-9169-156 7	04/12/2017 15:30	Craig S Pfautz	n.a.

*=This limit was used in the evaluation of the final result

Sample Description: SB-A5.2-OB118_24.5-25 Grab Soil
RACER Lansing Plant 2

LL Sample # SW 8934228
LL Group # 1787976
Account # 03074

Project Name: RACER Lansing Plant 2

Collected: 04/06/2017 12:00 by AV

Submitted: 04/08/2017 10:05
Reported: 04/27/2017 11:07

ARCADIS U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch CO 80129

A2607 SDG#: RLP01-07

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270C SIM**		ug/kg	ug/kg	ug/kg	
10725	1,4-Dioxane	123-91-1	65	0.74	1.9	1
	The stated QC limits for 1,4-Dioxane are advisory only.					
Wet Chemistry	**SM 2540 G-1997**		%	%	%	
00111	Moisture	n.a.	11.1	0.50	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.					

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10725	1,4-Dioxane in Soil	SW-846 8270C SIM	1	17103SLI026	04/18/2017 15:07	Joseph M Gambler	1
10811	BNA Soil Microwave SIM	SW-846 3546	1	17103SLI026	04/13/2017 17:45	Elizabeth E Donovan	1
00111	Moisture	SM 2540 G-1997	1	17103820007A	04/13/2017 21:52	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: SB-A5.2-OC107_13-13.5 Grab Soil
RACER Lansing Plant 2

LL Sample # SW 8934229
LL Group # 1787976
Account # 03074

Project Name: RACER Lansing Plant 2

Collected: 04/06/2017 12:45 by AV

Submitted: 04/08/2017 10:05
Reported: 04/27/2017 11:07

ARCADIS U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch CO 80129

A2608 SDG#: RLP01-08

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**ug/kg**		**ug/kg**	**ug/kg**	
10237	Acetone	67-64-1	30		7	20	0.85
10237	Benzene	71-43-2	4	J	0.5	5	0.85
10237	Bromodichloromethane	75-27-4	N.D.		1	5	0.85
10237	Bromoform	75-25-2	N.D.		1	5	0.85
10237	Bromomethane	74-83-9	N.D.		2	5	0.85
10237	2-Butanone	78-93-3	5	J	4	10	0.85
10237	Carbon Disulfide	75-15-0	N.D.		1	5	0.85
10237	Carbon Tetrachloride	56-23-5	N.D.		1	5	0.85
10237	Chlorobenzene	108-90-7	N.D.		1	5	0.85
10237	Chloroethane	75-00-3	230		2	5	0.85
10237	Chloroform	67-66-3	N.D.		1	5	0.85
10237	Chloromethane	74-87-3	N.D.		2	5	0.85
10237	Cyclohexane	110-82-7	6		1	5	0.85
10237	1,2-Dibromo-3-chloropropane	96-12-8	N.D.		2	5	0.85
10237	Dibromochloromethane	124-48-1	N.D.		1	5	0.85
10237	1,2-Dibromoethane	106-93-4	N.D.		1	5	0.85
10237	1,2-Dichlorobenzene	95-50-1	N.D.		1	5	0.85
10237	1,3-Dichlorobenzene	541-73-1	N.D.		1	5	0.85
10237	1,4-Dichlorobenzene	106-46-7	N.D.		1	5	0.85
10237	Dichlorodifluoromethane	75-71-8	N.D.		2	5	0.85
10237	1,1-Dichloroethane	75-34-3	1,200		40	200	34.44
10237	1,2-Dichloroethane	107-06-2	2	J	1	5	0.85
10237	1,1-Dichloroethene	75-35-4	170		1	5	0.85
10237	cis-1,2-Dichloroethene	156-59-2	N.D.		1	5	0.85
10237	trans-1,2-Dichloroethene	156-60-5	N.D.		1	5	0.85
10237	1,2-Dichloropropane	78-87-5	N.D.		1	5	0.85
10237	cis-1,3-Dichloropropene	10061-01-5	N.D.		1	5	0.85
10237	trans-1,3-Dichloropropene	10061-02-6	N.D.		1	5	0.85
10237	Ethylbenzene	100-41-4	4	J	1	5	0.85
10237	Freon 113	76-13-1	N.D.		2	10	0.85
10237	2-Hexanone	591-78-6	N.D.		3	10	0.85
10237	Isopropylbenzene	98-82-8	N.D.		1	5	0.85
10237	Methyl Acetate	79-20-9	N.D.		2	5	0.85
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.		0.5	5	0.85
10237	4-Methyl-2-pentanone	108-10-1	N.D.		3	10	0.85
10237	Methylcyclohexane	108-87-2	9		1	5	0.85
10237	Methylene Chloride	75-09-2	3	J	2	5	0.85
10237	Styrene	100-42-5	N.D.		1	5	0.85
10237	1,1,2,2-Tetrachloroethane	79-34-5	N.D.		1	5	0.85
10237	Tetrachloroethene	127-18-4	8		1	5	0.85
10237	Toluene	108-88-3	13		1	5	0.85
10237	1,2,4-Trichlorobenzene	120-82-1	N.D.		1	5	0.85
10237	1,1,1-Trichloroethane	71-55-6	4,000		40	200	34.44
10237	1,1,2-Trichloroethane	79-00-5	4	J	1	5	0.85
10237	Trichloroethene	79-01-6	20		1	5	0.85
10237	Trichlorofluoromethane	75-69-4	N.D.		2	5	0.85
10237	Vinyl Chloride	75-01-4	1	J	1	5	0.85
10237	Xylene (Total)	1330-20-7	9		1	5	0.85

The recovery for the sample internal standard is outside the QC acceptance limits. The following corrective action was taken:

*=This limit was used in the evaluation of the final result

Sample Description: SB-A5.2-OC107_13-13.5 Grab Soil
RACER Lansing Plant 2

LL Sample # SW 8934229
LL Group # 1787976
Account # 03074

Project Name: RACER Lansing Plant 2

Collected: 04/06/2017 12:45 by AV

Submitted: 04/08/2017 10:05
Reported: 04/27/2017 11:07

ARCADIS U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch CO 80129

A2608 SDG#: RLP01-08

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
	The sample was re-analyzed and the QC is again outside of the acceptance limits, indicating a matrix effect. The data is reported from the initial trial.					
GC/MS Semivolatiles	**SW-846 8270C SIM**		**ug/kg**	**ug/kg**	**ug/kg**	
10725	1,4-Dioxane	123-91-1	17	0.78	1.9	1
	The surrogate data is outside the QC limits due to unresolvable matrix problems evident in the sample chromatogram.					
	The recovery for the sample internal standard is outside the QC acceptance limits. The following corrective action was taken: The sample was re-analyzed and internal standard areas are again outside of the QC acceptance limits, indicating a matrix effect. The reported data is from the initial analysis of the sample.					
	The stated QC limits for 1,4-Dioxane are advisory only.					
Wet Chemistry	**SM 2540 G-1997**		**%**	**%**	**%**	
00111	Moisture	n.a.	14.4	0.50	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.					

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs- Solid by 8260B	SW-846 8260B	1	X171031AA	04/14/2017 02:12	Stephen C Nolte	0.85
10237	VOCs- Solid by 8260B	SW-846 8260B	1	Q171061AA	04/16/2017 18:43	Angela D Sneeringer	34.44
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	1	201710244925	04/06/2017 12:45	Client Supplied	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	2	201710244925	04/06/2017 12:45	Client Supplied	1
07579	GC/MS-5g Field Preserv.MeOH-NC	SW-846 5035A	1	201710244925	04/06/2017 12:45	Client Supplied	1
10725	1,4-Dioxane in Soil	SW-846 8270C SIM	1	17103SLI026	04/18/2017 15:40	Joseph M Gambler	1
10811	BNA Soil Microwave SIM	SW-846 3546	1	17103SLI026	04/13/2017 17:45	Elizabeth E Donovan	1
00111	Moisture	SM 2540 G-1997	1	17103820007A	04/13/2017 21:52	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: SB-A5.2-OC107_13-13.5 Grab Soil
SPLP NVE
RACER Lansing Plant 2

LL Sample # TL 8934230
LL Group # 1787976
Account # 03074

Project Name: RACER Lansing Plant 2

Collected: 04/06/2017 12:45 by AV

Submitted: 04/08/2017 10:05
Reported: 04/27/2017 11:07

ARCADIS U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch CO 80129

A2609 SDG#: RLP01-09

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270C SIM**		**ug/l**	**ug/l**	**ug/l**	
14243	1,4-dioxane	123-91-1	1.1	0.051	0.20	1

Sample Comments

If the analysis is for determination of Hazardous Waste Characteristics, see Table 1 in EPA Code of Federal Regulations 40 CFR 261.24.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14243	1,4-Dioxane in Water	SW-846 8270C SIM	1	17103WAJ026	04/17/2017 15:34	Linda M Hartenstine	1
10466	BNA Water Extraction SIM	SW-846 3510C	1	17103WAJ026	04/13/2017 21:45	Christine Gleim	1
01567	Synthetic Precipitation Leach	SW-846 1312	1	17102-9169-156 7	04/12/2017 15:30	Craig S Pfautz	n.a.

*=This limit was used in the evaluation of the final result

Sample Description: SB-A5.2-OC107_13.5-14 Grab Soil
SPLP ZHE
RACER Lansing Plant 2

LL Sample # TL 8934231
LL Group # 1787976
Account # 03074

Project Name: RACER Lansing Plant 2

Collected: 04/06/2017 12:45 by AV

Submitted: 04/08/2017 10:05
Reported: 04/27/2017 11:07

ARCADIS U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch CO 80129

A2610 SDG#: RLP01-10

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		ug/l	ug/l	ug/l	
10335	Acetone	67-64-1	N.D.	60	200	10
10335	Benzene	71-43-2	N.D.	5	10	10
10335	Bromodichloromethane	75-27-4	N.D.	5	10	10
10335	Bromoform	75-25-2	N.D.	5	40	10
10335	Bromomethane	74-83-9	N.D.	5	10	10
10335	2-Butanone	78-93-3	N.D.	30	100	10
10335	Carbon Disulfide	75-15-0	N.D.	10	50	10
10335	Carbon Tetrachloride	56-23-5	N.D.	5	10	10
10335	Chlorobenzene	108-90-7	N.D.	5	10	10
10335	Chloroethane	75-00-3	N.D.	5	10	10
10335	Chloroform	67-66-3	N.D.	5	10	10
10335	Chloromethane	74-87-3	N.D.	5	10	10
10335	Cyclohexane	110-82-7	N.D.	20	50	10
10335	1,2-Dibromo-3-chloropropane	96-12-8	N.D.	20	50	10
10335	Dibromochloromethane	124-48-1	N.D.	5	10	10
10335	1,2-Dibromoethane	106-93-4	N.D.	5	10	10
10335	1,2-Dichlorobenzene	95-50-1	N.D.	10	50	10
10335	1,3-Dichlorobenzene	541-73-1	N.D.	10	50	10
10335	1,4-Dichlorobenzene	106-46-7	N.D.	10	50	10
10335	Dichlorodifluoromethane	75-71-8	N.D.	5	10	10
10335	1,1-Dichloroethane	75-34-3	83	5	10	10
10335	1,2-Dichloroethane	107-06-2	N.D.	5	10	10
10335	1,1-Dichloroethene	75-35-4	99	5	10	10
10335	cis-1,2-Dichloroethene	156-59-2	N.D.	5	10	10
10335	trans-1,2-Dichloroethene	156-60-5	N.D.	5	10	10
10335	1,2-Dichloropropane	78-87-5	N.D.	5	10	10
10335	cis-1,3-Dichloropropene	10061-01-5	N.D.	5	10	10
10335	trans-1,3-Dichloropropene	10061-02-6	N.D.	5	10	10
10335	Ethylbenzene	100-41-4	N.D.	5	10	10
10335	Freon 113	76-13-1	N.D.	20	100	10
10335	2-Hexanone	591-78-6	N.D.	30	100	10
10335	Isopropylbenzene	98-82-8	N.D.	10	50	10
10335	Methyl Acetate	79-20-9	N.D.	10	50	10
10335	Methyl Tertiary Butyl Ether	1634-04-4	N.D.	5	10	10
10335	4-Methyl-2-pentanone	108-10-1	N.D.	30	100	10
10335	Methylcyclohexane	108-87-2	N.D.	10	50	10
10335	Methylene Chloride	75-09-2	N.D.	20	40	10
10335	Styrene	100-42-5	N.D.	10	50	10
10335	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	5	10	10
10335	Tetrachloroethene	127-18-4	N.D.	5	10	10
10335	Toluene	108-88-3	N.D.	5	10	10
10335	1,2,4-Trichlorobenzene	120-82-1	N.D.	10	50	10
10335	1,1,1-Trichloroethane	71-55-6	1,000	5	10	10
10335	1,1,2-Trichloroethane	79-00-5	N.D.	5	10	10
10335	Trichloroethene	79-01-6	N.D.	5	10	10
10335	Trichlorofluoromethane	75-69-4	N.D.	5	10	10
10335	Vinyl Chloride	75-01-4	N.D.	5	10	10
10335	Xylene (Total)	1330-20-7	N.D.	5	10	10

*=This limit was used in the evaluation of the final result

Sample Description: SB-A5.2-OC107_13.5-14 Grab Soil
SPLP ZHE
RACER Lansing Plant 2

LL Sample # TL 8934231
LL Group # 1787976
Account # 03074

Project Name: RACER Lansing Plant 2

Collected: 04/06/2017 12:45 by AV

Submitted: 04/08/2017 10:05
Reported: 04/27/2017 11:07

ARCADIS U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch CO 80129

A2610 SDG#: RLP01-10

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor

Reporting limits were raised due to interference from the sample matrix.

Sample Comments

If the analysis is for determination of Hazardous Waste Characteristics, see Table 1 in EPA Code of Federal Regulations 40 CFR 261.24.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10335	VOCs- 5ml Water by 8260B	SW-846 8260B	1	W171081AA	04/18/2017 18:00	Nicole S Lamoreaux	10
01163	GC/MS VOA Water Prep	SW-846 5030B	1	W171081AA	04/18/2017 18:00	Nicole S Lamoreaux	10
08792	SPLP Volatile Extraction	SW-846 1312	1	17104-12245-8792	04/14/2017 15:57	Tanner E Grumbling	n.a.

*=This limit was used in the evaluation of the final result

Sample Description: SB-A5.2-OC107_14.5-15 Grab Soil
RACER Lansing Plant 2

LL Sample # SW 8934232
LL Group # 1787976
Account # 03074

Project Name: RACER Lansing Plant 2

Collected: 04/06/2017 12:55 by AV

Submitted: 04/08/2017 10:05
Reported: 04/27/2017 11:07

ARCADIS U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch CO 80129

A2611 SDG#: RLP01-11

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270C SIM**		ug/kg	ug/kg	ug/kg	
10725	1,4-Dioxane	123-91-1	33	0.80	2.0	1
	The stated QC limits for 1,4-Dioxane are advisory only.					
Wet Chemistry	**SM 2540 G-1997**		%	%	%	
00111	Moisture	n.a.	16.6	0.50	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.					

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10725	1,4-Dioxane in Soil	SW-846 8270C SIM	1	17103SLI026	04/18/2017 16:12	Joseph M Gambler	1
10811	BNA Soil Microwave SIM	SW-846 3546	1	17103SLI026	04/13/2017 17:45	Elizabeth E Donovan	1
00111	Moisture	SM 2540 G-1997	1	17103820007A	04/13/2017 21:52	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: SB-A5.2-OC107_19.5-20 Grab Soil
RACER Lansing Plant 2

LL Sample # SW 8934233
LL Group # 1787976
Account # 03074

Project Name: RACER Lansing Plant 2

Collected: 04/06/2017 13:00 by AV

Submitted: 04/08/2017 10:05
Reported: 04/27/2017 11:07

ARCADIS U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch CO 80129

A2612 SDG#: RLP01-12

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270C SIM**		ug/kg	ug/kg	ug/kg	
10725	1,4-Dioxane	123-91-1	77	0.73	1.8	1
	The stated QC limits for 1,4-Dioxane are advisory only.					
Wet Chemistry	**SM 2540 G-1997**		%	%	%	
00111	Moisture	n.a.	9.7	0.50	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.					

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10725	1,4-Dioxane in Soil	SW-846 8270C SIM	1	17103SLI026	04/18/2017 16:45	Joseph M Gambler	1
10811	BNA Soil Microwave SIM	SW-846 3546	1	17103SLI026	04/13/2017 17:45	Elizabeth E Donovan	1
00111	Moisture	SM 2540 G-1997	1	17103820007A	04/13/2017 21:52	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: SB-A5.2-NY92_1.5-2 Grab Soil
RACER Lansing Plant 2

LL Sample # SW 8934234
LL Group # 1787976
Account # 03074

Project Name: RACER Lansing Plant 2

Collected: 04/06/2017 13:35 by AV

Submitted: 04/08/2017 10:05
Reported: 04/27/2017 11:07

ARCADIS U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch CO 80129

A2613 SDG#: RLP01-13

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**ug/kg**		**ug/kg**	**ug/kg**	
10237	Acetone	67-64-1	N.D.		340	970	43.24
10237	Benzene	71-43-2	N.D.		24	240	43.24
10237	Bromodichloromethane	75-27-4	N.D.		49	240	43.24
10237	Bromoform	75-25-2	N.D.		49	240	43.24
10237	Bromomethane	74-83-9	N.D.		97	240	43.24
10237	2-Butanone	78-93-3	N.D.		190	490	43.24
10237	Carbon Disulfide	75-15-0	N.D.		49	240	43.24
10237	Carbon Tetrachloride	56-23-5	N.D.		49	240	43.24
10237	Chlorobenzene	108-90-7	N.D.		49	240	43.24
10237	Chloroethane	75-00-3	N.D.		97	240	43.24
10237	Chloroform	67-66-3	N.D.		49	240	43.24
10237	Chloromethane	74-87-3	N.D.		97	240	43.24
10237	Cyclohexane	110-82-7	N.D.		49	240	43.24
10237	1,2-Dibromo-3-chloropropane	96-12-8	N.D.		97	240	43.24
10237	Dibromochloromethane	124-48-1	N.D.		49	240	43.24
10237	1,2-Dibromoethane	106-93-4	N.D.		49	240	43.24
10237	1,2-Dichlorobenzene	95-50-1	N.D.		49	240	43.24
10237	1,3-Dichlorobenzene	541-73-1	N.D.		49	240	43.24
10237	1,4-Dichlorobenzene	106-46-7	N.D.		49	240	43.24
10237	Dichlorodifluoromethane	75-71-8	N.D.		97	240	43.24
10237	1,1-Dichloroethane	75-34-3	2,800		49	240	43.24
10237	1,2-Dichloroethane	107-06-2	N.D.		49	240	43.24
10237	1,1-Dichloroethene	75-35-4	57	J	49	240	43.24
10237	cis-1,2-Dichloroethene	156-59-2	N.D.		49	240	43.24
10237	trans-1,2-Dichloroethene	156-60-5	N.D.		49	240	43.24
10237	1,2-Dichloropropane	78-87-5	N.D.		49	240	43.24
10237	cis-1,3-Dichloropropene	10061-01-5	N.D.		49	240	43.24
10237	trans-1,3-Dichloropropene	10061-02-6	N.D.		49	240	43.24
10237	Ethylbenzene	100-41-4	N.D.		49	240	43.24
10237	Freon 113	76-13-1	N.D.		97	490	43.24
10237	2-Hexanone	591-78-6	N.D.		150	490	43.24
10237	Isopropylbenzene	98-82-8	70	J	49	240	43.24
10237	Methyl Acetate	79-20-9	260		97	240	43.24
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.		24	240	43.24
10237	4-Methyl-2-pentanone	108-10-1	N.D.		150	490	43.24
10237	Methylcyclohexane	108-87-2	170	J	49	240	43.24
10237	Methylene Chloride	75-09-2	N.D.		97	240	43.24
10237	Styrene	100-42-5	N.D.		49	240	43.24
10237	1,1,2,2-Tetrachloroethane	79-34-5	N.D.		49	240	43.24
10237	Tetrachloroethene	127-18-4	4,200		49	240	43.24
10237	Toluene	108-88-3	N.D.		49	240	43.24
10237	1,2,4-Trichlorobenzene	120-82-1	N.D.		49	240	43.24
10237	1,1,1-Trichloroethane	71-55-6	2,000		49	240	43.24
10237	1,1,2-Trichloroethane	79-00-5	N.D.		49	240	43.24
10237	Trichloroethene	79-01-6	74	J	49	240	43.24
10237	Trichlorofluoromethane	75-69-4	N.D.		97	240	43.24
10237	Vinyl Chloride	75-01-4	N.D.		49	240	43.24
10237	Xylene (Total)	1330-20-7	N.D.		49	240	43.24

The LCS and/or LCSD recoveries are outside the stated QC window but within the marginal exceedance allowance of +/- 4 standard deviations as defined in

*=This limit was used in the evaluation of the final result

Sample Description: SB-A5.2-NY92_1.5-2 Grab Soil
RACER Lansing Plant 2

LL Sample # SW 8934234
LL Group # 1787976
Account # 03074

Project Name: RACER Lansing Plant 2

Collected: 04/06/2017 13:35 by AV

Submitted: 04/08/2017 10:05
Reported: 04/27/2017 11:07

ARCADIS U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch CO 80129

A2613 SDG#: RLP01-13

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
	the NELAC/DoD Standards. The following analytes are accepted based on this allowance: dichlorodifluoromethane and vinyl chloride.					
GC/MS Semivolatiles	**SW-846 8270C SIM**		**ug/kg**	**ug/kg**	**ug/kg**	
10725	1,4-Dioxane	123-91-1	5.1	0.75	1.9	1
	The surrogate data is outside the QC limits due to unresolvable matrix problems evident in the sample chromatogram.					
	The stated QC limits for 1,4-Dioxane are advisory only.					
Wet Chemistry	**SM 2540 G-1997**		**%**	**%**	**%**	
00111	Moisture	n.a.	11.2	0.50	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.					

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs- Solid by 8260B	SW-846 8260B	1	Q171031AA	04/13/2017 15:29	Angela D Sneeringer	43.24
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	1	201710244925	04/06/2017 13:35	Client Supplied	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	2	201710244925	04/06/2017 13:35	Client Supplied	1
07579	GC/MS-5g Field Preserv.MeOH-NC	SW-846 5035A	1	201710244925	04/06/2017 13:35	Client Supplied	1
10725	1,4-Dioxane in Soil	SW-846 8270C SIM	1	17103SLI026	04/18/2017 17:17	Joseph M Gambler	1
10811	BNA Soil Microwave SIM	SW-846 3546	1	17103SLI026	04/13/2017 17:45	Elizabeth E Donovan	1
00111	Moisture	SM 2540 G-1997	1	17103820007B	04/13/2017 21:52	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: SB-A5.2-NY92_1.5-2 Grab Soil
SPLP NVE
RACER Lansing Plant 2

LL Sample # TL 8934235
LL Group # 1787976
Account # 03074

Project Name: RACER Lansing Plant 2

Collected: 04/06/2017 13:35 by AV

Submitted: 04/08/2017 10:05
Reported: 04/27/2017 11:07

ARCADIS U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch CO 80129

A2614 SDG#: RLP01-14

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270C SIM**		**ug/l**	**ug/l**	**ug/l**	
14243	1,4-dioxane	123-91-1	0.24	0.051	0.20	1

Sample Comments

If the analysis is for determination of Hazardous Waste Characteristics, see Table 1 in EPA Code of Federal Regulations 40 CFR 261.24.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14243	1,4-Dioxane in Water	SW-846 8270C SIM	1	17103WAJ026	04/17/2017 16:02	Linda M Hartenstine	1
10466	BNA Water Extraction SIM	SW-846 3510C	1	17103WAJ026	04/13/2017 21:45	Christine Gleim	1
01567	Synthetic Precipitation Leach	SW-846 1312	1	17102-9169-1567	04/12/2017 15:30	Craig S Pfautz	n.a.

*=This limit was used in the evaluation of the final result

Sample Description: SB-A5.2-NY92_2-2.5 Grab Soil
SPLP ZHE
RACER Lansing Plant 2

LL Sample # TL 8934236
LL Group # 1787976
Account # 03074

Project Name: RACER Lansing Plant 2

Collected: 04/06/2017 13:38 by AV

Submitted: 04/08/2017 10:05
Reported: 04/27/2017 11:07

ARCADIS U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch CO 80129

A2615 SDG#: RLP01-15

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Volatiles SW-846 8260B			ug/l	ug/l	ug/l	
10335	Acetone	67-64-1	N.D.	60	200	10
10335	Benzene	71-43-2	N.D.	5	10	10
10335	Bromodichloromethane	75-27-4	N.D.	5	10	10
10335	Bromoform	75-25-2	N.D.	5	40	10
10335	Bromomethane	74-83-9	N.D.	5	10	10
10335	2-Butanone	78-93-3	N.D.	30	100	10
10335	Carbon Disulfide	75-15-0	N.D.	10	50	10
10335	Carbon Tetrachloride	56-23-5	N.D.	5	10	10
10335	Chlorobenzene	108-90-7	N.D.	5	10	10
10335	Chloroethane	75-00-3	N.D.	5	10	10
10335	Chloroform	67-66-3	N.D.	5	10	10
10335	Chloromethane	74-87-3	N.D.	5	10	10
10335	Cyclohexane	110-82-7	N.D.	20	50	10
10335	1,2-Dibromo-3-chloropropane	96-12-8	N.D.	20	50	10
10335	Dibromochloromethane	124-48-1	N.D.	5	10	10
10335	1,2-Dibromoethane	106-93-4	N.D.	5	10	10
10335	1,2-Dichlorobenzene	95-50-1	N.D.	10	50	10
10335	1,3-Dichlorobenzene	541-73-1	N.D.	10	50	10
10335	1,4-Dichlorobenzene	106-46-7	N.D.	10	50	10
10335	Dichlorodifluoromethane	75-71-8	N.D.	5	10	10
10335	1,1-Dichloroethane	75-34-3	N.D.	5	10	10
10335	1,2-Dichloroethane	107-06-2	N.D.	5	10	10
10335	1,1-Dichloroethene	75-35-4	N.D.	5	10	10
10335	cis-1,2-Dichloroethene	156-59-2	N.D.	5	10	10
10335	trans-1,2-Dichloroethene	156-60-5	N.D.	5	10	10
10335	1,2-Dichloropropane	78-87-5	N.D.	5	10	10
10335	cis-1,3-Dichloropropene	10061-01-5	N.D.	5	10	10
10335	trans-1,3-Dichloropropene	10061-02-6	N.D.	5	10	10
10335	Ethylbenzene	100-41-4	N.D.	5	10	10
10335	Freon 113	76-13-1	N.D.	20	100	10
10335	2-Hexanone	591-78-6	N.D.	30	100	10
10335	Isopropylbenzene	98-82-8	N.D.	10	50	10
10335	Methyl Acetate	79-20-9	N.D.	10	50	10
10335	Methyl Tertiary Butyl Ether	1634-04-4	N.D.	5	10	10
10335	4-Methyl-2-pentanone	108-10-1	N.D.	30	100	10
10335	Methylcyclohexane	108-87-2	N.D.	10	50	10
10335	Methylene Chloride	75-09-2	N.D.	20	40	10
10335	Styrene	100-42-5	N.D.	10	50	10
10335	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	5	10	10
10335	Tetrachloroethene	127-18-4	N.D.	5	10	10
10335	Toluene	108-88-3	N.D.	5	10	10
10335	1,2,4-Trichlorobenzene	120-82-1	N.D.	10	50	10
10335	1,1,1-Trichloroethane	71-55-6	N.D.	5	10	10
10335	1,1,2-Trichloroethane	79-00-5	N.D.	5	10	10
10335	Trichloroethene	79-01-6	N.D.	5	10	10
10335	Trichlorofluoromethane	75-69-4	N.D.	5	10	10
10335	Vinyl Chloride	75-01-4	N.D.	5	10	10
10335	Xylene (Total)	1330-20-7	N.D.	5	10	10

*=This limit was used in the evaluation of the final result

Sample Description: SB-A5.2-NY92_2-2.5 Grab Soil
SPLP ZHE
RACER Lansing Plant 2

LL Sample # TL 8934236
LL Group # 1787976
Account # 03074

Project Name: RACER Lansing Plant 2

Collected: 04/06/2017 13:38 by AV

Submitted: 04/08/2017 10:05
Reported: 04/27/2017 11:07

ARCADIS U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch CO 80129

A2615 SDG#: RLP01-15

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor

Reporting limits were raised due to interference from the sample matrix.

Sample Comments

If the analysis is for determination of Hazardous Waste Characteristics, see Table 1 in EPA Code of Federal Regulations 40 CFR 261.24.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10335	VOCs- 5ml Water by 8260B	SW-846 8260B	1	W171081AA	04/18/2017 18:24	Nicole S Lamoreaux	10
01163	GC/MS VOA Water Prep	SW-846 5030B	1	W171081AA	04/18/2017 18:24	Nicole S Lamoreaux	10
08792	SPLP Volatile Extraction	SW-846 1312	1	17104-12245-8792	04/14/2017 15:57	Tanner E Grumbling	n.a.

*=This limit was used in the evaluation of the final result

Sample Description: SB-A5.2-NY92_4.5-5 Grab Soil
RACER Lansing Plant 2

LL Sample # SW 8934237
LL Group # 1787976
Account # 03074

Project Name: RACER Lansing Plant 2

Collected: 04/06/2017 13:50 by AV

Submitted: 04/08/2017 10:05
Reported: 04/27/2017 11:07

ARCADIS U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch CO 80129

A2616 SDG#: RLP01-16

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270C SIM**		ug/kg	ug/kg	ug/kg	
10725	1,4-Dioxane	123-91-1	4.5	0.75	1.9	1
	The stated QC limits for 1,4-Dioxane are advisory only.					
Wet Chemistry	**SM 2540 G-1997**		%	%	%	
00111	Moisture	n.a.	11.7	0.50	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.					

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10725	1,4-Dioxane in Soil	SW-846 8270C SIM	1	17103SLI026	04/18/2017 17:50	Joseph M Gambler	1
10811	BNA Soil Microwave SIM	SW-846 3546	1	17103SLI026	04/13/2017 17:45	Elizabeth E Donovan	1
00111	Moisture	SM 2540 G-1997	1	17103820007B	04/13/2017 21:52	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: SB-A5.2-NY92_14.5-15 Grab Soil
RACER Lansing Plant 2

LL Sample # SW 8934238
LL Group # 1787976
Account # 03074

Project Name: RACER Lansing Plant 2

Collected: 04/06/2017 14:00 by AV

Submitted: 04/08/2017 10:05
Reported: 04/27/2017 11:07

ARCADIS U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch CO 80129

A2617 SDG#: RLP01-17

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270C SIM**		ug/kg	ug/kg	ug/kg	
10725	1,4-Dioxane	123-91-1	43	0.79	2.0	1
	The stated QC limits for 1,4-Dioxane are advisory only.					
Wet Chemistry	**SM 2540 G-1997**		%	%	%	
00111	Moisture	n.a.	16.4	0.50	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.					

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10725	1,4-Dioxane in Soil	SW-846 8270C SIM	1	17103SLI026	04/18/2017 18:22	Joseph M Gambler	1
10811	BNA Soil Microwave SIM	SW-846 3546	1	17103SLI026	04/13/2017 17:45	Elizabeth E Donovan	1
00111	Moisture	SM 2540 G-1997	1	17103820007B	04/13/2017 21:52	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: SB-A5.2-NM126_5-5.5 Grab Soil
RACER Lansing Plant 2

LL Sample # SW 8934239
LL Group # 1787976
Account # 03074

Project Name: RACER Lansing Plant 2

Collected: 04/06/2017 14:35 by AV

Submitted: 04/08/2017 10:05
Reported: 04/27/2017 11:07

ARCADIS U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch CO 80129

A2618 SDG#: RLP01-18

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		ug/kg		ug/kg	ug/kg	
10237	Acetone	67-64-1	100		6	17	0.7
10237	Benzene	71-43-2	4		0.4	4	0.7
10237	Bromodichloromethane	75-27-4	N.D.		0.8	4	0.7
10237	Bromoform	75-25-2	N.D.		0.8	4	0.7
10237	Bromomethane	74-83-9	N.D.		2	4	0.7
10237	2-Butanone	78-93-3	17		3	8	0.7
10237	Carbon Disulfide	75-15-0	10		0.8	4	0.7
10237	Carbon Tetrachloride	56-23-5	N.D.		0.8	4	0.7
10237	Chlorobenzene	108-90-7	N.D.		0.8	4	0.7
10237	Chloroethane	75-00-3	200		2	4	0.7
10237	Chloroform	67-66-3	N.D.		0.8	4	0.7
10237	Chloromethane	74-87-3	N.D.		2	4	0.7
10237	Cyclohexane	110-82-7	5		0.8	4	0.7
10237	1,2-Dibromo-3-chloropropane	96-12-8	N.D.		2	4	0.7
10237	Dibromochloromethane	124-48-1	N.D.		0.8	4	0.7
10237	1,2-Dibromoethane	106-93-4	N.D.		0.8	4	0.7
10237	1,2-Dichlorobenzene	95-50-1	3	J	0.8	4	0.7
10237	1,3-Dichlorobenzene	541-73-1	2	J	0.8	4	0.7
10237	1,4-Dichlorobenzene	106-46-7	2	J	0.8	4	0.7
10237	Dichlorodifluoromethane	75-71-8	N.D.		2	4	0.7
10237	1,1-Dichloroethane	75-34-3	3	J	0.8	4	0.7
10237	1,2-Dichloroethane	107-06-2	N.D.		0.8	4	0.7
10237	1,1-Dichloroethene	75-35-4	N.D.		0.8	4	0.7
10237	cis-1,2-Dichloroethene	156-59-2	N.D.		0.8	4	0.7
10237	trans-1,2-Dichloroethene	156-60-5	N.D.		0.8	4	0.7
10237	1,2-Dichloropropane	78-87-5	N.D.		0.8	4	0.7
10237	cis-1,3-Dichloropropene	10061-01-5	N.D.		0.8	4	0.7
10237	trans-1,3-Dichloropropene	10061-02-6	N.D.		0.8	4	0.7
10237	Ethylbenzene	100-41-4	8		0.8	4	0.7
10237	Freon 113	76-13-1	N.D.		2	8	0.7
10237	2-Hexanone	591-78-6	N.D.		3	8	0.7
10237	Isopropylbenzene	98-82-8	5		0.8	4	0.7
10237	Methyl Acetate	79-20-9	3	J	2	4	0.7
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.		0.4	4	0.7
10237	4-Methyl-2-pentanone	108-10-1	N.D.		3	8	0.7
10237	Methylcyclohexane	108-87-2	15		0.8	4	0.7
10237	Methylene Chloride	75-09-2	N.D.		2	4	0.7
10237	Styrene	100-42-5	N.D.		0.8	4	0.7
10237	1,1,2,2-Tetrachloroethane	79-34-5	N.D.		0.8	4	0.7
10237	Tetrachloroethene	127-18-4	N.D.		0.8	4	0.7
10237	Toluene	108-88-3	43		0.8	4	0.7
10237	1,2,4-Trichlorobenzene	120-82-1	5		0.8	4	0.7
10237	1,1,1-Trichloroethane	71-55-6	N.D.		0.8	4	0.7
10237	1,1,2-Trichloroethane	79-00-5	N.D.		0.8	4	0.7
10237	Trichloroethene	79-01-6	6		0.8	4	0.7
10237	Trichlorofluoromethane	75-69-4	N.D.		2	4	0.7
10237	Vinyl Chloride	75-01-4	N.D.		0.8	4	0.7
10237	Xylene (Total)	1330-20-7	26		0.8	4	0.7

The recovery for the sample internal standard is outside the QC acceptance limits. The following corrective action was taken:

*=This limit was used in the evaluation of the final result

Sample Description: SB-A5.2-NM126_5-5.5 Grab Soil
RACER Lansing Plant 2

LL Sample # SW 8934239
LL Group # 1787976
Account # 03074

Project Name: RACER Lansing Plant 2

Collected: 04/06/2017 14:35 by AV

Submitted: 04/08/2017 10:05
Reported: 04/27/2017 11:07

ARCADIS U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch CO 80129

A2618 SDG#: RLP01-18

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
	The secondary vial was analyzed and no valid data was collected during re-analysis. Therefore the matrix effects observed in the initial analysis could not be confirmed. The values reported here are from the initial analysis.					
GC/MS Semivolatiles	**SW-846 8270C SIM**		**ug/kg**	**ug/kg**	**ug/kg**	
10725	1,4-Dioxane	123-91-1	N.D.	8.0	20	10
	The stated QC limits for 1,4-Dioxane are advisory only.					
Wet Chemistry	**SM 2540 G-1997**		**%**	**%**	**%**	
00111	Moisture	n.a.	16.9	0.50	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.					

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs- Solid by 8260B	SW-846 8260B	1	X171031AA	04/14/2017 02:58	Stephen C Nolte	0.7
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	1	201710244925	04/06/2017 14:35	Client Supplied	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	2	201710244925	04/06/2017 14:35	Client Supplied	1
07579	GC/MS-5g Field Preserv.MeOH-NC	SW-846 5035A	1	201710244925	04/06/2017 14:35	Client Supplied	1
10725	1,4-Dioxane in Soil	SW-846 8270C SIM	1	17103SLI026	04/20/2017 05:29	William H Saadeh	10
10811	BNA Soil Microwave SIM	SW-846 3546	1	17103SLI026	04/13/2017 17:45	Elizabeth E Donovan	1
00111	Moisture	SM 2540 G-1997	1	17103820007B	04/13/2017 21:52	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: SB-A5.2-NM126_5-5.5 Grab Soil
SPLP NVE
RACER Lansing Plant 2

LL Sample # TL 8934240
LL Group # 1787976
Account # 03074

Project Name: RACER Lansing Plant 2

Collected: 04/06/2017 14:35 by AV

Submitted: 04/08/2017 10:05
Reported: 04/27/2017 11:07

ARCADIS U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch CO 80129

A2619 SDG#: RLP01-19

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270C SIM**		**ug/l**	**ug/l**	**ug/l**	
14243	1,4-dioxane	123-91-1	0.27	0.051	0.20	1

Sample Comments

If the analysis is for determination of Hazardous Waste Characteristics, see Table 1 in EPA Code of Federal Regulations 40 CFR 261.24.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14243	1,4-Dioxane in Water	SW-846 8270C SIM	1	17103WAJ026	04/17/2017 16:30	Linda M Hartenstine	1
10466	BNA Water Extraction SIM	SW-846 3510C	1	17103WAJ026	04/13/2017 21:45	Christine Gleim	1
01567	Synthetic Precipitation Leach	SW-846 1312	1	17102-9169-1567	04/12/2017 15:30	Craig S Pfautz	n.a.

*=This limit was used in the evaluation of the final result

Sample Description: SB-A5.2-NM126_5.5-6 Grab Soil
SPLP ZHE
RACER Lansing Plant 2

LL Sample # TL 8934241
LL Group # 1787976
Account # 03074

Project Name: RACER Lansing Plant 2

Collected: 04/06/2017 14:35 by AV

Submitted: 04/08/2017 10:05
Reported: 04/27/2017 11:07

ARCADIS U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch CO 80129

A2620 SDG#: RLP01-20

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		ug/l	ug/l	ug/l	
10335	Acetone	67-64-1	N.D.	60	200	10
10335	Benzene	71-43-2	N.D.	5	10	10
10335	Bromodichloromethane	75-27-4	N.D.	5	10	10
10335	Bromoform	75-25-2	N.D.	5	40	10
10335	Bromomethane	74-83-9	N.D.	5	10	10
10335	2-Butanone	78-93-3	N.D.	30	100	10
10335	Carbon Disulfide	75-15-0	N.D.	10	50	10
10335	Carbon Tetrachloride	56-23-5	N.D.	5	10	10
10335	Chlorobenzene	108-90-7	N.D.	5	10	10
10335	Chloroethane	75-00-3	N.D.	5	10	10
10335	Chloroform	67-66-3	N.D.	5	10	10
10335	Chloromethane	74-87-3	N.D.	5	10	10
10335	Cyclohexane	110-82-7	N.D.	20	50	10
10335	1,2-Dibromo-3-chloropropane	96-12-8	N.D.	20	50	10
10335	Dibromochloromethane	124-48-1	N.D.	5	10	10
10335	1,2-Dibromoethane	106-93-4	N.D.	5	10	10
10335	1,2-Dichlorobenzene	95-50-1	N.D.	10	50	10
10335	1,3-Dichlorobenzene	541-73-1	N.D.	10	50	10
10335	1,4-Dichlorobenzene	106-46-7	N.D.	10	50	10
10335	Dichlorodifluoromethane	75-71-8	N.D.	5	10	10
10335	1,1-Dichloroethane	75-34-3	N.D.	5	10	10
10335	1,2-Dichloroethane	107-06-2	N.D.	5	10	10
10335	1,1-Dichloroethene	75-35-4	N.D.	5	10	10
10335	cis-1,2-Dichloroethene	156-59-2	N.D.	5	10	10
10335	trans-1,2-Dichloroethene	156-60-5	N.D.	5	10	10
10335	1,2-Dichloropropane	78-87-5	N.D.	5	10	10
10335	cis-1,3-Dichloropropene	10061-01-5	N.D.	5	10	10
10335	trans-1,3-Dichloropropene	10061-02-6	N.D.	5	10	10
10335	Ethylbenzene	100-41-4	N.D.	5	10	10
10335	Freon 113	76-13-1	N.D.	20	100	10
10335	2-Hexanone	591-78-6	N.D.	30	100	10
10335	Isopropylbenzene	98-82-8	N.D.	10	50	10
10335	Methyl Acetate	79-20-9	N.D.	10	50	10
10335	Methyl Tertiary Butyl Ether	1634-04-4	N.D.	5	10	10
10335	4-Methyl-2-pentanone	108-10-1	N.D.	30	100	10
10335	Methylcyclohexane	108-87-2	N.D.	10	50	10
10335	Methylene Chloride	75-09-2	N.D.	20	40	10
10335	Styrene	100-42-5	N.D.	10	50	10
10335	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	5	10	10
10335	Tetrachloroethene	127-18-4	N.D.	5	10	10
10335	Toluene	108-88-3	N.D.	5	10	10
10335	1,2,4-Trichlorobenzene	120-82-1	N.D.	10	50	10
10335	1,1,1-Trichloroethane	71-55-6	N.D.	5	10	10
10335	1,1,2-Trichloroethane	79-00-5	N.D.	5	10	10
10335	Trichloroethene	79-01-6	N.D.	5	10	10
10335	Trichlorofluoromethane	75-69-4	N.D.	5	10	10
10335	Vinyl Chloride	75-01-4	N.D.	5	10	10
10335	Xylene (Total)	1330-20-7	N.D.	5	10	10

*=This limit was used in the evaluation of the final result

Sample Description: SB-A5.2-NM126_5.5-6 Grab Soil
SPLP ZHE
RACER Lansing Plant 2

LL Sample # TL 8934241
LL Group # 1787976
Account # 03074

Project Name: RACER Lansing Plant 2

Collected: 04/06/2017 14:35 by AV

Submitted: 04/08/2017 10:05
Reported: 04/27/2017 11:07

ARCADIS U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch CO 80129

A2620 SDG#: RLP01-20

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor

Reporting limits were raised due to interference from the sample matrix.

Sample Comments

If the analysis is for determination of Hazardous Waste Characteristics, see Table 1 in EPA Code of Federal Regulations 40 CFR 261.24.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10335	VOCs- 5ml Water by 8260B	SW-846 8260B	1	W171081AA	04/18/2017 18:47	Nicole S Lamoreaux	10
01163	GC/MS VOA Water Prep	SW-846 5030B	1	W171081AA	04/18/2017 18:47	Nicole S Lamoreaux	10
08792	SPLP Volatile Extraction	SW-846 1312	1	17104-12245-8792	04/14/2017 15:57	Tanner E Grumbling	n.a.

*=This limit was used in the evaluation of the final result

Sample Description: SB-A5.2-NM126_6.5-7 Grab Soil
RACER Lansing Plant 2

LL Sample # SW 8934242
LL Group # 1787976
Account # 03074

Project Name: RACER Lansing Plant 2

Collected: 04/06/2017 14:40 by AV

Submitted: 04/08/2017 10:05
Reported: 04/27/2017 11:07

ARCADIS U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch CO 80129

A2621 SDG#: RLP01-21

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270C SIM**		ug/kg	ug/kg	ug/kg	
10725	1,4-Dioxane	123-91-1	110	0.79	2.0	1
	The stated QC limits for 1,4-Dioxane are advisory only.					
Wet Chemistry	**SM 2540 G-1997**		%	%	%	
00111	Moisture	n.a.	17.0	0.50	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.					

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10725	1,4-Dioxane in Soil	SW-846 8270C SIM	1	17103SLI026	04/19/2017 01:41	William H Saadeh	1
10811	BNA Soil Microwave SIM	SW-846 3546	1	17103SLI026	04/13/2017 17:45	Elizabeth E Donovan	1
00111	Moisture	SM 2540 G-1997	1	17103820007B	04/13/2017 21:52	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: SB-A5.2-NM126_15-15.5 Grab Soil
RACER Lansing Plant 2

LL Sample # SW 8934243
LL Group # 1787976
Account # 03074

Project Name: RACER Lansing Plant 2

Collected: 04/06/2017 14:50 by AV

Submitted: 04/08/2017 10:05
Reported: 04/27/2017 11:07

ARCADIS U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch CO 80129

A2622 SDG#: RLP01-22

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		ug/kg		ug/kg	ug/kg	
10237	Acetone	67-64-1	22		5	15	0.6
10237	Benzene	71-43-2	2	J	0.4	4	0.6
10237	Bromodichloromethane	75-27-4	N.D.		0.7	4	0.6
10237	Bromoform	75-25-2	N.D.		0.7	4	0.6
10237	Bromomethane	74-83-9	N.D.		1	4	0.6
10237	2-Butanone	78-93-3	3	J	3	7	0.6
10237	Carbon Disulfide	75-15-0	3	J	0.7	4	0.6
10237	Carbon Tetrachloride	56-23-5	N.D.		0.7	4	0.6
10237	Chlorobenzene	108-90-7	N.D.		0.7	4	0.6
10237	Chloroethane	75-00-3	160		1	4	0.6
10237	Chloroform	67-66-3	N.D.		0.7	4	0.6
10237	Chloromethane	74-87-3	N.D.		1	4	0.6
10237	Cyclohexane	110-82-7	2	J	0.7	4	0.6
10237	1,2-Dibromo-3-chloropropane	96-12-8	N.D.		1	4	0.6
10237	Dibromochloromethane	124-48-1	N.D.		0.7	4	0.6
10237	1,2-Dibromoethane	106-93-4	N.D.		0.7	4	0.6
10237	1,2-Dichlorobenzene	95-50-1	N.D.		0.7	4	0.6
10237	1,3-Dichlorobenzene	541-73-1	N.D.		0.7	4	0.6
10237	1,4-Dichlorobenzene	106-46-7	N.D.		0.7	4	0.6
10237	Dichlorodifluoromethane	75-71-8	N.D.		1	4	0.6
10237	1,1-Dichloroethane	75-34-3	1	J	0.7	4	0.6
10237	1,2-Dichloroethane	107-06-2	N.D.		0.7	4	0.6
10237	1,1-Dichloroethene	75-35-4	N.D.		0.7	4	0.6
10237	cis-1,2-Dichloroethene	156-59-2	N.D.		0.7	4	0.6
10237	trans-1,2-Dichloroethene	156-60-5	N.D.		0.7	4	0.6
10237	1,2-Dichloropropane	78-87-5	N.D.		0.7	4	0.6
10237	cis-1,3-Dichloropropene	10061-01-5	N.D.		0.7	4	0.6
10237	trans-1,3-Dichloropropene	10061-02-6	N.D.		0.7	4	0.6
10237	Ethylbenzene	100-41-4	2	J	0.7	4	0.6
10237	Freon 113	76-13-1	N.D.		1	7	0.6
10237	2-Hexanone	591-78-6	N.D.		2	7	0.6
10237	Isopropylbenzene	98-82-8	1	J	0.7	4	0.6
10237	Methyl Acetate	79-20-9	N.D.		1	4	0.6
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.		0.4	4	0.6
10237	4-Methyl-2-pentanone	108-10-1	N.D.		2	7	0.6
10237	Methylcyclohexane	108-87-2	6		0.7	4	0.6
10237	Methylene Chloride	75-09-2	N.D.		1	4	0.6
10237	Styrene	100-42-5	N.D.		0.7	4	0.6
10237	1,1,2,2-Tetrachloroethane	79-34-5	N.D.		0.7	4	0.6
10237	Tetrachloroethene	127-18-4	N.D.		0.7	4	0.6
10237	Toluene	108-88-3	11		0.7	4	0.6
10237	1,2,4-Trichlorobenzene	120-82-1	1	J	0.7	4	0.6
10237	1,1,1-Trichloroethane	71-55-6	N.D.		0.7	4	0.6
10237	1,1,2-Trichloroethane	79-00-5	N.D.		0.7	4	0.6
10237	Trichloroethene	79-01-6	2	J	0.7	4	0.6
10237	Trichlorofluoromethane	75-69-4	N.D.		1	4	0.6
10237	Vinyl Chloride	75-01-4	N.D.		0.7	4	0.6
10237	Xylene (Total)	1330-20-7	7		0.7	4	0.6

The recovery for the sample internal standard is outside the QC acceptance limits. The following corrective action was taken:

*=This limit was used in the evaluation of the final result

Sample Description: SB-A5.2-NM126_15-15.5 Grab Soil
RACER Lansing Plant 2

LL Sample # SW 8934243
LL Group # 1787976
Account # 03074

Project Name: RACER Lansing Plant 2

Collected: 04/06/2017 14:50 by AV

Submitted: 04/08/2017 10:05
Reported: 04/27/2017 11:07

ARCADIS U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch CO 80129

A2622 SDG#: RLP01-22

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
	The sample was re-analyzed and the QC is again outside of the acceptance limits, indicating a matrix effect. The data is reported from the initial trial.					
	The LCS and/or LCSD recoveries are outside the stated QC window but within the marginal exceedance allowance of +/- 4 standard deviations as defined in the NELAC/DoD Standards. The following analytes are accepted based on this allowance: 1,3-dichlorobenzene.					
GC/MS Semivolatiles	**SW-846 8270C SIM**		**ug/kg**	**ug/kg**	**ug/kg**	
10725	1,4-Dioxane	123-91-1	90	8.0	20	10
	The stated QC limits for 1,4-Dioxane are advisory only.					
Wet Chemistry	**SM 2540 G-1997**		**%**	**%**	**%**	
00111	Moisture	n.a.	17.6	0.50	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.					

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs- Solid by 8260B	SW-846 8260B	1	X171041AA	04/14/2017 23:37	Patrick T Herres	0.6
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	1	201710244925	04/06/2017 14:50	Client Supplied	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	2	201710244925	04/06/2017 14:50	Client Supplied	1
07579	GC/MS-5g Field Preserv.MeOH-NC	SW-846 5035A	1	201710244925	04/06/2017 14:50	Client Supplied	1
10725	1,4-Dioxane in Soil	SW-846 8270C SIM	1	17103SLI026	04/20/2017 06:08	William H Saadeh	10
10811	BNA Soil Microwave SIM	SW-846 3546	1	17103SLI026	04/13/2017 17:45	Elizabeth E Donovan	1
00111	Moisture	SM 2540 G-1997	1	17103820007B	04/13/2017 21:52	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: SB-A5.2-NM126_15-15.5 Grab Soil
SPLP NVE
RACER Lansing Plant 2

LL Sample # TL 8934244
LL Group # 1787976
Account # 03074

Project Name: RACER Lansing Plant 2

Collected: 04/06/2017 14:50 by AV

Submitted: 04/08/2017 10:05
Reported: 04/27/2017 11:07

ARCADIS U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch CO 80129

A2623 SDG#: RLP01-23

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270C SIM**		**ug/l**	**ug/l**	**ug/l**	
14243	1,4-dioxane	123-91-1	4.3	0.050	0.20	1

The recovery for the sample internal standard is outside the QC acceptance limits. The following corrective action was taken: The sample was re-analyzed and internal standard areas are again outside of the QC acceptance limits, indicating a matrix effect. The reported data is from the initial analysis of the sample.

Sample Comments

If the analysis is for determination of Hazardous Waste Characteristics, see Table 1 in EPA Code of Federal Regulations 40 CFR 261.24.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14243	1,4-Dioxane in Water	SW-846 8270C SIM	1	17103WAJ026	04/17/2017 16:58	Linda M Hartenstine	1
10466	BNA Water Extraction SIM	SW-846 3510C	1	17103WAJ026	04/13/2017 21:45	Christine Gleim	1
01567	Synthetic Precipitation Leach	SW-846 1312	1	17102-9169-156 7	04/12/2017 15:30	Craig S Pfautz	n.a.

*=This limit was used in the evaluation of the final result

Sample Description: SB-A5.2-NM126_15.5-16 Grab Soil
SPLP ZHE
RACER Lansing Plant 2

LL Sample # TL 8934245
LL Group # 1787976
Account # 03074

Project Name: RACER Lansing Plant 2

Collected: 04/06/2017 14:50 by AV

Submitted: 04/08/2017 10:05
Reported: 04/27/2017 11:07

ARCADIS U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch CO 80129

A2624 SDG#: RLP01-24

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		ug/l	ug/l	ug/l	
10335	Acetone	67-64-1	N.D.	60	200	10
10335	Benzene	71-43-2	N.D.	5	10	10
10335	Bromodichloromethane	75-27-4	N.D.	5	10	10
10335	Bromoform	75-25-2	N.D.	5	40	10
10335	Bromomethane	74-83-9	N.D.	5	10	10
10335	2-Butanone	78-93-3	N.D.	30	100	10
10335	Carbon Disulfide	75-15-0	N.D.	10	50	10
10335	Carbon Tetrachloride	56-23-5	N.D.	5	10	10
10335	Chlorobenzene	108-90-7	N.D.	5	10	10
10335	Chloroethane	75-00-3	18	5	10	10
10335	Chloroform	67-66-3	N.D.	5	10	10
10335	Chloromethane	74-87-3	N.D.	5	10	10
10335	Cyclohexane	110-82-7	N.D.	20	50	10
10335	1,2-Dibromo-3-chloropropane	96-12-8	N.D.	20	50	10
10335	Dibromochloromethane	124-48-1	N.D.	5	10	10
10335	1,2-Dibromoethane	106-93-4	N.D.	5	10	10
10335	1,2-Dichlorobenzene	95-50-1	N.D.	10	50	10
10335	1,3-Dichlorobenzene	541-73-1	N.D.	10	50	10
10335	1,4-Dichlorobenzene	106-46-7	N.D.	10	50	10
10335	Dichlorodifluoromethane	75-71-8	N.D.	5	10	10
10335	1,1-Dichloroethane	75-34-3	N.D.	5	10	10
10335	1,2-Dichloroethane	107-06-2	N.D.	5	10	10
10335	1,1-Dichloroethene	75-35-4	N.D.	5	10	10
10335	cis-1,2-Dichloroethene	156-59-2	N.D.	5	10	10
10335	trans-1,2-Dichloroethene	156-60-5	N.D.	5	10	10
10335	1,2-Dichloropropane	78-87-5	N.D.	5	10	10
10335	cis-1,3-Dichloropropene	10061-01-5	N.D.	5	10	10
10335	trans-1,3-Dichloropropene	10061-02-6	N.D.	5	10	10
10335	Ethylbenzene	100-41-4	N.D.	5	10	10
10335	Freon 113	76-13-1	N.D.	20	100	10
10335	2-Hexanone	591-78-6	N.D.	30	100	10
10335	Isopropylbenzene	98-82-8	N.D.	10	50	10
10335	Methyl Acetate	79-20-9	N.D.	10	50	10
10335	Methyl Tertiary Butyl Ether	1634-04-4	N.D.	5	10	10
10335	4-Methyl-2-pentanone	108-10-1	N.D.	30	100	10
10335	Methylcyclohexane	108-87-2	N.D.	10	50	10
10335	Methylene Chloride	75-09-2	N.D.	20	40	10
10335	Styrene	100-42-5	N.D.	10	50	10
10335	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	5	10	10
10335	Tetrachloroethene	127-18-4	N.D.	5	10	10
10335	Toluene	108-88-3	N.D.	5	10	10
10335	1,2,4-Trichlorobenzene	120-82-1	N.D.	10	50	10
10335	1,1,1-Trichloroethane	71-55-6	N.D.	5	10	10
10335	1,1,2-Trichloroethane	79-00-5	N.D.	5	10	10
10335	Trichloroethene	79-01-6	N.D.	5	10	10
10335	Trichlorofluoromethane	75-69-4	N.D.	5	10	10
10335	Vinyl Chloride	75-01-4	N.D.	5	10	10
10335	Xylene (Total)	1330-20-7	N.D.	5	10	10

*=This limit was used in the evaluation of the final result

Sample Description: SB-A5.2-NM126_15.5-16 Grab Soil
SPLP ZHE
RACER Lansing Plant 2

LL Sample # TL 8934245
LL Group # 1787976
Account # 03074

Project Name: RACER Lansing Plant 2

Collected: 04/06/2017 14:50 by AV

Submitted: 04/08/2017 10:05
Reported: 04/27/2017 11:07

ARCADIS U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch CO 80129

A2624 SDG#: RLP01-24

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor

Reporting limits were raised due to interference from the sample matrix.

Sample Comments

If the analysis is for determination of Hazardous Waste Characteristics, see Table 1 in EPA Code of Federal Regulations 40 CFR 261.24.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10335	VOCs- 5ml Water by 8260B	SW-846 8260B	1	W171081AA	04/18/2017 19:11	Nicole S Lamoreaux	10
01163	GC/MS VOA Water Prep	SW-846 5030B	1	W171081AA	04/18/2017 19:11	Nicole S Lamoreaux	10
08792	SPLP Volatile Extraction	SW-846 1312	1	17104-12245-8792	04/14/2017 15:57	Tanner E Grumbling	n.a.

*=This limit was used in the evaluation of the final result

Sample Description: SB-A5.2-NM126_19.5-20 Grab Soil
RACER Lansing Plant 2

LL Sample # SW 8934246
LL Group # 1787976
Account # 03074

Project Name: RACER Lansing Plant 2

Collected: 04/06/2017 15:00 by AV

Submitted: 04/08/2017 10:05
Reported: 04/27/2017 11:07

ARCADIS U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch CO 80129

A2625 SDG#: RLP01-25

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270C SIM**		ug/kg	ug/kg	ug/kg	
10725	1,4-Dioxane	123-91-1	30	0.74	1.9	1
	The stated QC limits for 1,4-Dioxane are advisory only.					
Wet Chemistry	**SM 2540 G-1997**		%	%	%	
00111	Moisture	n.a.	11.0	0.50	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.					

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10725	1,4-Dioxane in Soil	SW-846 8270C SIM	1	17103SLI026	04/19/2017 02:45	William H Saadeh	1
10811	BNA Soil Microwave SIM	SW-846 3546	1	17103SLI026	04/13/2017 17:45	Elizabeth E Donovan	1
00111	Moisture	SM 2540 G-1997	1	17103820007B	04/13/2017 21:52	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: SB-A5.2-NU129_5-5.3 Grab Soil
RACER Lansing Plant 2

LL Sample # SW 8934247
LL Group # 1787976
Account # 03074

Project Name: RACER Lansing Plant 2

Collected: 04/06/2017 15:38 by AV

Submitted: 04/08/2017 10:05
Reported: 04/27/2017 11:07

ARCADIS U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch CO 80129

A2626 SDG#: RLP01-26

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**ug/kg**		**ug/kg**	**ug/kg**	
10237	Acetone	67-64-1	N.D.		470	1,300	54.95
10237	Benzene	71-43-2	N.D.		33	330	54.95
10237	Bromodichloromethane	75-27-4	N.D.		67	330	54.95
10237	Bromoform	75-25-2	N.D.		67	330	54.95
10237	Bromomethane	74-83-9	N.D.		130	330	54.95
10237	2-Butanone	78-93-3	N.D.		270	670	54.95
10237	Carbon Disulfide	75-15-0	N.D.		67	330	54.95
10237	Carbon Tetrachloride	56-23-5	N.D.		67	330	54.95
10237	Chlorobenzene	108-90-7	N.D.		67	330	54.95
10237	Chloroethane	75-00-3	270	J	130	330	54.95
10237	Chloroform	67-66-3	N.D.		67	330	54.95
10237	Chloromethane	74-87-3	N.D.		130	330	54.95
10237	Cyclohexane	110-82-7	N.D.		67	330	54.95
10237	1,2-Dibromo-3-chloropropane	96-12-8	N.D.		130	330	54.95
10237	Dibromochloromethane	124-48-1	N.D.		67	330	54.95
10237	1,2-Dibromoethane	106-93-4	N.D.		67	330	54.95
10237	1,2-Dichlorobenzene	95-50-1	N.D.		67	330	54.95
10237	1,3-Dichlorobenzene	541-73-1	N.D.		67	330	54.95
10237	1,4-Dichlorobenzene	106-46-7	N.D.		67	330	54.95
10237	Dichlorodifluoromethane	75-71-8	N.D.		130	330	54.95
10237	1,1-Dichloroethane	75-34-3	200	J	67	330	54.95
10237	1,2-Dichloroethane	107-06-2	N.D.		67	330	54.95
10237	1,1-Dichloroethene	75-35-4	N.D.		67	330	54.95
10237	cis-1,2-Dichloroethene	156-59-2	N.D.		67	330	54.95
10237	trans-1,2-Dichloroethene	156-60-5	N.D.		67	330	54.95
10237	1,2-Dichloropropane	78-87-5	N.D.		67	330	54.95
10237	cis-1,3-Dichloropropene	10061-01-5	N.D.		67	330	54.95
10237	trans-1,3-Dichloropropene	10061-02-6	N.D.		67	330	54.95
10237	Ethylbenzene	100-41-4	N.D.		67	330	54.95
10237	Freon 113	76-13-1	N.D.		130	670	54.95
10237	2-Hexanone	591-78-6	N.D.		200	670	54.95
10237	Isopropylbenzene	98-82-8	N.D.		67	330	54.95
10237	Methyl Acetate	79-20-9	340		130	330	54.95
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.		33	330	54.95
10237	4-Methyl-2-pentanone	108-10-1	N.D.		200	670	54.95
10237	Methylcyclohexane	108-87-2	N.D.		67	330	54.95
10237	Methylene Chloride	75-09-2	N.D.		130	330	54.95
10237	Styrene	100-42-5	N.D.		67	330	54.95
10237	1,1,2,2-Tetrachloroethane	79-34-5	N.D.		67	330	54.95
10237	Tetrachloroethene	127-18-4	N.D.		67	330	54.95
10237	Toluene	108-88-3	160	J	67	330	54.95
10237	1,2,4-Trichlorobenzene	120-82-1	N.D.		67	330	54.95
10237	1,1,1-Trichloroethane	71-55-6	150	J	67	330	54.95
10237	1,1,2-Trichloroethane	79-00-5	N.D.		67	330	54.95
10237	Trichloroethene	79-01-6	N.D.		67	330	54.95
10237	Trichlorofluoromethane	75-69-4	N.D.		130	330	54.95
10237	Vinyl Chloride	75-01-4	N.D.		67	330	54.95
10237	Xylene (Total)	1330-20-7	90	J	67	330	54.95

The LCS and/or LCSD recoveries are outside the stated QC window but within the marginal exceedance allowance of +/- 4 standard deviations as defined in

*=This limit was used in the evaluation of the final result

Sample Description: SB-A5.2-NU129_5-5.3 Grab Soil
RACER Lansing Plant 2

LL Sample # SW 8934247
LL Group # 1787976
Account # 03074

Project Name: RACER Lansing Plant 2

Collected: 04/06/2017 15:38 by AV

Submitted: 04/08/2017 10:05
Reported: 04/27/2017 11:07

ARCADIS U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch CO 80129

A2626 SDG#: RLP01-26

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
	the NELAC/DoD Standards. The following analytes are accepted based on this allowance: trichlorofluoromethane.					
GC/MS Semivolatiles	**SW-846 8270C SIM**		**ug/kg**	**ug/kg**	**ug/kg**	
10725	1,4-Dioxane	123-91-1	N.D.	40	100	50
	The stated QC limits for 1,4-Dioxane are advisory only.					
Wet Chemistry	**SM 2540 G-1997**		**%**	**%**	**%**	
00111	Moisture	n.a.	17.8	0.50	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.					

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs- Solid by 8260B	SW-846 8260B	1	Q171041AA	04/14/2017 14:42	Jennifer K Howe	54.95
06171	GC/MS-5g Field Preserv. MeOH	SW-846 5035A	1	201710244929	04/06/2017 15:38	Client Supplied	1
10725	1,4-Dioxane in Soil	SW-846 8270C SIM	1	17103SLI026	04/20/2017 06:45	William H Saadeh	50
10811	BNA Soil Microwave SIM	SW-846 3546	1	17103SLI026	04/13/2017 17:45	Elizabeth E Donovan	1
00111	Moisture	SM 2540 G-1997	1	17103820007B	04/13/2017 21:52	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: SB-A5.2-NU129_5-5.3 Grab Soil
SPLP NVE
RACER Lansing Plant 2

LL Sample # TL 8934248
LL Group # 1787976
Account # 03074

Project Name: RACER Lansing Plant 2

Collected: 04/06/2017 15:38 by AV

Submitted: 04/08/2017 10:05
Reported: 04/27/2017 11:07

ARCADIS U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch CO 80129

A2627 SDG#: RLP01-27

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270C SIM**		**ug/l**	**ug/l**	**ug/l**	
14243	1,4-dioxane	123-91-1	0.55	0.051	0.20	1

The recovery for the sample internal standard is outside the QC acceptance limits. The following corrective action was taken: The sample was re-analyzed and internal standard areas are again outside of the QC acceptance limits, indicating a matrix effect. The reported data is from the initial analysis of the sample.

Sample Comments

If the analysis is for determination of Hazardous Waste Characteristics, see Table 1 in EPA Code of Federal Regulations 40 CFR 261.24.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14243	1,4-Dioxane in Water	SW-846 8270C SIM	1	17103WAJ026	04/17/2017 17:26	Linda M Hartenstine	1
10466	BNA Water Extraction SIM	SW-846 3510C	1	17103WAJ026	04/13/2017 21:45	Christine Gleim	1
01567	Synthetic Precipitation Leach	SW-846 1312	1	17102-9169-156 7	04/12/2017 15:30	Craig S Pfautz	n.a.

*=This limit was used in the evaluation of the final result

Sample Description: SB-A5.2-NU129_5.3-5.5 Grab Soil
SPLP ZHE
RACER Lansing Plant 2

LL Sample # TL 8934249
LL Group # 1787976
Account # 03074

Project Name: RACER Lansing Plant 2

Collected: 04/06/2017 15:38 by AV

Submitted: 04/08/2017 10:05
Reported: 04/27/2017 11:07

ARCADIS U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch CO 80129

A2628 SDG#: RLP01-28

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		ug/l	ug/l	ug/l	
10335	Acetone	67-64-1	N.D.	60	200	10
10335	Benzene	71-43-2	N.D.	5	10	10
10335	Bromodichloromethane	75-27-4	N.D.	5	10	10
10335	Bromoform	75-25-2	N.D.	5	40	10
10335	Bromomethane	74-83-9	N.D.	5	10	10
10335	2-Butanone	78-93-3	N.D.	30	100	10
10335	Carbon Disulfide	75-15-0	N.D.	10	50	10
10335	Carbon Tetrachloride	56-23-5	N.D.	5	10	10
10335	Chlorobenzene	108-90-7	N.D.	5	10	10
10335	Chloroethane	75-00-3	N.D.	5	10	10
10335	Chloroform	67-66-3	N.D.	5	10	10
10335	Chloromethane	74-87-3	N.D.	5	10	10
10335	Cyclohexane	110-82-7	N.D.	20	50	10
10335	1,2-Dibromo-3-chloropropane	96-12-8	N.D.	20	50	10
10335	Dibromochloromethane	124-48-1	N.D.	5	10	10
10335	1,2-Dibromoethane	106-93-4	N.D.	5	10	10
10335	1,2-Dichlorobenzene	95-50-1	N.D.	10	50	10
10335	1,3-Dichlorobenzene	541-73-1	N.D.	10	50	10
10335	1,4-Dichlorobenzene	106-46-7	N.D.	10	50	10
10335	Dichlorodifluoromethane	75-71-8	N.D.	5	10	10
10335	1,1-Dichloroethane	75-34-3	N.D.	5	10	10
10335	1,2-Dichloroethane	107-06-2	N.D.	5	10	10
10335	1,1-Dichloroethene	75-35-4	N.D.	5	10	10
10335	cis-1,2-Dichloroethene	156-59-2	N.D.	5	10	10
10335	trans-1,2-Dichloroethene	156-60-5	N.D.	5	10	10
10335	1,2-Dichloropropane	78-87-5	N.D.	5	10	10
10335	cis-1,3-Dichloropropene	10061-01-5	N.D.	5	10	10
10335	trans-1,3-Dichloropropene	10061-02-6	N.D.	5	10	10
10335	Ethylbenzene	100-41-4	N.D.	5	10	10
10335	Freon 113	76-13-1	N.D.	20	100	10
10335	2-Hexanone	591-78-6	N.D.	30	100	10
10335	Isopropylbenzene	98-82-8	N.D.	10	50	10
10335	Methyl Acetate	79-20-9	N.D.	10	50	10
10335	Methyl Tertiary Butyl Ether	1634-04-4	N.D.	5	10	10
10335	4-Methyl-2-pentanone	108-10-1	N.D.	30	100	10
10335	Methylcyclohexane	108-87-2	N.D.	10	50	10
10335	Methylene Chloride	75-09-2	N.D.	20	40	10
10335	Styrene	100-42-5	N.D.	10	50	10
10335	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	5	10	10
10335	Tetrachloroethene	127-18-4	N.D.	5	10	10
10335	Toluene	108-88-3	N.D.	5	10	10
10335	1,2,4-Trichlorobenzene	120-82-1	N.D.	10	50	10
10335	1,1,1-Trichloroethane	71-55-6	N.D.	5	10	10
10335	1,1,2-Trichloroethane	79-00-5	N.D.	5	10	10
10335	Trichloroethene	79-01-6	N.D.	5	10	10
10335	Trichlorofluoromethane	75-69-4	N.D.	5	10	10
10335	Vinyl Chloride	75-01-4	N.D.	5	10	10
10335	Xylene (Total)	1330-20-7	N.D.	5	10	10

*=This limit was used in the evaluation of the final result

Sample Description: SB-A5.2-NU129_5.3-5.5 Grab Soil
SPLP ZHE
RACER Lansing Plant 2

LL Sample # TL 8934249
LL Group # 1787976
Account # 03074

Project Name: RACER Lansing Plant 2

Collected: 04/06/2017 15:38 by AV

Submitted: 04/08/2017 10:05
Reported: 04/27/2017 11:07

ARCADIS U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch CO 80129

A2628 SDG#: RLP01-28

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor

Reporting limits were raised due to interference from the sample matrix.

Sample Comments

If the analysis is for determination of Hazardous Waste Characteristics, see Table 1 in EPA Code of Federal Regulations 40 CFR 261.24.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10335	VOCs- 5ml Water by 8260B	SW-846 8260B	1	W171081AA	04/18/2017 19:35	Nicole S Lamoreaux	10
01163	GC/MS VOA Water Prep	SW-846 5030B	1	W171081AA	04/18/2017 19:35	Nicole S Lamoreaux	10
08792	SPLP Volatile Extraction	SW-846 1312	1	17104-12245-8792	04/14/2017 15:57	Tanner E Grumbling	n.a.

*=This limit was used in the evaluation of the final result

Sample Description: SB-A5.2-NU129_6.5-7 Grab Soil
RACER Lansing Plant 2

LL Sample # SW 8934250
LL Group # 1787976
Account # 03074

Project Name: RACER Lansing Plant 2

Collected: 04/06/2017 15:45 by AV

Submitted: 04/08/2017 10:05
Reported: 04/27/2017 11:07

ARCADIS U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch CO 80129

A2629 SDG#: RLP01-29

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270C SIM**		ug/kg	ug/kg	ug/kg	
10725	1,4-Dioxane	123-91-1	22	0.75	1.9	1
	The stated QC limits for 1,4-Dioxane are advisory only.					
Wet Chemistry	**SM 2540 G-1997**		%	%	%	
00111	Moisture	n.a.	12.3	0.50	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.					

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10725	1,4-Dioxane in Soil	SW-846 8270C SIM	1	17103SLI026	04/19/2017 03:50	William H Saadeh	1
10811	BNA Soil Microwave SIM	SW-846 3546	1	17103SLI026	04/13/2017 17:45	Elizabeth E Donovan	1
00111	Moisture	SM 2540 G-1997	1	17103820007B	04/13/2017 21:52	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: SB-A5.2-NU129_19.5-20 Grab Soil
RACER Lansing Plant 2

LL Sample # SW 8934251
LL Group # 1787976
Account # 03074

Project Name: RACER Lansing Plant 2

Collected: 04/06/2017 15:55 by AV

Submitted: 04/08/2017 10:05
Reported: 04/27/2017 11:07

ARCADIS U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch CO 80129

A2630 SDG#: RLP01-30

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270C SIM**		ug/kg	ug/kg	ug/kg	
10725	1,4-Dioxane	123-91-1	48	0.76	1.9	1
	The stated QC limits for 1,4-Dioxane are advisory only.					
Wet Chemistry	**SM 2540 G-1997**		%	%	%	
00111	Moisture	n.a.	13.1	0.50	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.					

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10725	1,4-Dioxane in Soil	SW-846 8270C SIM	1	17103SLI026	04/19/2017 04:22	William H Saadeh	1
10811	BNA Soil Microwave SIM	SW-846 3546	1	17103SLI026	04/13/2017 17:45	Elizabeth E Donovan	1
00111	Moisture	SM 2540 G-1997	1	17103820007B	04/13/2017 21:52	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: LMW-14-15D_040617 Grab LNAPL
RACER Lansing Plant 2

LL Sample # G5 8934252
LL Group # 1787976
Account # 03074

Project Name: RACER Lansing Plant 2

Collected: 04/06/2017 15:00 by AV

Submitted: 04/08/2017 10:05
Reported: 04/27/2017 11:07

ARCADIS U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch CO 80129

A2631 SDG#: RLP01-31

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit*	As Received Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270C SIM**		**ug/kg**	**ug/kg**	**ug/kg**	
10725	1,4-Dioxane	123-91-1	N.D.	200	500	1

Due to laboratory error, the incorrect surrogate solution was added to the sample and all QC. The following corredtive action was taken:
The sample was re-extracted outside the method required holding time and the QC is compliant. All results are reported from the first trial. Similar results were obtained in both trials.

Reporting limits were raised due to interference from the sample matrix.

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10725	1,4-Dioxane in Soil	SW-846 8270C SIM	1	17103SLE026	04/17/2017 18:16	Joseph M Gambler	1
10811	BNA Soil Microwave SIM	SW-846 3546	1	17103SLE026	04/14/2017 00:15	Sally L Appleyard	1

*=This limit was used in the evaluation of the final result

Sample Description: LMW-12-08_040717 Grab LNAPL
RACER Lansing Plant 2

LL Sample # G5 8934253
LL Group # 1787976
Account # 03074

Project Name: RACER Lansing Plant 2

Collected: 04/07/2017 14:00 by AV

Submitted: 04/08/2017 10:05
Reported: 04/27/2017 11:07

ARCADIS U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch CO 80129

A2632 SDG#: RLP01-32

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit*	As Received Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270C SIM**		ug/kg	ug/kg	ug/kg	
10725	1,4-Dioxane	123-91-1	N.D.	200	500	1

Due to laboratory error, the incorrect surrogate solution was added to the sample and all QC. The following corredtive action was taken:
The sample was re-extracted outside the method required holding time and the QC is compliant. All results are reported from the first trial. Similar results were obtained in both trials.

Reporting limits were raised due to interference from the sample matrix.

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10725	1,4-Dioxane in Soil	SW-846 8270C SIM	1	17103SLE026	04/17/2017 18:49	Joseph M Gambler	1
10811	BNA Soil Microwave SIM	SW-846 3546	1	17103SLE026	04/14/2017 00:15	Sally L Appleyard	1

*=This limit was used in the evaluation of the final result

Sample Description: PMW-01_040717 Grab LNAPL
RACER Lansing Plant 2

LL Sample # G5 8934254
LL Group # 1787976
Account # 03074

Project Name: RACER Lansing Plant 2

Collected: 04/07/2017 14:50 by AV

Submitted: 04/08/2017 10:05
Reported: 04/27/2017 11:07

ARCADIS U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch CO 80129

A2633 SDG#: RLP01-33

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit*	As Received Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270C SIM**		**ug/kg**	**ug/kg**	**ug/kg**	
10725	1,4-Dioxane	123-91-1	N.D.	200	500	1

Due to laboratory error, the incorrect surrogate solution was added to the sample and all QC. The following corredtive action was taken:
The sample was re-extracted outside the method required holding time and the QC is compliant. All results are reported from the first trial. Similar results were obtained in both trials.

Reporting limits were raised due to interference from the sample matrix.

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10725	1,4-Dioxane in Soil	SW-846 8270C SIM	1	17103SLE026	04/17/2017 20:12	Joseph M Gambler	1
10811	BNA Soil Microwave SIM	SW-846 3546	1	17103SLE026	04/14/2017 00:15	Sally L Appleyard	1

*=This limit was used in the evaluation of the final result

Quality Control Summary

Client Name: ARCADIS U.S., Inc.
Reported: 04/27/2017 11:07

Group Number: 1787976

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

Method Blank

Analysis Name	Result	MDL**	LOQ
	ug/kg	ug/kg	ug/kg
Batch number: Q171031AA	Sample number(s): 8934234		
Acetone	N.D.	350	1,000
Benzene	N.D.	25	250
Bromodichloromethane	N.D.	50	250
Bromoform	N.D.	50	250
Bromomethane	N.D.	100	250
2-Butanone	N.D.	200	500
Carbon Disulfide	N.D.	50	250
Carbon Tetrachloride	N.D.	50	250
Chlorobenzene	N.D.	50	250
Chloroethane	N.D.	100	250
Chloroform	N.D.	50	250
Chloromethane	N.D.	100	250
Cyclohexane	N.D.	50	250
1,2-Dibromo-3-chloropropane	N.D.	100	250
Dibromochloromethane	N.D.	50	250
1,2-Dibromoethane	N.D.	50	250
1,2-Dichlorobenzene	N.D.	50	250
1,3-Dichlorobenzene	N.D.	50	250
1,4-Dichlorobenzene	N.D.	50	250
Dichlorodifluoromethane	N.D.	100	250
1,1-Dichloroethane	N.D.	50	250
1,2-Dichloroethane	N.D.	50	250
1,1-Dichloroethene	N.D.	50	250
cis-1,2-Dichloroethene	N.D.	50	250
trans-1,2-Dichloroethene	N.D.	50	250
1,2-Dichloropropane	N.D.	50	250
cis-1,3-Dichloropropene	N.D.	50	250
trans-1,3-Dichloropropene	N.D.	50	250
Ethylbenzene	N.D.	50	250
Freon 113	N.D.	100	500
2-Hexanone	N.D.	150	500
Isopropylbenzene	N.D.	50	250
Methyl Acetate	N.D.	100	250
Methyl Tertiary Butyl Ether	N.D.	25	250
4-Methyl-2-pentanone	N.D.	150	500
Methylcyclohexane	N.D.	50	250
Methylene Chloride	N.D.	100	250
Styrene	N.D.	50	250
1,1,2,2-Tetrachloroethane	N.D.	50	250
Tetrachloroethene	N.D.	50	250

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

Quality Control Summary

Client Name: ARCADIS U.S., Inc.
Reported: 04/27/2017 11:07

Group Number: 1787976

Method Blank (continued)

Analysis Name	Result	MDL**	LOQ
	ug/kg	ug/kg	ug/kg
Toluene	N.D.	50	250
1,2,4-Trichlorobenzene	N.D.	50	250
1,1,1-Trichloroethane	N.D.	50	250
1,1,2-Trichloroethane	N.D.	50	250
Trichloroethene	N.D.	50	250
Trichlorofluoromethane	N.D.	100	250
Vinyl Chloride	N.D.	50	250
Xylene (Total)	N.D.	50	250
Batch number: Q171041AA	Sample number(s): 8934226,8934247		
Acetone	N.D.	350	1,000
Benzene	N.D.	25	250
Bromodichloromethane	N.D.	50	250
Bromoform	N.D.	50	250
Bromomethane	N.D.	100	250
2-Butanone	N.D.	200	500
Carbon Disulfide	N.D.	50	250
Carbon Tetrachloride	N.D.	50	250
Chlorobenzene	N.D.	50	250
Chloroethane	N.D.	100	250
Chloroform	N.D.	50	250
Chloromethane	N.D.	100	250
Cyclohexane	N.D.	50	250
1,2-Dibromo-3-chloropropane	N.D.	100	250
Dibromochloromethane	N.D.	50	250
1,2-Dibromoethane	N.D.	50	250
1,2-Dichlorobenzene	N.D.	50	250
1,3-Dichlorobenzene	N.D.	50	250
1,4-Dichlorobenzene	N.D.	50	250
Dichlorodifluoromethane	N.D.	100	250
1,1-Dichloroethane	N.D.	50	250
1,2-Dichloroethane	N.D.	50	250
1,1-Dichloroethene	N.D.	50	250
cis-1,2-Dichloroethene	N.D.	50	250
trans-1,2-Dichloroethene	N.D.	50	250
1,2-Dichloropropane	N.D.	50	250
cis-1,3-Dichloropropene	N.D.	50	250
trans-1,3-Dichloropropene	N.D.	50	250
Ethylbenzene	N.D.	50	250
Freon 113	N.D.	100	500
2-Hexanone	N.D.	150	500
Isopropylbenzene	N.D.	50	250
Methyl Acetate	N.D.	100	250
Methyl Tertiary Butyl Ether	N.D.	25	250
4-Methyl-2-pentanone	N.D.	150	500
Methylcyclohexane	N.D.	50	250
Methylene Chloride	N.D.	100	250
Styrene	N.D.	50	250
1,1,2,2-Tetrachloroethane	N.D.	50	250

*- Outside of specification
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(1) The result for one or both determinations was less than five times the LOQ.
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P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

Quality Control Summary

Client Name: ARCADIS U.S., Inc. Group Number: 1787976
Reported: 04/27/2017 11:07

Method Blank (continued)

Analysis Name	Result	MDL**	LOQ
	ug/kg	ug/kg	ug/kg
Tetrachloroethene	N.D.	50	250
Toluene	N.D.	50	250
1,2,4-Trichlorobenzene	N.D.	50	250
1,1,1-Trichloroethane	N.D.	50	250
1,1,2-Trichloroethane	N.D.	50	250
Trichloroethene	N.D.	50	250
Trichlorofluoromethane	N.D.	100	250
Vinyl Chloride	N.D.	50	250
Xylene (Total)	N.D.	50	250
Batch number: Q171061AA	Sample number(s): 8934229		
1,1-Dichloroethane	N.D.	50	250
1,1,1-Trichloroethane	N.D.	50	250
Batch number: X171031AA	Sample number(s): 8934222,8934229,8934239		
Acetone	N.D.	7	20
Benzene	N.D.	0.5	5
Bromodichloromethane	N.D.	1	5
Bromoform	N.D.	1	5
Bromomethane	N.D.	2	5
2-Butanone	N.D.	4	10
Carbon Disulfide	N.D.	1	5
Carbon Tetrachloride	N.D.	1	5
Chlorobenzene	N.D.	1	5
Chloroethane	N.D.	2	5
Chloroform	N.D.	1	5
Chloromethane	N.D.	2	5
Cyclohexane	N.D.	1	5
1,2-Dibromo-3-chloropropane	N.D.	2	5
Dibromochloromethane	N.D.	1	5
1,2-Dibromoethane	N.D.	1	5
1,2-Dichlorobenzene	N.D.	1	5
1,3-Dichlorobenzene	N.D.	1	5
1,4-Dichlorobenzene	N.D.	1	5
Dichlorodifluoromethane	N.D.	2	5
1,1-Dichloroethane	N.D.	1	5
1,2-Dichloroethane	N.D.	1	5
1,1-Dichloroethene	N.D.	1	5
cis-1,2-Dichloroethene	N.D.	1	5
trans-1,2-Dichloroethene	N.D.	1	5
1,2-Dichloropropane	N.D.	1	5
cis-1,3-Dichloropropene	N.D.	1	5
trans-1,3-Dichloropropene	N.D.	1	5
Ethylbenzene	N.D.	1	5
Freon 113	N.D.	2	10
2-Hexanone	N.D.	3	10
Isopropylbenzene	N.D.	1	5
Methyl Acetate	N.D.	2	5
Methyl Tertiary Butyl Ether	N.D.	0.5	5
4-Methyl-2-pentanone	N.D.	3	10

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Quality Control Summary

Client Name: ARCADIS U.S., Inc.
Reported: 04/27/2017 11:07

Group Number: 1787976

Method Blank (continued)

Analysis Name	Result	MDL**	LOQ
	ug/kg	ug/kg	ug/kg
Methylcyclohexane	N.D.	1	5
Methylene Chloride	N.D.	2	5
Styrene	N.D.	1	5
1,1,2,2-Tetrachloroethane	N.D.	1	5
Tetrachloroethene	N.D.	1	5
Toluene	N.D.	1	5
1,2,4-Trichlorobenzene	N.D.	1	5
1,1,1-Trichloroethane	N.D.	1	5
1,1,2-Trichloroethane	N.D.	1	5
Trichloroethene	N.D.	1	5
Trichlorofluoromethane	N.D.	2	5
Vinyl Chloride	N.D.	1	5
Xylene (Total)	N.D.	1	5
Batch number: X171041AA	Sample number(s): 8934243		
Acetone	N.D.	7	20
Benzene	N.D.	0.5	5
Bromodichloromethane	N.D.	1	5
Bromoform	N.D.	1	5
Bromomethane	N.D.	2	5
2-Butanone	N.D.	4	10
Carbon Disulfide	N.D.	1	5
Carbon Tetrachloride	N.D.	1	5
Chlorobenzene	N.D.	1	5
Chloroethane	N.D.	2	5
Chloroform	N.D.	1	5
Chloromethane	N.D.	2	5
Cyclohexane	N.D.	1	5
1,2-Dibromo-3-chloropropane	N.D.	2	5
Dibromochloromethane	N.D.	1	5
1,2-Dibromoethane	N.D.	1	5
1,2-Dichlorobenzene	N.D.	1	5
1,3-Dichlorobenzene	N.D.	1	5
1,4-Dichlorobenzene	N.D.	1	5
Dichlorodifluoromethane	N.D.	2	5
1,1-Dichloroethane	N.D.	1	5
1,2-Dichloroethane	N.D.	1	5
1,1-Dichloroethene	N.D.	1	5
cis-1,2-Dichloroethene	N.D.	1	5
trans-1,2-Dichloroethene	N.D.	1	5
1,2-Dichloropropane	N.D.	1	5
cis-1,3-Dichloropropene	N.D.	1	5
trans-1,3-Dichloropropene	N.D.	1	5
Ethylbenzene	N.D.	1	5
Freon 113	N.D.	2	10
2-Hexanone	N.D.	3	10
Isopropylbenzene	N.D.	1	5
Methyl Acetate	N.D.	2	5
Methyl Tertiary Butyl Ether	N.D.	0.5	5

*- Outside of specification
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Quality Control Summary

Client Name: ARCADIS U.S., Inc. Group Number: 1787976
Reported: 04/27/2017 11:07

Method Blank (continued)

Analysis Name	Result	MDL**	LOQ
	ug/kg	ug/kg	ug/kg
4-Methyl-2-pentanone	N.D.	3	10
Methylcyclohexane	N.D.	1	5
Methylene Chloride	N.D.	2	5
Styrene	N.D.	1	5
1,1,2,2-Tetrachloroethane	N.D.	1	5
Tetrachloroethene	N.D.	1	5
Toluene	N.D.	1	5
1,2,4-Trichlorobenzene	N.D.	1	5
1,1,1-Trichloroethane	N.D.	1	5
1,1,2-Trichloroethane	N.D.	1	5
Trichloroethene	N.D.	1	5
Trichlorofluoromethane	N.D.	2	5
Vinyl Chloride	N.D.	1	5
Xylene (Total)	N.D.	1	5
	ug/l	ug/l	ug/l
Batch number: W171081AA	Sample number(s): 8934224,8934231,8934236,8934241,8934245,8934249		
Acetone	N.D.	6	20
Benzene	N.D.	0.5	1
Bromodichloromethane	N.D.	0.5	1
Bromoform	N.D.	0.5	4
Bromomethane	N.D.	0.5	1
2-Butanone	N.D.	3	10
Carbon Disulfide	N.D.	1	5
Carbon Tetrachloride	N.D.	0.5	1
Chlorobenzene	N.D.	0.5	1
Chloroethane	N.D.	0.5	1
Chloroform	N.D.	0.5	1
Chloromethane	N.D.	0.5	1
Cyclohexane	N.D.	2	5
1,2-Dibromo-3-chloropropane	N.D.	2	5
Dibromochloromethane	N.D.	0.5	1
1,2-Dibromoethane	N.D.	0.5	1
1,2-Dichlorobenzene	N.D.	1	5
1,3-Dichlorobenzene	N.D.	1	5
1,4-Dichlorobenzene	N.D.	1	5
Dichlorodifluoromethane	N.D.	0.5	1
1,1-Dichloroethane	N.D.	0.5	1
1,2-Dichloroethane	N.D.	0.5	1
1,1-Dichloroethene	N.D.	0.5	1
cis-1,2-Dichloroethene	N.D.	0.5	1
trans-1,2-Dichloroethene	N.D.	0.5	1
1,2-Dichloropropane	N.D.	0.5	1
cis-1,3-Dichloropropene	N.D.	0.5	1
trans-1,3-Dichloropropene	N.D.	0.5	1
Ethylbenzene	N.D.	0.5	1
Freon 113	N.D.	2	10
2-Hexanone	N.D.	3	10
Isopropylbenzene	N.D.	1	5

*- Outside of specification
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Quality Control Summary

Client Name: ARCADIS U.S., Inc.
Reported: 04/27/2017 11:07

Group Number: 1787976

Method Blank (continued)

Analysis Name	Result	MDL**	LOQ
	ug/l	ug/l	ug/l
Methyl Acetate	N.D.	1	5
Methyl Tertiary Butyl Ether	N.D.	0.5	1
4-Methyl-2-pentanone	N.D.	3	10
Methylcyclohexane	N.D.	1	5
Methylene Chloride	N.D.	2	4
Styrene	N.D.	1	5
1,1,2,2-Tetrachloroethane	N.D.	0.5	1
Tetrachloroethene	N.D.	0.5	1
Toluene	N.D.	0.5	1
1,2,4-Trichlorobenzene	N.D.	1	5
1,1,1-Trichloroethane	N.D.	0.5	1
1,1,2-Trichloroethane	N.D.	0.5	1
Trichloroethene	N.D.	0.5	1
Trichlorofluoromethane	N.D.	0.5	1
Vinyl Chloride	N.D.	0.5	1
Xylene (Total)	N.D.	0.5	1
	ug/kg	ug/kg	ug/kg
Batch number: 17103SLE026	Sample number(s): 8934252-8934254		
1,4-Dioxane	N.D.	200	500
Batch number: 17103SLI026	Sample number(s): 8934222,8934225-8934226,8934228-8934229,8934232-8934234,8934237-8934239,8934242-8934243,8934246-8934247,8934250-8934251		
1,4-Dioxane	N.D.	0.67	1.7
	ug/l	ug/l	ug/l
Batch number: 17103WAJ026	Sample number(s): 8934223,8934227,8934230,8934235,8934240,8934244,8934248		
1,4-dioxane	N.D.	0.050	0.20

LCS/LCSD

Analysis Name	LCS Spike Added	LCS Conc	LCSD Spike Added	LCSD Conc	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
	ug/kg	ug/kg	ug/kg	ug/kg					
Batch number: Q171031AA	Sample number(s): 8934234								
Acetone	7500	7984.64	7500	7938.2	106	106	32-144	1	30
Benzene	1000	1001.61	1000	946.59	100	95	80-120	6	30
Bromodichloromethane	1000	1005.3	1000	956.05	101	96	75-120	5	30
Bromoform	1000	902.55	1000	900	90	90	61-122	0	30
Bromomethane	1000	603.41	1000	619.53	60	62	39-155	3	30
2-Butanone	7500	6964.71	7500	7187.54	93	96	41-134	3	30
Carbon Disulfide	1000	943.37	1000	828.12	94	83	60-128	13	30
Carbon Tetrachloride	1000	953.19	1000	891.97	95	89	69-130	7	30
Chlorobenzene	1000	979.89	1000	928.52	98	93	80-120	5	30
Chloroethane	1000	636.54	1000	648.68	64	65	50-137	2	30

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Quality Control Summary

Client Name: ARCADIS U.S., Inc.
Reported: 04/27/2017 11:07

Group Number: 1787976

LCS/LCSD (continued)

Analysis Name	LCS Spike Added ug/kg	LCS Conc ug/kg	LCSD Spike Added ug/kg	LCSD Conc ug/kg	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Chloroform	1000	1015.63	1000	949.49	102	95	80-120	7	30
Chloromethane	1000	643.56	1000	560.55	64	56	56-120	14	30
Cyclohexane	1000	930.07	1000	882.5	93	88	58-126	5	30
1,2-Dibromo-3-chloropropane	1000	918.84	1000	924.68	92	92	54-120	1	30
Dibromochloromethane	1000	970.74	1000	938.97	97	94	71-120	3	30
1,2-Dibromoethane	1000	1017.7	1000	975.51	102	98	80-120	4	30
1,2-Dichlorobenzene	1000	974.66	1000	933.35	97	93	80-120	4	30
1,3-Dichlorobenzene	1000	975.76	1000	939.84	98	94	80-120	4	30
1,4-Dichlorobenzene	1000	990.72	1000	954.59	99	95	80-120	4	30
Dichlorodifluoromethane	1000	294.22	1000	268.21	29*	27*	30-127	9	30
1,1-Dichloroethane	1000	1034.14	1000	956.34	103	96	77-120	8	30
1,2-Dichloroethane	1000	1021	1000	1003.74	102	100	78-127	2	30
1,1-Dichloroethene	1000	958.17	1000	852.58	96	85	73-129	12	30
cis-1,2-Dichloroethene	1000	988.73	1000	951.93	99	95	80-120	4	30
trans-1,2-Dichloroethene	1000	1006.57	1000	920.41	101	92	80-125	9	30
1,2-Dichloropropane	1000	1052.94	1000	1011.27	105	101	76-120	4	30
cis-1,3-Dichloropropene	1000	1033.91	1000	976.15	103	98	74-120	6	30
trans-1,3-Dichloropropene	1000	1030.91	1000	993.75	103	99	70-120	4	30
Ethylbenzene	1000	1001.07	1000	922.63	100	92	80-120	8	30
Freon 113	1000	929.43	1000	837.55	93	84	59-139	10	30
2-Hexanone	5000	5416.86	5000	5362.55	108	107	45-138	1	30
Isopropylbenzene	1000	955.86	1000	880.26	96	88	76-120	8	30
Methyl Acetate	1000	1073.37	1000	1038	107	104	54-155	3	30
Methyl Tertiary Butyl Ether	1000	979.82	1000	960.57	98	96	72-120	2	30
4-Methyl-2-pentanone	5000	5438.55	5000	5378.97	109	108	53-134	1	30
Methylcyclohexane	1000	894.91	1000	814.68	89	81	56-134	9	30
Methylene Chloride	1000	987.36	1000	946.89	99	95	76-122	4	30
Styrene	1000	987.22	1000	935.98	99	94	76-120	5	30
1,1,2,2-Tetrachloroethane	1000	1048.49	1000	1064.72	105	106	67-121	2	30
Tetrachloroethene	1000	914.08	1000	844.98	91	84	74-126	8	30
Toluene	1000	1024.86	1000	942.77	102	94	80-120	8	30
1,2,4-Trichlorobenzene	1000	993.47	1000	844.31	99	84	63-121	16	30
1,1,1-Trichloroethane	1000	1045.54	1000	968.19	105	97	66-128	8	30
1,1,2-Trichloroethane	1000	991.5	1000	979.42	99	98	80-120	1	30
Trichloroethene	1000	997.83	1000	936.48	100	94	80-120	6	30
Trichlorofluoromethane	1000	764.83	1000	703.39	76	70	63-132	8	30
Vinyl Chloride	1000	648.63	1000	582.66	65	58*	59-120	11	30
Xylene (Total)	3000	2940.1	3000	2715.55	98	91	80-120	8	30
Batch number: Q171041AA	Sample number(s): 8934226,8934247								
Acetone	7500	8123.25	7500	8370.78	108	112	32-144	3	30
Benzene	1000	1042.09	1000	1037.81	104	104	80-120	0	30
Bromodichloromethane	1000	991.19	1000	998.8	99	100	75-120	1	30
Bromoform	1000	870.99	1000	874.71	87	87	61-122	0	30
Bromomethane	1000	673.98	1000	663.67	67	66	39-155	2	30
2-Butanone	7500	6235.25	7500	6544.86	83	87	41-134	5	30
Carbon Disulfide	1000	1041.63	1000	1046.42	104	105	60-128	0	30
Carbon Tetrachloride	1000	927.09	1000	939.05	93	94	69-130	1	30

*- Outside of specification
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(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

Quality Control Summary

Client Name: ARCADIS U.S., Inc.
Reported: 04/27/2017 11:07

Group Number: 1787976

LCS/LCSD (continued)

Analysis Name	LCS Spike Added ug/kg	LCS Conc ug/kg	LCSD Spike Added ug/kg	LCSD Conc ug/kg	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Chlorobenzene	1000	977.81	1000	964	98	96	80-120	1	30
Chloroethane	1000	665.15	1000	598.69	67	60	50-137	11	30
Chloroform	1000	1017.73	1000	1026.12	102	103	80-120	1	30
Chloromethane	1000	863.58	1000	824.19	86	82	56-120	5	30
Cyclohexane	1000	862.88	1000	899.75	86	90	58-126	4	30
1,2-Dibromo-3-chloropropane	1000	886.34	1000	888.96	89	89	54-120	0	30
Dibromochloromethane	1000	942.63	1000	935.21	94	94	71-120	1	30
1,2-Dibromoethane	1000	1029.07	1000	1012.02	103	101	80-120	2	30
1,2-Dichlorobenzene	1000	927.51	1000	949.74	93	95	80-120	2	30
1,3-Dichlorobenzene	1000	955	1000	979.42	95	98	80-120	3	30
1,4-Dichlorobenzene	1000	948.38	1000	976.47	95	98	80-120	3	30
Dichlorodifluoromethane	1000	516.51	1000	531.96	52	53	30-127	3	30
1,1-Dichloroethane	1000	1053.05	1000	1068.36	105	107	77-120	1	30
1,2-Dichloroethane	1000	1040.68	1000	1044.21	104	104	78-127	0	30
1,1-Dichloroethene	1000	980.14	1000	987.03	98	99	73-129	1	30
cis-1,2-Dichloroethene	1000	986.93	1000	1022.99	99	102	80-120	4	30
trans-1,2-Dichloroethene	1000	1022.91	1000	1024.01	102	102	80-125	0	30
1,2-Dichloropropane	1000	1072.37	1000	1085.08	107	109	76-120	1	30
cis-1,3-Dichloropropene	1000	1034.21	1000	1027.84	103	103	74-120	1	30
trans-1,3-Dichloropropene	1000	1016.08	1000	1031.98	102	103	70-120	2	30
Ethylbenzene	1000	973.83	1000	967.43	97	97	80-120	1	30
Freon 113	1000	831.5	1000	883.01	83	88	59-139	6	30
2-Hexanone	5000	5459.22	5000	5546.28	109	111	45-138	2	30
Isopropylbenzene	1000	903.81	1000	906.28	90	91	76-120	0	30
Methyl Acetate	1000	1133.32	1000	1123.13	113	112	54-155	1	30
Methyl Tertiary Butyl Ether	1000	1007.21	1000	1019.25	101	102	72-120	1	30
4-Methyl-2-pentanone	5000	5496.42	5000	5638.17	110	113	53-134	3	30
Methylcyclohexane	1000	723.35	1000	790.42	72	79	56-134	9	30
Methylene Chloride	1000	1015.5	1000	1032.5	102	103	76-122	2	30
Styrene	1000	963.14	1000	961.13	96	96	76-120	0	30
1,1,2,2-Tetrachloroethane	1000	1021.37	1000	1027.07	102	103	67-121	1	30
Tetrachloroethene	1000	866.83	1000	869.53	87	87	74-126	0	30
Toluene	1000	1010.83	1000	999.93	101	100	80-120	1	30
1,2,4-Trichlorobenzene	1000	787.39	1000	890.3	79	89	63-121	12	30
1,1,1-Trichloroethane	1000	1050.12	1000	1060.46	105	106	66-128	1	30
1,1,2-Trichloroethane	1000	983.53	1000	979.24	98	98	80-120	0	30
Trichloroethene	1000	1001.89	1000	1027.27	100	103	80-120	3	30
Trichlorofluoromethane	1000	696.31	1000	612.51	70	61*	63-132	13	30
Vinyl Chloride	1000	787.99	1000	815.59	79	82	59-120	3	30
Xylene (Total)	3000	2842.9	3000	2844.43	95	95	80-120	0	30
Batch number: Q171061AA	Sample number(s): 8934229								
1,1-Dichloroethane	1000	1088.06	1000	940.54	109	94	77-120	15	30
1,1,1-Trichloroethane	1000	1116.14	1000	1135.25	112	114	66-128	2	30
Batch number: X171031AA	Sample number(s): 8934222,8934229,8934239								
Acetone	150	133.56	150	137.44	89	92	32-144	3	30
Benzene	20	20.54	20	20.63	103	103	80-120	0	30

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(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

Quality Control Summary

Client Name: ARCADIS U.S., Inc.
Reported: 04/27/2017 11:07

Group Number: 1787976

LCS/LCSD (continued)

Analysis Name	LCS Spike Added ug/kg	LCS Conc ug/kg	LCSD Spike Added ug/kg	LCSD Conc ug/kg	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Bromodichloromethane	20	19.43	20	19.29	97	96	75-120	1	30
Bromoform	20	16.41	20	16.63	82	83	61-122	1	30
Bromomethane	20	19.27	20	18.56	96	93	39-155	4	30
2-Butanone	150	122.42	150	128.27	82	86	41-134	5	30
Carbon Disulfide	20	21.51	20	21.36	108	107	60-128	1	30
Carbon Tetrachloride	20	19.09	20	18.97	95	95	69-130	1	30
Chlorobenzene	20	19.05	20	19.06	95	95	80-120	0	30
Chloroethane	20	19.3	20	19.27	96	96	50-137	0	30
Chloroform	20	20.01	20	20.08	100	100	80-120	0	30
Chloromethane	20	19.06	20	18.92	95	95	56-120	1	30
Cyclohexane	20	18.38	20	18.66	92	93	58-126	1	30
1,2-Dibromo-3-chloropropane	20	15.72	20	16.19	79	81	54-120	3	30
Dibromochloromethane	20	17.57	20	17.63	88	88	71-120	0	30
1,2-Dibromoethane	20	18.67	20	18.94	93	95	80-120	1	30
1,2-Dichlorobenzene	20	18.25	20	18.65	91	93	80-120	2	30
1,3-Dichlorobenzene	20	18.15	20	18.33	91	92	80-120	1	30
1,4-Dichlorobenzene	20	18.11	20	18.21	91	91	80-120	1	30
Dichlorodifluoromethane	20	16.98	20	16.99	85	85	30-127	0	30
1,1-Dichloroethane	20	20.07	20	20.19	100	101	77-120	1	30
1,2-Dichloroethane	20	18.69	20	19.11	93	96	78-127	2	30
1,1-Dichloroethene	20	20.85	20	20.9	104	104	73-129	0	30
cis-1,2-Dichloroethene	20	21	20	21.2	105	106	80-120	1	30
trans-1,2-Dichloroethene	20	21.38	20	21.07	107	105	80-125	1	30
1,2-Dichloropropane	20	20.18	20	20.36	101	102	76-120	1	30
cis-1,3-Dichloropropene	20	18.63	20	18.76	93	94	74-120	1	30
trans-1,3-Dichloropropene	20	17.96	20	18.04	90	90	70-120	0	30
Ethylbenzene	20	18.85	20	18.93	94	95	80-120	0	30
Freon 113	20	21.07	20	20.93	105	105	59-139	1	30
2-Hexanone	100	81.01	100	83.9	81	84	45-138	3	30
Isopropylbenzene	20	19.14	20	19.01	96	95	76-120	1	30
Methyl Acetate	20	17.31	20	17.64	87	88	54-155	2	30
Methyl Tertiary Butyl Ether	20	17.87	20	18.31	89	92	72-120	2	30
4-Methyl-2-pentanone	100	88.38	100	91.98	88	92	53-134	4	30
Methylcyclohexane	20	20.26	20	20.43	101	102	56-134	1	30
Methylene Chloride	20	21.82	20	21.62	109	108	76-122	1	30
Styrene	20	19.38	20	19.06	97	95	76-120	2	30
1,1,2,2-Tetrachloroethane	20	17.5	20	18.3	87	91	67-121	4	30
Tetrachloroethene	20	17.67	20	17.6	88	88	74-126	0	30
Toluene	20	19.16	20	19.26	96	96	80-120	1	30
1,2,4-Trichlorobenzene	20	17.4	20	17.12	87	86	63-121	2	30
1,1,1-Trichloroethane	20	18.6	20	18.62	93	93	66-128	0	30
1,1,2-Trichloroethane	20	18.64	20	18.45	93	92	80-120	1	30
Trichloroethene	20	20.21	20	20.27	101	101	80-120	0	30
Trichlorofluoromethane	20	17.88	20	17.61	89	88	63-132	2	30
Vinyl Chloride	20	19.63	20	19.75	98	99	59-120	1	30
Xylene (Total)	60	57.4	60	57.03	96	95	80-120	1	30

Batch number: X171041AA Sample number(s): 8934243

*- Outside of specification
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P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

Quality Control Summary

Client Name: ARCADIS U.S., Inc.
Reported: 04/27/2017 11:07

Group Number: 1787976

LCS/LCSD (continued)

Analysis Name	LCS Spike Added ug/kg	LCS Conc ug/kg	LCSD Spike Added ug/kg	LCSD Conc ug/kg	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Acetone	150	159.5	150	130.12	106	87	32-144	20	30
Benzene	20	19.97	20	17.97	100	90	80-120	11	30
Bromodichloromethane	20	19.28	20	16.98	96	85	75-120	13	30
Bromoform	20	17.2	20	14.26	86	71	61-122	19	30
Bromomethane	20	18.33	20	16.72	92	84	39-155	9	30
2-Butanone	150	157.41	150	122.67	105	82	41-134	25	30
Carbon Disulfide	20	20.11	20	18.48	101	92	60-128	8	30
Carbon Tetrachloride	20	17.74	20	16.04	89	80	69-130	10	30
Chlorobenzene	20	18.21	20	16.51	91	83	80-120	10	30
Chloroethane	20	17.91	20	16.89	90	84	50-137	6	30
Chloroform	20	19.37	20	17.44	97	87	80-120	10	30
Chloromethane	20	18.83	20	17.08	94	85	56-120	10	30
Cyclohexane	20	17.39	20	15.93	87	80	58-126	9	30
1,2-Dibromo-3-chloropropane	20	18.71	20	14.28	94	71	54-120	27	30
Dibromochloromethane	20	17.75	20	15.45	89	77	71-120	14	30
1,2-Dibromoethane	20	19.5	20	16.7	98	83	80-120	15	30
1,2-Dichlorobenzene	20	18.04	20	16.03	90	80	80-120	12	30
1,3-Dichlorobenzene	20	17.83	20	15.82	89	79*	80-120	12	30
1,4-Dichlorobenzene	20	18.03	20	16.08	90	80	80-120	11	30
Dichlorodifluoromethane	20	15.79	20	14.5	79	72	30-127	9	30
1,1-Dichloroethane	20	19.53	20	17.35	98	87	77-120	12	30
1,2-Dichloroethane	20	19.05	20	16.64	95	83	78-127	13	30
1,1-Dichloroethene	20	20.05	20	18.16	100	91	73-129	10	30
cis-1,2-Dichloroethene	20	20.57	20	18.29	103	91	80-120	12	30
trans-1,2-Dichloroethene	20	20.21	20	18.19	101	91	80-125	11	30
1,2-Dichloropropane	20	20.41	20	18.21	102	91	76-120	11	30
cis-1,3-Dichloropropene	20	18.99	20	16.25	95	81	74-120	16	30
trans-1,3-Dichloropropene	20	18.16	20	15.9	91	79	70-120	13	30
Ethylbenzene	20	18.07	20	16.34	90	82	80-120	10	30
Freon 113	20	19.47	20	17.75	97	89	59-139	9	30
2-Hexanone	100	101	100	77.1	101	77	45-138	27	30
Isopropylbenzene	20	18.25	20	16.5	91	83	76-120	10	30
Methyl Acetate	20	21.38	20	17.31	107	87	54-155	21	30
Methyl Tertiary Butyl Ether	20	19.14	20	16.08	96	80	72-120	17	30
4-Methyl-2-pentanone	100	109.94	100	84.78	110	85	53-134	26	30
Methylcyclohexane	20	19.65	20	17.94	98	90	56-134	9	30
Methylene Chloride	20	20.82	20	18.62	104	93	76-122	11	30
Styrene	20	18.88	20	16.84	94	84	76-120	11	30
1,1,2,2-Tetrachloroethane	20	19.74	20	16.43	99	82	67-121	18	30
Tetrachloroethene	20	16.66	20	15.12	83	76	74-126	10	30
Toluene	20	18.5	20	16.64	93	83	80-120	11	30
1,2,4-Trichlorobenzene	20	17.12	20	14.47	86	72	63-121	17	30
1,1,1-Trichloroethane	20	17.56	20	15.82	88	79	66-128	10	30
1,1,2-Trichloroethane	20	19.14	20	16.53	96	83	80-120	15	30
Trichloroethene	20	19.64	20	17.82	98	89	80-120	10	30
Trichlorofluoromethane	20	16.21	20	14.84	81	74	63-132	9	30
Vinyl Chloride	20	19.21	20	17.42	96	87	59-120	10	30
Xylene (Total)	60	55	60	49.43	92	82	80-120	11	30

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P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

Quality Control Summary

Client Name: ARCADIS U.S., Inc.
Reported: 04/27/2017 11:07

Group Number: 1787976

LCS/LCSD (continued)

Analysis Name	LCS Spike Added ug/kg	LCS Conc ug/kg	LCSD Spike Added ug/kg	LCSD Conc ug/kg	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
	ug/l	ug/l	ug/l	ug/l					
Batch number: W171081AA	Sample number(s): 8934224,8934231,8934236,8934241,8934245,8934249								
Acetone	150	156.8	150	178.9	105	119	50-168	13	30
Benzene	20	19.82	20	19.82	99	99	78-120	0	30
Bromodichloromethane	20	19.13	20	19.01	96	95	80-120	1	30
Bromoform	20	17.65	20	17.32	88	87	64-120	2	30
Bromomethane	20	14.55	20	14.46	73	72	49-121	1	30
2-Butanone	150	153.93	150	160.74	103	107	53-140	4	30
Carbon Disulfide	20	18.33	20	18.43	92	92	63-122	1	30
Carbon Tetrachloride	20	19.15	20	18.95	96	95	76-123	1	30
Chlorobenzene	20	19.85	20	19.48	99	97	80-120	2	30
Chloroethane	20	13.86	20	13.71	69	69	51-121	1	30
Chloroform	20	19.77	20	19.75	99	99	80-120	0	30
Chloromethane	20	18.5	20	18.3	92	92	57-120	1	30
Cyclohexane	20	16.76	20	16.2	84	81	67-121	3	30
1,2-Dibromo-3-chloropropane	20	17.02	20	16.67	85	83	59-120	2	30
Dibromochloromethane	20	17.81	20	17.79	89	89	78-120	0	30
1,2-Dibromoethane	20	19.99	20	19.76	100	99	75-120	1	30
1,2-Dichlorobenzene	20	19.02	20	18.92	95	95	80-120	1	30
1,3-Dichlorobenzene	20	18.62	20	18.46	93	92	80-120	1	30
1,4-Dichlorobenzene	20	18.83	20	18.81	94	94	80-120	0	30
Dichlorodifluoromethane	20	14.82	20	14.47	74	72	54-122	2	30
1,1-Dichloroethane	20	19.98	20	20.07	100	100	80-120	0	30
1,2-Dichloroethane	20	19.8	20	19.96	99	100	66-128	1	30
1,1-Dichloroethene	20	20.5	20	19.94	103	100	76-124	3	30
cis-1,2-Dichloroethene	20	20.45	20	20.15	102	101	80-120	1	30
trans-1,2-Dichloroethene	20	20.77	20	20.6	104	103	80-120	1	30
1,2-Dichloropropane	20	19.68	20	19.75	98	99	80-120	0	30
cis-1,3-Dichloropropene	20	18.97	20	18.92	95	95	75-120	0	30
trans-1,3-Dichloropropene	20	19.27	20	19.05	96	95	76-120	1	30
Ethylbenzene	20	19.39	20	19.25	97	96	78-120	1	30
Freon 113	20	17.7	20	17.47	89	87	68-129	1	30
2-Hexanone	100	95.67	100	96.02	96	96	49-137	0	30
Isopropylbenzene	20	18.82	20	18.83	94	94	80-120	0	30
Methyl Acetate	20	19.6	20	19.9	98	100	61-137	2	30
Methyl Tertiary Butyl Ether	20	19.31	20	19.28	97	96	75-120	0	30
4-Methyl-2-pentanone	100	98.65	100	96.64	99	97	56-131	2	30
Methylcyclohexane	20	17.4	20	16.77	87	84	66-126	4	30
Methylene Chloride	20	19.35	20	19.11	97	96	80-120	1	30
Styrene	20	18.34	20	18.35	92	92	80-120	0	30
1,1,2,2-Tetrachloroethane	20	18.24	20	18.4	91	92	72-120	1	30
Tetrachloroethene	20	19.85	20	19.49	99	97	80-129	2	30
Toluene	20	19.87	20	19.58	99	98	80-120	1	30
1,2,4-Trichlorobenzene	20	19	20	18.95	95	95	58-120	0	30
1,1,1-Trichloroethane	20	17.7	20	17.96	88	90	67-120	1	30
1,1,2-Trichloroethane	20	19.72	20	19.65	99	98	80-120	0	30
Trichloroethene	20	20.35	20	20.12	102	101	80-120	1	30

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(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

Quality Control Summary

Client Name: ARCADIS U.S., Inc. Group Number: 1787976
Reported: 04/27/2017 11:07

LCS/LCSD (continued)

Analysis Name	LCS Spike Added	LCS Conc	LCSD Spike Added	LCSD Conc	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
	ug/l	ug/l	ug/l	ug/l					
Trichlorofluoromethane	20	17.65	20	17.03	88	85	57-134	4	30
Vinyl Chloride	20	17.62	20	17.59	88	88	63-121	0	30
Xylene (Total)	60	58.16	60	57.95	97	97	80-120	0	30
	ug/kg	ug/kg	ug/kg	ug/kg					
Batch number: 17103SLE026	Sample number(s): 8934252-8934254								
1,4-Dioxane	2000	2367.2	2000	1984	118	99	70-130	18	30
Batch number: 17103SLI026	Sample number(s): 8934222,8934225-8934226,8934228-8934229,8934232-8934234,8934237-8934239,8934242-8934243,8934246-8934247,8934250-8934251								
1,4-Dioxane	33.33	19.99			60*		70-130		
	ug/l	ug/l	ug/l	ug/l					
Batch number: 17103WAJ026	Sample number(s): 8934223,8934227,8934230,8934235,8934240,8934244,8934248								
1,4-dioxane	1.00	0.501	1.00	0.454	50	45	13-66	10	30
	%	%	%	%					
Batch number: 17103820007A	Sample number(s): 8934222,8934225-8934226,8934228-8934229,8934232-8934233								
Moisture	89.5	89.38			100		99-101		
Batch number: 17103820007B	Sample number(s): 8934234,8934237-8934239,8934242-8934243,8934246-8934247,8934250-8934251								
Moisture	89.5	89.38			100		99-101		

MS/MSD

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

Analysis Name	Unspiked Conc	MS Spike Added	MS Conc	MSD Spike Added	MSD Conc	MS %Rec	MSD %Rec	MS/MSD Limits	RPD	RPD Max
	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg					
Batch number: Q171061AA	Sample number(s): 8934229 UNSPK: P934271									
1,1-Dichloroethane	N.D.	1196.17	1159.68	1018.33	1108.11	97	109	77-120	5	30
1,1,1-Trichloroethane	N.D.	1196.17	1079	1018.33	1031.49	90	101	66-128	5	30
Batch number: X171041AA	Sample number(s): 8934243 UNSPK: P936524									
Acetone	17.18	137.87	158.15	155.93	167.89	102	97	32-144	6	30
Benzene	N.D.	18.38	21.48	20.79	23.82	117	115	80-120	10	30
Bromodichloromethane	N.D.	18.38	20.16	20.79	22.66	110	109	75-120	12	30
Bromoform	N.D.	18.38	17.38	20.79	19.46	95	94	61-122	11	30
Bromomethane	N.D.	18.38	17.93	20.79	19.57	98	94	39-155	9	30
2-Butanone	N.D.	137.87	140.53	155.93	154.66	102	99	41-134	10	30
Carbon Disulfide	1.17	18.38	24.79	20.79	28.11	128	130*	60-128	13	30
Carbon Tetrachloride	N.D.	18.38	20.62	20.79	22.75	112	109	69-130	10	30

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Quality Control Summary

Client Name: ARCADIS U.S., Inc.
Reported: 04/27/2017 11:07

Group Number: 1787976

MS/MSD (continued)

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

Analysis Name	Unspiked Conc ug/kg	MS Spike Added ug/kg	MS Conc ug/kg	MSD Spike Added ug/kg	MSD Conc ug/kg	MS %Rec	MSD %Rec	MS/MSD Limits	RPD	RPD Max
Chlorobenzene	N.D.	18.38	19.47	20.79	21.58	106	104	80-120	10	30
Chloroethane	N.D.	18.38	19.9	20.79	21.54	108	104	50-137	8	30
Chloroform	N.D.	18.38	20.71	20.79	23.23	113	112	80-120	11	30
Chloromethane	N.D.	18.38	19.93	20.79	22.01	108	106	56-120	10	30
Cyclohexane	N.D.	18.38	21.29	20.79	23.89	116	115	58-126	12	30
1,2-Dibromo-3-chloropropane	N.D.	18.38	18.57	20.79	20.84	101	100	54-120	12	30
Dibromochloromethane	N.D.	18.38	18.64	20.79	20.63	101	99	71-120	10	30
1,2-Dibromoethane	N.D.	18.38	19.85	20.79	22.37	108	108	80-120	12	30
1,2-Dichlorobenzene	N.D.	18.38	18.76	20.79	21.09	102	101	80-120	12	30
1,3-Dichlorobenzene	N.D.	18.38	18.84	20.79	20.95	102	101	80-120	11	30
1,4-Dichlorobenzene	N.D.	18.38	18.78	20.79	20.84	102	100	80-120	10	30
Dichlorodifluoromethane	N.D.	18.38	19.57	20.79	21.21	106	102	30-127	8	30
1,1-Dichloroethane	N.D.	18.38	21.09	20.79	23.63	115	114	77-120	11	30
1,2-Dichloroethane	N.D.	18.38	19.39	20.79	21.7	106	104	78-127	11	30
1,1-Dichloroethene	N.D.	18.38	22.49	20.79	25.3	122	122	73-129	12	30
cis-1,2-Dichloroethene	N.D.	18.38	22.32	20.79	24.49	121*	118	80-120	9	30
trans-1,2-Dichloroethene	N.D.	18.38	22.47	20.79	25.11	122	121	80-125	11	30
1,2-Dichloropropane	N.D.	18.38	21.42	20.79	24.04	117	116	76-120	12	30
cis-1,3-Dichloropropene	N.D.	18.38	19.67	20.79	22.24	107	107	74-120	12	30
trans-1,3-Dichloropropene	N.D.	18.38	18.61	20.79	21.01	101	101	70-120	12	30
Ethylbenzene	N.D.	18.38	19.81	20.79	22.04	108	106	80-120	11	30
Freon 113	N.D.	18.38	23.37	20.79	25.78	127	124	59-139	10	30
2-Hexanone	N.D.	91.91	96.63	103.95	107.63	105	104	45-138	11	30
Isopropylbenzene	N.D.	18.38	20.04	20.79	22.28	109	107	76-120	11	30
Methyl Acetate	N.D.	18.38	18.49	20.79	20.64	101	99	54-155	11	30
Methyl Tertiary Butyl Ether	N.D.	18.38	19.41	20.79	21.98	106	106	72-120	12	30
4-Methyl-2-pentanone	N.D.	91.91	104.85	103.95	116.85	114	112	53-134	11	30
Methylcyclohexane	N.D.	18.38	23.1	20.79	26.12	126	126	56-134	12	30
Methylene Chloride	N.D.	18.38	22.17	20.79	24.15	121	116	76-122	9	30
Styrene	N.D.	18.38	19.69	20.79	21.95	107	106	76-120	11	30
1,1,2,2-Tetrachloroethane	N.D.	18.38	19.76	20.79	22.19	107	107	67-121	12	30
Tetrachloroethene	N.D.	18.38	18.54	20.79	20.54	101	99	74-126	10	30
Toluene	N.D.	18.38	20.24	20.79	22.46	110	108	80-120	10	30
1,2,4-Trichlorobenzene	N.D.	18.38	17.54	20.79	19.52	95	94	63-121	11	30
1,1,1-Trichloroethane	N.D.	18.38	20.2	20.79	22.47	110	108	66-128	11	30
1,1,2-Trichloroethane	N.D.	18.38	19.9	20.79	21.85	108	105	80-120	9	30
Trichloroethene	N.D.	18.38	21.57	20.79	24.36	117	117	80-120	12	30
Trichlorofluoromethane	N.D.	18.38	19.74	20.79	21.48	107	103	63-132	8	30
Vinyl Chloride	N.D.	18.38	21.23	20.79	23.51	116	113	59-120	10	30
Xylene (Total)	N.D.	55.15	59.69	62.37	66.72	108	107	80-120	11	30
	ug/l	ug/l	ug/l	ug/l	ug/l					
Batch number: W171081AA	Sample number(s): 8934224,8934231,8934236,8934241,8934245,8934249 UNSPK: 8934224									
Acetone	N.D.	1500	3360.68	1500	3119.54	224*	208*	50-168	7	30
Benzene	N.D.	200	200.81	200	201.6	100	101	78-120	0	30
Bromodichloromethane	N.D.	200	191.5	200	192.53	96	96	80-120	1	30

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Quality Control Summary

Client Name: ARCADIS U.S., Inc.
Reported: 04/27/2017 11:07

Group Number: 1787976

MS/MSD (continued)

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

Analysis Name	Unspiked Conc ug/l	MS Spike Added ug/l	MS Conc ug/l	MSD Spike Added ug/l	MSD Conc ug/l	MS %Rec	MSD %Rec	MS/MSD Limits	RPD	RPD Max
Bromoform	N.D.	200	175.19	200	177.53	88	89	64-120	1	30
Bromomethane	N.D.	200	157.4	200	152.96	79	76	49-121	3	30
2-Butanone	N.D.	1500	2146.21	1500	1916.34	143*	128	53-140	11	30
Carbon Disulfide	N.D.	200	191.33	200	187.88	96	94	63-122	2	30
Carbon Tetrachloride	N.D.	200	192.12	200	194.65	96	97	76-123	1	30
Chlorobenzene	N.D.	200	199.19	200	201.09	100	101	80-120	1	30
Chloroethane	N.D.	200	152.43	200	149.65	76	75	51-121	2	30
Chloroform	N.D.	200	199.29	200	201.51	100	101	80-120	1	30
Chloromethane	N.D.	200	184.82	200	183.21	92	92	57-120	1	30
Cyclohexane	N.D.	200	170.77	200	169.57	85	85	67-121	1	30
1,2-Dibromo-3-chloropropane	N.D.	200	163.11	200	167.95	82	84	59-120	3	30
Dibromochloromethane	N.D.	200	181.97	200	182.44	91	91	78-120	0	30
1,2-Dibromoethane	N.D.	200	198.05	200	203.82	99	102	75-120	3	30
1,2-Dichlorobenzene	N.D.	200	190.93	200	198.51	95	99	80-120	4	30
1,3-Dichlorobenzene	N.D.	200	187.9	200	191.43	94	96	80-120	2	30
1,4-Dichlorobenzene	N.D.	200	191.34	200	195.14	96	98	80-120	2	30
Dichlorodifluoromethane	N.D.	200	153.85	200	151.84	77	76	54-122	1	30
1,1-Dichloroethane	N.D.	200	202.46	200	205.85	101	103	80-120	2	30
1,2-Dichloroethane	N.D.	200	201.29	200	202.59	101	101	66-128	1	30
1,1-Dichloroethene	N.D.	200	208.74	200	209.29	104	105	76-124	0	30
cis-1,2-Dichloroethene	N.D.	200	206.35	200	206.78	103	103	80-120	0	30
trans-1,2-Dichloroethene	N.D.	200	213.11	200	212	107	106	80-120	1	30
1,2-Dichloropropane	N.D.	200	195.94	200	200.65	98	100	80-120	2	30
cis-1,3-Dichloropropene	N.D.	200	185.24	200	189.96	93	95	75-120	3	30
trans-1,3-Dichloropropene	N.D.	200	188.63	200	190.68	94	95	76-120	1	30
Ethylbenzene	N.D.	200	194.51	200	196.74	97	98	78-120	1	30
Freon 113	N.D.	200	187.82	200	183.85	94	92	68-129	2	30
2-Hexanone	N.D.	1000	1170.15	1000	1217.99	117	122	49-137	4	30
Isopropylbenzene	N.D.	200	189.79	200	191.94	95	96	80-120	1	30
Methyl Acetate	N.D.	200	210.99	200	223.01	105	112	61-137	6	30
Methyl Tertiary Butyl Ether	N.D.	200	192.09	200	187.23	96	94	75-120	3	30
4-Methyl-2-pentanone	N.D.	1000	984.12	1000	1012.34	98	101	56-131	3	30
Methylcyclohexane	N.D.	200	184.69	200	185.34	92	93	66-126	0	30
Methylene Chloride	N.D.	200	203.19	200	205.98	102	103	80-120	1	30
Styrene	N.D.	200	184.52	200	186.68	92	93	80-120	1	30
1,1,2,2-Tetrachloroethane	N.D.	200	156.55	200	160.4	78	80	72-120	2	30
Tetrachloroethene	N.D.	200	365.8	200	370.55	183*	185*	80-129	1	30
Toluene	N.D.	200	199.81	200	201.59	100	101	80-120	1	30
1,2,4-Trichlorobenzene	N.D.	200	189.19	200	195.31	95	98	58-120	3	30
1,1,1-Trichloroethane	N.D.	200	179.4	200	183.45	90	92	67-120	2	30
1,1,2-Trichloroethane	N.D.	200	190.94	200	199.48	95	100	80-120	4	30
Trichloroethene	N.D.	200	226.34	200	231.93	113	116	80-120	2	30
Trichlorofluoromethane	N.D.	200	180.98	200	176.73	90	88	57-134	2	30
Vinyl Chloride	N.D.	200	182.38	200	181.54	91	91	63-121	0	30
Xylene (Total)	N.D.	600	587.81	600	591.57	98	99	80-120	1	30

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Quality Control Summary

Client Name: ARCADIS U.S., Inc. Group Number: 1787976
Reported: 04/27/2017 11:07

MS/MSD (continued)

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

Analysis Name	Unspiked Conc ug/kg	MS Spike Added ug/kg	MS Conc ug/kg	MSD Spike Added ug/kg	MSD Conc ug/kg	MS %Rec	MSD %Rec	MS/MSD Limits	RPD	RPD Max
Batch number: 17103SLI026	Sample number(s): 8934222,8934225-8934226,8934228-8934229,8934232-8934234,8934237-8934239,8934242-8934243 ,8934246-8934247,8934250-8934251 UNSPK: 8934222									
1,4-Dioxane	10.89	33.3	19.65	32.99	19.83	26*	27*	70-130	1	30

Laboratory Duplicate

Background (BKG) = the sample used in conjunction with the duplicate

Analysis Name	BKG Conc %	DUP Conc %	DUP RPD	DUP RPD Max
Batch number: 17103820007A	Sample number(s): 8934222,8934225-8934226,8934228-8934229,8934232-8934233 BKG: 8934225			
Moisture	11.05	11.35	3	5
Batch number: 17103820007B	Sample number(s): 8934234,8934237-8934239,8934242-8934243,8934246-8934247,8934250-8934251 BKG: 8934243			
Moisture	17.63	16.06	9*	5

Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: VOCs- Solid by 8260B
Batch number: Q171031AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
8934234	86	87	82	87
Blank	102	102	100	105
LCS	95	94	97	100
LCSD	93	93	90	97
Limits:	50-141	54-135	52-141	50-131

Analysis Name: VOCs- Solid by 8260B
Batch number: Q171041AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
8934226	98	105	94	93
8934247	95	95	86	89

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P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

Quality Control Summary

Client Name: ARCADIS U.S., Inc.
Reported: 04/27/2017 11:07

Group Number: 1787976

Surrogate Quality Control (continued)

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: VOCs- Solid by 8260B
Batch number: Q171041AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
Blank	99	102	100	97
LCS	95	95	95	104
LCSD	97	96	94	104
Limits:	50-141	54-135	52-141	50-131

Analysis Name: VOCs- 5ml Water by 8260B
Batch number: W171081AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
8934224	101	103	97	92
8934231	100	102	97	92
8934236	100	102	96	91
8934241	100	102	96	90
8934245	100	101	96	91
8934249	101	102	96	90
Blank	100	103	97	91
LCS	100	101	100	98
LCSD	100	104	100	97
MS	100	103	99	97
MSD	100	100	99	97
Limits:	80-116	77-113	80-113	78-113

Analysis Name: VOCs- Solid by 8260B
Batch number: X171031AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
8934222	123	130	130	47*
8934229	92	104	100	81
8934239	107	110	121	80
Blank	105	103	94	93
LCS	100	99	97	99
LCSD	100	100	97	99
Limits:	50-141	54-135	52-141	50-131

Analysis Name: VOCs- Solid by 8260B
Batch number: X171041AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
8934243	101	105	101	81
Blank	105	105	94	94
LCS	100	103	97	101
LCSD	101	101	97	100
MS	100	100	97	100
MSD	99	99	98	101

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Quality Control Summary

Client Name: ARCADIS U.S., Inc. Group Number: 1787976
Reported: 04/27/2017 11:07

Surrogate Quality Control (continued)

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: VOCs- Solid by 8260B
Batch number: X171041AA

Limits:	50-141	54-135	52-141	50-131

Analysis Name: 1,4-Dioxane in Soil
Batch number: 17103SLE026

	Fluoranthene-d10	Benzo(a)pyrene-d12	1-Methylnaphthalene-d10
8934252	0*	0*	0*
8934253	0*	0*	0*
8934254	0*	0*	0*
Blank	0*	7*	0*
LCS	0*	566*	32*
LCSD	1*	568*	29*
Limits:	56-142	53-137	52-110

Analysis Name: 1,4-Dioxane in Soil
Batch number: 17103SLI026

	Fluoranthene-d10	Benzo(a)pyrene-d12	1-Methylnaphthalene-d10
8934222	168*	84	95
8934225	99	78	92
8934226	242*	87	97
8934228	107	83	95
8934229	201*	83	82
8934232	108	72	75
8934233	105	75	90
8934234	164*	74	87
8934237	95	80	86
8934238	104	78	90
8934239	314*	107	108
8934242	172*	77	73
8934243	233*	79	84
8934246	103	80	92
8934247	649*	153*	84
8934250	91	80	69
8934251	96	78	91
Blank	100	84	93
LCS	101	86	94
MS	144*	86	86
MSD	183*	73	93
Limits:	56-142	53-137	52-110

Analysis Name: 1,4-Dioxane in Water
Batch number: 17103WAJ026

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

Quality Control Summary

Client Name: ARCADIS U.S., Inc.
Reported: 04/27/2017 11:07

Group Number: 1787976

Surrogate Quality Control (continued)

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: 1,4-Dioxane in Water
Batch number: 17103WAJ026

	Fluoranthene-d10	Benzo(a)pyrene-d12	1-Methylnaphthalene-d10
8934223	117	87	74
8934227	92	77	69
8934230	86	49	67
8934235	82	80	70
8934240	80	45	70
8934244	84	68	62
8934248	81	77	71
Blank	80	71	68
LCS	86	80	79
LCSD	85	78	75
Limits:	42-136	26-137	22-129

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

Environmental Analysis Request/Chain of Custody

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Acct. # 3074 Group # 1787916 Sample # 89 54222-54

COC # 524873

Client Information

Client: Arcadis	Acct. #: 03074
Project Name/#: RACER Lansing Plant 2/B0064479.2017	PWSID #:
Project Manager: Randy Christensen	P.O. #: B0064479.2017.00102
Sampler: Alex Villhauer / Dale Arnott	Quote #: 204295
State where samples were collected: Michigan	For Compliance: Yes ☐ No ☒

Matrix: Soil ☒ Sediment ☐ Tissue ☐ Water: Potable ☐ Ground ☐ Surface ☐ NPDES ☐ Other: ____

For Lab Use Only

FSC:

SCR#: 204295

Preservation Codes

H=HCl T=Thiosulfate
N=HNO_3 B=NaOH
S=H_2SO_4 O=Other

Remarks

p. 1 of 3

Sample Identification	Collected Date	Collected Time	Grab	Composite	Total # of Containers	1,4-dioxane 8270C SIM	1,4-dioxane 8270C SIM/SPLP	TCL VOCs 8260B	TCL VOCs 8260B SPLP	Remarks
SB-A5.2-OB118_10.5-11	4/6/2017	11:38	X		5	X	X	X		
SB-A5.2-OB118_11-11.5		11:40			1				X	
SB-A5.2-OB118_14-14.5		11:45			1	X				
SB-A5.2-OB118_21-21.5		11:50			2	X	X	X		low volume MeOH only for 8260
SB-A5.2-OB118_24.5-25		12:00			1	X				
SB-A5.2-OC107_13-13.5		12:45			5	X	X	X		
SB-A5.2-OC107_13.5-14		12:45			1				X	
SB-A5.2-OC107_14.5-15		12:55			1	X				
SB-A5.2-OC107_19.5-20		13:00			1	X				
SB-A5.2-NY92_1.5-2		13:35			5	X	X	X		

Turnaround Time (TAT) Requested (please circle)

Standard Rush

(Rush TAT is subject to laboratory approval and surcharge.)

Date results are needed: ____

E-mail address: Alex.Villhauer@arcadis.com, Patrick.Curry@arcadis.com

Data Package Options (circle if required)

Type I (EPA Level 3 Equivalent/non-CLP) Type VI (Raw Data Only)

Type III (Reduced non-CLP) NJ DKQP TX TRRP-13

NYSDEC Category A or B MA MCP CT RCP

Relinquished by	Date	Time	Received by	Date	Time
[signature]	4/4/17	14:25	[signature]	4/5/17	13:00
[signature]	4/7/17	1300	[signature]	4/7/17	1300
[signature]	4/7/17	1745			
			[signature]	4/8/17	1005

EDD Required? Yes No

If yes, format: EQQ15

Site-Specific QC (MS/MSD/Dup)? Yes No

(If yes, indicate QC sample and submit triplicate sample volume.)

Relinquished by Commercial Carrier: UPS ____ FedEx ____ Other ____

Temperature upon receipt 1.7-4.7 °C

Environmental Analysis Request/Chain of Custody

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Acct. # 30714 Group # 1787976 Sample # 8934222-54

COC # 524874

Client Information

Client: Arcadis | Acct. #: 03074

Project Name/#: RACER Lansing Plant 2/B00644479.2017 | PWSID #:

Project Manager: Randy Christensen | P.O. #: B00644479.2017.00102

Sampler: Alex Villhauer / Dale Arnett | Quote #: 204295

State where samples were collected: Michigan | For Compliance: Yes ☐ No ☒

Matrix

Tissue ☐ | Ground ☐ | Surface ☐ | Sediment ☐ | Potable ☐ | NPDES ☐ | Soil ☒ | Water | Other:

Sample Identification	Collected Date	Collected Time	Grab	Composite	Total # of Containers	1,4-dioxane by 8270C SIM	1,4-dioxane 8270C SIM SPLP	TCL VOCs 8260B	TCL VOCs 8260B SPLP
SB-A5.2-NY92_2-2.5	4/6/17	13:38	X		1				X
SB-A5.2-NY92_4.5-5		13:50			1	X			
SB-A5.2-NY92_14.5-15		14:00			1	X			
SB-A5.2-NM126_5-5.5		14:35			5	X	X	X	
SB-A5.2-NM126_5.5-6		14:35			1	X			X
SB-A5.2-NM126_6.5-7		14:40			1	X			
SB-A5.2-NM126_15-15.5		14:50			5	X	X	X	
SB-A5.2-NM126_15.5-16		14:50			1				X
SB-A5.2-NM126_19.5-20		15:00			1	X			
SB-A5.2-NM129_5-5.3		15:38			3	X	X	X	

Analysis Requested

Preservation Codes

For Lab Use Only
FSC:
SCR#:

Preservation Codes
H=HCl T=Thiosulfate
N=HNO_3 B=NaOH
S=H_2SO_4 O=Other

Remarks

P. 2 of 3

low soil Volume / no 5B VOAs

Turnaround Time (TAT) Requested (please circle)
Standard Rush
(Rush TAT is subject to laboratory approval and surcharge.)

Date results are needed:
E-mail address: Alex.Villhauer@arcadis.com, Patrick.Curry@arcadis.com

Data Package Options (circle if required)
Type I (EPA Level 3 Equivalent/non-CLP) Type VI (Raw Data Only)
Type III (Reduced non-CLP) NJ DKQP TX TRRP-13
NYSDEC Category A or B MA MCP CT RCP

Relinquished by	Date	Time	Received by	Date	Time
				4/5/17	13:00
	4/7/17	1300		4/7/17	1745
	4/7/17	1745			
				4/8/17	1005

EDD Required? Yes No
If yes, format: EQUIS

Site-Specific QC (MS/MSD/Dup)? Yes No
(If yes, indicate QC sample and submit triplicate sample volume.)

Relinquished by Commercial Carrier:
UPS FedEx Other

Temperature upon receipt 1.7-4.7 °C

Environmental Analysis Request/Chain of Custody

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Acct. # 3074 Group # 1787976 Sample # 893422-54

COC # 524875

Client Information

Client: Arcadis	Acct. #: 03074
Project Name/#: RACER Lansing Plat 2/B0064479.2017	PWSID #:
Project Manager: Randy Christensen	P.O. #: B0064479.2017.00102
Sampler: Alex Villhauer / Dale Arnett	Quote #: 204295
State where samples were collected: Michigan	For Compliance: Yes ☐ No ☒

Matrix: Soil ☒ Sediment ☐ Tissue ☐ Water: Potable ☐ Ground ☐ Surface ☐ NPDES ☐ Other: LNAPL

Sample Identification	Collected Date	Collected Time	Grab	Composite	Total # of Containers	1,4-dioxane 8270C SIM	1,4-dioxane 8270C SIM SPLP	TCL VOCs 8260B	TCL VOCs 8260B SPLP	Remarks
SB-A5.2-NU129_5.3-5.5	4/6/17	15:38	X		1				X	
SB-A5.2-NU129-6.5-7	4/6/17	15:45	X		1	X				4 oz jar
SB-A5.2-NU129_19.5-20	4/6/17	15:55	X		1	X				4 oz jar
LMW-14-150_040617	4/6/17	1500	X		3	X				LNAPL
LMW-12-08_040717	4/7/17	1400	X		3	X				LNAPL } dilute + shoot
~~LMW-12-05~~ PMW-01_040717	4/7/17	1450	X		3	X				LNAPL

p3 of 3

Turnaround Time (TAT) Requested (please circle)

Standard Rush

(Rush TAT is subject to laboratory approval and surcharge.)

Date results are needed: _____

E-mail address: Alex.Villhauer@arcadis.com, patrick.curry@arcadis.com

Data Package Options (circle if required)

Type I (EPA Level 3 Equivalent/non-CLP) | Type VI (Raw Data Only)

Type III (Reduced non-CLP) | NJ DKQP | TX TRRP-13

NYSDEC Category A or B | MA MCP | CT RCP

Relinquished by	Date	Time	Received by	Date	Time
				4/5/17	13:00
	4/7/17	1300		4/7/17	1300
	4/7/17	1750			
				4/8/17	1005

EDD Required? Yes No

If yes, format: EQuIS

Site-Specific QC (MS/MSD/Dup)? Yes No

(If yes, indicate QC sample and submit triplicate sample volume.)

Relinquished by Commercial Carrier: UPS _____ FedEx _____ Other _____

Temperature upon receipt 1.7-4.7 °C

For Lab Use Only

FSC: _____

SCR#: _____

Preservation Codes

H=HCl T=Thiosulfate

N=HNO_3 B=NaOH

S=H_2SO_4 O=Other

Remarks

eurofins | Lancaster Laboratories Environmental

Sample Administration Receipt Documentation Log

Doc Log ID: 180378

Group Number(s): 1787976

Client: Arcadis

Delivery and Receipt Information

Delivery Method:	Fed Ex	Arrival Timestamp:	04/08/2017 10:05
Number of Packages:	2	Number of Projects:	1
State/Province of Origin:	MI		

Arrival Condition Summary

Shipping Container Sealed:	Yes	Sample IDs on COC match Containers:	Yes
Custody Seal Present:	Yes	Sample Date/Times match COC:	Yes
Custody Seal Intact:	Yes	VOA Vial Headspace ≥ 6mm:	N/A
Samples Chilled:	Yes	Total Trip Blank Qty:	0
Paperwork Enclosed:	Yes	Air Quality Samples Present:	No
Samples Intact:	Yes		
Missing Samples:	No		
Extra Samples:	Yes		
Discrepancy in Container Qty on COC:	No		

Unpacked by Karen Diem (3060) at 12:52 on 04/08/2017

Samples Chilled Details

Thermometer Types: DT = Digital (Temp. Bottle) IR = Infrared (Surface Temp) All Temperatures in °C.

Cooler #	Thermometer ID	Corrected Temp	Therm. Type	Ice Type	Ice Present?	Ice Container	Elevated Temp?
1	DT121	1.7	DT	Wet	Y	Bagged	N
2	DT121	4.7	DT	Wet	Y	Bagged	N

Extra Sample Details

Sample ID on Label	Number of Extra Containers	Date on Label	Comments
SB-A5.2 NM 126-5-5.3	1	4/06/2017 13:35	
SB-A5.2 DC107-19.5-20	1	4/06/2017 12:55	
SB-A5.2 NM126-6.5-7.0	1	4/06/2017 13:47	
SB-A5.2 NU129-5.3-5.5	1	4/06/2017 13:47	

2425 New Holland Pike
Lancaster, PA 17605-2425
T | 717-656-2300
F | 717-656-2681
www.LancasterLabs.com

Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

BMQL	Below Minimum Quantitation Level	**mg**	milligram(s)
C	degrees Celsius	**mL**	milliliter(s)
cfu	colony forming units	**MPN**	Most Probable Number
CP Units	cobalt-chloroplatinate units	**N.D.**	none detected
F	degrees Fahrenheit	**ng**	nanogram(s)
g	gram(s)	**NTU**	nephelometric turbidity units
IU	International Units	**pg/L**	picogram/liter
kg	kilogram(s)	**RL**	Reporting Limit
L	liter(s)	**TNTC**	Too Numerous To Count
lb.	pound(s)	**µg**	microgram(s)
m3	cubic meter(s)	**µL**	microliter(s)
meq	milliequivalents	**umhos/cm**	micromhos/cm

< less than

> greater than

ppm parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg) or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas.

ppb parts per billion

Dry weight basis Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.

Laboratory Data Qualifiers:

C - Result confirmed by reanalysis
E - Concentration exceeds the calibration range
J (or G, I, X) - estimated value ≥ the Method Detection Limit (MDL or DL) and < the Limit of Quantitation (LOQ or RL)
P - Concentration difference between the primary and confirmation column >40%. The lower result is reported.
U - Analyte was not detected at the value indicated
V - Concentration difference between the primary and confirmation column >100%. The reporting limit is raised due to this disparity and evident interference…
W - The dissolved oxygen uptake for the unseeded blank is greater than 0.20 mg/L.

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods.
Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as “analyze immediately” are not performed within 15 minutes.

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ATTACHMENT 4

NJDEP SPLP Spreadsheet

NJDEP SPLP Spreadsheet, V3.1, November 2013

Case name/area of concern:	Plant 2 LNAPL Area
Case number:	
Sampling date:	4/6/2017

Contaminant:	1,4-Dioxane	**NOTE:**
CAS No:	123-91-1	**USE ONE PAGE PER CONTAMINANT, do not leave empty rows between samples**
Water solubility (mg/L)	1.00E+06 ← enter NA if inorganic	**Do not enter samples with soil concentrations at or below the reporting limit.**
Aqueous reporting limit (µg/L):	2.00E-04	**When leachate concentration is non-detect, enter the aqueous reporting limit**
Soil reporting limit (mg/kg):	2.00E-04 ← if unavailable, enter a value below lowest concentration measured	**Enter site-specific dilution-attenuation factor (DAF) if desired**
Health-based GWQC (µg/L)	7.20E+00	Data entry cells (do not skip rows)
DAF (20, or site-specific if approved):	**16**	Optional data entry
Leachate Criterion (µg/L):	1.20E+02 adjusted from 115.2	Calculated or locked cells
Henry's law constant (dimensionless):	1.96E-04 ← enter 0 if inorganic	**Indicates that Alternative Remediation Standard needs to be recalculated**

Sample ID	Soil sample weight (kg)	Leachate Volume (L)	Total Soil Concentration (mg/kg)	SPLP Leachate Concentration (µg/L)	Final pH of Leachate (except VOCs)	Optional data: Sampling Depth (ft)	Optional data: Soil Type	Optional data: Organic Carbon (mg/kg)	Optional data: Organic Carbon (%)	Kd (L/kg)	% Contaminant in Leachate	Field leachate concentration (µg/L)	Pass or fail?	
OB118_10.5-11	0.1	2	0.013	0.18						52.2	27.69	0.25	PASS	Sand, some silt
NY92_1.5-2	0.1	2	0.0051	0.24						1.3	94.12	3.63	PASS	Sand, some silt
OB118_21-21.5	0.1	2	0.035	1.4						5.0	80.00	6.79	PASS	Sand and silt
NM126_15-15.5	0.1	2	0.09	4.3						0.9	95.56	83.06	PASS	Sand, some silt, little clay
OC107_13-13.5	0.1	2	0.017	1.1						0.0	129.41	110.78	PASS	Sand, some silt, trace granules

Note: At least 3 rows of data required. Samples SB-A5.2-NM126_5-5.5 and SB-A5.2-NU129 were non-detect with elevated RLs due to matrix interference. Those samples not entered above.

SPLP RESULTS for

OPTION 1a: All adjusted leachate concentrations are below the leachate criterion

REMEDIATION STANDARD = 0.09 mg/kg

OPTION 1b: Simple inspection of tabulated results to find highest acceptable standard
EVERYTHING PASSED, OPTION 1b NOT VALID

OPTION 2: Remediation standard using site-specific Kd value
Kd ratio = 522222.22, USE MINIMUM Kd
Kd USED FOR CALCULATING STANDARD = . L/kg
result before rounding = 0.0184 mg/kg
REMEDIATION STANDARD = 0.02 mg/kg

OPTION 3: Remediation standard using linear regression
Number of points = 5
Soil concentration midrange = .05
Number of points above midrange = 1
Enough points above midrange? NO
R-Square high enough? NO
Leachate criterion within range of leachate concentrations? NO
OPTION 3 NOT VALID