Interim Measures Investigation Report

EXIDE ENVIRONMENTAL RESPONSE TRUST
Frankfort Indiana Site
555 North Hoke Avenue
EPA ID No. IND001647460

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ADVANCED GeoServices
a Montrose Environmental Group company

PROFESSIONAL GEOLOGIST CERTIFICATION

Interim Measures Investigation Report
EXIDE ENVIRONMENTAL RESPONSE TRUST
Frankfort Indiana Site
555 North Hoke Avenue
EPA ID No. IND001647460

By affixing my seal, I am certifying that information which was developed by Montrose for use in this report is true and correct, and that information obtained from other parties was utilized without intentional modification. I further certify that I am licensed to practice in the State of Indiana and that it is within my professional expertise to verify the correctness of the appropriate hydrogeologic information.

Gregory Smoot, P.G. (License No. 1562)

Signed and sealed this day 29 July 2022

ABBREVIATIONS

AOC	area of concern
BTEX	Benzene, Toluene, Ethyl Benzene, and xylenes
CA	Corrective Action
cis-1,2-DCE	cis-1,2-Dichloroethene
CSM	Conceptual Site Model
CVOCs	chlorinated volatile organic compounds
GC	gas chromatograph
HQ	Hazard Quotient
IDEM	Indiana Department of Environmental Management
ICM	Interim Corrective Measures
IMI	Interim Measures Investigation
IMWP	Interim Measures Work Plan
L	liter
MCL	Maximum Contaminant Limit
m	meter
PCE	Perchloroethylene
PRT	Geoprobe's Post Run Tubing
RFI	RCRA Facility Investigation
RISC	Risk Integrated System of Closure
SOP	Standard Operating Procedure
SLVE	Screening Level Vapor Exposure
SSI	Supplemental Site Investigation
TCE	Trichloroethene
ug	microgram
USEPA	United State Environmental Protection Agency
VISL	Vapor Intrusion Screening Level
VOCs	volatile organic compounds
VI	Vapor intrusion
VC	Vinyl Chloride

EXECUTIVE SUMMARY

Advanced GeoServices Corp., dba Montrose Environmental Solutions LLC (Montrose), on behalf of the Exide Environmental Response Trust (Trust) performed an Interim Measures Investigation (IMI) to address impacts to groundwater from volatile organic compounds (VOCs) and chlorinated VOCs (CVOCs) at the former Exide Technologies (Exide) facility located at 555 North Hoke Avenue in Frankfort, Indiana (EPA ID# IND 001 647 460) (i.e., the Site). The work was performed in accordance with the Interim Measures Work Plan (IMWP or Work Plan) issued by Montrose on August 30, 2021.

Montrose prepared a Comprehensive RCRA Facility Investigation (RFI) Report dated February 24, 2021, as part of the RCRA Corrective Action (CA) process. The RFI Report recommended conducting focused investigation activities. The focused IMI activities included installing additional monitoring wells and groundwater sampling and analysis for VOCs and CVOCs to define the movement of groundwater and groundwater contamination in the area north and east of MW-4, for the ultimate purpose of proceeding with interim measures for chlorinated VOCs.

The IMI activities included the collection of representative soil gas samples using permanent soil gas sampling points and probes and direct push methods from select locations (including three samples directly above or adjacent to the sanitary sewer bedding). Vapor samples were also collected from sanitary and storm water manholes for analysis for VOCs and CVOCs. Vapor sampling was conducted to assess the subsurface vadose zone, local utilities, and local sewer bedding for the presence of VOC and CVOC vapors that could be moving along preferred pathways.

Groundwater in on-Site monitoring wells is impacted with VOCs and CVOCs. Recently, the TCE concentrations detected were 49.1 ug/L at MW-1, and 187,000 ug/L at MW-4. Off-Site monitoring well MW-9 contained 1.8 ug/L TCE, 3,210 ug/L cis-1,2-DCE, and 957 ug/L vinyl chloride. The TCE impact at MW-1 appears to be discontinuous with the CVOC plume at MW-4. MW-1 is over 500 feet from MW-4 and it is unlikely that the TCE in MW-1 is a result of contaminant transport by groundwater flow down hydraulic gradient. The CVOC concentrations decrease quickly with distance away from MW-4 which indicates that the plume of TCE impacted groundwater is localized and likely contained by low-permeability soils. The source of CVOCs is suspected to be associated with AOC-3/UST-2 because CVOC impacts were within 20 feet of UST-2. The In Situ Microcosm study suggests there is a strong potential for the complete anaerobic reductive dechlorination of PCE and TCE under bioaugmentation with SDC-9 and SRS amendment at this Site. The complicating issue may be that the subsurface may not be able to adequately transmit amendments through the area of impact given the extensive low-permeability soil in the subsurface.

Groundwater was evaluated to assess the CVOC plume, groundwater flow direction, and groundwater velocity to evaluate the potential for groundwater in exceedance of the standards to migrate off-site. The groundwater flow rate is extremely slow due to laterally extensive low-permeability glacial tills combined with a low groundwater gradient. Data indicates that it can take decades for groundwater to flow 1.0 foot horizontally at the Site.

The results of soil gas samples indicate that there are no exceedances of the Target Sub-Slab and Near Source Soil Gas Concentration VISL.

The sewer gas samples collected from manhole locations exceeded the Target Sub-Slab and Near Source Soil Gas Concentration VISL for CVOCs. No unique utility bedding fill material (i.e., sand/gravel) was identified during the investigation at three locations and it appears the utility trench was backfilled and compacted using the local excavated material. The soil gas samples taken adjacent to the sewer pipe did not contain soil gas results above VISL. The issue of CVOC vapors in the sewer system is complex because the sewer is the receptor of pollutants from a large number of potential sources. CVOC vapors in sewer lines should not be a source for indoor CVOC vapor intrusion because modern plumbing systems has sewer traps to prevent gases contained in wastewater, the public sewer, or septic tanks from escaping and entering residential housing.

Recommendations

Elevated lead in the shallow surface soils at the surface water discharge locations should be delineated and removed, or stabilized using capping, fencing, silt fence or similar techniques as Corrective Action alternatives. Additionally, appropriate institutional and deed controls can be put into place.

Based on the results of this study, the *CVOC Remediation Evaluation* dated January 19, 2021, will be revisited to further evaluate the potential groundwater remedial actions that may be employed at the Site.

Additional sampling and/or investigation to define the extent of trichloroethene (TCE) contamination in the area of groundwater near monitoring wells MW-1 and MW-13 will be considered under a separate future work plan.

Future sampling and/or investigations will be necessary to evaluate and identify the permanent solutions to assure protection of groundwater at, and beyond, the property boundary and also identify how potential exposures to off-site receptors will be mitigated, if warranted.

A prudent method to further investigate for evidence of COVC impacted groundwater from potentially infiltrating the sewer would be to run a camera through the sewer, possibly after water-jetting the line, to assess for potential pipe connections from the Site or obvious breaches in the sewer line. This can be conducted during Interim Remedial Action.

1.0 OVERVIEW

Advanced GeoServices Corp., dba Montrose Environmental Solutions LLC (Montrose), on behalf of the Exide Environmental Response Trust (Trust) performed an Interim Measures Investigation (IMI) to address impacts to groundwater from volatile organic compounds (VOCs) and chlorinated VOCs (CVOCs) at the former Exide Technologies (Exide) facility located at 555 North Hoke Avenue in Frankfort, Indiana (EPA ID# IND 001 647 460) (i.e., the Site). The work was performed in accordance with the Interim Measures Work Plan (IMWP or Work Plan) issued by Montrose on August 30, 2021.

Montrose conducted a Comprehensive RCRA Facility Investigation (RFI) at the Site and presented the results of the RFI and Interim Corrective Measures (ICM) activities in a report titled Comprehensive RFI Report dated February 24, 2021 (RFI Report). The RFI was completed as part of the RCRA Corrective Action (CA) process. Investigation of groundwater in May and July 2018 showed impact to groundwater in on-site monitoring wells from VOCs and CVOCs. The RFI Report recommended conducting focused investigation activities to define the movement of groundwater and groundwater contamination in the area north and east of MW-4, for the ultimate purpose of proceeding with interim measures for chlorinated VOCs. The focused investigation activities included additional groundwater sampling and analysis for VOCs and CVOCs as detailed herein.

The investigation also included the collection of representative soil gas samples using permanent soil gas sampling points and probes and direct push methods from select locations (including three samples directly above or adjacent to the sanitary sewer bedding). Vapor samples were also collected from sanitary and storm water manholes for analysis for VOCs and CVOCs.

1.1 Facility Location and Description

The Site is located in central Indiana within Clinton County, approximately 50 miles northwest of Indianapolis (see Figure 1). The Site is bounded by North Hoke Avenue to the west, Kelley Avenue to the east, Michigantown Road to the north (also referred to as Washington Street on some maps), and Norfolk Southern railroad tracks to the south. The Site consists of eighteen (18) contiguous parcels now owned by the Trust which encompass approximately 13.7 acres. All but three of the parcels are located within a perimeter security fence. The majority of the area (12.1 acres) lies within the perimeter security, and with the exception of grass and a few shrubs along North Hoke Avenue is covered with former building pads, pavement or crushed stone. The facility was formerly a manufacturing plant that produced lead-acid automotive batteries. The plant was closed and the aboveground infrastructure was decontaminated and demolished January 2013.

1.2 Geologic Setting

As the Laurentide ice sheet began to retreat from present day Northern Indiana and Northwest Ohio between 14,000 and 15,000 years ago, it receded into three distinct lobes. The eastern or Erie Lobe sat atop and behind the Fort Wayne Moraine. Meltwater from the glacier fed into two

ice-marginal streams, which became the St. Joseph and St. Marys Rivers. Their combined discharge was probably the primary source of water for the proglacial Wabash River system. Rich prairie soils extend over central Indiana. Some clays in east-central Indiana are compact with poor drainage and frequent ponding of water. Till (material deposited directly by glaciers) forms flat to hummocky plains that dominate the central portion of the state. The thickness of the glacial deposits ranges from 100 to 400 feet throughout Clinton County.

Bedrock beneath the Site is located at approximately 550 feet MSL; or approximately 300 feet below ground surface (bgs). The Site appears to fall near the contact between Devonian and Silurian bedrock units. Devonian formations typically have a carbonaceous shale on the upper portion and are underlain by limestone, dolostone and shale. Silurian bedrock contains the carbonates limestone and dolostone. Indiana bedrock geology features a broad anticline with a slight plunge to the northwest.

1.3 Local Geology

The soil and unconsolidated materials in the subsurface of the Site consist of glacial till which is unsorted glacial sediment that washes off of retreating glaciers. The soil has been mapped as the Fincastle-Crosby soils. This is a silty loam with slow infiltration rates (Class C) and is somewhat poorly drained. The area is characterized by swell and swale topography. Fincastle soils are typically observed on rises and have a brown silt loam surface layer, and yellowish brown, mottled silty clay loam to clay loam subsoil. Crosby soils are found on high rises and have a brown silt loam surface layer, and yellowish brown, mottled silty clay loam, clay loam, and loam subsoil. The hydraulic conductivity (K) in these regional silt and clay deposits is low which makes these deposits semi-pervious. Slug testing of select monitoring wells has indicated that vertical hydraulic conductivities range from 0.0004 to 0.0088 feet/day (See Section 2.6) and are consistent with glacial till.

1.4 Hydrogeologic Setting

The Tipton Complex Aquifer System is characterized by unconsolidated deposits that are quite variable in materials and thickness. Aquifers within the system range from thin to thick and include single or multiple intra-till sands and gravels. The aquifers are highly variable in depth and lateral extent and are typically confined by thick clay layers. The total unconsolidated thickness of the Tipton Complex Aquifer System generally ranges from about 200 feet to over 400 feet in Clinton County. The potentiometric surface of the regional unconsolidated aquifer is approximately 800 feet MSL; or approximately 50 feet bgs.

Aquifer layers utilized in the Tipton Complex Aquifer System are generally 5 to 10 feet thick sands and/or gravels. These sands and gravels are overlain by a till cap which is commonly 65 to 190 feet thick with thin intratill sand and gravel layers. Wells in this system are typically completed at depths ranging from 68 to 195 feet. Domestic well yields are commonly 15 to 65 gallons per minute (gpm) and static water levels are generally 15 to 35 feet below the surface. There are 8 registered significant ground-water withdrawal facilities (29 wells) in this system in Clinton County. High-capacity well yields of up to 1,200 gpm are reported.

1.5 Local Hydrogeology

Shallow groundwater is present in the till cap that is 65 to 195 feet thick and overlays the layers of sand and gravel. Shallow groundwater is present as local perched zones of saturation in clay and small local sand and silt layers. The depth and thickness of the saturated layers varied from 4 to 10 feet below ground surface, and appear to be laterally discontinuous. The depth to the water table measured in the fourteen (14) monitoring wells at the site range from 1.89 to 8.83 feet below top of casing. The underlining aquiclude was encountered in all of the groundwater monitoring well locations and consisted of a very stiff to hard gray clayey Silt to silty Clay with trace amounts of sand and/or gravel. The perched groundwater near MW-4 was 4.43 feet below top of casing in December 2021 and groundwater flows very slowly generally towards the north (see Section 3.10.4).

Based on the well gauging data collected on December 8, 2021, the hydraulic gradient in the central portion of the Site is 0.007 toward the north northwest. In the northern portion of the site near MW-1 and MW-2, the hydraulic gradient steepens slightly to 0.013 and turns to the north northeast. On the eastern portion of the Site in the area of groundwater contamination near MW-4, groundwater flows north under a hydraulic gradient of 0.013. In the area along North Kelley Avenue, the groundwater flow turns to the northeast under a gradient of 0.010. The groundwater flow rate calculated in Section 3.11.4 is extremely slow due to laterally extensive low-permeability glacial tills combined with a low groundwater gradient. Data indicates that it can take decades for groundwater to flow 1.0 foot horizontally at the Site.

The low groundwater velocity indicates that the groundwater at the Site is “old” groundwater, meaning there has been long period since the water recharged the subsurface. In this setting, it is not uncommon for overturned groundwater ages, which is where younger groundwater is under older groundwater. The significance is that high age groundwater accumulates and contains contaminants.

1.6 Community Relations Activities

Community involvement and outreach consisted of the preparation of a fact sheet mailer sent to residents near the Site, updated language in the website (https://www.exidefrankfortclosure.com/), and installing signage on the fence of the Site.

1.7 Reference Documents

The focused investigation activities described herein were performed under the framework of the following site documents:

1. *Supplemental Site Investigation Work Plan prepared for Exide Technologies* by Advanced GeoServices Corp. dated December 21, 2018

2. *Quality Assurance Project Plan for the RCRA Facility Investigation, Exide Technologies Former Manufacturing Facility, Frankfort, Indiana,* prepared for Excide Technologies by Advanced GeoServices Corp. dated October 12, 2017

3. *Sampling and Analysis Plan for the RCRA Facility Investigation, Former Exide Manufacturing Facility, Frankfort, Indiana,* prepared for Excide Technologies by Advanced GeoServices Corp. dated October 12, 2017

4. *CVOC Remediation Evaluation* prepared by Advanced GeoServices / Montrose Environmental Group, dated January 19, 2021

5. *Interim Measure Work Plan, Frankfort Indiana Site,* prepared for Exide Environmental Response Trust by Montrose dated August 30, 2021

2.0 INVESTIGATION ACTIVITIES

2.1 Objectives

The objectives of the investigation outlined in the IMWP dated August 30, 2021, were to:

1. Conduct a focused investigation activities to define the movement of groundwater and groundwater contamination in the area north and east of MW-4, for the ultimate purpose of proceeding with interim measures for chlorinated VOCs.

2. Assess the subsurface vadose zone, local utilities, and local sewer bedding for the presence of VOC and CVOC vapors that could be moving along preferred pathways.

2.2 Investigation Overview

Montrose mobilized to the Site on October 12, 2021 to perform the majority of the field activities discussed in the Work Plan. Montrose mobilized to the site a second time on December 8, 2021 to perform the groundwater sampling and initiate the in-situ microcosm study. Field notes are provided in Appendix A. The following paragraphs discusses the field activities performed.

Montrose contracted Cascade Technical Services (Cascade) to provide all powered sub-surface installation and sampling (i.e., Hydropunch activities, well install, vapor port install, etc.). Samples collected were analyzed by Pace Analytical Laboratories at either an on-Site mobile lab or at their permanent location in Indianapolis, Indiana.

In order to achieve the objectives stated in Section 2.1, the IMWP developed a set of sampling locations for soil gas, sewer vapor, and groundwater samples to be collected and analyzed using an on-Site Pace Analytical® Services mobile laboratory gas chromatograph (GC) for the following parameters:

- Benzene, Toluene, Ethyl Benzene, and xylenes (BTEX);
- cis-1,2-Dichloroethene (cis-1,2-DCE);
- Perchloroethylene (PCE);
- Trichloroethene (TCE); and
- Vinyl Chloride (VC)

Eighteen (18) sample locations were designated for Hydropunch sampling and/or soil gas sampling in the IMWP designated Location 1 through Location 18. These locations are shown on Figure 2.

The locations designated as L1 through L6 were six vapor ports for the purpose of sampling soil gas along the east side of Kelley Avenue as described in Section 2.13. Montrose installed soil gas probes as fixed/permanent flush-mount wells, with bolted lids.

The locations designated as L7 through L11 were Hydropunch groundwater sampling locations that were analyzed on-Site for TCE, PCE, cis-1,2-DCE, VC, and BTEX.

Four “step-in” locations, designated as L7A, L8A, L9A, and L10A were additional Hydropunch groundwater sampling locations based on the results in accordance with the IMWP and described in Section 2.3.

The groundwater monitoring well network was enhanced by installing a new monitoring well at Location L12 (MW-11) on the south side of E. McClurg Street (approximately 50 feet east of MW-9) as shown on Figure 2. Additionally, three new groundwater monitoring wells (MW-12, MW-13, and MW-14) were installed at the fringe of the TCE plume around MW-4. The wells were sampled and analyzed at the on-Site laboratory. Surface water and sediment samples were collected at Outfall Z shown on Figure 2 and analyzed at an on-Site laboratory.

In addition, Montrose collected step out soil gas samples in the locations shown on the attached map designated as:

- Location 13 – Along the unpaved road north of East McClurg Street (soil gas);
- Location 14 - Near the curve close to 1609 Goder Drive (soil gas);
- Location 15 - East of North Kelley Ave. and north of MW-3 (soil gas and Hydropunch).

Montrose obtained utility maps from the City of Frankfort and reviewed the available information (Appendix B). Montrose collected three (3) soil gas samples from soil gas probes and temporary Geoprobe vapor sampling at Locations 16, 17, and 18 which to collect soil gas samples from immediately above the saturated bedding for the sanitary sewer and storm sewer.

Eight (8) grab vapor samples were collected from sanitary manholes (B, C, E, F, G, H, and I). Storm sewer manhole A was an open grate manhole identified along Kelley Avenue as shown on the attached Figure 2. Montrose also collected VOC/CVOC vapor grab samples from sanitary manholes J and L along Washington Avenue shown on Figure 3.

2.3 Decision Tree Document

Pace® mobile laboratory testing services (Pace® Mobile Labs) was utilized so that data could be obtained quickly and decisions could be made based on the Decision Tree document contained in Appendix A of the IMWP. The Decision Tree document is summarized below. Table 1 summarizes the Decision Tree actions.

Groundwater samples were obtained using a Hydropunch sampler. If the groundwater sample results were between 100 and 600 ug/L TCE, sampling was deemed complete and no offset samples were collected If the number was less than 100 ug/l, Montrose stepped in and installed an offset sample location closer to the source (MW-4). These locations are designated with an “A” on Figure 2. Four step-in Hydropunch locations (L7A, L8A, L9A, and L10A) were conducted. At a value of less than 100 ug/L, the extent of impact can be reasonably estimated employing

multiple lines of evidence, including, but not limited to, analytical data; extrapolation or modeling based on existing data; application of a conceptual site model; or other means for determining the extent of the contamination for the purposes of interim remedial action. If the number was over 600 ug/L, Montrose would have stepped out and completed a step-out offset Hydropunch sample. These locations are designated with an "B" on Figure 2. No step-out Hydropunch locations were warranted based on the on-Site laboratory data.

2.4 Groundwater Sampling – Temporary Sampling Points

Samples of the groundwater were collected in the general area of monitoring well MW-4. These samples were collected to better understand the horizontal extent of the observed groundwater VOC plume located at MW-4. Collection of groundwater samples was initially attempted using standard Geoprobe Hydropunch sampling techniques. However, water was not observed to recharge sufficiently to allow sampling using this methodology on site. Therefore, samples were collected by advancing a Geoprobe rod to a target depth of 11 feet (i.e., within the upper groundwater interval) and installing a temporary 1-inch diameter piezometer that was allowed to recharge overnight prior to sampling. Samples for VOCs were collected from these piezometers using a peristaltic pump.

The results provided by the mobile lab were reviewed for the concentration of TCE. Locations L8, L9, L10, and L11 had TCE concentrations less than 100 ug/L. Therefore, a second Hydropunch sample was collected at an offset boring located closer to the source (i.e., Locations L8A, L9A, L10A, and L11A) in order to better define the TCE extent around MW-4. Location L7 had a TCE result of 280 ug/L, which is within the target concentration of 100-600 ug/L, therefore, no additional step out sampling was performed (i.e., Location L7A).

2.5 Outfall Sampling

One stormwater outfall location is present along Kelley Ave. north of the Site. This outfall (designated Outfall Location Z on Figures 2 and 9) was observed to be flowing on October 19, 2021. A sample of the water was collected for VOC and Lead analysis. Additionally, a soil sample from the unnamed tributary the outfall pipe drains to was collected for VOCs and Lead analysis. Samples from the outfall (water and sediment) were relinquished to Pace – Indianapolis for analysis.

Discharge from the MH-10 pipe was not able to be sampled during the IMI field work.

2.6 Slug Testing

Slug testing was performed at monitoring wells MW-1, MW-3, MW-4, MW-7, MW-9, and MW-10 on October 13, 2021. The slug tests were performed by installing automated data logging devices in the selected wells (i.e., Eijkelkamp TD-Diver system [Divers]) and then adding sufficient de-ionized water to the well to fill the casing. The Divers were set to record the water level in the well at 5 second intervals. Once the water level in the well had regained 80% of its initial static level, the Divers were removed from the well and the data downloaded using the Eijkelkamp software.

A K value for each well was calculated using the USGS published Spreadsheets for the Analysis of Aquifer-Test and Slug-Test Data by Halford and Kuniansky (2002). This spreadsheet uses the Bouwer and Rice (1976) modeling to calculate the K value. During the analysis, it was found that the use of a 5 second data collection interval resulted in a significant amount of data (over 17,000 data points per well), while the spreadsheet used is only capable of analyzing 600 data points. Therefore, the data was systematically reduced by Montrose to focus on the first three hours of the testing when the well had regained 80% of its initial static level during that time. One well (MW-7) took a longer period than the other wells to regain this level, therefore additional points collected at an hourly or bihourly interval for the remaining time period (i.e., beyond the initial three hours) were incorporated into the data set for the calculation of the hydraulic conductivity (K) value for this well. The final summary sheet produced by the spreadsheet and a data plot for each well is presented in Appendix C. Calculated hydraulic conductivities range from 0.0004 to 0.0088 and are summarized on Table 3. The values are consistent with glacial till.

2.7 Monitoring Well Installation

Monitoring well installation activities were performed by Cascade using hollow-stem auger drilling techniques. The drill tools were decontaminated using a steam cleaner in between well locations to minimize the potential of cross contamination. A Montrose field geologist monitored the well installation activities. The wells were installed between October 19 and 21, 2021. Well installation logs are provided as Appendix D. A well construction summary table for all Site groundwater wells is included as Table 4.

One (1) groundwater monitoring well (MW-11) was installed off of the Site in the downgradient direction from well MW-9. This location was selected to better understand an eastward flow pattern noticed in sampling events following the installation of MW-9 as well as define the extent of the groundwater impacts observed in MW-9 sample results.

Three (3) groundwater monitoring wells were installed on-Site in the general area of existing well MW-4. One well (MW-12) was installed in the upgradient direction of groundwater flow. The other two wells (MW-13 and MW-14) were positioned in the down- and side-gradient directions to define the extent of the groundwater impacts at MW-4.

During monitoring well installation, a soil sample was collected from the auger tailings from the 2 to 3-foot depth interval for analysis of VOCs and lead. A sample could not be collected from the installation of MW-14 due to no tailings being generated during the installation process. The samples were relinquished to Pace Indianapolis for analysis.

These monitoring wells were constructed using a 2-inch ID, flush-threaded, Schedule 40 PVC riser with a factory-slotted 0.010-inch PVC well screen. The wells were installed using 10 feet of well screen. A sand pack was placed to a minimum of 2 feet above the top of the monitoring well screen with No. 1 sand. The annulus of the borehole above the sand was sealed to the ground surface using bentonite. Wells on site were completed as stick-up style wells with a 4-inch square protective casing extending approximately 3 feet below ground and projecting approximately 2

feet above ground. Monitoring well MW-11 was installed as a flush mount style well to allow for vehicular traffic in the road. A 2 by 2-foot square well pad was installed so that the surface slopes away from the well for all wells.

The wells were developed using a submersible pump and purged until the water removed from the well ran clear. Due to the yield of the wells and the flow rate of the pump, the wells ran dry multiple times during the development. The wells were allowed to recharge and development resumed until the desired visual clarity was achieved.

Soils and purged groundwater generated during well installation and development activities were containerized in 55-gallon drums and stored on site. A composite sample was taken for each matrix (i.e., one sample for soils and one sample for water) for off-site waste disposal characterization. The laboratory results are summarized on Table 5 and the laboratory reports are contained in Appendix H. The waste is classified as non-hazardous. The USEAP Generator ID Number is IND001647460. The drums of material were removed from the site by US Ecology on March 9, 2022 for disposal at EQ Detroit, Inc., ID Number MID980991566.

2.8 Synoptic Water Level Measurement

Depth-to-water was measured by Montrose in each well on the Site using an electronic water level indicator prior to the initiation of groundwater sampling activities. The synoptic measurements included the measurement of water levels in the monitoring wells. The wells were allowed to equilibrate to atmospheric pressure and the data was collected over a two-hour period to determine the potentiometric surface across the Site. The field personnel measured the water levels in the wells to the nearest 0.01 foot using the surveyed point at the top of the inner well casing for reference. An updated groundwater potentiometric map is presented on Figure 4 using the results of the synoptic water level measurement performed on December 8, 2021. Depth to bottom measurements were collected following completion of the groundwater sampling activities to prevent unnecessary disturbance of the settled material in the well that may affect the sampling results.

2.9 Groundwater Sampling

During December 2021, one round of groundwater sampling was performed from site monitoring wells MW-1, MW-2, MW-3, MW-4, MW-7, MW-9, MW-10, MW-11, MW-12, MW-13 and MW-14, using low-flow sampling techniques. The Site well construction and water level readings conducted during the installation and groundwater sampling events are presented in Table 4. Monitoring wells were purged and sampled from the suspected least contaminated well to the most contaminated well to minimize the potential for cross-contamination.

The wells were purged using a stainless-steel low-flow bladder pump placed at the midpoint of the screen in each well. A flow-through cell was used to measure pH, temperature, conductivity, redox potential, and dissolved oxygen prior to contact with oxygen at 3 to 5-minute intervals during purging. Turbidity was also measured at the same interval. The wells were purged until the field

parameters stabilize to within 10% over three readings and pH readings differed less than 0.1 unit.

Once the field parameters had stabilized, the flow rate was reduced to 100 ml/min. to collect volatile organic compounds (VOC) samples. Samples were collected directly from the pump discharge line into laboratory-supplied bottles containing the necessary preservatives. An equipment blank sample was collected from the sampling equipment each day of the sampling event.

Purge water was contained in 55-gallon drums for off-site disposal as discussed in Section 2.7.

2.10 Survey

Randall Miller & Associates, Inc., an Indiana licensed surveyor, located all new monitoring wells, permanent vapor ports, temporary piezometer, and manhole locations for the purpose of accurately representing the horizontal datum of the sampling locations in the state-plane coordinate system. Elevations and locations presented on Table 4 and figures for this report are based on these survey results.

2.11 Sediment and Surface Water Sampling

A sediment sample and a surface water sample were be collected at the discharge point of the Site storm water sewer to unnamed tributary along Michigantown Road, near Kelley Avenue. This is designated as Outfall Z on Figure 2. The sample was collected and sent to Pace Analytical for analysis for VOCs using EPA Method 8260 and lead analysis.

2.12 Utility Investigation

Montrose contacted the Frankfort Street Department to acquire available utility maps for sewer lines and utilities in Kelley Avenue, Hoke Avenue, Washington Avenue (aka Michigantown Road), and E. Morrison Street. Additionally, the manholes selected for vapor sampling (discussed in Sections 2.15) were surveyed by a professional surveyor following sample collection. The utilities have been incorporated into the figures of this report as appropriate. Drawings and summarized observations are contained in Appendix B.

Montrose subcontracted Bloodhound Underground Utility Locators (Bloodhound) to scan the work areas with ground penetrating radar (GPR) to determine the locations of any utilities or other underground features that may interfere with the proposed subsurface investigation activities. The field scan was performed on October 12, 2021. Minor adjustments were made following the GPR scan to the proposed subsurface investigation locations, however no individual point required significant movement from the proposed location (i.e., less than 5 feet). Sampling from and next to underground utilities was conducted as described in Section 2.14 and Section 2.15.

2.13 Kelly Avenue and Step-Out Soil Gas Sampling

On October 13 to 14, 2021, Montrose oversaw as Cascade installed six (6) soil vapor ports along North Kelley Ave (L1 through L6), Goder Drive (L13), East McClurg Street (L14) and west of North Kelly Ave. (L15). Montrose also had Cascade install three (3) sampling ports within the sewer utility bedding along the east side of Kelley Avenue (locations L16, L17, and L18).

The locations were hand-augured until groundwater was encountered. The 8-inch long, stainless-steel screen of the port was positioned approximately 1 foot above the encountered groundwater in the borehole. Teflon tubing was connected to the screen and extended to the surface to allow sampling. The screen area was filled with sand, bentonite was placed and hydrated to the surface grade, and a bolted flush mount well vault was installed at the surface. Observations during installation are summarized on Table 2.

Sampling of these permanent vapor port locations was performed on October 18, 2021. A shroud was placed over the sampling port and filled with helium. A pre-sample was collected in a Tedlar bag and field screened for the presence of significant (>10%) helium. No pre-sample contained significant helium. Collection of the pre-sample also allowed for the purging of more than 3 volumes of vapor from the sample port prior to collection of the vapor sample. The sample was collected into a new Tedlar bag using a hand operated pump and relinquished to the on-Site Pace mobile lab for VOC analysis.

Locations L1, L3, L14, L15, and L18 were the only locations that could be sampled for soil gas using this procedure. The other seven vapor point locations L2, L4, L5, L6, L13, L16, and 17 were discovered to be saturated and produce only groundwater. Upon determining that the procedures described in the August 30, 2021 Interim Measures Work Plan were inadequate and impractical at these locations, another procedure had to be used to obtain a soil gas samples. Geoprobe's Post Run Tubing (PRT) system of sample collection was selected to collect soil gas samples at a depth of 1.5 feet at The PRT system is a USEPA-approved method of collecting soil gas and is described in the Region 4 document "Operating Procedure: Soil Gas Sampling" dated February 24, 2020 (LSASDPROC-307-R4).

Geoprobe's Post Run Tubing (PRT) system of sample collection was selected to collect soil gas samples at a depth of 1.5 feet at locations L2, L4, L5, L6, L13, L16, and 17. This system collects soil vapors from a temporary sampling port. The PRT system is a predominant and industry accepted method of collecting soil gas samples. Using this system, soil gas samples can be collected with a high degree of assurance that the samples are representative shallow (1.5 foot) depth. The change in sampling procedures from a vapor point to the PRT system is not expected to have an impact on the quality and usability of the soil gas data for the following reasons:

- The PRT sample ports were placed as closely as possible to the permanent sample ports allowing for equipment restrictions (i.e., overhead wires). The PRT samples were collected within 5 feet of the permanent port locations.

- The post run tubing and PRT adapter with O-rings eliminates concerns about system leaks at threaded joints and ensures that the entire sampling train is air-tight. No ambient air is introduced into the sample during collection.
- Tubing/equipment used to collect the sample was either Teflon® or stainless steel.
- The samples were analyzed using an on-Site mobile laboratory eliminating concerns associated with storing and shipping samples.

A total of twelve (12) soil gas samples were collected and analyzed for BTEX, cis-1,2-DCE, PCE, TCE, and VC using a field GC operated by Pace Analytical. One duplicate sample was also collected. The results indicate no exceedances of the Target Sub-Slab and Near Source Soil Gas Concentration Vapor Intrusion Screening Level (VISL).

Aqueous samples were collected at the saturated probe locations L2, L4, L5, L6, L13, L16, and 17 for analysis for BTEX, cis-1,2-DCE, PCE, TCE, and VC using a field GC operated by Pace Analytical. Additionally, locations L3, L4, and L6 were selected to have groundwater sampled using the Geoprobe Hydropunch procedure. The Hydropunch samples were collected in the rough center of Kelley Ave. perpendicular to the corresponding soil gas location. The groundwater samples were collected at these locations for analysis for BTEX, cis-1,2-DCE, PCE, TCE, and VC using a field GC operated by Pace Analytical.

During December 10, 2021, Montrose field technicians attempted to collect soil gas samples from the permanent soil gas sampling ports (Locations L1 through L6). Two of these six locations (L1 and L3) could be sampled for soil gas while the other four could not be sampled due to the presence of significant amounts of water in the sample port. As this was the same conditions previously observed during October 2021, Montrose did not re-sample the two available ports as the resulting small dataset would not be of significant value to the overall Site model.

2.14 Utility Bedding Vapor Sampling

Montrose installed three (3) sampling ports within the sanitary sewer utility bedding along the east side of Kelley Avenue (locations L16, L17, and L18). No unique utility bedding fill material (i.e., sand or gravel) was identified during the installation of these ports, and it is Montrose's observation that the utility trench was backfilled using the local excavated material. Hand auger techniques were used to install these ports and prevent damage to the utility line. The ports were constructed such that the stainless-steel screen was placed adjacent to the utility within the reworked backfill material. Teflon tubing was used to allow sampling. The screen area of the port was backfilled with sand, and the borehole was sealed using hydrated bentonite to the ground surface. A permanent bolted flush-mount well vault was installed at the surface. Two of these ports (L16 and L17) were found to produce water and could not be sampled. Only location L18 could be sampled. The PRT method of collecting a soil gas samples was implemented to collect soil gas at a depth of 1.5 feet at L16 and L17.

The results indicate no exceedances of the Target Sub-Slab and Near Source Soil Gas Concentration VISL.

2.15 Manhole Sampling

The accumulated vapors within sewer manhole access points were collected along Kelley Ave, Washington Ave, and within the Site property. A dedicated length of tubing was lowered into the culvert and positioned so that the tubing was approximately 2 feet above the bottom of the culvert. If the manhole was an open grate-style manhole (i.e., a storm sewer inlet point), the location was not sampled under the assumption that the culvert is open to the atmosphere and therefore would not accumulate vapors. Manholes with multiple small holes (i.e., 2-inch diameter) were sampled by lowering the tubing through the hole. Manholes without any integral openings were opened sufficiently (i.e., 'cracked') to allow sample tubing access. The vapors were collected using a hand operated pump into a new Tedlar bag. The manholes are designated as Manhole B, C, E, F, G, H, I, J, L, and MH-10. The sewer vapor samples were for analyzed for BTEX, cis-1,2-DCE, PCE, TCE, and VC using a field GC operated by Pace Analytical.

Manhole A shown on Figure 2 was not sampled because it was an open grate manhole. Manhole C was initially believed to be a storm water manhole but is now believed to be a sanitary sewer manhole located where the sanitary sewer branches from North Kelley Avenue eastward along East McClurg Street. Manhole C was sampled. Based on site reconnaissance, Manhole N shown on Figure 3 is likely to be the same manhole that has been previously designated as "O" or "MH-11" on Site sketches. The exact location of the piping for stormwater Manhole N is not well understood but records indicate the piping makes a corner toward the North and then empties into the "K" manhole.

2.16 Passive In-Situ Microcosm Study

Upon completion of the groundwater sampling event, an in-situ microcosm study was completed by Montrose. This study entails collecting microbial, chemical and geochemical data to determine if monitored natural attenuation (MNA), bio-enhancement or bio-augmentation are appropriate interim measures. The in-situ study comprises Bio-Trap® Sampler and CENSUS analysis provided and performed by Microbial Insights, Inc. Bio-Trap® samplers are in-well study units that contain a sampling matrix favorable to colonization by microorganisms, which can later be harvested, quantified and assessed in the laboratory for microbial characterization and contaminant degradation potential (i.e. CENSUS analysis). The CENSUS assessment tests for the presence and growth of Dehalococcoides, intrinsic and augmented, and the microbial reductase genes necessary for complete conversion of chlorinated VOCs (i.e., TCE) to non-toxic end products (i.e. ethene or ethane). Specifically, the parameters assessed with CENSUS are used as metrics for assessing biodegradation potential and include the following:

1. Dehalococcoides population (>104 cells/milliliter groundwater benchmark for effective bioremediation strategy);
2. Expression of tceA Reductase gene (TCE degradation);
3. Expression of bvcA Reductase gene (VC degradation, prevents cis-DCE accumulation); and

4. Expression of vcrA Reductase gene (VC degradation, prevents cis-DCE accumulation).

In addition to the CENSUS analysis, Bio-Trap® samplers also collect groundwater for characterization of secondary lines of evidence indicative of microbial growth and contaminant degradation including dissolved gas production (ethane, ethene and methane), volatile fatty acids ("VFA") production, standard geochemical parameters and contaminant of concern concentration profiles. Detection of VFAs indicates active fermentation of intrinsic or added organic substrates (i.e. biostimulation) by microbial organisms has occurred and microbial growth is favorable. Changes to the innate contaminant of concern concentration profile, with the production of intermediate degradation products (e.g., cis-1,2,-Dichloroethene and vinyl chloride) and non-toxic end products (e.g., ethene and ethane), can provide a direct line of evidence that bioremediation is occurring. Lastly, the Bio-Trap® sampler includes sub-units that assess the benefit of carbon substrate addition, a critical factor in determining full-scale design parameters. The following text is an exert from the SITE LOGIC Report dated March 25, 2022, and briefly describes each sub-unit that was deployed in MW-1, MW-4, and MW-9 on December 10, 2021:

> ***Monitored Natural Attenuation (MNA) Unit:*** *The purpose of the Control Bio-Trap Unit is to quantify contaminant degrading bacteria and daughter product formation under monitored natural attenuation (MNA) conditions and to serve as a baseline for comparison to BioStim and/or BioAug Units.*
>
> ***BioStim Slow Release Substrate (SRS) Unit:*** *The Biostimulation Bio-Trap Unit is designed to test the hypothesis that electron donor addition will stimulate growth of dechlorinating bacteria and enhance biodegradation.*
>
> ***BioAug SRS Dehalococcoides-containing microbial consortium (SDC-9TM)Unit:*** *The Bioaugmentation Bio-Trap Unit is designed to evaluate bioaugmentation as a treatment technology. The MICRO sampler contains Bio-Sep® beads pre-inoculated with the desired commercial culture. An amendment supplier may also be used to deliver an amendment.*

The deployment guidance provided by Microbial Insights, Inc. (Appendix F). The units were retrieved after three months on March 9, 2022, and shipped to Microbial Insights laboratory in Knoxville, Tennessee. Upon receiving the results, Montrose utilized the Microbial Insights Database to assess the degree that bioremediation may be successful based on the measured concentrations of contaminant degrading microorganisms. The Microbial Insights Database allows comparison to more than 32,000 unique groundwater, soil, and sediment sample results in order to answer the questions as to whether the result is low, medium, or high.

3.0 RESULTS EVALUATION

3.1 Data Validation

All data reported by Pace (both the mobile lab and Indianapolis) was reviewed by a Montrose data validation specialist. Pace analytical sheets and laboratory packages are provided in Appendix G. Validation was performed in accordance with the Quality Assurance Project Plan to verify compliance with the required analytical protocols and to determine the qualitative and quantitative reliability of the data. A Montrose Level IIA validation was performed for:

- Holding Time Compliance;
- Laboratory Method Blank;
- Field Blank Contamination;
- Initial and Continuing Calibration Accuracy;
- Matrix Spike/Matrix Spike Duplicate Precision and Recovery;
- Field Duplicate Precision;
- Quantitation/Detection Limits;
- Instrument Blanks;
- Laboratory Control Sample; and,
- Laboratory Duplicate Precision.

All data were acceptable as reported with data validation qualifiers, if necessary. The data validation check sheets and the raw data packages (including copies of chain-of-custody documentation) from the laboratory are included in Appendix G and H, respectively.

3.2 Groundwater Monitoring Results

The analytical results for groundwater samples collected during December 8 and 9, 2021, from the on-Site monitoring wells are presented on Table 6. Eleven (11) monitoring wells were sampled: MW-1, MW-2, MW-3, MW-4, MW-7, MW-9, MW-9D (duplicate), MW-10, MW-11, MW-12, MW-13, and MW-14.

The groundwater sampling data was used to develop isoconcentration maps shown on Figures 5, 6, and 7 to further understand the extent and magnitude of the CVOC plume in groundwater. The IDEM VISL based definition 2021 Screening Level Vapor Exposure (SLVE) was used to interpreting the overall extent of the VOCs plume:

		2021 SLVE[2](ug/L)	
Compound	Standard[1](ug/L)	Residential	Industrial
Benzene	5	28	120
Ethyl Benzene	700	-	-
Toluene	1,000	-	-
Xylenes	10,000	-	-
cis-1,2-DCE	70	-	-
Tetrachloroethene	5	6.5	28
TCE	5	9.1	38
Vinyl Chloride	2	2.1	35

1. 2018 Remediation Closure Guide (RCG) GW Tap Limit, 2009 RISC TPH Closure Limits
2. Indiana Department of Environmental Management 2021 Residential Screening Level Vapor Exposure

The IDEM 2021 SLVE was used to interpreting the overall extent of the VOC plumes. The results were also compared to 2018 RCG GW Tap Limits because not all compounds have IDEM 2021 SLVE.

Trichloroethene (TCE) was detected at concentrations above the 2018 SLVE at two (2) of the monitoring well locations (MW-1 and MW-4) during the December 2021 groundwater sampling event. The TCE concentrations detected were 49.1 ug/L at MW-1, and 187,000 ug/L at MW-4. Both the 2021 SLVE residential and Industrial standards were exceeded at MW-1 and MW-4. Several other VOCs were detected in the groundwater sample collected at MW-4 including 1,1-Dichloroethane at 795 J ug/L, 1,1-Dichloroethene at 554 ug/L, Chloroform at 149 J ug/L, cis-1,2-Dichloroethene at 267,000 ug/L, toluene at 239 J ug/L, trans-1,2-Dichloroethene at 1,700 J ug/L and Vinyl Chloride at 22,900 ug/L.

Monitoring wells MW-9 and MW-13 were the only other monitoring wells on Site to contain VOCs (other than TCE) in excess of their compound specific limits. Cis-1,2-DCE and Vinyl Chloride were detected in MW-9 at 3,210 ug/L and 957 ug/L, respectively at MW-9. The 2018 RCG GW Tap Limits for cis-1,2-DCE and VC are 70 ug/L and 2 ug/L, respectively. There are no 2021 SLVE residential and Industrial standards for cis-1,2-DCE. VC was detected at 29.1 ug/L at MW-13. The 2021 SLVE residential and Industrial standards for VC are 2.1 ug/L and 35. Monitoring well MW-13 is above the residential SLVE but below the Industrial SLVE.

3.3 Hydropunch Sampling Results

Locations L3-HP, L4-HP, L6-HP, L7, L8, L8A, L9, L9A, L10, L10A, L11, and L11A were sampled using the Geoprobe Hydropunch procedure. The groundwater samples were analyzed for BTEX, cis-1,2-DCE, PCE, TCE, and VC using a field GC operated by Pace Analytical. The analytical results for groundwater samples collected during October 18 - 19, 2021 are shown on Table 7.

The Hydropunch results were used to refined the locations of the new monitoring wells. In addition, the Hydropunch data was used in conjunction with the monitoring well results to develop the isoconcentration discussed in Section 3.5. The data extracted from Table 7 for use in contouring is summarized below and the results that exceeded the 2021 SLVE residential and Industrial standards for TCE and VC (or cis-1,2-DCE Tap Limit) are shown in bold.

Hydro-punch	*Location*	*TCE (ug/L)*	*Cis-1,2-DCE (ug/L)*	*VC (ug/L)*
L3-HP	Off-Site downgradient and northeast from MW-4 across Kelley Avenue	--	--	--
L4-HP	Off-Site downgradient and east-northeast from MW-4 across Kelley Avenue	--	**180**	**270**
L6-HP	Off-Site upgradient and south-southeast from MW-4 across Kelley Avenue	**6.7**	15	**3**
L7	On-Site upgradient and south of MW-4	**280**	**2,400**	**430**
L8	On-Site upgradient and southwest of MW-4	**66**	**420**	**200**
L8A	L8A was a step-in sample location based on the L8 results.	--	**1,500**	**330**
L9	On-Site cross-gradient and west of MW-4	0.2	8.5	**10**
L9A	L9A was a step-in sample location based on the L9 results.	--	**71**	**75**
L10	On-Site downgradient northwest from MW-4	**0.49**	19	**23**
L10A	L10A was a step-in sample location based on the L10 results.	**510**	**380**	**170**
L11	On-Site downgradient north from MW-4	--	2.7	**2.1**
L11A	L11A was a step-in sample location based on the L11 results.	1.1	21	**14**

To summarize the basic plume configuration, MW-4 is the highest concentration of CVOCs. MW-9 cross-gradient to the east has relatively high concentrations of cis-1,2-DCE and VC. The newly installed monitoring wells are located along the plume edges and bound the plume except upgradient toward the southwest. On-Site monitoring well MW-13 meets the Industrial SLVE for VC, but not the residential SLVE. Sampling the Hydropunch locations and decision tree step-in sample locations provided information on the extent and magnitude of the CVOC plume(s).

3.4 Aqueous Samples from Soil Gas Probes

Aqueous samples were collected at the saturated probe locations L2, L4, L5, L6, L13, L16, and 17 for analysis for BTEX, cis-1,2-DCE, PCE, TCE, and VC using a field GC operated by Pace Analytical. The results are shown on Table 8 and indicate that there are no exceedances of the Target Sub-Slab and Near Source Soil Gas Concentration VISL. Because there were no

exceedances, and because the aqueous samples were collected from vapor pins, this data was not used in developing the isoconcentration maps.

3.5 Extent and Magnitude of VOC/CVOC Impacts

Isoconcentration maps have been developed for the three compounds that exceed the 2018 RCG GW Tap Limit at the Site: Trichloroethene (Figure 5), cis-1,2-Dichloroethene (Figure 6), and Vinyl Chloride (Figure 7). Additional data gathered from the temporary piezometers installed and sampled during the Interim Measures Investigation were used to further define the extents of the groundwater impacts.

As has been observed previously, and as is shown on the isoconcentration maps, the primary area of groundwater impact is localized at MW-4. There is an increase of several orders of magnitude from the upgradient wells (i.e., MW-12) as well as a decrease of several orders of magnitude in the downgradient direction (i.e., MW-3, MW-13, and MW-14). This interpreted area of the groundwater impacts has been largely stable for the previous monitoring events and is comparable for the compounds for which isoconcentration maps were developed. The CVOC concentrations decrease quickly with distance away from MW-4 which indicates that the plume of highly TCE-impacted groundwater is localized and likely contained by low-permeability soils.

Off-Site monitoring well MW-9 contained 1.8 ug/L TCE, 3,210 ug/L cis-1,2-DCE, and 957 ug/L vinyl chloride. The 957 ug/L result for vinyl chloride exceeds the USEPA VISL (55.9 ug/L) and the residential and industrial IDEM SLVEs for vinyl chloride. Groundwater flow is toward the northeast from MW-9 toward MW-11 which is approximately 70 feet downgradient from MW-9. MW-11's groundwater sample was non-detect for CVOCs, including vinyl chloride. The extent of CVOC in groundwater appears to be unbounded to the southeast, but given the low permeability of the subsurface and low rate of groundwater velocity, additional delineation of off-Site impacts at MW-9 is not needed for the purpose of developing and implementing Interim Measures on-Site.

A future work plan will include language to perform routine monitoring of MW-1, MW-9, MW-13, and other wells on an regular basis, and potentially additional delineation, if warranted.

It should be noted that an additional area of CVOC groundwater impact is present around monitoring well MW-1 at the north extent of the Site. TCE (49.1 ug/L) in exceedance of the screening level (5 ug/L) has been noted in this well during the December 2021 event, as well as several historical sampling events. However, the surrounding wells (MW-2, MW-7, and MW-10) do not show a corresponding elevated result. Additional sampling and/or investigation to define the extent of trichloroethene (TCE) contamination in the area of groundwater monitoring well MW-1 will be considered under a separate future work plan.

3.6 Soil Sampling Results

During monitoring well installation, a soil sample was collected from the auger tailings from the 2 to 3-foot depth interval from MW-11, MW-12, and MW-13 for analysis of VOCs and lead. A sample could not be collected from the installation of MW-14 due to no tailings being generated. The

results are presented on Table 9. No VOCs above IDEM RISC Screening levels were detected in the soil samples. The sample from MW-12 contained a lead level of 560 mg/kg which exceeds the Residential IDEM RISC Screening level for lead of 400 mg/kg but is below the commercial/industrial screening level of 800 mg/kg.

3.7 Outfall Z Results

The results of the samples collected at Outfall Z are presented on Table 10. The screening criteria utilized for Outfall Z was the 2021 IDEM RCG GW Tap Limit for the surface water and the RCG Soil Direct Contact Residential and Non-Residential Limit for the sediment. The lead results were found to be below the appropriate screening levels. No VOCs were detected in the sediment sample. Two VOCs were detected in the surface water sample: cis-1,2-Dichlorethene and Vinyl Chloride at concentrations of 5.3 and 2.1 ug/L, respectively. The Vinyl Chloride result is just above the screening level of 2 ug/L.

3.8 Soil Gas Results

Soil gas results were compared to screening levels derived using the USEPA VISL calculator for "Near Source Soil Screening" HQ=1.0 and Target Risk $1x10^{-5}$ which are shown on the following table:

USEPA Vapor Intrusion Screening Level (VISL)			
Near Source Soil Screening" HQ=1.0 and Target Risk $1x10^{-5}$			
	Target Sub-Slab and Near-source Soil Gas Concentration VISL (ug/M^3)	Target Groundwater Concentration (ug/L)	Is Target Groundwater Concentration < MCL? (Cgw < MCL?)
Trichloroethylene (TCE)	69.5	5.18	No (5)
Tetrachloroethylene (PCE)	1,390	57.6	No (5)
1,2-dichloroethane (I,2-DCE)	-	-	-
Vinyl Chloride (VC)	55.9	1.47	Yes (2)
Benzene	120	15.9	No (5)
Toluene	174,000	19,200	No (1,000)
Ethyl Benzene	374	34.9	Yes (700)
Xylenes	3,480	385	Yes (10,000)

Notes:
1. Output generated 27AUG2021:10:49:19
2. There is no VISL value for cis I,2-DCE on the EPA VISL website or in IDEM's 2021 Screening Level Vapor Exposure. Source: https://epa-visl.ornl.gov/cgi-bin/visl_search
3. [1] No VISL standard exists for cis-1,2-Dichloroethene

A total of twelve (12) soil gas samples were collected and analyzed for BTEX, cis-1,2-DCE, PCE, TCE, and VC using a field GC operated by Pace Analytical. Locations L1, L3, L14, L15, and L18 were collected from soil vapor pins (after helium leak testing) and the results are shown on Table 11. A duplicate sample was taken of L3. Geoprobe PRT system of sample collection was used to collect soil gas samples at a depth of 1.5 feet at locations L2, L4, L5, L6, L13, L16, and 17. Figure 8 shows the locations of the soil gas sampling and any positive detections. The results are shown on Table 12. The results on Table 11 and Table 12 indicate no exceedances of the Target Sub-Slab and Near Source Soil Gas Concentration VISL.

3.9 Utility Bedding Results

Montrose installed three (3) sampling ports within the sewer utility bedding along the east side of Kelley Avenue (locations L16, L17, and L18). No unique utility bedding fill material (i.e., sand/gravel) was identified during the installation of these ports, and it is Montrose's observation that the utility trench was backfilled using the local excavated material. The results are shown on Table 12 and Table 13 and indicate that there are no exceedances of the Target Sub-Slab and Near Source Soil Gas Concentration VISL.

3.10 Manhole Vapor Sampling Results

The ten (10) manhole sample results are shown on Table 13. The manholes are designated as Manhole B, C, E, F, G, H, I, J, L, and MH-10. All of the ten sampled manholes were found to exceed the Target Sub-Slab and Near Source Soil Gas Concentration VISL for TCE (69.5 ug/m3). Additionally, five of the ten sampled manholes exceeded the VISL for VC (55.9 ug/m3). All manholes had detectable concentrations of DCE ranging from 23 to 8,900 ug/m3. Other compounds detected in at least one manhole sample include Chloroform, Tetrachloroethene, and Toluene.

The vapor concentrations in manholes near the northeast corner of the Site (Manhole J, L, and MH-10) reported TCE concentration roughly five times higher than cis-1,2-DCE and low or no concentration of VC. Manhole J had the highest concentration of TCE at 5,000 ug/m3. Vapor results in manholes along North Kelley Avenue reported TCE concentrations lower than the cis-1,2-DCE in six out of seven samples. The following information was obtained by former employee of the Site and provided to Montrose.

Manhole Information Summary					
Man-Hole	Street	Type	Outlet & Flow Direction	Manhole Inlets	Notes
A	Kelley	Storm	North	South	NS–Open Grate
Man-Hole	Street	Type	Outlet & Flow Direction	Manhole Inlets	Notes
B	Kelley	Sanitary	North	South	Sampled
C	Kelley	Sanitary	North	South & East	Sampled
D	Kelley	Storm	North	South & SW & SE	NS-Open
E	Kelley	Sanitary	North	South & Southwest	Sampled
F	Kelley	Sanitary	Northeast	South	Sampled
G	Kelley	Sanitary	Northeast	SWW & SW & (2) East	Sampled
H	Kelley	Sanitary	Northwest	Southwest	Sampled
I	Kelley	Sanitary	North	Southeast	Sampled
J	Washington	Sanitary	West	East	Sampled
K	Washington	Storm	West	SW & (2) SSW & Northeast	NS–Open Grate
L	Washington	Sanitary	West	NE & (2) South SE	Sampled
M	Hoke	Storm	East	Northwest	NS–Open Grate
N	Hoke	Storm	Southeast East	Northwest West	NS–Open Grate
Z	Kelley	Storm	North	South	Outfall Sampled
MH-10	On-Site	Storm	West	South & West	Sampled

Figure 9 shows the location of the manhole, the location of the sanitary sewer and storm water buried utilities, and the direction of flow based on the information reviewed by Montrose.

3.11 Groundwater Flow Discussion

In order to calculate the rate of groundwater movement (or groundwater horizontal velocity), the following properties must be understood: 1) the horizontal hydraulic conductivity, 2) the groundwater gradient, and 3) the porosity of the subsurface.

3.11.1 Horizontal Hydraulic Conductivity

Hydraulic conductivity is a function of the ability of materials to convey quantity of groundwater under a hydraulic gradient with respect to time. Hydraulic conductivity is a property of soil that describes the ease with which a fluid can move through pore spaces. Slug tests were conducted

to calculate the horizontal hydraulic conductivity (K) proximal to six on-Site groundwater monitoring wells. The results shown on Table 3.

3.11.2 Groundwater Gradient

The hydraulic gradient represents the pressure head differential between two points which keeps groundwater moving from one point to another. As stated in Section 1.3, the well gauging data collected on December 8, 2021, indicates the hydraulic gradient in the central portion of the Site is 0.007 toward the north northwest. In the northern portion of the site near MW-1, MW-2, and MW-7, the hydraulic gradient steepens slightly to 0.013 and turns to the north northeast. On the eastern portion of the Site in the area of groundwater contamination near MW-4, groundwater flows north under a hydraulic gradient of 0.013. In the area along North Kelley Avenue, the groundwater flow turns to the northeast under a gradient of 0.010.

3.11.3 Porosity

Porosity is the ratio of openings and voids to the total volume of geologic material. Clay is the most porous sediment but is the least permeable. Clay usually acts as an aquitard, impeding the flow of water. The porosity of clay can vary from 40 to 70 percent and silt porosity ranges from 35 to 50 percent (Freeze, A. and Cherry, J., *Groundwater,* Prentice Hall, Inc., Englewood Cliffs, New Jersey, 1979, p. 37.). According to the Wikipedia entry (http://en.wikipedia.org/wiki/Porosity): "Typical bulk density of clay soil is between 1.1 and 1.3 g/cm^3. This calculates to a porosity between 0.58 and 0.51." Because of the presence of silts and occasional sand in the clay soil noted in the well logs and boring logs for this Site, Montrose assumed a porosity of 0.50 to calculate groundwater velocity at the site.

3.11.4 Groundwater Velocity

The rate at which groundwater will travel horizontally, or the horizontal groundwater velocity (V), can be estimated using the following equation:

$$V = \frac{K \times i}{n}$$

where: K= Hydraulic Conductivity (feet/day)
i = Hydraulic gradient (ft/ft)
n = effective porosity

At MW-1, the groundwater velocity is:

$$V = \frac{0.0088 \text{ feet/day} \times 0.013 \text{ feet/feet}}{0.50}$$ or 2.288×10^{-4} feet per day

This is equivalent to 8.351×10^{-2} feet per year. At this velocity, the groundwater would need a period of 12 years in order to flow a distance of 1.0 foot. Using the same formula for the remaining wells that were slug tested yields the following summary of groundwater velocities at the Site:

Well	Calculated K (feet/day)	Gradient I (feet/feet)	Groundwater Velocity (foot/day)	Groundwater Velocity (foot/year)	Time to Travel 1.0 foot Distance in Subsurface (years)	Flow Direction
MW-1	0.0088	0.013	0.0002288	0.083512	12	NNE
MW-3	0.0078	0.013	0.0002028	0.074022	13.5	NNE
MW-4	0.0033	0.010	0.000066	0.02409	41.5	NE
MW-7	0.0004	0.013	0.0000104	0.003796	263.4	NNW
MW-9	0.0015	0.010	0.00003	0.01095	91.3	NE
MW-10	0.0012	0.013	0.0000312	0.011388	87.8	NNE

Note: Based on porosity n = 0.50

The shallow groundwater velocities at this Site are extraordinary slow. According to the USGS, a groundwater velocity of 1.0 foot per day is a high velocity and groundwater velocities can be as low as 1.0 foot per year or 1.0 foot per decade. The groundwater velocities of one foot per several decades or longer indicates that the groundwater at the Site is "old" groundwater, meaning there has been long period since the water recharged the subsurface.

The high-age zone of groundwater is in an unconsolidated aquifer with a laterally extensive low-permeability unit (glacial tills) that also have a low groundwater gradient. This high-age zone of groundwater is not a hydraulic stagnation point but is associated with the 65 to 190-foot thick till cap overlaying the Tipton Complex Aquifer System. In this setting, it is not uncommon for overturned groundwater ages, which is where younger groundwater is under older groundwater. The significance is that high age groundwater accumulates and contains contaminants.

3.12 Microbial Insights Results

The assemblies deployed in all three wells consisted of three Bio-Trap units each: (i) a control monitored natural attenuation (MNA) unit with no exogenous amendment, (ii) a BioStim unit amended with SRS as the electron donor, and (iii) a BioAug unit amended with SRS as the electron donor and the exogenous SDC-9 dechlorinating bacterial culture. The results from the In Situ Microcosm study are summarized on Table 14. The following information is summarized from the Microbial Insights report contained in Appendix F.

MW-1

The microbial and functional gene data indicate that the potential for the complete reductive dechlorination of PCE and TCE to ethene at well MW-1 is moderate under MNA conditions, low in the BioStim unit, and high under the BioAug condition assessed. As previously stated, the TCE impact at MW-1 appears to be discontinuous with the CVOC plume at MW-4. MW-1 is over 500 feet from MW-4 and it is unlikely that the TCE in MW-1 is a result of contaminant transport by groundwater flow down hydraulic gradient.

MW-4

The results indicate that the both SRS amendment and SDC-9 bioaugmentation stimulated the overall growth of DHC and functional genes. The results suggest that complete reductive dechlorination to ethene occurred in all three Bio-Trap ISM units during the deployment period.

MW-9

The results suggest that complete reductive dechlorination to ethene occurred in all three Bio-Trap ISM units during the deployment period. The results indicate an increase in the genetic potential for the complete anaerobic reductive dechlorination of PCE and TCE under bioaugmentation with SDC-9 and SRS amendment at this well location.

4.0 CONCEPTUAL SITE MODEL

A Conceptual Site Model (CSM) outlines potential source areas, transport mechanisms, environmental media affected, potential exposure pathways, and potential exposure routes to potential receptors. The CSM considers current Site conditions and surrounding land use, as well as the most likely future conditions and land use. The CSM is prepared in accordance with IDEM technical guidance created February 14, 2014.

4.1 Site Setting

The Site is situated in the 65 to 190-foot thick till cap overlaying the Tipton Complex Aquifer System. Nearly the entire site is covered by pavement or building pads that were associated with previous site manufacturing operations. Soils are brown silt loam surface layer on silty clay loam to clay loam subsoil. Evidence of shallow filling (typically less than 1 to 2 feet) was observed beneath most of the paved areas and building pads typically in the form of crushed stone that is consistent with material that would be utilized for pavement and building pad subbase. The depth to the water table measured in the fourteen (14) monitoring wells at the site range from 1.89 to 8.83 feet below top of casing. The shallow groundwater velocities are extraordinary slow, indicating the groundwater is old; high-age groundwater accumulates and contains the migration of contaminants.

4.2 Sources of Contaminants

4.2.1 Former Operations

In 1963, General Battery Corporation began the manufacturing of lead-acid batteries for use in automotive, golf cart, marine and industrial applications. At its peak the facility produced over 12,000 automotive batteries per day. The battery manufacturing process used metallic lead that was received at the facility, melted, and cast into grids and posts.

Based on the documented operational history and an understanding of the character of lead mobility and transport, the most significant potential sources of contamination at the facility during its operational history were erosion and transport of lead-bearing solids by storm water runoff; fugitive dust emissions from traffic and production areas; uncovered waste pile areas or miscellaneous spills. In October 2012, the facility was decontaminated followed by demolition of the above grade structures. The decontamination and demolition project was completed in January 2013.

4.2.2 Soil

Comprehensive RI soil sampling across the Site indicates that elevated lead in soil generally is present to the south and east of the former manufacturing areas, in addition to the manufacturing portion of the site. The detections found above the IDEM RISC Non-Residential Direct Contact Standard are only found within the top 2 feet below the surface in shallow fill. Arsenic concentrations in soil are below IDEM RISC Non-Residential Direct Contact Standard, with the

exception of two individual samples found within the top 2 feet below the surface in shallow fill. As stated, nearly the entire site is covered by pavement or building pads. The Site is situated within a fenced and secured area to prevent unauthorized access.

4.2.3 Sediment

There are no surface water features or wetlands on the site. Sediment that had accumulated in the storm water manholes and pipes was flushed and cleaned during site demolition in 2012. During the SSI, sediment samples collected from the stormwater piping network indicated concentrations of lead in two of four locations in excess of the IDEM RISC Non-Residential Direct Contact Standard (800 mg/kg).

During the 2021 IMI, a sediment sample was collected adjacent to Outfall Z and the lead result was 105 mg/kg. No VOCs were detected in the sediment sample. Two VOCs were detected in the surface water sample: cis-1,2-Dichlorethene and Vinyl Chloride at concentrations of 5.3 and 2.1 ug/L, respectively. The Vinyl Chloride result is just above the screening level of 2 ug/L.

4.2.4 Groundwater

Previous investigations of groundwater in May and July 2018 showed impact to groundwater in on-Site monitoring wells from VOCs and CVOCs. Recently, the TCE concentrations detected were 49.1 ug/L at MW-1, and 187,000 ug/L at MW-4. Off-Site monitoring well MW-9 contained 1.8 ug/L TCE, 3,210 ug/L cis-1,2-DCE, and 957 ug/L vinyl chloride. The CVOC concentrations decrease quickly with distance away from MW-4 which indicates that the plume of highly TCE-impacted groundwater is localized and likely contained by low-permeability soils. The 957 ug/L result for vinyl chloride exceeds the USEPA VISL (55.9 ug/L) and the residential and industrial IDEM SLVEs for vinyl chloride. Groundwater flow is toward the northeast from MW-9 toward MW-11 which is approximately 70 feet from MW-9 and is non-detect for CVOCs, including vinyl chloride. The extent of CVOC in groundwater appears to be unbounded to the southeast, but given the low permeability of the subsurface and low rate of groundwater velocity, additional delineation of off-Site impacts at MW-9 is not needed for the purpose of developing and implementing Interim Measures on-Site. A future work plan will include language to perform routine monitoring of MW-9 and other wells on an regular basis, and potentially additional delineation, if warranted.

The source of CVOCs is suspected to be associated with AOC-3/UST-2 because CVOC impacts were within 20 feet of UST-2. The rate of groundwater flow is extremely slow due to laterally extensive low-permeability glacial tills combined with a low groundwater gradient. Slug test data indicates that it can take decades for groundwater to flow 1.0 foot horizontally at the Site. Discontinuous sand stringers, and zones of preferred pathways may provide for faster localized groundwater transport but this is not evident based on the existing monitoring well network, measured potentiometric groundwater surface, and interpreted isoconcentration maps.

The TCE impact at MW-1 (49.1 ug/L) appears to be discontinuous with the impact at MW-4. MW-1 is over 500 feet from MW-4 and it appears unlikely that the TCE in MW-1 is a result of

contaminant transport by groundwater flow down hydraulic gradient. The wells surrounding MW-1 (MW-2, MW-7, and MW-10) do not show a corresponding elevated result. Additional sampling and/or investigation to define the extent of trichloroethene (TCE) contamination in the area of groundwater monitoring well MW-1 will be considered under a separate future work plan.

The In Situ Microcosm study suggests there is a strong potential for the complete anaerobic reductive dechlorination of PCE and TCE under bioaugmentation with SDC-9 and SRS amendment at this Site. The complicating issue may be that the subsurface may not be able to adequately transmit amendments through the area of impact given the extensive low-permeability soil in the subsurface. Future sampling and/or investigations will be necessary to evaluate and identify the permanent solutions to assure protection of groundwater at, and beyond, the property boundary and also identify how potential exposures to off-site receptors will be mitigated, if warranted.

4.2.5 Soil Gas

The results of twelve (12) soil gas samples indicate that there are no exceedances of the Target Sub-Slab and Near Source Soil Gas Concentration VISL. Locations L5 and L17 were close to off-Site monitoring well MW-9 and there were no CVOVs in soil gas these locations. As stated, there is an exceedance of IDEM Vapor Intrusion screening levels in MW-9 for vinyl chloride.

4.2.6 Sewer Gas

The ten (10) sewer gas samples collected from manhole locations exceeded the Target Sub-Slab and Near Source Soil Gas Concentration VISL for CVOCs. Manhole J had the highest concentration of TCE at 5,000 ug/m^3. Manhole F had the highest concentration of cis-1,2-DCE at 8,900 ug/m^3 and the highest concentration of VC at 1,500 ug/m^3. If the on-Site CVOC-impacted groundwater is the source of CVOCs in the sewer, the mechanism of CVOC entry into the interior of the sewer is unknown. The source does not appear to be soil gas infiltration. No unique utility bedding fill material (i.e., sand/gravel) was identified during the investigation at three locations and it appears the utility trench was backfilled and compacted using the local excavated material when the sewer line was installed. The sanitary sewer lines pass through CVOC impacted groundwater near the intersection of North Kelley Avenue and East McClurg Street. The soil gas samples taken adjacent to (L18) or directly above (L16 and L17) the sewer pipe did not contain soil gas results above VISL. No CVOCs were detected in L16, L17, or L18.

It is possible that impacted groundwater from the Site is leaking into the sewer and volatizing the CVOC vapors into the sewer. It is also possible that the CVOCs in the interior of the sewer piping is from an off-Site source. The issue of CVOC vapors in the sewer system is complex because the sewer is the receptor of pollutants from a large number of potential sources.

The soil gas samples taken adjacent to the sewer pipe did not contain soil gas results above VISL. CVOC vapors in sewer lines should not be a source for indoor CVOC vapor intrusion because modern plumbing systems has sewer traps to prevent gases contained in wastewater, the public sewer, or septic tanks from escaping and entering residential housing. A prudent method to further

investigate for evidence of COVC impacted groundwater from potentially infiltrating the sewer would be to run a camera through the sewer, possibly after water-jetting the line, to assess for potential pipe connections from the Site or obvious breaches in the sewer line. This can be considered for inclusion in the Interim Measures Work Plan.

4.3 Pathways

A pathway evaluation identifies which exposure pathways are open and which are incomplete. Potential complete exposure pathways to regulated substances located in soil and groundwater on the Site include:

- Direct contact (inhalation, ingestion) to soil;
- Soil leaching to groundwater;
- Groundwater ingestion; and
- Vapor Intrusion

Shallow soil ingestion, inhalation, and dermal contact is limited to construction worker scenarios and because the impacts are located under pavement, building slabs, or other caps. The potential direct contact pathway to soil is deemed incomplete based on capping and PPE procedures which limit exposure to soil encountered in excavations. Additionally, appropriate institutional and deed controls can be put into place to manage the construction worker exposure scenario.

Soil leaching to groundwater has been assessed through the installation and sampling of the network of groundwater monitoring wells. Elevated lead levels in soil at depth (1 to 2 ft below ground surface), are limited to the a few samples to the south and west of the manufacturing area. Soil leaching is not considered a complete pathway because of the shallow nature of the contaminant, the Site capping, the slow rate of groundwater migration, and the fact that no lead over screening levels was detected in groundwater samples from monitoring wells.

Groundwater in on-Site monitoring wells is impacted with VOCs and CVOCs. Groundwater was evaluated to assess the CVOC plume, groundwater flow direction, and groundwater velocity to evaluate the potential for groundwater in exceedance of the standards to migrate off-site. The groundwater flow rate is extremely slow due to laterally extensive low-permeability glacial tills combined with a low groundwater gradient. Data indicates that it can take decades for groundwater to flow 1.0 foot horizontally at the Site. The Site was supplied with potable water by the City of Frankfort municipal supply (Frankfort Water Works). The municipal water supply lines to the Site were cut and capped in October 22, 2012 as part of the demolition. Due to the plume stability and lack of groundwater users, groundwater ingestion is not a complete pathway.

Vapor intrusion (VI) typically is risk driver for sites with chlorinated impacts. This Site is vacant and all aboveground structures have been demolished. Practical experience has indicated that VI stems from relatively significant sources in close proximity to the slab or the presence of preferential pathways (e.g., sumps, pipes, or openings). There is an off-Site exceedance of IDEM Vapor Intrusion screening levels in MW-9 for vinyl chloride. This exceedance was addressed by soil gas sampling in the vicinity of MW-9 to further assess the potential for vapor exposure.

Locations L5 and L17 were close to off-Site monitoring well MW-9 and there were no CVOVs in soil gas these locations. The results of twelve (12) soil gas samples indicate that there are no exceedances of the Target Sub-Slab and Near Source Soil Gas Concentration VISL. Based on the data collected, the exposure pathway for VI from the Site appears to be incomplete.

CVOC vapors in sewer lines should not be a source for indoor CVOC vapor intrusion because modern plumbing systems has sewer traps to prevent gases contained in wastewater, the public sewer, or septic tanks from escaping and entering residential housing.

4.4 Receptors

4.4.1 On-Site Receptors

The future construction worker scenario is the only contact with a receptor to on-Site CVOC impacts. The Site is essentially capped. As a technology, capping can be quite effective at interrupting the human health exposure.

4.4.2 Off-Site Receptors

Residential properties lie across the street from the Site on North Hoke and Kelly Avenues; as well as on the opposite side of the railroad tracks to the south. Michigantown Road is immediately north of the Site and has several light industrial/ commercial properties located in proximity to the Site.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Groundwater

Groundwater in on-Site monitoring wells is impacted with VOCs and CVOCs. Recently, the TCE concentrations detected were 49.1 ug/L at MW-1, and 187,000 ug/L at MW-4. Off-Site monitoring well MW-9 contained 1.8 ug/L TCE, 3,210 ug/L cis-1,2-DCE, and 957 ug/L vinyl chloride. The TCE impact at MW-1 appears to be discontinuous with the CVOC plume at MW-4. MW-1 is over 500 feet from MW-4 and it is unlikely that the TCE in MW-1 is a result of contaminant transport by groundwater flow down hydraulic gradient. The CVOC concentrations decrease quickly with distance away from MW-4 which indicates that the plume of TCE impacted groundwater is localized and likely contained by low-permeability soils. The source of CVOCs is suspected to be associated with AOC-3/UST-2 because CVOC impacts were within 20 feet of UST-2.

Groundwater was evaluated to assess the CVOC plume, groundwater flow direction, and groundwater velocity to evaluate the potential for groundwater in exceedance of the standards to migrate off-site. The groundwater flow rate is extremely slow due to laterally extensive low-permeability glacial tills combined with a low groundwater gradient. Data indicates that it can take decades for groundwater to flow 1.0 foot horizontally at the Site, and such high-age groundwater will accumulate and contain contaminants. The In Situ Microcosm study suggests there is a strong potential for the complete anaerobic reductive dechlorination of PCE and TCE under bioaugmentation with SDC-9 and SRS amendment at this Site. The issue is the ability of the subsurface to transmit amendments through the area of impact given the extensive low-permeability soil in the subsurface.

Soil Gas

The results of twelve (12) soil gas samples indicate that there are no exceedances of the Target Sub-Slab and Near Source Soil Gas Concentration VISL.

Sewer vapors

The sewer gas samples collected from manhole locations exceeded the Target Sub-Slab and Near Source Soil Gas Concentration VISL for CVOCs. No unique utility bedding fill material (i.e., sand/gravel) was identified during the investigation at three locations and it appears the utility trench was backfilled and compacted using the local excavated material. The soil gas samples taken adjacent to the sewer pipe did not contain soil gas results above VISL. The issue of CVOC vapors in the sewer system is complex because the sewer is the receptor of pollutants from a large number of potential sources.

CVOC vapors in sewer lines should not be a source for indoor CVOC vapor intrusion because modern plumbing systems has sewer traps to prevent gases contained in wastewater, the public sewer, or septic tanks from escaping and entering residential housing.

In Situ Microcosm study

The In Situ Microcosm study suggests there is a strong potential for the complete anaerobic reductive dechlorination of PCE and TCE under bioaugmentation with SDC-9 and SRS amendment at this Site. The complicating issue may be that the subsurface may not be able to adequately transmit amendments through the area of impact given the extensive low-permeability soil in the subsurface.

5.2 Recommendations

Elevated lead in the shallow surface soils at the surface water discharge locations should be delineated and removed, or stabilized using capping, fencing, silt fence or similar techniques as Corrective Action alternatives. Additionally, appropriate institutional and deed controls can be put into place.

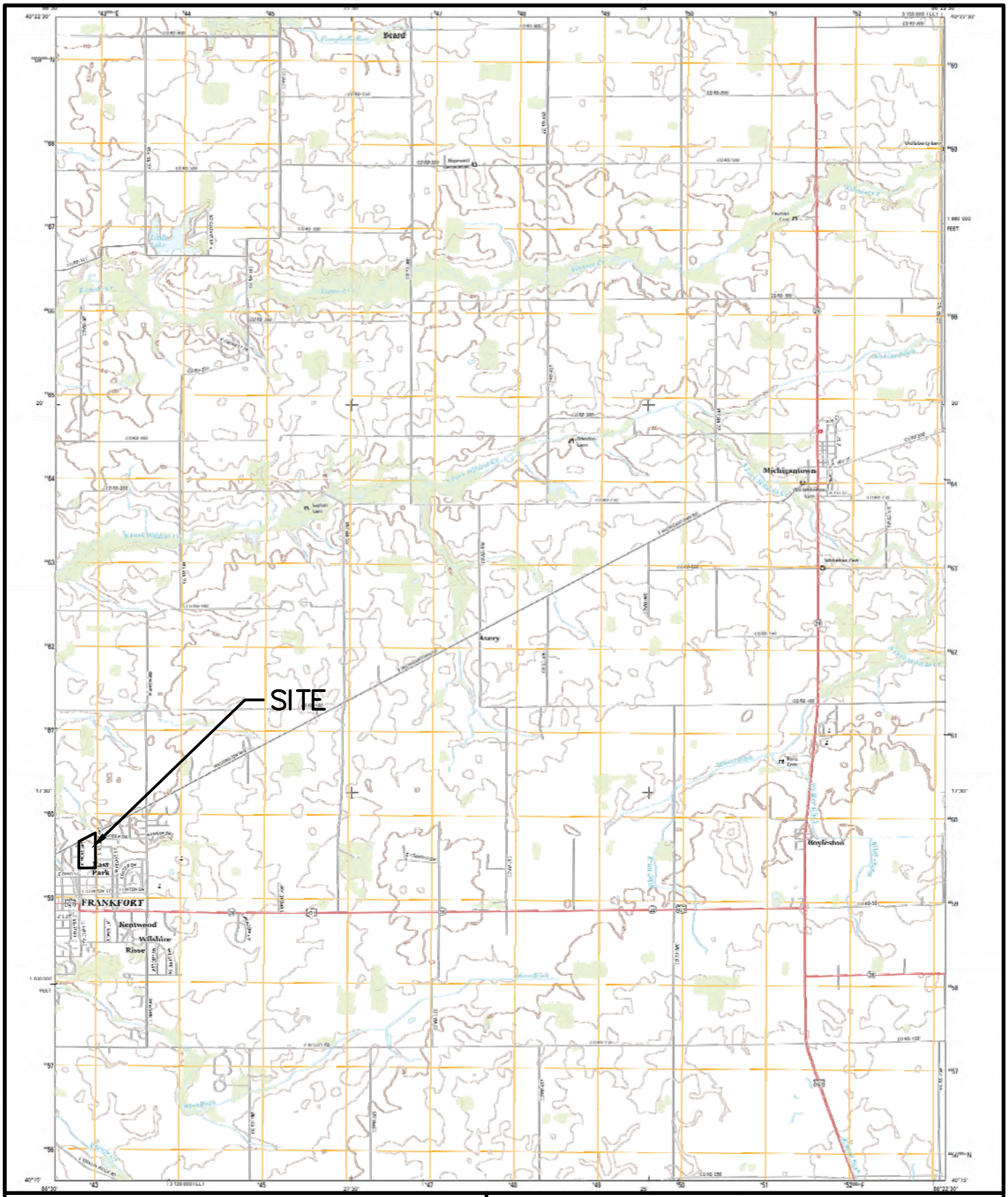
Based on the results of this study, the CVOC Remediation Evaluation dated January 19, 2021, will be revisited to further evaluate the potential groundwater remedial actions that may be employed at the Site.

Additional sampling and/or investigation to define the extent of trichloroethene (TCE) contamination in the area of groundwater near monitoring wells MW-1 and MW-13 will be considered under a separate future work plan.

Future sampling and/or investigations will be necessary to evaluate and identify the permanent solutions to assure protection of groundwater at, and beyond, the property boundary and also identify how potential exposures to off-site receptors will be mitigated, if warranted.

A prudent method to further investigate for evidence of COVC impacted groundwater from potentially infiltrating the sewer would be to run a camera through the sewer, possibly after water-jetting the line, to assess for potential pipe connections from the Site or obvious breaches in the sewer line. This can be potentially be conducted during Interim Measures or in a subsequent post Interim Measures investigation phase.

FIGURES



USGS TOPOGRAPHIC MAP

EXIDE TECHNOLOGIES
FRANKFORT, INDIANA

PROJECT ENGINEER:	PGS	SCALE:	NTS
CHECKED BY:	JSD	PROJECT NUMBER:	2011-2678
DRAWN BY:	KEZ	DATE:	FIGURE: 1

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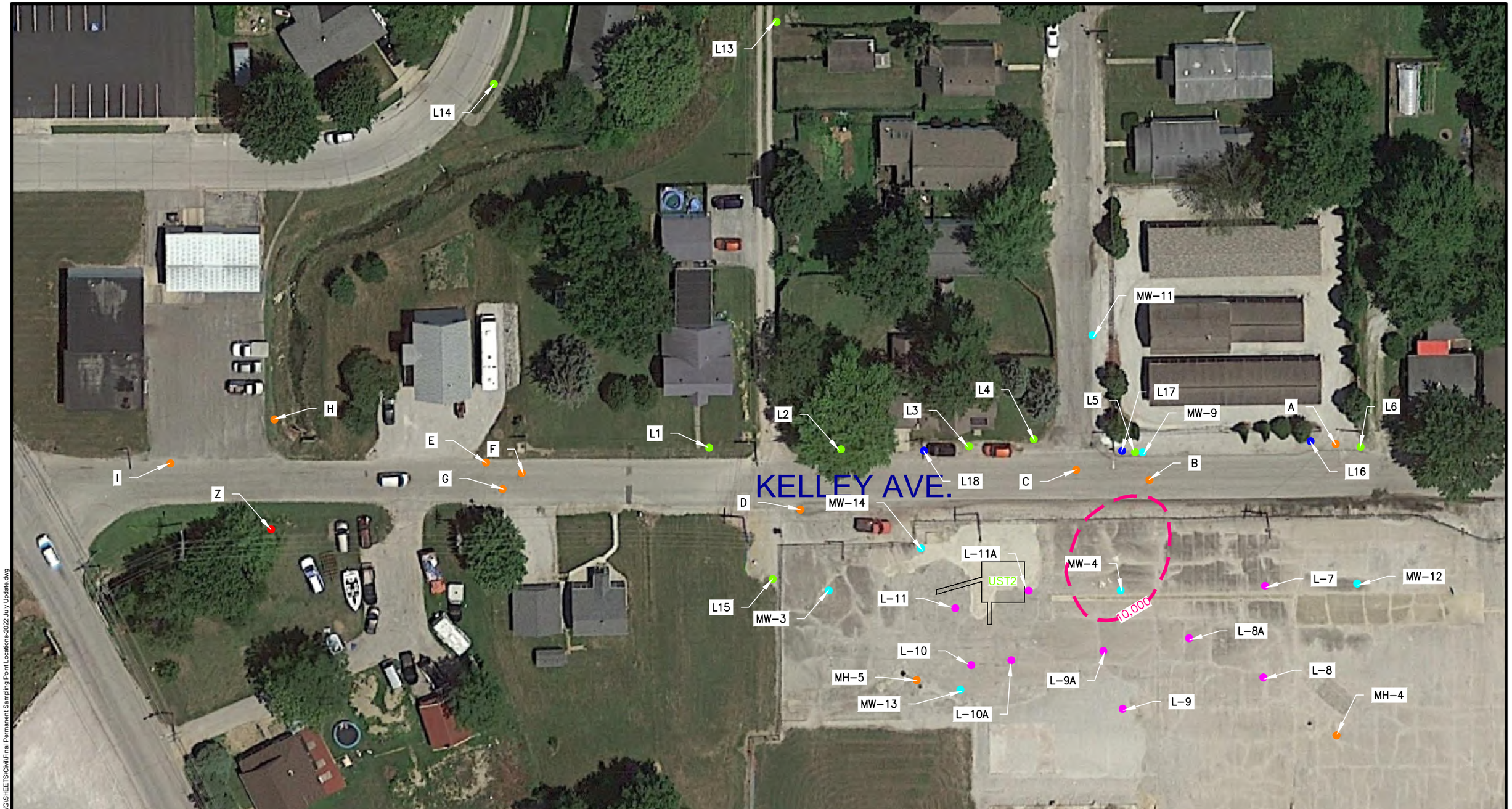
F:\Projects\2011\20112678-Exide Frankfort Decon Demo\Cad\UST Removal\Figure 1 - USGS Topo.dwg



LEGEND:

- 10,000 — TCE ISOCONCENTRATION DECEMBER 2021
- P2H — 2018 HYDROPUNCH POINT
- FORMER UST-2 AREA
- 2021 HYDROPUNCH POINT
- EXISTING MANHOLE
- EXISTING MONITORING WELL
- EXISTING SOIL GAS SAMPLING POINT
- EXISTING SEWER BEDDING GAS SAMPLING POINT
- EXISTING OUTFALL

0 25 50 100

1 INCH = 50 FT

EXIDE TECHNOLOGIES

555 HOKE AVENUE
FRANKFORT, INDIANA

PERMANENT GROUNDWATER AND SOIL VAPOR SAMPLING POINTS

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A MONTROSE ENVIRONMENTAL GROUP COMPANY
1055 ANDREW DRIVE, SUITE A
WEST CHESTER, PENNSYLVANIA 19380
Tel: 610.840.9100 Fax: 610.840.9199 Web: www.advancedgeoservices.com

Scale	1" = 50'
Drawn By:	MCB
Checked By:	GS
Project Mgr.:	PGS
Originated By:	GS
Project No.:	20204123
Drawing Date:	AUGUST 2021
Sheet No.:	2 OF 3
Revision Number	0

FIGURE 2

F:\Projects\2020\20204123 - Exide Trust - Frankfort\CAD\DWG\SHEETS\Civil\Final Permanent Sampling Point Locations-2022 July Update.dwg

LEGEND:

- EXISTING MONITORING WELL
- EXISTING STORMWATER MANHOLE
- EXISTING SANITARY MANHOLE
- EXISTING SANITARY LINE AND MANHOLES
- EXISTING STORMWATER LINE AND MANHOLES
- EXISTING WATER LINE AND HYDRANT

NOTE: LINE LOCATIONS ARE APPROXIMATE AND TAKEN FROM MAPS PROVIDED BY THE CITY OF FRANKFORT'S MUNICIPAL UTILITY SUPERINTENDENTS.

0 25 50 100

1 INCH = 50 FT

EXIDE TECHNOLOGIES

555 HOKE AVENUE
FRANKFORT, INDIANA

PROPOSED MANHOLE VAPOR WASHINGTON AVENUE LOCATIONS

ADVANCED GeoServices
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1055 ANDREW DRIVE, SUITE A
WEST CHESTER, PENNSYLVANIA 19380
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Scale:	1" = 50'
Drawn By:	MCB
Checked By:	GS
Project Mgr.:	PGS
Originated By:	GS
Project No.:	20204123
Drawing Date:	AUGUST 2021
Sheet No.:	3 OF 3
Revision Number:	0

FIGURE 3

F:\Projects\20202020204123 - Exide Trust - Frankfort\CAD\DWG\SHEETS\Civil\Final Permanent Sampling Point Locations-2022 July Update.dwg

GROUNDWATER FLOW DIRECTION

848 GROUNDWATER CONTOURS

MW-1 MONITORING WELL

0 75 150 300

1 INCH = 150 FT

EXIDE FRANKFORT

555 HOKE AVENUE
FRANKFORT, INDIANA

POTENTIOMETRIC SURFACE MAP FOR SHALLOW GROUNDWATER- DECEMBER 2021

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Scale:	1" = 150'
Drawn By:	C.E.P.
Checked By:	G.S.
Project Mgr.:	J.S.D.
Originated By:	S.D.W.
Project No.:	2020-4123
Drawing Date:	12/15/21
Sheet No.:	1 OF 1
Revision Number:	0

FIGURE 4

F:\Projects\2020\2020412 3 - Exide Trust - Frankfort\CAD\DWG\SHEETS\Civil\GW Contours December 2021.dwg

KELLEY AVE.

MW-11
ND

L4
L5
L17
MW-9
1.8 J
A
L6
L2
L1
L18
L3
E
F
L3-HP
ND
B
L16
L6-HP
6.7
C
G
D
MW-14
ND
L4-HP
ND
3.3
L11A
UST2
MW-4
187,000
L7
280
MW-12
0.46 J
MW-6
ND – 11/09/19
L15
MW-3
ND
L11
ND
10,000
500
100
L10
ND
L10A
510
L8A
ND
L8
66
MH-5
L9A
ND
MW-13
0.43 J
L10
0.49 J
L9
0.2 J
MH-4
ND
MW-2
841
842
843
844
845
846
847
848
648
650
657

LEGEND:

- 10,000 — TCE ISOCONCENTRATION 4TH QUARTER 2021
- 843 — GROUNDWATER POTENTIOMTRIC SURFACE 4TH QUARTER 2021
- GROUNDWATER FLOW DIRECTION
- FORMER UST-2 AREA
- EXISTING MANHOLE
- EXISTING MONITORING WELL
- EXISTING SOIL GAS SAMPLING POINT
- EXISTING SEWER BEDDING GAS SAMPLING POINT
- TEMPORARY HYDROPUNCH SAMPLE LOCATION

CONCENTRATIONS IN MICROGRAMS PER LITER (ug/L)

ND – NON DETECT RESULT
J – ESTIMATED

HYDROPUNCH SAMPLES COLLECTED DURING OCTOBER 18–19, 2021 SAMPLING EVENT.

GROUNDWATER POTENTIOMETRIC CONTOURS BASED ON MEASUREMENTS COLLECTED ON DECEMBER 8, 2021.

GROUNDWATER SAMPLE RESULTS COLLECTED FROM DECEMBER 8–9, 2021 EXCEPT AS NOTED.

0 25 50 100

1 INCH = 50 FT

EXIDE TECHNOLOGIES
555 HOKE AVENUE
FRANKFORT, INDIANA

TRICHLOROETHENE ISOCONCENTRATION MAP INTERIM MEASURES INVESTIGATION SAMPLING

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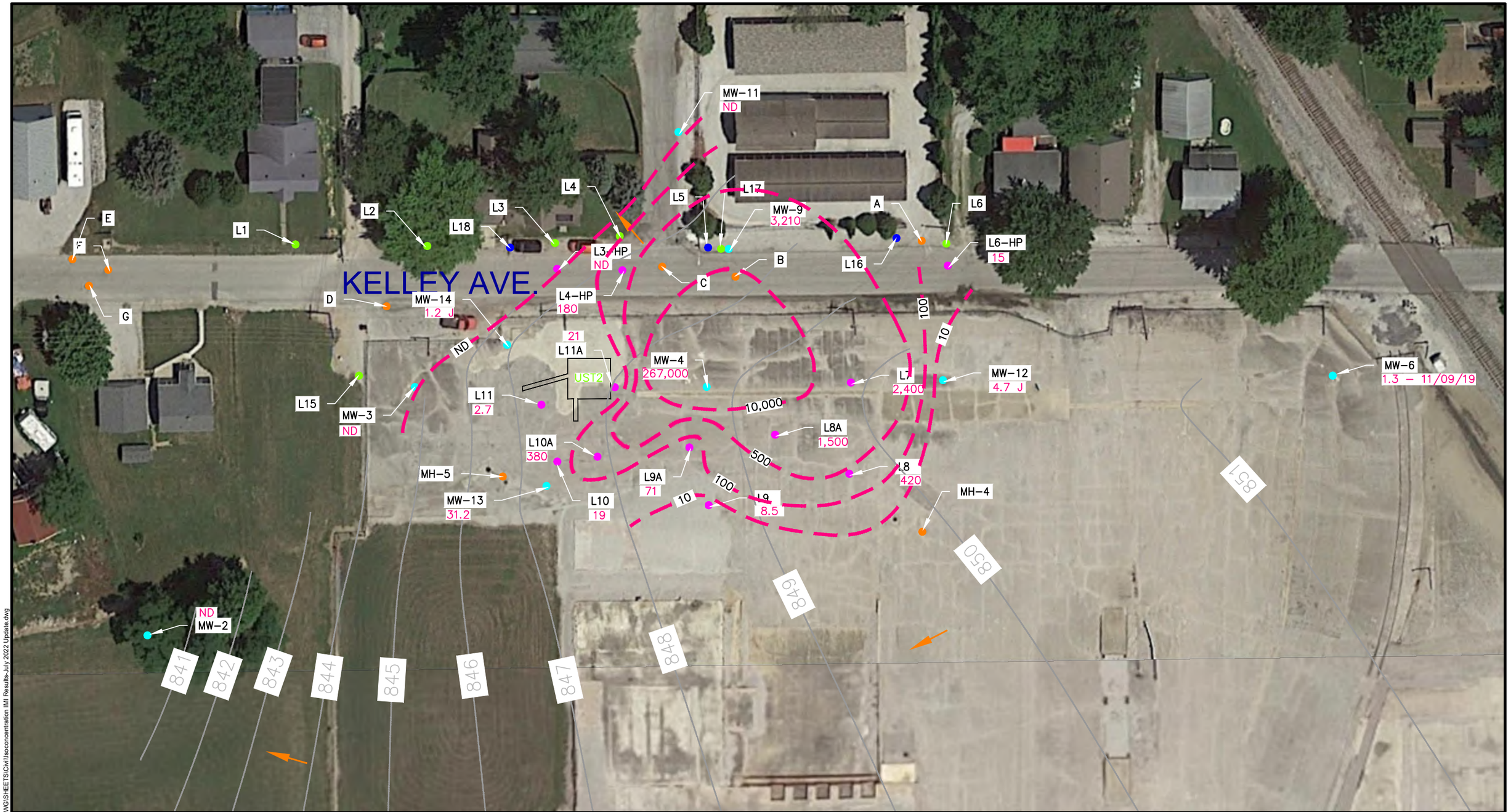
1055 ANDREW DRIVE, SUITE A
WEST CHESTER, PENNSYLVANIA 19380
Tel: 610.840.9100 Fax: 610.840.9199 Web: www.advancedgeoservices.com

Scale:	1" = 50'
Drawn By:	MCB
Checked By:	GS
Project Mgr.:	PGS
Originated By:	GS
Project No.:	20204123
Drawing Date:	JULY 2022
Sheet No.:	1 OF 3
Revision Number:	0

FIGURE 5

F:\Projects\20204123 - Exide Trust - Frankfort\CAD\DWG\SHEETS\Civil\soconcentration IMI Results-July 2022 Update.dwg



LEGEND:

- 10,000 — TCE ISOCONCENTRATION 4TH QUARTER 2021
- 843 — GROUNDWATER POTENTIOMTRIC SURFACE 4TH QUARTER 2021
- GROUNDWATER FLOW DIRECTION
- FORMER UST-2 AREA
- EXISTING MANHOLE
- EXISTING MONITORING WELL
- EXISTING SOIL GAS SAMPLING POINT
- EXISTING SEWER BEDDING GAS SAMPLING POINT
- TEMPORARY HYDROPUNCH SAMPLE LOCATION

CONCENTRATIONS IN MICROGRAMS PER LITER (ug/L)

ND – NON DETECT RESULT
J – ESTIMATED

HYDROPUNCH SAMPLES COLLECTED DURING OCTOBER 18–19, 2021 SAMPLING EVENT.

GROUNDWATER POTENTIOMETRIC CONTOURS BASED ON MEASUREMENTS COLLECTED ON DECEMBER 8, 2021.

GROUNDWATER SAMPLE RESULTS COLLECTED FROM DECEMBER 8–9, 2021 EXCEPT AS NOTED.

0 25 50 100

1 INCH = 50 FT

EXIDE TECHNOLOGIES

555 HOKE AVENUE
FRANKFORT, INDIANA

CIS-1,2-DICHLOROETHENE ISOCONCENTRATION MAP INTERIM MEASURES INVESTIGATION SAMPLING

ADVANCED GeoServices
A MONTROSE ENVIRONMENTAL GROUP COMPANY
1055 ANDREW DRIVE, SUITE A
WEST CHESTER, PENNSYLVANIA 19380
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Scale	1" = 50'
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Checked By	GS
Project Mgr.:	PGS
Originated By	GS
Project No.:	20204123
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Sheet No.:	2 OF 3
Revision Number	0

FIGURE 6

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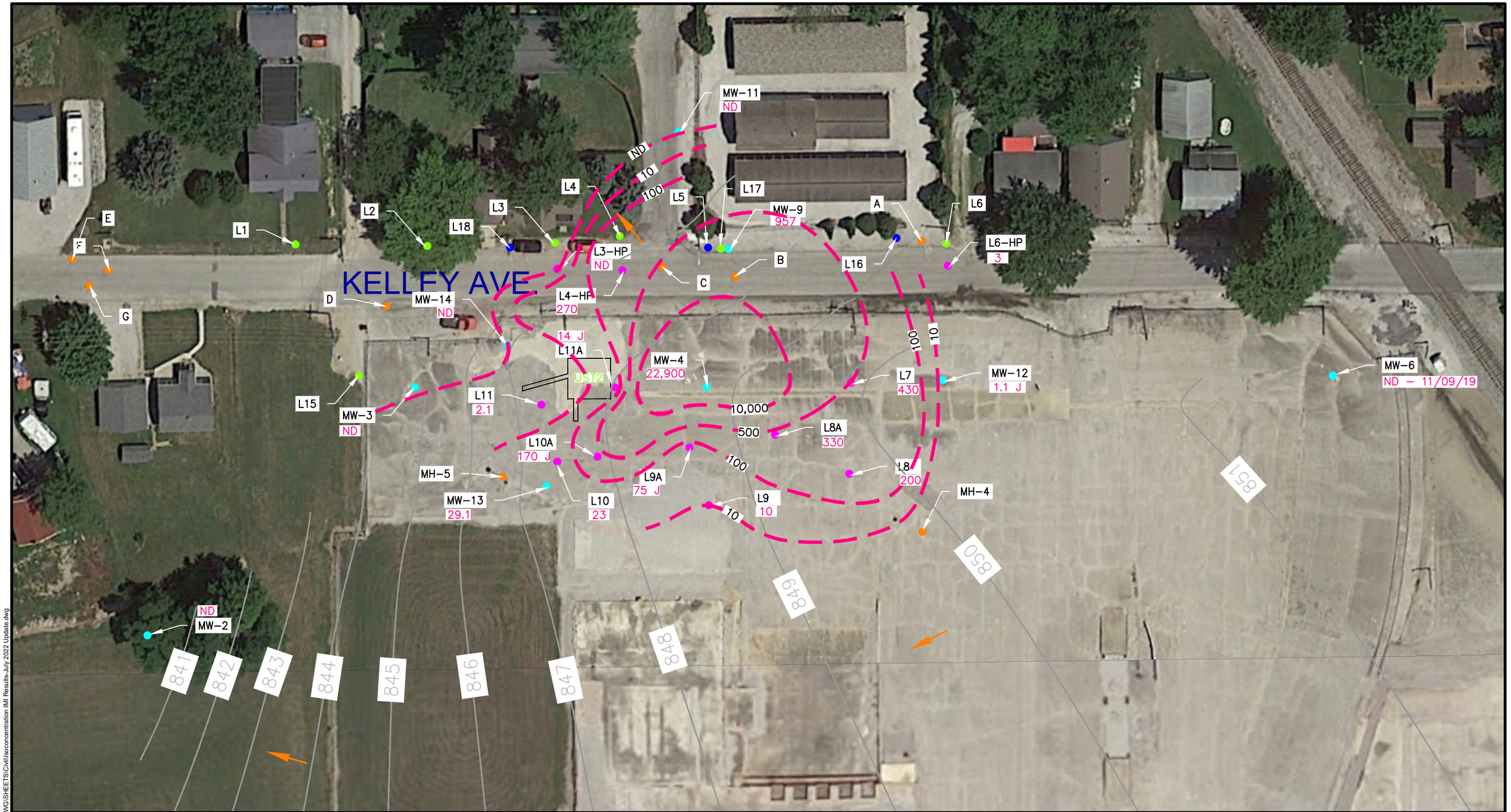

LEGEND:

- 10,000 — TCE ISOCONCENTRATION 4TH QUARTER 2021
- 843 — GROUNDWATER POTENTIOMTRIC SURFACE 4TH QUARTER 2021
- GROUNDWATER FLOW DIRECTION
- FORMER UST-2 AREA
- EXISTING MANHOLE
- EXISTING MONITORING WELL
- EXISTING SOIL GAS SAMPLING POINT
- EXISTING SEWER BEDDING GAS SAMPLING POINT
- TEMPORARY HYDROPUNCH SAMPLE LOCATION

CONCENTRATIONS IN MICROGRAMS PER LITER (ug/L)

ND – NON DETECT RESULT
J – ESTIMATED

HYDROPUNCH SAMPLES COLLECTED DURING OCTOBER 18–19, 2021 SAMPLING EVENT.

GROUNDWATER POTENTIOMETRIC CONTOURS BASED ON MEASUREMENTS COLLECTED ON DECEMBER 8, 2021.

GROUNDWATER SAMPLE RESULTS COLLECTED FROM DECEMBER 8–9, 2021 EXCEPT AS NOTED.

0 25 50 100

1 INCH = 50 FT

EXIDE TECHNOLOGIES
555 HOKE AVENUE
FRANKFORT, INDIANA

VINYL CHLORIDE ISOCONCENTRATION MAP INTERIM MEASURES INVESTIGATION SAMPLING

ADVANCED GeoServices
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Scale	1" = 50'
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Checked By	GS
Project Mgr.:	PGS
Originated By	GS
Project No.:	20204123
Drawing Date:	JULY 2022
Sheet No.:	3 OF 3
Revision Number	0

FIGURE 7

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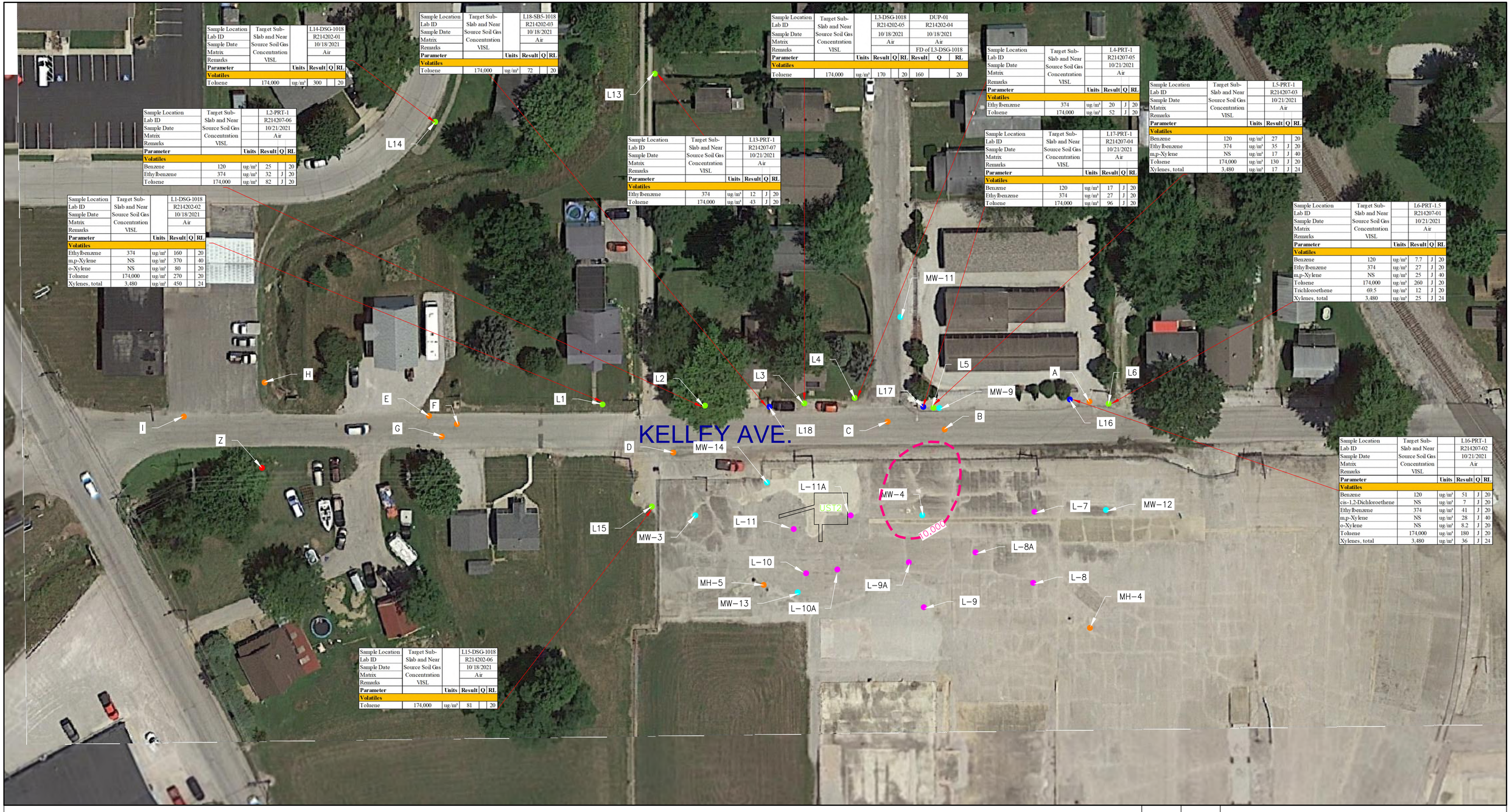

Sample Location	Target Sub-		L14-DSG-1018		
Lab ID	Slab and Near		R214202-01		
Sample Date	Source Soil Gas		10/18/2021		
Matrix	Concentration		Air		
Remarks	VISL				
Parameter		**Units**	**Result**	**Q**	**RL**
Volatiles					
Toluene	174,000	ug/m³	300		20

Sample Location	Target Sub-		L18-SBS-1018		
Lab ID	Slab and Near		R214202-03		
Sample Date	Source Soil Gas		10/18/2021		
Matrix	Concentration		Air		
Remarks	VISL				
Parameter		**Units**	**Result**	**Q**	**RL**
Volatiles					
Toluene	174,000	ug/m³	72		20

Sample Location	Target Sub-		L3-DSG-1018			DUP-01		
Lab ID	Slab and Near		R214202-05			R214202-04		
Sample Date	Source Soil Gas		10/18/2021			10/18/2021		
Matrix	Concentration		Air			Air		
Remarks	VISL					FD of L3-DSG-1018		
Parameter		**Units**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**
Volatiles								
Toluene	174,000	ug/m³	170		20	160		20

Sample Location	Target Sub-		L4-PRT-1		
Lab ID	Slab and Near		R214207-05		
Sample Date	Source Soil Gas		10/21/2021		
Matrix	Concentration		Air		
Remarks	VISL				
Parameter		**Units**	**Result**	**Q**	**RL**
Volatiles					
Ethylbenzene	374	ug/m³	20	J	20
Toluene	174,000	ug/m³	52	J	20

Sample Location	Target Sub-		L5-PRT-1		
Lab ID	Slab and Near		R214207-03		
Sample Date	Source Soil Gas		10/21/2021		
Matrix	Concentration		Air		
Remarks	VISL				
Parameter		**Units**	**Result**	**Q**	**RL**
Volatiles					
Benzene	120	ug/m³	27		20
Ethylbenzene	374	ug/m³	35	J	20
m,p-Xylene	NS	ug/m³	17	J	40
Toluene	174,000	ug/m³	130	J	20
Xylenes, total	3,480	ug/m³	17	J	24

Sample Location	Target Sub-		L2-PRT-1		
Lab ID	Slab and Near		R214207-06		
Sample Date	Source Soil Gas		10/21/2021		
Matrix	Concentration		Air		
Remarks	VISL				
Parameter		**Units**	**Result**	**Q**	**RL**
Volatiles					
Benzene	120	ug/m³	25		20
Ethylbenzene	374	ug/m³	32	J	20
Toluene	174,000	ug/m³	82	J	20

Sample Location	Target Sub-		L13-PRT-1		
Lab ID	Slab and Near		R214207-07		
Sample Date	Source Soil Gas		10/21/2021		
Matrix	Concentration		Air		
Remarks	VISL				
Parameter		**Units**	**Result**	**Q**	**RL**
Volatiles					
Ethylbenzene	374	ug/m³	12	J	20
Toluene	174,000	ug/m³	43	J	20

Sample Location	Target Sub-		L17-PRT-1		
Lab ID	Slab and Near		R214207-04		
Sample Date	Source Soil Gas		10/21/2021		
Matrix	Concentration		Air		
Remarks	VISL				
Parameter		**Units**	**Result**	**Q**	**RL**
Volatiles					
Benzene	120	ug/m³	17	J	20
Ethylbenzene	374	ug/m³	27	J	20
Toluene	174,000	ug/m³	96	J	20

Sample Location	Target Sub-		L1-DSG-1018		
Lab ID	Slab and Near		R214202-02		
Sample Date	Source Soil Gas		10/18/2021		
Matrix	Concentration		Air		
Remarks	VISL				
Parameter		**Units**	**Result**	**Q**	**RL**
Volatiles					
Ethylbenzene	374	ug/m³	160		20
m,p-Xylene	NS	ug/m³	370		40
o-Xylene	NS	ug/m³	80		20
Toluene	174,000	ug/m³	270		20
Xylenes, total	3,480	ug/m³	450		24

Sample Location	Target Sub-		L6-PRT-1.5		
Lab ID	Slab and Near		R214207-01		
Sample Date	Source Soil Gas		10/21/2021		
Matrix	Concentration		Air		
Remarks	VISL				
Parameter		**Units**	**Result**	**Q**	**RL**
Volatiles					
Benzene	120	ug/m³	7.7	J	20
Ethylbenzene	374	ug/m³	27	J	20
m,p-Xylene	NS	ug/m³	25	J	40
Toluene	174,000	ug/m³	260	J	20
Trichloroethene	69.5	ug/m³	12	J	20
Xylenes, total	3,480	ug/m³	25	J	24

Sample Location	Target Sub-		L16-PRT-1		
Lab ID	Slab and Near		R214207-02		
Sample Date	Source Soil Gas		10/21/2021		
Matrix	Concentration		Air		
Remarks	VISL				
Parameter		**Units**	**Result**	**Q**	**RL**
Volatiles					
Benzene	120	ug/m³	51	J	20
cis-1,2-Dichloroethene	NS	ug/m³	7	J	20
Ethylbenzene	374	ug/m³	41	J	20
m,p-Xylene	NS	ug/m³	28	J	40
o-Xylene	NS	ug/m³	8.2	J	20
Toluene	174,000	ug/m³	180	J	20
Xylenes, total	3,480	ug/m³	36	J	24

Sample Location	Target Sub-		L15-DSG-1018		
Lab ID	Slab and Near		R214202-06		
Sample Date	Source Soil Gas		10/18/2021		
Matrix	Concentration		Air		
Remarks	VISL				
Parameter		**Units**	**Result**	**Q**	**RL**
Volatiles					
Toluene	174,000	ug/m³	81		20

LEGEND:

- 10,000 — TCE ISOCONCENTRATION DECEMBER 2021
- FORMER UST-2 AREA
- 2021 HYDROPUNCH POINT
- EXISTING MANHOLE
- EXISTING MONITORING WELL
- EXISTING SOIL GAS SAMPLING POINT
- EXISTING SEWER BEDDING GAS SAMPLING POINT
- EXISTING OUTFALL

NOTES:

1. SOIL GAS SAMPLES WERE ANALYZED FOR BTEX, CIS-1,2-DCE, PCE, TCE, AND VC USING A FIELD GC OPERATED BY PACE ANALYTICAL.
2. ANALYTES NOT DETECTED AT OR ABOVE THE METHOD DETECTION LIMIT ARE NOT SHOWN.
3. ALL RESULTS SHOWN IN UG/M3 - MICROGRAM PER CUBIC METER
4. THE RESULTS INDICATE NO EXCEEDANCES OF THE TARGET SUB-SLAB AND NEAR SOURCE SOIL GAS CONCENTRATION VISL
5. VISL - VAPOR INTRUSION SCREENING LEVEL
6. DSG - DEEP SOIL SAMPLE (3-4 FEET BELOW GRADE)
7. PRT - GEOPROBE POST RUN TUBING (1 - 1.5 FEET BELOW GRADE)
8. SBS - SEWER BED SAMPLE (L16, L17, L18)
9. J - DENOTES AN ESTIMATED REPORTING LIMIT
10. Q - QUALIFIER
11. RL - REPORTING LIMIT
12. NS - NO STANDARD AVAILABLE FOR THE COMPOUND
13. FD - FIELD DUPLICATE

30 0 15 30 60 120

1 INCH = 30 FT

Number:	Date:	Revision:

EXIDE TECHNOLOGIES

555 HOKE AVENUE
FRANFORT, INDIANA

SOIL VAPOR SAMPLING RESULTS

ADVANCED GeoServices
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Tel: 610.840.9100 Fax: 610.840.9199 Web: www.advancedgeoservices.com

Scale:	1" = 30'
Drawn By:	MCB
Checked By:	GS
Project Mgr.:	PGS
Originated By:	GS
Project No.:	2020-4123
Drawing Date:	AUGUST 2021
Sheet No.:	OF
Revision Number:	0

FIGURE 8

I:\Projects\2020\2020412\3 - Exide Trust - Frankfort\CAD\MICHAELS\EXIDE\Soil Vapor Sampling Results.dwg

Sample Location	Target Sub-Slab and Near Source Soil Gas Concentration VISL	Manhole I		
Lab ID		R214205-06		
Sample Date		10/19/2021		
Matrix		Air		
Remarks				
Parameter		**Result**	**Q**	**RL**
Volatiles				
Chloroform	NS	28		20
cis-1,2-Dichloroethene	NS	1200	J	20
Toluene	174,000	62		20
Trichloroethene	69.5	1100	J	20
Vinyl chloride	55.9	190	J	20

Sample Location	Target Sub-Slab and Near Source Soil Gas Concentration VISL	Manhole H			Dup-02		
Lab ID		R214205-05			R214205-04		
Sample Date		10/19/2021			10/19/2021		
Matrix		Air			Air		
Remarks					FD of Manhole H		
Parameter		**Result**	**Q**	**RL**	**Result**	**Q**	**RL**
Volatiles							
Chloroform	NS	17	J	20	11	J	20
cis-1,2-Dichloroethene	NS	880	J	20	540	J	20
Toluene	174,000	88	J	20	54	J	20
Trichloroethene	69.5	800	J	20	600	J	20
Vinyl chloride	55.9	150	J	20	74	J	20

Sample Location	Target Sub-Slab and Near Source Soil Gas Concentration VISL	Manhole G		
Lab ID		R214205-03		
Sample Date		10/19/2021		
Matrix		Air		
Remarks				
Parameter		**Result**	**Q**	**RL**
Volatiles				
cis-1,2-Dichloroethene	NS	360		20
Toluene	174,000	100		20
Trichloroethene	69.5	220		20
Vinyl chloride	55.9	29		20

Sample Location	Target Sub-Slab and Near Source Soil Gas Concentration VISL	Manhole L			Dup-04		
Lab ID		R214206-03			R214206-02		
Sample Date		10/20/2021			10/20/2021		
Matrix		Air			Air		
Remarks					FD of Manhole L		
Parameter		**Result**	**Q**	**RL**	**Result**	**Q**	**RL**
Volatiles							
cis-1,2-Dichloroethene	NS	37	J	20	25		20
Toluene	174,000	130	J	20	78	J	20
Trichloroethene	69.5	200	J	20	120	J	20

Sample Location	Target Sub-Slab and Near Source Soil Gas Concentration VISL	Manhole J		
Lab ID		R214206-01		
Sample Date		10/20/2021		
Matrix		Air		
Remarks				
Parameter		**Result**	**Q**	**RL**
Volatiles				
Chloroform	NS	110		20
cis-1,2-Dichloroethene	NS	1000	J	20
Tetrachloroethene	1,390	38		20
Toluene	174,000	140		20
Trichloroethene	69.5	5000	J	20
Vinyl chloride	55.9	36		20

Sample Location	Target Sub-Slab and Near Source Soil Gas Concentration VISL	Manhole E		
Lab ID		R214205-01		
Sample Date		10/19/2021		
Matrix		Air		
Remarks				
Parameter		**Result**	**Q**	**RL**
Volatiles				
Chloroform	NS	36		20
cis-1,2-Dichloroethene	NS	2400	J	20
Toluene	174,000	170		20
Trichloroethene	69.5	1900	J	20
Vinyl chloride	55.9	490		20

Sample Location	Target Sub-Slab and Near Source Soil Gas Concentration VISL	Manhole B		
Lab ID		R214202-08		
Sample Date		10/18/2021		
Matrix		Air		
Remarks				
Parameter		**Result**	**Q**	**RL**
Volatiles				
cis-1,2-Dichloroethene	NS	76		20
Toluene	174,000	120		20
Trichloroethene	69.5	16	J	20

Sample Location	Target Sub-Slab and Near Source Soil Gas Concentration VISL	Manhole C		
Lab ID		R214202-07		
Sample Date		10/18/2021		
Matrix		Air		
Remarks				
Parameter		**Result**	**Q**	**RL**
Volatiles				
cis-1,2-Dichloroethene	NS	1400	J	20
Toluene	174,000	160		20
Trichloroethene	69.5	280		20
Vinyl chloride	55.9	180		20

Sample Location	Target Sub-Slab and Near Source Soil Gas Concentration VISL	Manhole F		
Lab ID		R214205-02		
Sample Date		10/19/2021		
Matrix		Air		
Remarks				
Parameter		**Result**	**Q**	**RL**
Volatiles				
Chloroform	NS	68		20
cis-1,2-Dichloroethene	NS	8900	J	20
Toluene	174,000	130		20
Trichloroethene	69.5	2100	J	20
Vinyl chloride	55.9	1500	J	20

Sample Location	Target Sub-Slab and Near Source Soil Gas Concentration VISL	MH-10		
Lab ID		R214206-04		
Sample Date		10/20/2021		
Matrix		Air		
Remarks				
Parameter		**Result**	**Q**	**RL**
Volatiles				
cis-1,2-Dichloroethene	NS	23		20
Toluene	174,000	100		20
Trichloroethene	69.5	120		20

LEGEND

- SERVICE LINE
- SANITARY SEWER
- STORMWATER
- INFERRED FLOW DIRECTION
- MW-1 MONITORING WELL

NOTE

1. UTILITY LINE LOCATIONS INFERRED FROM FIELD MEASUREMENTS AND DRAWINGS PROVIDED BY FRANKFORT UTILITY DEPARTMENTS AND SURVEY DATA COLLECTED BY RANDALL MILLER ASSOCIATES.
2. MANHOLE VAPOR SAMPLES WERE ANALYZED FOR BTEX, CIS-1,2-DCE, PCE, TCE, AND VC USING A FIELD GC OPERATED BY PACE ANALYTICAL.
3. ANALYTES NOT DETECTED AT OR ABOVE THE METHOD DETECTION LIMIT ARE NOT SHOWN.
4. ALL RESULTS SHOWN IN UG/M3 – MICROGRAM PER CUBIC METER.
5. BOLDING AND SHADING INDICATES EXCEEDANCES OF THE TARGET SUB-SLAB AND NEAR SOURCE SOIL GAS CONCENTRATION VISL.
6. VISL – VAPOR INTRUSION SCREENING LEVEL.
7. J – DENOTES AN ESTIMATED REPORTING LIMIT.
8. Q – QUALIFIER.
9. RL – REPORTING LIMIT.
10. NS – NO STANDARD AVAILABLE FOR THE COMPOUND.
11. FD – FIELD DUPLICATE.

NORTH

0 50 100 200

1 INCH = 100 FT

EXIDE FRANKFORT

555 HOKE AVENUE
FRANKFORT, INDIANA

UNDERGROUND UTILITY MAP- SANITARY MANHOLE VAPOR SAMPLING RESULTS

ADVANCED GeoServices™
Engineering for the Environment. Planning for People.
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Scale:	1" = 100'
Drawn By:	MCB
Checked By:	G.S.
Project Mgr.:	J.S.D.
Originated By:	S.D.W.
Project No.:	2020-4123
Drawing Date:	12/24/21
Sheet No.:	1 OF 1
Revision Number:	0

FIGURE 9

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TABLES

Table 1
Sampling Plan Decision Tree
Exide Technologies
Frankfort, Indiana

Sample Location	Type of Sample	Decision
Location 1	Soil Gas/ Potential Groundwater	If results are above VISL values, Hydropunch groundwater sampling will be conducted at the location with the highest exceedance with TCE as primary deciding indicator. The groundwater will be analyzed with the Field GC for TCE, PCE, cis-1,2-DCE, VC, and BTEX.
Location 2	Soil Gas/ Potential Groundwater	
Location 2A	Groundwater	If soil gas results at Locations 1 and 2 are below the VISL values, a Hydropunch boring will be completed at Location 2A and groundwater will be field analyzed for TCE, PCE, cis-1,2-DCE, VC, and BTEX. If the Hydropunch groundwater result for TCE is >600 ug/L, then Hydropunch groundwater sampling adjacent to Locations 2 will be conducted.
Location 3	Soil Gas/ Groundwater	No decision - collect both soil gas and Hydropunch groundwater sample for field GC testing for TCE, PCE, cis-1,2-DCE, VC, and BTEX.
Location 4	Soil Gas/ Groundwater	No decision - collect both soil gas and Hydropunch groundwater sample for field GC testing for TCE, PCE, cis-1,2-DCE, VC, and BTEX.
Location 5	Soil Gas	No decision - collect only soil gas sample for field GC testing for TCE, PCE, cis-1,2-DCE, VC, and BTEX.
Location 6	Soil Gas/ Groundwater	No decision - collect both soil gas and Hydropunch groundwater sample for field GC testing for TCE, PCE, cis-1,2-DCE, VC, and BTEX.
Location 7	Groundwater	Collect groundwater sample for Field GC testing for TCE, PCE, cis-1,2-DCE, VC, and BTEX. If TCE is >600 ug/L, sample groundwater via Hydropunch at Location 7B. If TCE is <100 ug/L, Hydropunch sample at Location 7A. Groundwater samples analyzed using Field GC for TCE, PCE, cis-1,2-DCE, VC, and BTEX.
Location 7A	Groundwater	Only conduct Hydropunch sampling if TCE in groundwater at Location 7 is <100 ug/l
Location 7B	Groundwater	Only conduct Hydropunch sampling if TCE in groundwater at Location 7 is >600 ug/l
Location 8	Groundwater	Collect groundwater sample for Field GC testing for TCE, PCE, cis-1,2-DCE, VC, and BTEX. If TCE is >600 ug/L, sample groundwater via Hydropunch at Location 8B. If TCE is <100 ug/L, Hydropunch sample at Location 8A. Groundwater samples analyzed using Field GC for TCE, PCE, cis-1,2-DCE, VC, and BTEX.
Location 8A	Groundwater	Only conduct Hydropunch sampling if TCE in groundwater at Location 8 is <100 ug/l
Location 8B	Groundwater	Only conduct Hydropunch sampling if TCE in groundwater at Location 8 is >600 ug/l

Table 1
Sampling Plan Decision Tree
Exide Technologies
Frankfort, Indiana

Sample Location	Type of Sample	Decision
Location 9	Groundwater	Collect groundwater sample for Field GC testing for TCE, PCE, cis-1,2-DCE, VC, and BTEX. If TCE is >600 ug/L, sample groundwater via Hydropunch at Location 9B. If TCE is <100 ug/L, Hydropunch sample at Location 9A. Groundwater samples analyzed using Field GC for TCE, PCE, cis-1,2-DCE, VC, and BTEX.
Location 9A	Groundwater	Only conduct Hydropunch sampling if TCE in groundwater at Location 9 is <100 ug/l
Location 9B	Groundwater	Only conduct Hydropunch sampling if TCE in groundwater at Location 9 is >600 ug/l
Location 10	Groundwater	Collect groundwater sample for Field GC testing for TCE, PCE, cis-1,2-DCE, VC, and BTEX. If TCE is >600 ug/L, sample groundwater via Hydropunch at Location 10B. If TCE is <100 ug/L, Hydropunch sample at Location 10A. Groundwater samples analyzed using Field GC for TCE, PCE, cis-1,2-DCE, VC, and BTEX.
Location 10A	Groundwater	Only conduct Hydropunch sampling if TCE in groundwater at Location 10 is <100 ug/l
Location 10B	Groundwater	Only conduct Hydropunch sampling if TCE in groundwater at Location 10 is >600 ug/l
Location 11	Groundwater	Collect groundwater sample for Field GC testing for TCE, PCE, cis-1,2-DCE, VC, and BTEX. If TCE is <100 ug/L. Location 11 does not have an 11B, because groundwater well MW-3 will be utilized as a step out groundwater sampling location. EPA Comment 10 and 22
Location 11A	Groundwater	Only conduct “step-in” Hydropunch sampling if TCE in groundwater at Location 11 is <100 ug/l.
Location 12 (New MW-11)	Groundwater	Groundwater sampled along with all existing and new monitoring wells and analyzed for RFI Work Plan parameters
Location 13	Step Out Soil Gas	No decision - collect only soil gas sample for field GC testing for TCE, PCE, cis-1,2-DCE, VC, and BTEX.
Location 14	Step Out Soil Gas	No decision - collect only soil gas sample for field GC testing for TCE, PCE, cis-1,2-DCE, VC, and BTEX.
Location 15	Step Out Soil Gas	No decision - collect only soil gas sample for field GC testing for TCE, PCE, cis-1,2-DCE, VC, and BTEX.
Location 16 Sewer Bedding Sample 1	Soil Gas/ Groundwater	Target the granular backfill/bedding of the utilities for temporary soil gas probes and, if possible, groundwater sampling using Hydropunch or soft dig temporary well point. One step out ~200 feet away if VISLs are significantly exceeded.

Table 1
Sampling Plan Decision Tree
Exide Technologies
Frankfort, Indiana

Sample Location	Type of Sample	Decision
Location 17 Sewer Bedding Sample 2	Soil Gas/ Groundwater	Target the granular backfill/bedding of the utilities for temporary soil gas probes and, if possible, groundwater sampling using Hydropunch or soft dig temporary well point. One step out ~200 feet away if VISLs are significantly exceeded.
Location 18 Sewer Bedding Sample 3	Soil Gas/ Groundwater	Target the granular backfill/bedding of the utilities for temporary soil gas probes and, if possible, groundwater sampling using Hydropunch or soft dig temporary well point. One step out ~200 feet away if VISLs are significantly exceeded.

NOTE: Field GC testing for TCE, PCE, cis-1,2-DCE, VC, and BTEX

Table 2
Summary of Soil Gas Point Installation Observations
Exide Technologies
Frankfort, Indiana

Location	Soil Gas Sample	Observed Depth to Water on Installation (feet)	Depth to bottom of 8-inch screen (feet)	PID Reading (ppm)	Remarks
L1	DSG	3	2	<1.0	
L2	PRT	4.5	3.5	6.4 - 18.4	Initially appeared dry to 5 feet.
L3	DSG	3.5	2.5	1 – 22.8	
L4	PRT	4.5	3.5		
L5	PRT	4.5	3.5	1.0 -5.0	
L6	PRT	3.5	2.5	<1.0	
L13	PRT	>6	5	<1.0	Initially appeared dry to 6 feet
L14	DSG	>6	4.5	<1.0	
L15	DSG	5	4	<1.0	
L16	PRT (SBS)	>3	3 (top of pipe)	<1.0	Sewer Bed Sample
L17	PRT (SBS)	>2.5	2.5 (top of pipe)	<1.0	Sewer Bed Sample

Table 2
Summary of Soil Gas Point Installation Observations
Exide Technologies
Frankfort, Indiana

Location	Soil Gas Sample	Observed Depth to Water on Installation (feet)	Depth to bottom of 8-inch screen (feet)	PID Reading (ppm)	Remarks
L18	DSG (SBS)	>3	3 (top of pipe)	<1.0	Sewer Bed Sample

DSG – Deep Soil Gas collected at depth shown on Column 4 after Helium Leak Test
PRT - Soil gas collected by Geoprobe Post Run Tubing (PRT) Method at 1.5 feet depth
SBS - Sewer Bed Sample

TABLE 3

SUMMARY OF CALCULATED K VALUES FROM SLUG TEST DATA

Exide Environmental Response Trust

Frankfort, Indiana

Well	Calculated K (ft/day)
MW-1	0.0088
MW-3	0.0078
MW-4	0.0033
MW-7	0.0004
MW-9	0.0015
MW-10	0.0012

Table 4
Monitoring Well Construction Information
Exide Environmental Response Trust
Frankfort, Indiana

Well ID	Date Installed	Construction Type	Inner Casing Diameter (in.)	Outer Casing Diameter (in.)	Well Depth (f.b.g.s.)	DTW (TOIC) May 2018	DTW (TOIC) July 2018	DTW (TOIC) November 2019	DTW (TOIC) December 2021	Ground Surface Elevation (ft.)	TOIC Elevation (ft.)	Screen Interval (ft.)	Comments
MW-1	5/2/2018	Hollow Stem Auger	2	6	18	8.08	7.97	8.15	7.49	849.27	851.26	10 (8-18 ft. bgs)	0.0 PID readings
MW-2	5/2/2018	Hollow Stem Auger	2	6	18	10.24	10.83	10.44	8.83	846.97	848.92	10 (8-18 ft. bgs)	0.0 PID readings
MW-3	5/1/2018	Hollow Stem Auger	2	6	16	7.23	7.10	7.13	6.67	849.43	851.45	10 (6-16 ft. bgs)	0.0 PID readings
MW-4	4/30/2018	Hollow Stem Auger	2	6	18	4.74	4.33	4.82	4.43	851.19	853.17	10 (8-18 ft. bgs)	1.2 PID reading
MW-5	5/2/2018	Hollow Stem Auger	2	6	13	5.28	5.15	5.26	4.48	853.95	856.05	5 (8-13 ft. bgs)	0.0 PID readings
MW-6	4/30/2018	Hollow Stem Auger	2	6	18	4.31	4.25	4.39	4.13	853.24	855.47	10 (8-18 ft. bgs)	0.0 PID readings
MW-7	5/1/2018	Hollow Stem Auger	2	6	22	7.16	6.97	5.17	4.61	845.86	847.70	10 (12-22 ft. bgs)	0.0 PID readings
MW-8	5/2/2018	Hollow Stem Auger	2	6	18	6.12	6.13	6.18	5.59	851.76	853.73	10 (8-18 ft. bgs)	0.0 PID readings
MW-9	10/7/2019	Hollow Stem Auger	2	*	18	NM	NM	4.20	1.89	849.60	849.00	10 (8-18 ft. bgs)	0.0 PID readings
MW-10	10/7/2019	Hollow Stem Auger	2	*	18	NM	NM	3.20	2.42	846.00	842.81	10 (8-18 ft. bgs)	0.0 PID readings
MW-11	10/19/2021	Hollow Stem Auger	2	*	15	NM	NM	NM	3.56	850.40	849.90	10 (5-15 ft. bgs)	
MW-12	10/20/2021	Hollow Stem Auger	2	4	15	NM	NM	NM	3.82	852.54	854.51	10 (5-15 ft. bgs)	
MW-13	10/20/2021	Hollow Stem Auger	2	4	15	NM	NM	NM	3.73	849.33	851.20	10 (5-15 ft. bgs)	
MW-14	10/21/2021	Hollow Stem Auger	2	4	15	NM	NM	NM	4.48	849.51	851.60	10 (5-15' ft. bgs)	

FBGS- Feet Below Ground Surface
TOIC- Top of Inner Casing
NM- Not Measured
NS- Not Surveyed
*MW-9, MW-10, and MW-11 are flush mount wells

TABLE 5a
WATER DISPOSAL SAMPLE RESULTS
Exide Environmental Response Trust
Frankfort, Indiana

Sample Location		Water-1021		
Lab ID		50300888001		
Sample Date		10/22/2021		
Matrix		Groundwater		
Remarks				
Parameter	**Units**	**Result**	**Q**	**RL**
Volatiles				
1,1,1-Trichloroethane	ug/L		U	5
1,1,2,2-Tetrachloroethane	ug/L		U	5
1,1,2-Trichloroethane	ug/L		U	5
1,1,2-Trichlorotrifluoroethane	ug/L		U	5
1,1-Dichloroethane	ug/L		U	5
1,1-Dichloroethene	ug/L		U	5
1,2,3-Trichlorobenzene	ug/L		U	5
1,2,4-Trichlorobenzene	ug/L		U	5
1,2-Dibromo-3-chloropropane	ug/L		U	10
1,2-Dibromoethane (EDB)	ug/L		U	5
1,2-Dichlorobenzene	ug/L		U	5
1,2-Dichloroethane	ug/L		U	5
1,2-Dichloropropane	ug/L		U	5
1,3-Dichlorobenzene	ug/L		U	5
1,4-Dichlorobenzene	ug/L		U	5
2-Butanone (MEK)	ug/L		U	25
2-Hexanone	ug/L		U	25
4-Methyl-2-pentanone (MIBK)	ug/L		U	25
Acetone	ug/L	159		100
Benzene	ug/L		U	5
Bromochloromethane	ug/L		U	5
Bromodichloromethane	ug/L		U	5
Bromoform	ug/L		U	5
Bromomethane	ug/L		U	5
Carbon disulfide	ug/L		U	10
Carbon tetrachloride	ug/L		U	5
Chlorobenzene	ug/L		U	5
Chloroethane	ug/L		U	5
Chloroform	ug/L		U	5
Chloromethane	ug/L		U	5
cis-1,2-Dichloroethene	ug/L	7.8		5
cis-1,3-Dichloropropene	ug/L		U	5
Cyclohexane	ug/L		U	100
Dibromochloromethane	ug/L		U	5
Dichlorodifluoromethane	ug/L		U	5
Ethylbenzene	ug/L		U	5
Isopropylbenzene (Cumene)	ug/L		U	5
Methyl acetate	ug/L		U	50
Methylcyclohexane	ug/L		U	50
Methylene Chloride	ug/L		U	5
Methyl-tert-butyl ether	ug/L		U	4
Styrene	ug/L		U	5
Tetrachloroethene	ug/L		U	5
Toluene	ug/L		U	5
trans-1,2-Dichloroethene	ug/L		U	5
trans-1,3-Dichloropropene	ug/L		U	5
Trichloroethene	ug/L	0.61	J	5
Trichlorofluoromethane	ug/L		U	5
Vinyl chloride	ug/L	1.9	J	2
Xylene (Total)	ug/L		U	10
Semivolatiles				
2,2'-Oxybis(1-chloropropane)	ug/L		U	10
2,3,4,6-Tetrachlorophenol	ug/L		U	10
2,4,5-Trichlorophenol	ug/L		U	10
2,4,6-Trichlorophenol	ug/L		U	10
2,4-Dichlorophenol	ug/L		U	10
2,4-Dimethylphenol	ug/L		U	10
2,4-Dinitrophenol	ug/L		U	50
2,4-Dinitrotoluene	ug/L		U	10
2,6-Dinitrotoluene	ug/L		U	10
2-Chloronaphthalene	ug/L		U	10
2-Chlorophenol	ug/L		U	10
2-Methylphenol(o-Cresol)	ug/L		U	10
2-Nitroaniline	ug/L		U	10
2-Nitrophenol	ug/L		U	10
3&4-Methylphenol(m&p Cresol)	ug/L		U	10
3,3'-Dichlorobenzidine	ug/L		U	20
3-Nitroaniline	ug/L		U	10
4,6-Dinitro-2-methylphenol	ug/L		U	20
4-Bromophenylphenyl ether	ug/L		U	10
4-Chloro-3-methylphenol	ug/L		U	10
4-Chloroaniline	ug/L		U	10
4-Chlorophenylphenyl ether	ug/L		U	10
4-Nitroaniline	ug/L		U	10
4-Nitrophenol	ug/L		U	50
Acetophenone	ug/L		U	10
Atrazine	ug/L		U	10
Benzaldehyde	ug/L		U	50
Biphenyl (Diphenyl)	ug/L		U	10
bis(2-Chloroethoxy)methane	ug/L		U	10
bis(2-Chloroethyl) ether	ug/L		U	10
bis(2-Ethylhexyl)phthalate	ug/L		U	10
Butylbenzylphthalate	ug/L		U	10
Caprolactam	ug/L		U	10
Carbazole	ug/L		U	10
Dibenzofuran	ug/L		U	10
Diethylphthalate	ug/L		U	10
Dimethylphthalate	ug/L		U	10
Di-n-butylphthalate	ug/L		U	10

TABLE 5a
WATER DISPOSAL SAMPLE RESULTS
Exide Environmental Response Trust
Frankfort, Indiana

Sample Location		Water-1021		
Lab ID		50300888001		
Sample Date		10/22/2021		
Matrix		Groundwater		
Remarks				
Parameter	**Units**	**Result**	**Q**	**RL**
Di-n-octylphthalate	ug/L		U	10
Hexachloro-1,3-butadiene	ug/L		U	10
Hexachlorobenzene	ug/L		U	10
Hexachlorocyclopentadiene	ug/L		U	10
Hexachloroethane	ug/L		U	10
Isophorone	ug/L		U	10
Nitrobenzene	ug/L		U	10
N-Nitroso-di-n-propylamine	ug/L		U	50
N-Nitrosodiphenylamine	ug/L		U	10
Pentachlorophenol	ug/L		U	50
Phenol	ug/L	5.9	J	10
Semivolatiles SIMs				
2-Methylnaphthalene	ug/L		U	1
Acenaphthene	ug/L		U	1
Acenaphthylene	ug/L		U	1
Anthracene	ug/L		U	0.1
Benzo(a)anthracene	ug/L		U	0.1
Benzo(a)pyrene	ug/L		U	0.1
Benzo(b)fluoranthene	ug/L		U	0.1
Benzo(g,h,i)perylene	ug/L		U	0.1
Benzo(k)fluoranthene	ug/L		U	0.1
Chrysene	ug/L		U	0.5
Dibenz(a,h)anthracene	ug/L		U	0.1
Fluoranthene	ug/L		U	1
Fluorene	ug/L		U	1
Indeno(1,2,3-cd)pyrene	ug/L		U	0.1
Naphthalene	ug/L		U	1
Phenanthrene	ug/L		U	1
Pyrene	ug/L		U	1
Total Metals				
Arsenic	ug/L	3.7	J	10
Barium	ug/L	74.1		10
Cadmium	ug/L		U	2
Chromium	ug/L	28.8		10
Lead	ug/L		U	10
Mercury	ug/L		U	2
Selenium	ug/L		U	10
Silver	ug/L		U	10
Volatiles TCLP				
1,1-Dichloroethene	mg/L		U	0.05
1,2-Dichloroethane	mg/L		U	0.05
2-Butanone (MEK)	mg/L		U	1
Benzene	mg/L		U	0.05
Carbon tetrachloride	mg/L		U	0.05
Chlorobenzene	mg/L		U	0.05
Chloroform	mg/L		U	0.05
Tetrachloroethene	mg/L		U	0.05
Trichloroethene	mg/L		U	0.05
Vinyl chloride	mg/L		U	0.02
Semivolatiles TCLP				
1,4-Dichlorobenzene	mg/L		U	0.1
2,4,5-Trichlorophenol	mg/L		U	0.5
2,4,6-Trichlorophenol	mg/L		U	0.1
2,4-Dinitrotoluene	mg/L		U	0.1
2-Methylphenol(o-Cresol)	mg/L		U	0.1
3&4-Methylphenol(m&p Cresol)	mg/L		U	0.2
Hexachloro-1,3-butadiene	mg/L		U	0.1
Hexachlorobenzene	mg/L		U	0.1
Hexachloroethane	mg/L		U	0.1
Nitrobenzene	mg/L		U	0.1
Pentachlorophenol	mg/L		U	0.5
Pyridine	mg/L		U	0.1
TCLP Metals				
Arsenic	mg/L		U	0.1
Barium	mg/L		U	5
Cadmium	mg/L		U	0.05
Chromium	mg/L		U	0.1
Lead	mg/L		U	0.1
Mercury	mg/L		U	0.002
Selenium	mg/L		U	0.1
Silver	mg/L		U	0.1
Conventionals				
Cyanide, Reactive	mg/kg		U	1
Flashpoint	deg F	>200		
pH at 25 Degrees C	Std. Units	8.7		0.1
Sulfide, Reactive	mg/kg		U	10

J - Denotes an estimated reporting limit
U - Analyte was not detected at or above the method detection limit
ug/L - micrograms per liter
mg/L - milligrams per liter
mg/kg - milligrams per kilogram
Q - Qualifier
RL - Reporting Limit

TABLE 5b
SOIL DISPOSAL SAMPLE RESULTS
Exide Environmental Response Trust
Frankfort, Indiana

Sample Location		Soil-1021		
Lab ID		50300888002		
Sample Date		10/22/2021		
Matrix		Soil		
Remarks				
Parameter	**Units**	**Result**	**Q**	**RL**
Volatiles				
1,1,1-Trichloroethane	mg/kg		U	0.0048
1,1,2,2-Tetrachloroethane	mg/kg		U	0.0048
1,1,2-Trichloroethane	mg/kg		U	0.0048
1,1,2-Trichlorotrifluoroethane	mg/kg		U	0.0048
1,1-Dichloroethane	mg/kg		U	0.0048
1,1-Dichloroethene	mg/kg		U	0.0048
1,2,3-Trichlorobenzene	mg/kg		U	0.0048
1,2,4-Trichlorobenzene	mg/kg		U	0.0048
1,2-Dibromo-3-chloropropane	mg/kg		U	0.0096
1,2-Dibromoethane (EDB)	mg/kg		U	0.0048
1,2-Dichlorobenzene	mg/kg		U	0.0048
1,2-Dichloroethane	mg/kg		U	0.0048
1,2-Dichloropropane	mg/kg		U	0.0048
1,3-Dichlorobenzene	mg/kg		U	0.0048
1,4-Dichlorobenzene	mg/kg		U	0.0048
1,4-Dioxane (p-Dioxane)	mg/kg		U	0.48
2-Butanone (MEK)	mg/kg		U	0.024
2-Hexanone	mg/kg		U	0.096
4-Methyl-2-pentanone (MIBK)	mg/kg		U	0.024
Acetone	mg/kg	0.01	J	0.096
Benzene	mg/kg		U	0.0048
Bromochloromethane	mg/kg		U	0.0048
Bromodichloromethane	mg/kg		U	0.0048
Bromoform	mg/kg		U	0.0048
Bromomethane	mg/kg		U	0.0048
Carbon disulfide	mg/kg		U	0.0096
Carbon tetrachloride	mg/kg		U	0.0048
Chlorobenzene	mg/kg		U	0.0048
Chloroethane	mg/kg		U	0.0048
Chloroform	mg/kg	0.00096	J	0.0048
Chloromethane	mg/kg		U	0.0048
cis-1,2-Dichloroethene	mg/kg	0.0037	J	0.0048
cis-1,3-Dichloropropene	mg/kg		U	0.0048
Cyclohexane	mg/kg		U	0.096
Dibromochloromethane	mg/kg		U	0.0048
Dichlorodifluoromethane	mg/kg		U	0.0048
Ethylbenzene	mg/kg		U	0.0048
Isopropylbenzene (Cumene)	mg/kg		U	0.0048
Methyl acetate	mg/kg		U	0.0048
Methylcyclohexane	mg/kg		U	0.0048
Methylene Chloride	mg/kg		U	0.019
Methyl-tert-butyl ether	mg/kg		U	0.0048
Styrene	mg/kg		U	0.0048
Tetrachloroethene	mg/kg		U	0.0048
Toluene	mg/kg		U	0.0048
trans-1,2-Dichloroethene	mg/kg		U	0.0048
trans-1,3-Dichloropropene	mg/kg		U	0.0048
Trichloroethene	mg/kg	0.00092	J	0.0048
Trichlorofluoromethane	mg/kg		U	0.0048
Vinyl chloride	mg/kg	0.00064	J	0.0048
Xylene (Total)	mg/kg		U	0.0096
Total Semivolatiles				
1,2,4,5-Tetrachlorobenzene	mg/kg		U	0.42
2,2'-Oxybis(1-chloropropane)	mg/kg		U	0.42
2,3,4,6-Tetrachlorophenol	mg/kg		U	0.42
2,4,5-Trichlorophenol	mg/kg		U	0.42
2,4,6-Trichlorophenol	mg/kg		U	0.42
2,4-Dichlorophenol	mg/kg		U	0.42
2,4-Dimethylphenol	mg/kg		U	0.42
2,4-Dinitrophenol	mg/kg		U	2.1
2,4-Dinitrotoluene	mg/kg		U	0.42
2,6-Dinitrotoluene	mg/kg		U	0.42
2-Chloronaphthalene	mg/kg		U	0.42
2-Chlorophenol	mg/kg		U	0.42
2-Methylnaphthalene	mg/kg		U	0.42
2-Methylphenol(o-Cresol)	mg/kg		U	0.42
2-Nitroaniline	mg/kg		U	0.42
2-Nitrophenol	mg/kg		U	0.42
3&4-Methylphenol(m&p Cresol)	mg/kg		U	0.85
3,3'-Dichlorobenzidine	mg/kg		U	0.85
3-Nitroaniline	mg/kg		U	0.42
4,6-Dinitro-2-methylphenol	mg/kg		U	0.85
4-Bromophenylphenyl ether	mg/kg		U	0.42
4-Chloro-3-methylphenol	mg/kg		U	0.85
4-Chloroaniline	mg/kg		U	0.85
4-Chlorophenylphenyl ether	mg/kg		U	0.42
4-Nitroaniline	mg/kg		U	0.42
4-Nitrophenol	mg/kg		U	2.1
Acenaphthene	mg/kg		U	0.42
Acenaphthylene	mg/kg		U	0.42
Acetophenone	mg/kg		U	0.42

TABLE 5b
SOIL DISPOSAL SAMPLE RESULTS
Exide Environmental Response Trust
Frankfort, Indiana

Sample Location		Soil-1021		
Lab ID		50300888002		
Sample Date		10/22/2021		
Matrix		Soil		
Remarks				
Parameter	**Units**	**Result**	**Q**	**RL**
Anthracene	mg/kg		U	0.42
Atrazine	mg/kg		U	0.42
Benzaldehyde	mg/kg		U	0.42
Benzo(a)anthracene	mg/kg		U	0.42
Benzo(a)pyrene	mg/kg		U	0.42
Benzo(b)fluoranthene	mg/kg		U	0.42
Benzo(g,h,i)perylene	mg/kg		U	0.42
Benzo(k)fluoranthene	mg/kg		U	0.42
Biphenyl (Diphenyl)	mg/kg		U	0.42
bis(2-Chloroethoxy)methane	mg/kg		U	0.42
bis(2-Chloroethyl) ether	mg/kg		U	0.42
bis(2-Ethylhexyl)phthalate	mg/kg		U	0.42
Butylbenzylphthalate	mg/kg		U	0.42
Caprolactam	mg/kg		U	0.42
Carbazole	mg/kg		U	0.42
Chrysene	mg/kg		U	0.42
Dibenz(a,h)anthracene	mg/kg		U	0.42
Dibenzofuran	mg/kg		U	0.42
Diethylphthalate	mg/kg		U	0.42
Dimethylphthalate	mg/kg		U	0.42
Di-n-butylphthalate	mg/kg		U	0.42
Di-n-octylphthalate	mg/kg		U	0.42
Fluoranthene	mg/kg		U	0.42
Fluorene	mg/kg		U	0.42
Hexachloro-1,3-butadiene	mg/kg		U	0.42
Hexachlorobenzene	mg/kg		U	0.42
Hexachlorocyclopentadiene	mg/kg		U	0.42
Hexachloroethane	mg/kg		U	0.42
Indeno(1,2,3-cd)pyrene	mg/kg		U	0.42
Isophorone	mg/kg		U	0.42
Naphthalene	mg/kg		U	0.42
Nitrobenzene	mg/kg		U	0.42
N-Nitroso-di-n-propylamine	mg/kg		U	0.42
N-Nitrosodiphenylamine	mg/kg		U	0.42
Pentachlorophenol	mg/kg		U	2.1
Phenanthrene	mg/kg		U	0.42
Phenol	mg/kg		U	0.42
Pyrene	mg/kg		U	0.42
Total Metals				
Arsenic	mg/kg	7.6		1.2
Barium	mg/kg	76.5		1.2
Cadmium	mg/kg	0.62		0.6
Chromium	mg/kg	14.4		1.2
Lead	mg/kg	47.7		1.2
Mercury	mg/kg	0.037	J	0.26
Selenium	mg/kg		U	1.2
Silver	mg/kg		U	0.6
TCLP Volatiles				
1,1-Dichloroethene	mg/L		U	0.05
1,2-Dichloroethane	mg/L		U	0.05
2-Butanone (MEK)	mg/L		U	1
Benzene	mg/L		U	0.05
Carbon tetrachloride	mg/L		U	0.05
Chlorobenzene	mg/L		U	0.05
Chloroform	mg/L		U	0.05
Tetrachloroethene	mg/L		U	0.05
Trichloroethene	mg/L		U	0.05
Vinyl chloride	mg/L		U	0.02
TCLP Semivolatiles				
1,4-Dichlorobenzene	mg/L		U	0.1
2,4,5-Trichlorophenol	mg/L		U	0.5
2,4,6-Trichlorophenol	mg/L		U	0.1
2,4-Dinitrotoluene	mg/L		U	0.1
2-Methylphenol(o-Cresol)	mg/L		U	0.1
3&4-Methylphenol(m&p Cresol)	mg/L		U	0.2
Hexachloro-1,3-butadiene	mg/L		U	0.1
Hexachlorobenzene	mg/L		U	0.1
Hexachloroethane	mg/L		U	0.1
Nitrobenzene	mg/L		U	0.1
Pentachlorophenol	mg/L		U	0.5
Pyridine	mg/L		U	0.1
TCLP Metals				
Arsenic	mg/L		U	0.1
Barium	mg/L	0.82	J	5
Cadmium	mg/L		U	0.05
Chromium	mg/L		U	0.1
Lead	mg/L		U	0.1
Mercury	mg/L		U	0.002
Selenium	mg/L		U	0.1
Silver	mg/L		U	0.1

TABLE 5b
SOIL DISPOSAL SAMPLE RESULTS
Exide Environmental Response Trust
Frankfort, Indiana

Sample Location		Soil-1021		
Lab ID		50300888002		
Sample Date		10/22/2021		
Matrix		Soil		
Remarks				
Parameter	**Units**	**Result**	**Q**	**RL**
Conventionals				
Cyanide, Reactive	mg/kg		U	1.3
Ignitability, non-metallic	mm/sec	<2.2	U	2.2
Percent Moisture	%	22.2		0.1
pH at 25 Degrees C	Std. Units	6.8		0.1
Sulfide, Reactive	mg/kg		U	12.9

J - Denotes an estimated reporting limit
U - Analyte was not detected at or above the method detection limit
mg/kg - milligrams per kilogram
mm/sec - millimeters per second
Q - Qualifier
RL - Reporting Limit

TABLE 6
GROUNDWATER MONITORING WELL SAMPLE RESULTS
Exide Environmental Response Trust
Frankfort, Indiana

Sample Location	2021 IDEM RCG GW Tap Limit		MW-1			MW-2			MW-3			MW-4			MW-7			MW-9			MW-9D			MW-10			MW-11			MW-12			MW-13			MW-14		
Lab ID			50304949006			50304949001			50304949003			50304949014			50304949004			50304949009			50304949010			50304949002			50304949008			50304949007			50304949011			50304949012		
Sample Date			12/8/2021			12/8/2021			12/8/2021			12/9/2021			12/8/2021			12/9/2021			12/9/2021			12/8/2021			12/9/2021			12/9/2021			12/9/2021			12/9/2021		
Matrix			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater		
Remarks																					FD of MW-9																	
Parameter		**Units**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**
Volatiles																																							
1,1,1-Trichloroethane	200	ug/L	0.34	J	5		U	5		U	5		U	**2500**		U	5		U	25		U	25		U	5		U	5		UJ	5		U	5		U	5
1,1,2,2-Tetrachloroethane	0.76	ug/L		U	**5**		U	**5**		U	**5**		U	**2500**		U	**5**		U	**25**		U	**25**		U	**5**		U	**5**		UJ	**5**		U	**5**		U	**5**
1,1,2-Trichloroethane	5	ug/L		U	5		U	5		U	5		U	**2500**		U	5		U	**25**		U	**25**		U	5		U	5		UJ	5		U	5		U	5
1,1,2-Trichlorotrifluoroethane	10000	ug/L		U	5		U	5		U	5		U	2500		U	5		U	25		U	25		U	5		U	5		UJ	5		U	5		U	5
1,1-Dichloroethane	28	ug/L	1.3	J	5		U	5		U	5	**795**	J	**2500**		U	5	10.8	J	25	11.1	J	25		U	5		U	5	0.68	J	5	2.3	J	5		U	5
1,1-Dichloroethene	7	ug/L		U	5		U	5		U	5	**554**	J	**2500**		U	5	**7.4**	J	**25**	**7.7**	J	**25**		U	5		U	5		UJ	5		U	5		U	5
1,2,3-Trichlorobenzene	7	ug/L		U	5		U	5		U	5		U	**2500**		U	5		U	**25**		U	**25**		U	5		U	5	5	UJ	5		U	5		U	5
1,2,4-Trichlorobenzene	70	ug/L		U	5		U	5		U	5		U	**2500**		U	5		U	25		U	25		U	5		U	5	3.6	J	5		U	5		U	5
1,2-Dibromo-3-chloropropane	0.2	ug/L		U	**10**		U	**10**		U	**10**		U	**5000**		U	**10**		U	**50**		U	**50**		U	**10**		U	**10**		UJ	**10**		U	**10**		U	**10**
1,2-Dibromoethane (EDB)	0.05	ug/L		U	**5**		U	**5**		U	**5**		U	**2500**		U	**5**		U	**25**		U	**25**		U	**5**		U	**5**		UJ	**5**		U	**5**		U	**5**
1,2-Dichlorobenzene	600	ug/L		U	5		U	5		U	5		U	**2500**		U	5		U	25		U	25		U	5		U	5	0.21	J	5		U	5		U	5
1,2-Dichloroethane	5	ug/L		U	5		U	5		U	5		U	**2500**		U	5		U	**25**		U	**25**		U	5		U	5		UJ	5		U	5		U	5
1,2-Dichloropropane	5	ug/L		U	5		U	5		U	5		U	**2500**		U	5		U	**25**		U	**25**		U	5		U	5		UJ	5		U	5		U	5
1,3-Dichlorobenzene	NC	ug/L		U	5		U	5		U	5		U	2500		U	5		U	25		U	25		U	5		U	5		UJ	5		U	5		U	5
1,4-Dichlorobenzene	75	ug/L		U	5		U	5		U	5		U	**2500**		U	5		U	25		U	25		U	5		U	5		UJ	5		U	5		U	5
2-Butanone (MEK)	5600	ug/L		U	25		U	25		U	25		U	**12500**		U	25		U	125		U	125		U	25		U	25		UJ	25		U	25		U	25
2-Hexanone	38	ug/L		U	25		U	25		U	25		U	**12500**		U	25		U	**125**		U	**125**		U	25		U	25		UJ	25		U	25		U	25
4-Methyl-2-pentanone (MIBK)	6300	ug/L		U	25		U	25		U	25		U	**12500**		U	25		U	125		U	125		U	25		U	25		UJ	25		U	25		U	25
Acetone	14000	ug/L		U	100		UJ	100		UJ	100		U	**50000**	12.9	J	100		U	500		U	500		UJ	100		U	100		UJ	100		U	100		U	100
Benzene	5	ug/L		U	5		U	5		U	5		U	**2500**		U	5	3.2	J	**25**	3	J	**25**		U	5		U	5		UJ	5		U	5		U	5
Bromochloromethane	83	ug/L		U	5		U	5		U	5		U	**2500**		U	5		U	25		U	25		U	5		U	5		UJ	5		U	5		U	5
Bromodichloromethane	80	ug/L		U	5		U	5		U	5		U	**2500**		U	5		U	25		U	25		U	5		U	5		UJ	5		U	5		U	5
Bromoform	80	ug/L		U	5		U	5		U	5		U	**2500**		U	5		U	25		U	25		U	5		U	5		UJ	5		U	5		U	5
Bromomethane	7.5	ug/L		U	5		U	5		U	5		U	**2500**		U	5		U	**25**		U	**25**		U	5		U	5		UJ	5		U	5		U	5
Carbon disulfide	810	ug/L		UJ	10		U	10		U	10		UJ	**5000**		U	10		UJ	50		UJ	50		U	10		UJ	10		UJ	10		UJ	10		UJ	10
Carbon tetrachloride	5	ug/L		U	5		U	5		U	5		U	**2500**		U	5		U	**25**		U	**25**		U	5		U	5		UJ	5		U	5		U	5
Chlorobenzene	100	ug/L		U	5		U	5		U	5		U	**2500**		U	5		U	25		U	25		U	5		U	5		UJ	5		U	5		U	5
Chloroethane	8300	ug/L		U	5		U	5		U	5		U	2500		U	5		U	25		U	25		U	5		U	5		UJ	5		U	5		U	5
Chloroform	80	ug/L		UJ	5		UJ	5		UJ	5	**149**	J	**2500**		UJ	5	25	U	25	25	U	25		UJ	5		UJ	5		UJ	5		UJ	5		UJ	5
Chloromethane	190	ug/L		U	5		U	5		U	5		U	**2500**		U	5		U	25		U	25		U	5		U	5		UJ	5		U	5		U	5
cis-1,2-Dichloroethene	70	ug/L	9.8		5		U	5		U	5	**267000**		**25000**	0.72	J	5	**3210**		**250**	**3290**		**250**		U	5		U	5	4.7	J	5	31.2		5	1.2	J	5
cis-1,3-Dichloropropene	4.7	ug/L		U	**5**		U	**5**		U	**5**		U	**2500**		U	**5**		U	**25**		U	**25**		U	**5**		U	**5**		UJ	**5**		U	**5**		U	**5**
Cyclohexane	13000	ug/L		UJ	100		U	100		U	100		UJ	**50000**		U	100		UJ	500		UJ	500		U	100		UJ	100		UJ	100		UJ	100		UJ	100
Dibromochloromethane	80	ug/L		U	5		U	5		U	5		U	**2500**		U	5		U	25		U	25		U	5		U	5		UJ	5		U	5		U	5
Dichlorodifluoromethane	200	ug/L		U	5		U	5		U	5		U	**2500**		U	5		U	25		U	25		U	5		U	5		UJ	5		U	5		U	5
Ethylbenzene	700	ug/L		U	5		U	5		U	5		U	**2500**		U	5		U	25		U	25		U	5		U	5		UJ	5		U	5		U	5
Isopropylbenzene (Cumene)	450	ug/L		U	5		U	5		U	5		U	**2500**		U	5		U	25		U	25		U	5		U	5		UJ	5		U	5		U	5
Methyl acetate	20000	ug/L		U	50		U	50		U	50		U	**25000**		U	50		U	250		U	250		U	50		U	50		UJ	50		U	50		U	50
Methylcyclohexane	NC	ug/L		UJ	50		U	50		U	50		UJ	25000		U	50		UJ	250		UJ	250		U	50		UJ	50		UJ	50		UJ	50		UJ	50
Methylene Chloride	5	ug/L		U	5		U	5		U	5		U	**2500**		U	5		U	**25**		U	**25**		U	5		U	5		UJ	5		U	5		U	5
Methyl-tert-butyl ether	140	ug/L		U	4		U	4		U	4		U	**2000**		U	4		U	20		U	20		U	4		U	4		UJ	4		U	4		U	4
Styrene	100	ug/L		U	5		U	5		U	5		U	**2500**		U	5		U	25		U	25		U	5		U	5		UJ	5		U	5		U	5
Tetrachloroethene	5	ug/L		U	5		U	5		U	5		U	**2500**		U	5		U	**25**		U	**25**		U	5		U	5		UJ	5		U	5		U	5
Toluene	1000	ug/L		U	5		U	5		U	5	239	J	**2500**		U	5		U	25		U	25		U	5		U	5		UJ	5		U	5		U	5
trans-1,2-Dichloroethene	100	ug/L	0.39	J	5		U	5		U	5	**1700**	J	**2500**		U	5	53		25	53.6		25		U	5		U	5	0.27	J	5	0.31	J	5		U	5
trans-1,3-Dichloropropene	4.7	ug/L		UJ	**5**		UJ	**5**		UJ	**5**		UJ	**2500**		UJ	**5**		U	**25**		UJ	**25**		UJ	**5**		UJ	**5**		UJ	**5**		UJ	**5**		UJ	**5**
Trichloroethene	5	ug/L	**49.1**		5		U	5		U	5	**187000**		**25000**		U	5	1.8	J	**25**	1.9	J	**25**		U	5		U	5	0.46	J	5	0.43	J	5		U	5
Trichlorofluoromethane	5200	ug/L		U	5		U	5		U	5		U	2500		U	5		U	25		U	25		U	5		U	5		UJ	5		U	5		U	5
Vinyl chloride	2	ug/L		U	2		U	2		U	2	**22900**		**1000**		U	2	**957**		**10**	**932**		**10**		U	2		U	2	1.1	J	2	**29.1**		2		U	2
Xylene (Total)	10000	ug/L		U	10		U	10		U	10		U	5000		U	10		U	50		U	50		U	10		U	10		UJ	10		U	10		U	10

J - Denotes an estimated reporting limit
ug/L - microgram per liter
NA - Not Analyzed for this parameter
U - Analyte was not detected at or above the method detection limit
RCG - Remediation Closure Guide
Bolding indicates exceedances of IDEM 2021 RCG GW Tap Limit

TABLE 6
GROUNDWATER MONITORING WELL SAMPLE RESULTS
Exide Environmental Response Trust
Frankfort, Indiana

Sample Location	2021 IDEM RCG GW Tap Limit		EB-01-120821			EB-01-120821			TB-01-110919		
Lab ID			50304949005			50304949005			50304949015		
Sample Date			12/8/2021			12/8/2021			11/9/2019		
Matrix			Aqueous			Aqueous			Aqueous		
Remarks			Equipment Blank			Equipment Blank			Trip Blank		
Parameter		**Units**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**
Volatiles											
1,1,1-Trichloroethane	200	ug/L		U	5		U	5		U	5
1,1,2,2-Tetrachloroethane	0.76	ug/L		U	**5**		U	**5**		U	**5**
1,1,2-Trichloroethane	5	ug/L		U	5		U	5		U	5
1,1,2-Trichlorotrifluoroethane	10000	ug/L		U	5		U	5		U	5
1,1-Dichloroethane	28	ug/L		U	5		U	5		U	5
1,1-Dichloroethene	7	ug/L		U	5		U	5		U	5
1,2,3-Trichlorobenzene	7	ug/L		U	5		U	5		U	5
1,2,4-Trichlorobenzene	70	ug/L		U	5		U	5		U	5
1,2-Dibromo-3-chloropropane	0.2	ug/L		U	**10**		U	**10**		U	**10**
1,2-Dibromoethane (EDB)	0.05	ug/L		U	**5**		U	**5**		U	**5**
1,2-Dichlorobenzene	600	ug/L		U	5		U	5		U	5
1,2-Dichloroethane	5	ug/L		U	5		U	5		U	5
1,2-Dichloropropane	5	ug/L		U	5		U	5		U	5
1,3-Dichlorobenzene	NC	ug/L		U	5		U	5		U	5
1,4-Dichlorobenzene	75	ug/L		U	5		U	5		U	5
2-Butanone (MEK)	5600	ug/L		U	25		U	25		U	25
2-Hexanone	38	ug/L		U	25		U	25		U	25
4-Methyl-2-pentanone (MIBK)	6300	ug/L		U	25		U	25		U	25
Acetone	14000	ug/L		U	100		U	100		U	100
Benzene	5	ug/L		U	5		U	5		U	5
Bromochloromethane	83	ug/L		U	5		U	5		U	5
Bromodichloromethane	80	ug/L		U	5		U	5		U	5
Bromoform	80	ug/L		U	5		U	5		U	5
Bromomethane	7.5	ug/L		U	5		U	5		U	5
Carbon disulfide	810	ug/L		U	10		U	10		U	10
Carbon tetrachloride	5	ug/L		U	5		U	5		U	5
Chlorobenzene	100	ug/L		U	5		U	5		U	5
Chloroethane	8300	ug/L		U	5		U	5		U	5
Chloroform	80	ug/L	5	U	5	5	U	5	5	U	5
Chloromethane	190	ug/L		U	5		U	5		U	5
cis-1,2-Dichloroethene	70	ug/L		U	5		U	5		U	5
cis-1,3-Dichloropropene	4.7	ug/L		U	**5**		U	**5**		U	**5**
Cyclohexane	13000	ug/L		UJ	100		UJ	100		UJ	100
Dibromochloromethane	80	ug/L		U	5		U	5		U	5
Dichlorodifluoromethane	200	ug/L		U	5		U	5		U	5
Ethylbenzene	700	ug/L		U	5		U	5		U	5
Isopropylbenzene (Cumene)	450	ug/L		U	5		U	5		U	5
Methyl acetate	20000	ug/L		U	50		U	50		U	50
Methylcyclohexane	NC	ug/L		UJ	50		UJ	50		UJ	50
Methylene Chloride	5	ug/L		U	5		U	5		U	5
Methyl-tert-butyl ether	140	ug/L		U	4		U	4		U	4
Styrene	100	ug/L		U	5		U	5		U	5
Tetrachloroethene	5	ug/L		U	5		U	5		U	5
Toluene	1000	ug/L		U	5		U	5		U	5
trans-1,2-Dichloroethene	100	ug/L		U	5		U	5		U	5
trans-1,3-Dichloropropene	4.7	ug/L		U	**5**		U	**5**		U	**5**
Trichloroethene	5	ug/L		U	5		U	5		U	5
Trichlorofluoromethane	5200	ug/L		U	5		U	5		U	5
Vinyl chloride	2	ug/L		U	2		U	2		U	2
Xylene (Total)	10000	ug/L		U	10		U	10		U	10

J - Denotes an estimated reporting limit
ug/L - microgram per liter
NA - Not Analyzed for this parameter
U - Analyte was not detected at or above the method detection limit
RCG - Remediation Closure Guide
Bolding indicates exceedances of IDEM 2021 RCG GW Tap Limit

TABLE 7
GROUNDWATER SAMPLING RESULTS - TEMPORARY PIEZOMETERS
Exide Environmental Response Truat
Frankfort, Indiana

Sample Location			L6-HP-9-11			L4-HP-9-11			L3-HP-9-11			L7-HP-10-11			L8-HP-10-11			L9-HP-10-11		
Lab ID			R214201-01			R214201-02			R214201-03			R214201-04			R214201-05			R214201-06		
Sample Date	2021 IDEM		10/18/2021			10/18/2021			10/18/2021			10/18/2021			10/18/2021			10/18/2021		
Matrix	RCG GW Tap		Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater		
Remarks	Limit																			
Parameter		**Units**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**
Volatiles																				
Benzene	5	ug/L	0.41	J	0.5	1.2	J	5		U	0.5		U	50		U	5	1.5		0.5
Chloroform	NS	ug/L		U	0.5		U	5		U	0.5		U	50		U	5		U	0.5
cis-1,2-Dichloroethene	70	ug/L	15		0.5	**180**		5		U	0.5	**2400**		50	**420**		5	8.5		0.5
Ethylbenzene	700	ug/L	0.19	J	0.5		U	5	0.15	J	0.5		U	50	2.3	J	5	0.19	J	0.5
m,p-Xylene	10,000	ug/L	0.42	J	1		U	10	0.16	J	1		U	100	8	J	10	0.39	J	1
o-Xylene	10,000	ug/L	0.17	J	0.5		U	5	0.11	J	0.5		U	50	3.5	J	5	0.2	J	0.5
Tetrachloroethene	5	ug/L		U	0.5		U	5		U	0.5		U	50		U	5		U	0.5
Toluene	1,000	ug/L	23		0.5	2.3	J	5	5.3		0.5		U	50	0.8	J	5	0.75		0.5
Trichloroethene	5	ug/L	**6.7**		0.5		U	5		U	0.5	**280**		50	**66**		5	0.2	J	0.5
Vinyl chloride	2	ug/L	**3**		0.5	**270**	J	5		U	0.5	**430**		50	**200**		5	**10**		0.5
Xylenes, total	10,000	ug/L	0.59	J	1.5		U	15	0.27	J	1.5		U	150	12	J	15	0.59	J	1.5

Sample Location			L10-HP-10-11			L11-HP-10-11			L8A-HP-10-11			L9A-HP-10-11			L10A-HP-10-11			L11A-HP-10-11		
Lab ID			R214201-07			R214201-08			R214203-01			R214203-02			R214203-03			R214203-04		
Sample Date	2021 IDEM		10/18/2021			10/18/2021			10/19/2021			10/19/2021			10/19/2021			10/19/2021		
Matrix	RCG GW Tap		Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater		
Remarks	Limit																			
Parameter		**Units**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**
Volatiles																				
Benzene	5	ug/L	0.18	J	0.5	0.36	J	0.5		U	50	0.44	J	1		U	10	0.24	J	0.5
Chloroform	NS	ug/L		U	0.5		U	0.5		U	50		U	1		U	10		U	0.5
cis-1,2-Dichloroethene	70	ug/L	19		0.5	2.7		0.5	**1500**		50	**71**		1	**380**		10	21		0.5
Ethylbenzene	700	ug/L	0.19	J	0.5	0.18	J	0.5		U	50	0.96	J	1	1.6	J	10	0.57		0.5
m,p-Xylene	10000	ug/L	0.41	J	1	0.37	J	1		U	100	3.1		2	4	J	20	1.5		1
o-Xylene	10000	ug/L	0.2	J	0.5	0.2	J	0.5		U	50	1.2		1	1.8	J	10	0.54		0.5
Tetrachloroethene	5	ug/L		U	0.5		U	0.5		U	50		U	1		U	10		U	0.5
Toluene	1,000	ug/L	0.83		0.5	1.6		0.5		U	50	0.42	J	1		U	10	3.3		0.5
Trichloroethene	5	ug/L	0.49	J	0.5		U	0.5		U	50		U	1	**510**		10	1.1		0.5
Vinyl chloride	2	ug/L	**23**		0.5	**2.1**		0.5	**330**	J	50	**75**	J	1	**170**	J	10	**14**	J	0.5
Xylenes, total	10000	ug/L	0.61	J	1.5	0.57	J	1.5		U	150	4.4		3	5.8	J	30	2		1.5

Notes:
J - Denotes an estimated reporting limit
U - Analyte was not detected at or above the method detection limit
ug/L - microgram per liter
Q - Qualifier
RL - Reporting Limit
Bolding indicates exceedances of IDEM 2021 RCG GW Tap Limit

TABLE 8
GROUNDWATER SAMPLING RESULTS - PERMANENT SOIL VAPOR PORT WATER SAMPLING
Exide Environmental Response Trust
Frankfort, Indiana

Sample Location			L13-GW-1019			DUP-03			L2-GW-1019			L4-GW-1019			L17-GW-1019			L5-GW-1019			L16-GW-1019			L6-GW-1019		
Lab ID			R214204-01			R214204-02			R214204-03			R214204-04			R214204-05			R214204-06			R214204-07			R214204-08		
Sample Date	2021 IDEM		10/19/2021			10/19/2021			10/19/2021			10/19/2021			10/19/2021			10/19/2021			10/19/2021			10/19/2021		
Matrix	RCG GW Tap		Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater		
Remarks	Limit					FD of L13-GW-1019																				
Parameter		**Units**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**
Volatiles																										
Benzene	5	ug/L		U	0.5		U	0.5		U	0.5		U	0.5		U	0.5		U	0.5		U	0.5		U	0.5
Chloroform	NS	ug/L		U	0.5		U	0.5		U	0.5		U	0.5		U	0.5		U	0.5		U	0.5		U	0.5
cis-1,2-Dichloroethene	70	ug/L		U	0.5		U	0.5		U	0.5		U	0.5		U	0.5	5.5		0.5		U	0.5		U	0.5
Ethylbenzene	700	ug/L		U	0.5		U	0.5		U	0.5		U	0.5		U	0.5		U	0.5		U	0.5		U	0.5
m,p-Xylene	10000	ug/L		U	1		U	1	0.1	J	1	0.14	J	1		U	1		U	1		U	1		U	1
o-Xylene	10000	ug/L		U	0.5		U	0.5		U	0.5		U	0.5		U	0.5		U	0.5		U	0.5		U	0.5
Tetrachloroethene	5	ug/L		U	0.5		U	0.5		U	0.5		U	0.5		U	0.5		U	0.5		U	0.5		U	0.5
Toluene	1,000	ug/L	0.14	J	0.5		U	0.5		U	0.5		U	0.5		U	0.5		U	0.5		U	0.5		U	0.5
Trichloroethene	5	ug/L		U	0.5		U	0.5		U	0.5		U	0.5		U	0.5		U	0.5		U	0.5		U	0.5
Vinyl chloride	2	ug/L		U	0.5		U	0.5		U	0.5		U	0.5		U	0.5	0.19	J	0.5		U	0.5		U	0.5
Xylenes, total	10000	ug/L		U	1.5		U	1.5	0.15	J	1.5	0.19	J	1.5		U	1.5		U	1.5		U	1.5		U	1.5

Notes:
J - Denotes an estimated reporting limit
U - Analyte was not detected at or above the method detection limit
ug/L - microgram per liter
Q - Qualifier
RL - Reporting Limit
Bolding indicates exceedances of IDEM 2021 RCG GW Tap Limit

TABLE 9
SOIL SAMPLE RESULTS - MONITORING WELL INSTALLATION
Exide Environmental Response Trust
Frankfort, Indiana

Sample Location				MW-11-2-3			MW-12-2-3			MW-13-2-3			TB-01-101921			TB-02-102021		
Lab ID	2021 RCG Soil	2021 RCG Soil		50300609001			50300754001			50300754002			50300615003			50300754003		
Sample Date	Direct Contact	Direct Contact		10/19/2021			10/20/2021			10/20/2021			10/19/2021			10/20/2021		
Matrix	Residential	Non-Residential		Soil			Soil			Soil			Aqueous			Aqueous		
Remarks	Limit (mg/kg)	Limit (mg/kg)																
Parameter			**Units**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**
Volatiles																		
1,1,1-Trichloroethane	640	640	mg/kg		U	0.0043		U	0.0037		U	0.0055		U	5		U	0.005
1,1,2,2-Tetrachloroethane	8.4	27	mg/kg		U	0.0043		U	0.0037		U	0.0055		U	5		U	0.005
1,1,2-Trichloroethane	2.1	6.3	mg/kg		U	0.0043		U	0.0037		U	0.0055		U	5		U	0.005
1,1,2-Trichlorotrifluoroethane	910	910	mg/kg		U	0.0043		U	0.0037		U	0.0055		U	5		U	0.005
1,1-Dichloroethane	50	160	mg/kg		U	0.0043		U	0.0037		U	0.0055		U	5		U	0.005
1,1-Dichloroethene	320	1000	mg/kg		U	0.0043		U	0.0037		U	0.0055		U	5		U	0.005
1,2,3-Trichlorobenzene	88	930	mg/kg		U	0.0043	0.00069	J	0.0037	0.00054	J	0.0055		U	5	0.00068	J	0.005
1,2,4-Trichlorobenzene	81	260	mg/kg		U	0.0043		U	0.0037		U	0.0055		U	5	0.0005	J	0.005
1,2-Dibromo-3-chloropropane	0.074	0.64	mg/kg		U	0.0086		U	0.0074		U	0.011		U	10		U	0.01
1,2-Dibromoethane (EDB)	0.5	1.6	mg/kg		U	0.0043		U	0.0037		U	0.0055		U	5		U	0.005
1,2-Dichlorobenzene	380	380	mg/kg		U	0.0043		U	0.0037		U	0.0055		U	5		U	0.005
1,2-Dichloroethane	6.4	20	mg/kg		U	0.0043		U	0.0037		U	0.0055		U	5		U	0.005
1,2-Dichloropropane	22	66	mg/kg		U	0.0043		U	0.0037		U	0.0055		U	5		U	0.005
1,3-Dichlorobenzene	NC	NC	mg/kg		U	0.0043		U	0.0037		U	0.0055		U	5		U	0.005
1,4-Dichlorobenzene	36	110	mg/kg		U	0.0043		U	0.0037		U	0.0055		U	5		U	0.005
1,4-Dioxane (p-Dioxane)	74	240	mg/kg		U	0.43		U	0.37		U	0.55		NA			U	0.5
2-Butanone (MEK)	28000	28000	mg/kg		U	0.021		U	0.018		U	0.028		U	25		U	0.025
2-Hexanone	280	1300	mg/kg		U	0.086		U	0.074		U	0.11		U	25		U	0.1
4-Methyl-2-pentanone (MIBK)	3400	3400	mg/kg		U	0.021		U	0.018		U	0.028		U	25		U	0.025
Acetone	85000	100000	mg/kg		U	0.086	0.0059	J	0.074	0.012	J	0.11		U	100		U	0.1
Benzene	17	51	mg/kg		U	0.0043		U	0.0037		U	0.0055		U	5		U	0.005
Bromochloromethane	210	630	mg/kg		U	0.0043		U	0.0037		U	0.0055		U	5		U	0.005
Bromodichloromethane	4.1	13	mg/kg		U	0.0043		U	0.0037		U	0.0055		U	5		U	0.005
Bromoform	270	860	mg/kg		U	0.0043		U	0.0037		U	0.0055		U	5		U	0.005
Bromomethane	9.5	30	mg/kg		U	0.0043		U	0.0037		U	0.0055		U	5		U	0.005
Carbon disulfide	740	740	mg/kg		U	0.0086	0.0013	J	0.0074	0.001	J	0.011		U	10		U	0.01
Carbon tetrachloride	9.1	29	mg/kg		U	0.0043		U	0.0037		U	0.0055		U	5		U	0.005
Chlorobenzene	390	760	mg/kg		U	0.0043		U	0.0037		U	0.0055		U	5		U	0.005
Chloroethane	2100	2100	mg/kg		U	0.0043		U	0.0037		U	0.0055		U	5		U	0.005
Chloroform	4.5	14	mg/kg		U	0.0043	0.00095	J	0.0037	0.0013	J	0.0055		U	5	0.0012	J	0.005
Chloromethane	150	460	mg/kg		U	0.0043		U	0.0037		U	0.0055		U	5		U	0.005
cis-1,2-Dichloroethene	220	2300	mg/kg		U	0.0043		U	0.0037		U	0.0055		U	5		U	0.005
cis-1,3-Dichloropropene	25	82	mg/kg		U	0.0043		U	0.0037		U	0.0055		U	5		U	0.005
Cyclohexane	120	120	mg/kg		U	0.086		U	0.074		U	0.11		U	100		U	0.1
Dibromochloromethane	120	390	mg/kg		U	0.0043		U	0.0037		U	0.0055		U	5		U	0.005
Dichlorodifluoromethane	120	370	mg/kg		U	0.0043		U	0.0037		U	0.0055		U	5		U	0.005
Ethylbenzene	81	250	mg/kg		U	0.0043		U	0.0037	0.00034	J	0.0055		U	5		U	0.005
Isopropylbenzene (Cumene)	270	270	mg/kg		U	0.0043		U	0.0037		U	0.0055		U	5		U	0.005
Methyl acetate	29000	29000	mg/kg		U	0.0043		U	0.0037		U	0.0055		U	50		U	0.005
Methylcyclohexane	NC	NC	mg/kg		U	0.0043		U	0.0037		U	0.0055		U	50		U	0.005
Methylene Chloride	490	3200	mg/kg		U	0.017		U	0.015		U	0.022		U	5		U	0.02
Methyl-tert-butyl ether	660	2100	mg/kg		U	0.0043		U	0.0037		U	0.0055		U	4		U	0.005
Styrene	870	870	mg/kg		U	0.0043		U	0.0037		U	0.0055		U	5		U	0.005
Tetrachloroethene	110	170	mg/kg		U	0.0043		U	0.0037		U	0.0055		U	5		U	0.005
Toluene	820	820	mg/kg		U	0.0043		U	0.0037		U	0.0055		U	5		U	0.005
trans-1,2-Dichloroethene	98	300	mg/kg		U	0.0043		U	0.0037		U	0.0055		U	5		U	0.005
trans-1,3-Dichloropropene	25	82	mg/kg		U	0.0043		U	0.0037		U	0.0055		U	5		U	0.005
Trichloroethene	5.7	19	mg/kg		U	0.0043		U	0.0037		U	0.0055		U	5		U	0.005
Trichlorofluoromethane	1200	1200	mg/kg		U	0.0043		U	0.0037		U	0.0055		U	5		U	0.005
Vinyl chloride	0.83	17	mg/kg		U	0.0043	0.00062	J	0.0037		U	0.0055		U	2		U	0.005
Xylene (Total)	260	260	mg/kg		U	0.0086	0.00063	J	0.0074	0.0022	J	0.011		U	10		U	0.01
Metals																		
Lead	400	800	mg/kg	12.5		1.1	**560**		1.1	214		1		NA			NA	
Conventionals																		
Percent Moisture	NC	NC	%	15.2		0.1	17.3		0.1	5.5		0.1		NA			NA	

J - Denotes an estimated reporting limit
U - Analyte was not detected at or above the method detection limit
mg/kg - milligrams per kilogram
Q - Qualifier
RL - Reporting Limit
NC - No Criteria
NA - Not Analyzed
Bolding indicates exceedances of IDEM 2021 RCG Soil Direct Contact Residential Limit

TABLE 10
OUTFALL Z SAMPLE RESULTS
Exide Environmental Response Trust
Frankfort, Indiana

Sample Location	2021 IDEM RCG GW Tap Limit (ug/L)	2021 IDEM RCG Soil Direct Contact Residential Limit (mg/kg)	2021 IDEM RCG Soil Direct Contact Non-Residential Limit (mg/kg)		Outfall Z SW				Outfall Z Sed		
Lab ID					50300615001				50300615002		
Sample Date					10/19/2021				10/19/2021		
Matrix					Surface Water				Sediment		
Remarks											
Parameter				**Units**	**Result**	**Q**	**RL**	**Units**	**Result**	**Q**	**RL**
Volatiles											
1,1,1-Trichloroethane	200	640	640	ug/L		U	5	mg/kg		U	0.0062
1,1,2,2-Tetrachloroethane	0.76	8.4	27	ug/L		U	5	mg/kg		U	0.0062
1,1,2-Trichloroethane	5	2.1	6.3	ug/L		U	5	mg/kg		U	0.0062
1,1,2-Trichlorotrifluoroethane	10000	910	910	ug/L		U	5	mg/kg		U	0.0062
1,1-Dichloroethane	28	50	160	ug/L		U	5	mg/kg		U	0.0062
1,1-Dichloroethene	7	320	1000	ug/L		U	5	mg/kg		U	0.0062
1,2,3-Trichlorobenzene	7	88	930	ug/L		U	5	mg/kg		U	0.0062
1,2,4-Trichlorobenzene	70	81	260	ug/L		U	5	mg/kg		U	0.0062
1,2-Dibromo-3-chloropropane	0.2	0.074	0.64	ug/L		U	10	mg/kg		U	0.012
1,2-Dibromoethane (EDB)	0.05	0.5	1.6	ug/L		U	5	mg/kg		U	0.0062
1,2-Dichlorobenzene	600	380	380	ug/L		U	5	mg/kg		U	0.0062
1,2-Dichloroethane	5	6.4	20	ug/L		U	5	mg/kg		U	0.0062
1,2-Dichloropropane	5	22	66	ug/L		U	5	mg/kg		U	0.0062
1,3-Dichlorobenzene	NC	NC	NC	ug/L		U	5	mg/kg		U	0.0062
1,4-Dichlorobenzene	75	36	110	ug/L		U	5	mg/kg		U	0.0062
1,4-Dioxane (p-Dioxane)		74	240	ug/L		NA		mg/kg		U	0.57
2-Butanone (MEK)	5600	28000	28000	ug/L		U	25	mg/kg		U	0.031
2-Hexanone	38	280	1300	ug/L		U	25	mg/kg		U	0.12
4-Methyl-2-pentanone (MIBK)	6300	3400	3400	ug/L		U	25	mg/kg		U	0.031
Acetone	14000	85000	100000	ug/L		U	100	mg/kg		U	0.12
Benzene	5	17	51	ug/L		U	5	mg/kg		U	0.0062
Bromochloromethane	83	210	630	ug/L		U	5	mg/kg		U	0.0062
Bromodichloromethane	80	4.1	13	ug/L		U	5	mg/kg		U	0.0062
Bromoform	80	270	860	ug/L		U	5	mg/kg		U	0.0062
Bromomethane	7.5	9.5	30	ug/L		U	5	mg/kg		U	0.0062
Carbon disulfide	810	740	740	ug/L		U	10	mg/kg		U	0.012
Carbon tetrachloride	5	9.1	29	ug/L		U	5	mg/kg		U	0.0062
Chlorobenzene	100	390	760	ug/L		U	5	mg/kg		U	0.0062
Chloroethane	8300	2100	2100	ug/L		U	5	mg/kg		U	0.0062
Chloroform	80	4.5	14	ug/L		U	5	mg/kg		U	0.0062
Chloromethane	190	150	460	ug/L		U	5	mg/kg		U	0.0062
cis-1,2-Dichloroethene	70	220	2300	ug/L	5.3		5	mg/kg		U	0.0062
cis-1,3-Dichloropropene	4.7	25	82	ug/L		U	5	mg/kg		U	0.0062
Cyclohexane	13000	120	120	ug/L		U	100	mg/kg		U	0.12
Dibromochloromethane	80	120	390	ug/L		U	5	mg/kg		U	0.0062
Dichlorodifluoromethane	200	120	370	ug/L		U	5	mg/kg		U	0.0062
Ethylbenzene	700	81	250	ug/L		U	5	mg/kg		U	0.0062
Isopropylbenzene (Cumene)	450	270	270	ug/L		U	5	mg/kg		U	0.0062
Methyl acetate	20000	29000	29000	ug/L		U	50	mg/kg		U	0.0062
Methylcyclohexane	NC	NC	NC	ug/L		U	50	mg/kg		U	0.0062
Methylene Chloride	5	490	3200	ug/L		U	5	mg/kg		U	0.025
Methyl-tert-butyl ether	140	660	2100	ug/L		U	4	mg/kg		U	0.0062
Styrene	100	870	870	ug/L		U	5	mg/kg		U	0.0062
Tetrachloroethene	5	110	170	ug/L		U	5	mg/kg		U	0.0062
Toluene	1000	820	820	ug/L		U	5	mg/kg		U	0.0062
trans-1,2-Dichloroethene	100	98	300	ug/L		U	5	mg/kg		U	0.0062
trans-1,3-Dichloropropene	4.7	25	82	ug/L		U	5	mg/kg		U	0.0062
Trichloroethene	5	5.7	19	ug/L		U	5	mg/kg		U	0.0062
Trichlorofluoromethane	5200	1200	1200	ug/L		U	5	mg/kg		U	0.0062
Vinyl chloride	2	0.83	17	ug/L	**2.1**		2	mg/kg		U	0.0062
Xylene (Total)	10000	260	260	ug/L		U	10	mg/kg		U	0.012
Total Metals											
Lead	15	400	800	ug/L	3.4	J	10	mg/kg	104		1.2
Conventionals											
Percent Moisture	NC	NC	NC	%		NA		%	22.6		0.1

Q - Qualifier
RL - Reporting Limit
J - Denotes an estimated reporting limit
U - Analyte was not detected at or above the method detection limit
ug/L - microgram per liter
mg/kg - milligrams per kilogram
NA - Not Analyzed for this parameter
NC - No Criteria
Bolding indicates exceedances of IDEM 2021 RCG GW Tap Limit or the RCG Soil Direct Contact Residential Limit depending on matrix.

APPENDIX A

Field Notes

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Location Frankfort, IN Date 10/12/21

Project / Client Ekide

Overcast, 65°

0730 Crew Pitt (CEP-AGC) Leaves For Site

0755 - CEP Onsite To Perform Interim Remedial Action Study

0800 - Rogers Brothers (Blood Hound) Onsite To Mark Utilities

0845 CEP Collects Measurements At Select Wells

Well	DTW	DTB
MW-1	6.52	19.97
MW-3	5.88	16.97
MW-4	3.72	19.58
MW-7	3.93	23.82
MW-9	2.78	17.39
MW-10	2.61	18.27

0930 - Matt-A-Pitt Delivered

- ~~Locks Have~~ Key Gate Noted As Having A Broken Lock
- Lock Replaced
- Bloodhound Continues Work

1230 - Bloodhound Completes Work

1245 - CEP Offsite To Deliver Check & Permit

1330 - CEP Offsite To Hotel

Quick Pitt 10/12/21

Location Frankfort, IN Date 10/12/21 105

Project / Client Ekide

1600 - Results From Bloodhound Indicated Assessment Seemed - CEP Was Assured All Areas Had Been Scanned Prior To Remobilization.

1615 - Return To Site To Oversee Completion

1720 - Bloodhound Returns & Completes Scan

1750 - Offsite

Ekide Office 10/12/21

Rite in the Rain

Location FRANKFORT IN. Date 10-13-21

Project / Client EXIDE ERT

0700 - B. BERRIE & CRAIG PETKO ON-SITE, ALSO CASCADE PERSONNEL JAMES ASHE, & TONY BREWER.

0710 - REVIEWED HES PLAN, WAITING FOR DAYLIGHT.

0800 - DISCUSSING PROTOCOL FOR INSTALLING SOIL PROBES, PERMANENT ALONG KELLY AVE CASCADE DOES NOT HAVE POWDERED BENTONITE FOR SEAL ABOVE SCREEN, JUST HAVE PELLETS 3/8", CASCADE CALLED SHOP TO CHECK ON POWDERED BENTONITE.

0910 - CASCADE HAVING GRANULAR BENTONITE TO BE DELIVERED TO SITE FOR SEALING SOIL VAPOR PROBES.

0915 MOBED TO LOCATION No. 1 TO HAND AUGER FOR SOIL VAPOR PROBE (SVP).

10-13-21

Location FRANKFORT IN Date 10-13-21

Project / Client EXIDE ERT

0930 - WET AT 4' BGS, SOILS PID 1 ppm TO 3.6 ppm, SETTING SVP AT 3' BGS.

0940 - CITY OF FRANKFORT MUNICIPAL AUTHORITY ALONG KELLY AVE. BRAD - 765 421-3450.

0955 LOCATION 1, WATER AT 3' BGS. SETTING WELL GRAVEL FROM 2' TO 4', SET BOTTOM OF SCREEN AT 2' BGS, WELL GRAVEL SET

1000 MOBED TO LOCATION 2 TO HAND AUGER.

1020 - LOCATION 2' DRY AT 5' BGS. NEED TO WAIT FOR LONGER HAND AUGER TO COME FROM CASCADE. PID - 6.4 TO 18.4 ppm.

1025 - MOBED TO LOCATION 3 TO HAND AUGER. PID - 1 - 22.8 ppm, WATER AT 3.5' BGS

10-13-21

Rite in the Rain

Location FRANKFORT Date 10-13-21

Project / Client EXIDE ERT

LOCATION 3 - SETTING BOTTOM OF SCREEN @ 2.5' BGS FOR SVP, 6" WELL GRAVEL ABOVE SCREEN, REMAING 1.5' TO GRADE, FOR GRANULAR BENTONITE

1110 - MOBED TO LOCATION 4, DOWN 4.5' BGS, CHECK LOCATION 2, WATER AT 4.5' GOING TO SET SVP SCREEN @ 3.5' BGS NOW & WAIT FOR WATER IN LOCATION 4, LOCATION 4 PID - 1-5 ppm.

1130 - BACK AT LOCATION 4 WATER AT 4.5' BGS, SETING SVP SCREEN BOTTOM @ 3.5' BGS, WELL GRAVEL TO 2.5' BGS

1140 - CASCADE LUNCH BREAK CRAIG HUNG UP 3 SITE SIGNS ~~ONE~~ ON EACH OF 3 GATES

10-13-21

Location FRANKFORT Date 10-13-21

Project / Client EXIDE ERT

1220 - MOBED TO LOCATION 5 TO HAND AUGER SVP. DOWN 5' BGS, WAITING TO SEE IF WATER COMES IN PID-1-5 ppm

1310 - MOBED TO LOCATION 6, TO HAND AUGER, PID - <1 ppm, 4'2" DTB. 6" WATER, SETTING BOTTOM OF SVP SCREEN AT @ 2.5' WELL GRAVEL SET TO 1.5' BGS BENTONITE GRANULAR ADDED TO LOCATION 6 FROM 0.5' TO 1.5', HYDRATED W/ WATER, BEGAN DIGGING FOR FLUSH MOUNT, ADD ROUND CONC. PAD

1430 - AT LOCATION 5, 5' BGS 6" WATER, SETTING BOTTOM OF SVP SCREEN @ 3.5', ADDING WELL GRAVEL TO 1.5' BGS. PID - <1 ppm, INSTALLATION OF FLUSH MOUNT & ROUND CONCRETE PAD.

10-13-21

Rite in the Rain

Location FRANKFORT IN Date 10-13-21

Project / Client EXIDE ERT

1500 CREW PETKO completed INSTALLING PRESSURE TRANSDUCERS IN WELLS TO CONDUCT SLUG TEST DATA/Angl

WELL #	STRING LENGTH (FEET)	CM	DTW (FT)
MW-1	9.95	303.28	7.12
MW-3	10.33	314.86	6.12
MW-4	10.40	316.99	3.62
MW-7	10.23	311.81	3.96
MW-9	9.75	297.18	2.22
MW-10	10.02	305.41	2.33

1610 - LOCATION 5, GRANULAR BENTONITE 0.5' TO 1' BGS, FLUSH MOUNT Complete w/ PAD

1615 - MOVE TO LOCATION 4 TO FINISH, 0.5' TO 1.5' BGS GRANULAR BENTONITE, ADDED FLUSH MOUNT & ROUND CONCRETE PAD

1540 - MOVE TO LOCATION 3 TO INSTALL FLUSH MOUNT AND

10-13-21

Location FRNKFORT Date 10-13-21

Project / Client EXIDE ERT.

ROUND CONCRETE COLLAR PAD.

1605 - INSTALLED FLUSH MOUNT & ROUND CONCRETE PAD AT LOCATION 2.

1640 - INSTALLED FLUSH MOUNT AND ROUND CONCRETE PAD AT LOCATION 1.

CLEANING UP FOR THE DAY.

1710 - ALL OFF-SITE

10-13-21

Location FRANKFORT Date 10-14-21

Project / Client EXIDE ERT

0745 - B. BEEGLE & C. PETKO ON-SITE, CASCADE ON-SITE JAMES ASHE & TONY BREWER, H&S MEETING.

0815 - MOBED TO LOCATION 13 TO INSTALL SVP. HAND AUGERED TO 5' BGS, NO WATER, WELL WAIT. PID - <1ppm

0835 - MOBED TO LOCATION 14 TO INSTALL SVP. HAND AUGERED TO 5' BGS. NO WATER, WELL WAIT, PID - <1ppm

0855 - MOBED TO LOCATION 15 TO INSTALL SVP. HAND AUGERED TO 5' BGS. WET AT 5', 1.5" WATER WATER, SETTING SCREEN BOTTOM AT 4' BGS AND WELL GRAVEL TO 3' BGS, 0.5-3' Bentonite Granular

1100 PID <1ppm Completed FLUSH Mount AT LOCATION 14, HAND AUGERED TO 6' BGS, SET BOTTOM OF SCREEN @ 4.5'

Location FRANKFORT Date 10-14-21

Project / Client EXIDE ERT

Bentonite

WELL GRAVEL 3.5' TO 6', 0.5-3.5 Completed Round Concrete PAD AT LOCATION 14. BEGAN INSTALLING THE 3 BEDDING SVP. PID - <1ppm

1115 - AT LOCATION 17 ALONG STORM SEWER, CORNER OF KELLY AVE & E. McCLURG. ST.

1125 DOWN 2.5' BGS AT LOCATION 17 (BEDDING MATERIAL APPEARS TO BE NATIVE, NO GROUNDWATER OBSERVED, CLAY & GRAVEL WILL SET SCREEN BOTTOM AT 2.5' & WELL GRAVEL TO 0.5' BGS. PID - <1ppm

1145 - MOBED TO LOCATION 16 100' SOUTH OF LOCATION 17.

1200 - CASCADE LUNCH

1230 - BACK AT LOCATION 16.

1300 - DOWN 3' @ LOCATION 16, NATIVE BACK FILL

10-14-21 Rain in the Rain

Location FRANKFORT IN Date 10-14-21

Project / Client EXIDE ERT

PID - 21ppm
CLAY & GRAVEL, NO GROUNDWATER
SETTING SCREEN BOTTOM
@ 3' BGS, WELL GRAVEL @ 1.5' BGS.
SETTING FLUSH MOUNT & ROUND
CONCRETE PAD. 0.5-1.5' BENTONITE
1315 - AT LOCATION 13, HAND
AUGERED TO 6', DRY, TO
SET BOTTOM OF SVP SCREEN
@ 5', WELL GRAVEL TO 4' BGS,
1400 - AT LOCATION 18 TO
SET SVP, PID - < 1ppm
HAND AUGERED TO 3' BGS,
NATIVE GRAVEL & CLAY,
BOTTOM OF SCREEN @ 3'
WELL GRAVEL TO 1.5', 0.5'
TO 1.5' BGS GRANULAR
BENTONITE, HYDRATED.
1430 - CRAIG PETKO REMOVED
THE PRESSURE TRANSDUCERS
FROM THE 6 WELLS THEY
WERE INSTALLED IN YESTERDAY
FOR SLUG TEST ANALYSIS.

DLT 10-14-21

Location FRANKFORT IN Date 10-14-21

Project / Client EXIDE ERT.

1430-1630, INSTALLED FLUSH
MOUNTS AND ROUND CONCRETE
PADS AT LOCATIONS 13, 15,
16, 17 AND 18. ALL LOCATIONS
WERE FINISHED WITH
GRANULAR BENTONITE
& HYDRATED W/WATER TO
~6" BELOW GRADE.
1630 - BEGAN CLEANING UP
FOR THE DAY,
1645 - ALL OFF-SITE

DLT 10-14-21

Location FRANKFORT Date 10-15-21

Project / Client EXIDE ERT

0740 - B. BEEGLE & C. PETKO ON-SITE.

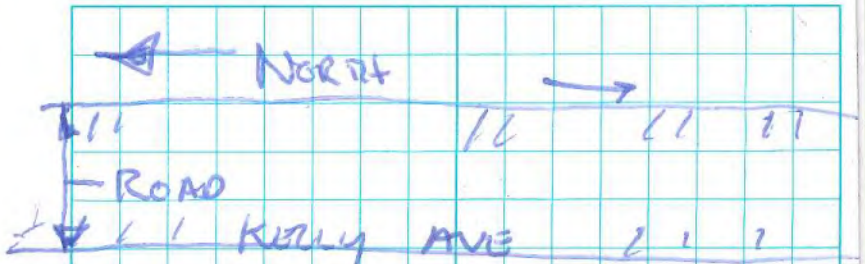
0745 CASCADE ON-SITE, JAMES & TONY, TODAY COLLECTING HYDRO-PUNCH SAMPLE HELD H&S MEETING WORKING AROUND GEOPROBE.

0815 - MOBING TO LOCATION 3 TO HYDROPUNCH. LIGHT RAIN NOW. DUE TO OVERHEAD ELEERIC & UNDERGROUND UTILITIES AT LOCATION 3 NEED TO IN STREET 5' DISCUSSED W/ JAN. D. & GREG S. OK, NEED TO OBTAIN APPROVAL FROM THE CITY, CITY INSPECTOR SCHEDULED TO ARRIVE ON-SITE AT 1000 TODAY TO DISCUSS

D. Beegle 10-15-21

Location FRANFORT IN Date 10-15-21

Project / Client EXIDE ERT



0905 - MOBED ON-SITE AT LOCATION 7 TO HYDROPUNCH LOCATION 7, 86' SOUTH OF MW-4. WATER ENCOUNTERED AT ABOUT 2', PLAN TO COLLECT GROUNDWATER SAMPLE FROM 10'-11' SIMILAR TO SAMPLING DEPTH AT MW-4 GREG S. AGREED. GROUNDWATER SAMPLING TO BE CONDUCTED W/ PERISTALTIC PUMP.

1015 - SCREEN OPEN 2' FROM 9'-11', SLOW RECOVERY

1030 - NO GROUNDWATER,

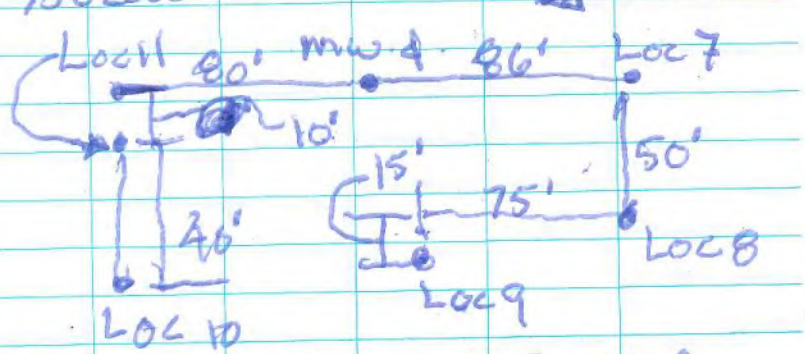
D. Beegle 10-15-21

Location FRANKFORT IN Date 10-15-21

Project / Client EXIDE ERT

NEED TO PLACE TEMPORARY 1" DIA PVC CASING & 5' SCREEN SAMPLE MONDAY 10-18-21

1100 - BEGAN SETTING TEMPORARY CASING ALSO AT LOCATIONS 8, 9, 10 & 11. DUE TO SLOW RECOVERY. SEE BELOW



1100 - DAN STOCK, DIRECTOR OF PLANNING & HOUSING INITIATIVES & DANIEL HOWE, BUILDING INSPECTOR FROM THE CITY OF FRANKFORT ARRIVED ON-SITE TO REVIEW WORK

RL 10-15-21

Location FRANKFORT IN Date 10-15-21

Project / Client EXIDE ERT

DAN & DANIEL STATED WE CAN PUT HYDRO PUNCHES IN ROAD - KELLY HAVE. JUST ADD SEALANT AROUND ASPHALT PATCH, OFF-SITE AT 1145. ALSO THEY REQUESTED TO CALL STREET DEPT WHEN WORK TO CLOSE ROAD. NO ADDITIONAL PERMIT OR MONEY NEEDED.

1245 - COMPLETED PIEZOMETERS AT LOCATIONS 5, 7, 8 & 9. ISSUES AT # 10. TO BE ADDRESSED MONDAY 10-18-21. CASCADE NEEDS TO LEAVE SITE TO BE IN COMPLIANCE W/ DOT REGS.

1300 - HANDED FIELD BOOK TO CRAIG PETKO FOR THE DAY

RL 10-15-21

1305 - DRINKS, FLAGS & SECURING EQUIPMENT ON-SITE

1310 - ALL OFF-SITE

Craig Petko 10/15/21

Rite in the Rain

Location Frankfort, Ky Date 10/17/21

Project / Client Exide Frankfort

1720 - Onsite to meet Ben Claas (Pace Analytical) to Setup Mobile Lab

1730 - Pace Setting up Lab to Run overnight + Gain Necessary Sampling Conditions

0755 - Pace Provided Key Site Key Code
- will Secure Site upon Departure

1800 - CEP Offsite

Exide 10/17/21

Location FRANKFORT Date 10-18-21

Project / Client EXIDE ERT

0730 - B. BEEGLE & C. PETKO ON-SITE

BEN CLAAS FROM PACE W/ MOBILE LAB ON-SITE.

0800 CASCADE ON-SITE

~~JAMES~~ TONY B. STARTED GEOPROBE

0810 - PACE MOBILE LAB, CALIBRATING INSTRUMENT FOR WATER ANALYSIS, 3 TO 4 HOURS TO CALIBRATE.

0815 - C. PETKO SETTING UP TO COLLECT GROUNDWATER SAMPLES.

0830 - CASCADE FILLING UP GEOPROBE W/ FUEL.

0845 - MOVED TO LOCATION TO ON-SITE TO SET PIEZOMETERS. CALLED CITY OF FRANKFORT STREETS DEPARTMENT 765-659 ~~502-875-8530~~ TO 2912. CLOSE KELLY AVE FOR

10-18-21

Rite in the Rain

HYDROPUNCHES IN ROAD LOCATIONS 3, 4 & 6.

0910 - INSTALLED 1" DIA. PIEZOMETER AT LOCATION 10

0920 - MOBED TO LOCATION #11 ON-SITE. PIEZOMETER AT LOCATION 10 IS SET AT 11' BGS W/ 5' SCREEN.

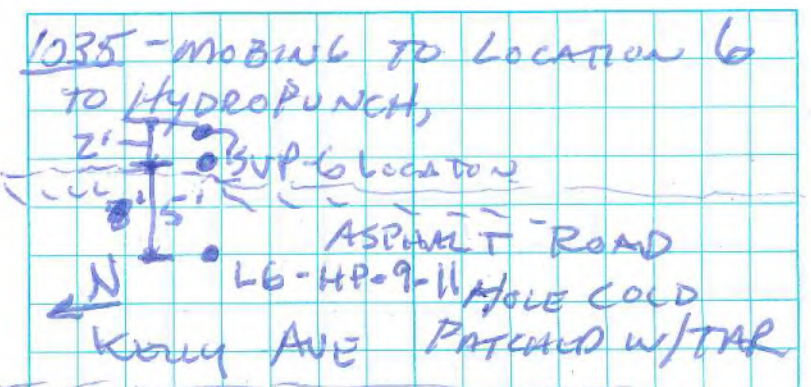
LOCATION 11, PID < 1ppm SOIL SMELLS.

0945 - SETTING 1" DIA PIEZOMETER AT LOCATION 11, SET AT 11' BGS W/ 5' SCREEN.

1000 STREETS DEPT CAME AND CLOSED ROAD ALONG KELLY AVE TO HYDROPUNCH. CASCADE OUT TO GET ASPHALT PATCH & SEALANT

10-18-21

1035 - MOBING TO LOCATION 6 TO HYDROPUNCH,

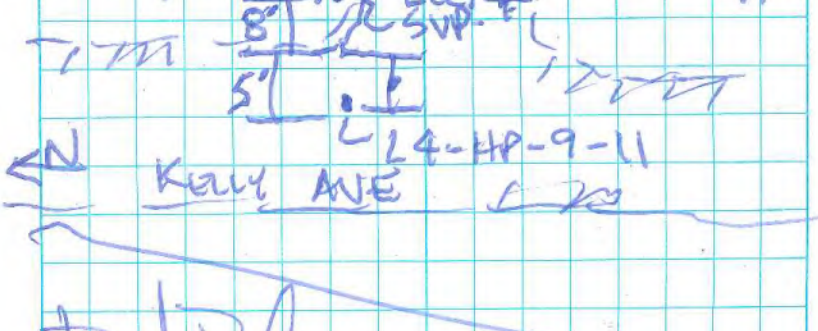


HOLE COLD PATCHED W/TAR

1110 SETTING HYDROPUNCH 9'-11' BGS, SOILS PID - <1ppm

1125 - COLLECT 3-40ml VIALS OF GROUNDWATER # L6-HP-9-11, 1125 DELIVERED TO MOB

1150 - MOBED TO LOCATION 4 TO HYDROPUNCH PID-<1ppm



10-18-21

Rite in the Rain

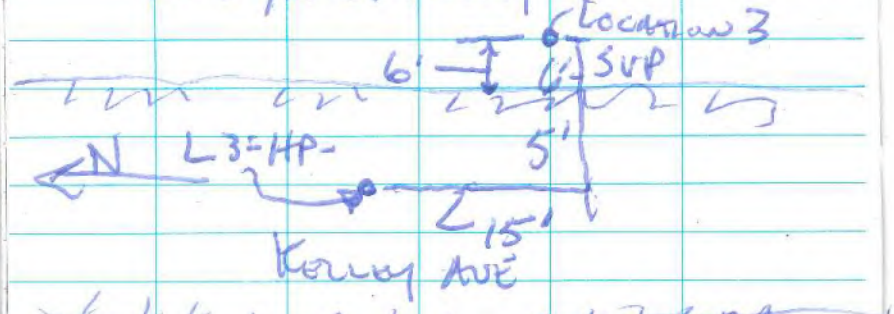
Location FRNKFORT Date 10-18-21

Project / Client EXADE ERT

1240 COLLECTED 3-40ML VIALS OF GROUNDWATER, SAMPLE # L4-HP-9-11, HOLE WAS ASPHALT COLD PATCHED W/ TAR,

1255 CASCADE LUNCH

1325 - MOBED TO LOCATION 3 TO HYDROPUNCH,



1410 COLLECTED 3-40ML VIALS OF GROUNDWATER SAMPLES # L3-HP-9-11, ASPHALT COLD PATCH W/ SEALANT IN HOLE,

1500 - OPENED UP ROAD CALLED STREETS DEPT FOR THEM TO PICK UP CONES

DF Rob 10-18-21

Location FRNKFORT Date 10-18-21

Project / Client EXADE ERT

1515 - COLLECTED 3-40ML VIALS, GROUNDWATER SAMPLE # L7-HP-10-11

1535 - COLLECTED 3-40ML VIALS, GROUNDWATER SAMPLE # L8-HP-10-11

1550 - COLLECTED 3-40ML VIALS GROUNDWATER SAMPLE # L9-HP-10-11

1610 - COLLECTED 3-40ML VIALS, GROUNDWATER SAMPLE # L10-HP-10-11

1630 - COLLECTED 3-40ML VIALS, GROUNDWATER SAMPLE # L11-HP-10-11

1645 - BBD Offsite

1700 - Drillers Offsite

1715 - Off Site

- Bond (Truck) and Secure Site Upon Departure Following Completion of Analysis

Kyle Robb 10/18/21

Rite in the Rain

Location Frankfort, IN Date 10/18/21

Project / Client Evide ERT

CEP Performed Vapor Sampling Activities
As Follows

0740 - At Location 14 For Soil Gas Sampling
0750 - Location 14 Passed Helium Screening (0.0%)
- Slow water encountered During Sampling Required Rest
1030 - Collect Sample L14-DSG-1018
1040 - At Location 1 Deep Soil Gas Port
1045 - Helium Test Passed (0.0%)
1050 - Collect Sample L1-DSG-1018
1100 - At Location 2 Deep Soil Gas Port
1120 - Water Produced At Location 2 Cannot Sample
1130 - At Location 13 Deep Soil Gas Port
- Cannot Sample due to water Production
1140 - At Location 18 Sewer Bedding Location
1143 - Passed Helium Test (0.0%)
1148 - Collect Sample L18-SBS-1018
1155 - At Location 3 Deep Soil Gas Port
1200 - Pass Helium Test (0.0%)
1215 - Collect Sample L3-DSG-1018
- Collect Duplicate Sample Dup-01 Time 1155
1220 - At Location 4 Deep Soil Gas Port
- Could Not Sample Due to Water Production
1240 - At Location 5 Deep Soil Gas Port
- Cannot Sample due to water Production

Craig E. Potts 10/18/21

Location Frankfort, IN Date 10/18/21 127

Project / Client Evide ERT

1245 - At Location 17 Sewer Bedding Sample
- Could Not Sample Due to Water Production
1300 - At Location 6 Deep Soil Gas Port
- Could not Sample due to water Production
1310 - At Location 16 Deep Soil Gas Port
1323 - Pass Helium Screening (0.0%)
1325 - Collect Sample L16-DSG-1018
1440 - Collect Manhole C Sample of Gas
- No Vapor Readings on Multi-Gas Meter
1455 - Collect Manhole B Sample of Gas
- No Vapor Readings on Multi Meter
1520 - Begin Attempting To Purge Water From Vapor Point
- Begin Pumping Location 5
1548 - Stop Pump
- Removed ≈ 0.75 Gal Constant Flow
1600 - Begin Pumping Location 2
1615 - Stop Pumping
- Removed ≈ 0.75 Gal, Regular Flow
1625 - Attempt Location 15 (Near Location 6)
1635 - Stop Pumping
- Removed ≈ 1 Gal, Constant Flow

Craig E. Potts 10/18/21

Rite in the Rain

Location FRANKFORT IN Date 10-19-21

Project / Client EXIDE ERT

0730 B. BIZZLE & C. PETKO ON-SITE, RECEIVED HYDRO-PUNCH DATA, NEED TO HYDROPUNCH 8A, 9A, 10A AND 11A LOCATIONS, VM MOBILE LAB

0800 CASCADE ARRIVED AT SITE, JAMES & TONY, H&S MEETING CONDUCTED

0830 - MOBED TO LOCATION 8A TO SET 1" DIA PIEZOMETER, SET AT 11' BGS W/ 5' SCREEN.

0905 - MOBED TO LOCATION 9A TO SET 1" DIA. 5' PIEZOMETER, SET TO 11' BGS SCREEN

0930 - MOBED TO LOCATION #10A TO SET 1" DIA. PIEZOMETER, SET TO 11' BGS 5' SCREEN.

1000 MOBED TO LOCATION #11A TO SET 1" DIA PIEZOMETER, SET TO 11' BGS W/ 5' SCREEN

TH RL 10-19-21

Location FRANKFORT IN Date 10-19-21

Project / Client EXIDE ERT

1045-1110 CONFERENCE CALL W/ P. STOTTLAR, JAN, D. GREG, S, CRAIG P, & B. BIZZLE TO DISCUSS SOIL VAPOR SAMPLING ISSUES, COLLECT WATER SAMPLES FROM SVP THAT HAS WATER, CRAIG P. WILL COLLECT THESE SAMPLES

1115 - MOBED TO LOCATION 8A TO SAMPLE GROUND-WATER, # L8A-HP-10-11 COLLECTED 3-40 ML VIALS AT 1140.

1145 MOBED TO LOCATION 9A TO SAMPLE WATER (GROUNDWATER) # L9A-HP-10-11, COLLECTED 3-40 ML VIALS, AT 1155

1200 - MOBED TO LOCATION 10A TO COLLECT GROUNDWATER SAMPLE, # L10A-HP-10-11 COLLECTED 3-40 ML VIALS

TH RL 10-19-21

Rite in the Rain

Location FRANKFORT IN Date 10-19-21

Project / Client EXIDE ERT

1215 - MOBED TO LOCATION
11A TO COLLECT GROUND-
WATER SAMPLE L11A-HP-10-11
3-40 ML VIALS, COLLECTED
AT 1230.
1240-1310 - CASCADE LUNCH
1315 - MOBED TO LOCATION 12
TO INSTALL NEW WELL
MW-11, 0-8" - 1" ASPHALT &
7" GRAVEL BASE, 8"-5'
BROWN CLAY TRACE GRAVEL
WET AT 3' BGS, COLLECTED
SOIL SAMPLE FROM 2'-3'
MW-11-2-3 @ 1410.
0-5' WAS HAND AUGERED TO
CLEAR UTILITIES
1430 - USING 4¼" HSA'S TO 15'
1500 - AT 12' BGS, BROWN
CLAY TRACE GRAVEL,
1510 - DOWN 15' BGS, BEGAN
SETTING WELL.

10-19-21

Location FRANKFORT IN Date 10-19-21

Project / Client EXIDE ERT

NOTE; 12'-15' SILTY BROWN
SAND, SET 2" DIA PVC
CASING & SCREEN, SCREEN
5' BTB 15' BGS, WELL GRAVEL
(SAND) PLACED TO 4' BGS
BENTONITE PLUG PLACED
TO ABOUT 1' BGS &
HYDRATED, 8" DIA FLUSH
MOUNT INSTALLED W/ Bentonite
PLUG HYDRATED INSIDE,
1630 - COMPLETED WELL MW-11
1640 - Back offsite
1645 - Cascade offsite
1700 - Back Cargo (Place) w/ U Rovers Onsite Performing
analysis & will secure site
1705 - CEP offsite

Entered 10/19/21

Location Exide Frankfort Date 10/19/21

Project / Client Exide ERT

- CEP Completed Sampling As Follows
0830 - Continue Sewer Manhole Sampling
0845 - Collect Manhole E For VOC's
0900 - Collect Manhole F For VOC's
0915 - Collect Manhole G For VOC's
0930 - Collect Manhole H For VOC's
- Collect Pvp-02 at 0925 From Manhole H
1000 - Collect Manhole I For VOC's
1045 - Discuss Vapor Ports with Project Personnell
- will Sample water From Vapor Ports
1210 - Collect Water Sample L13-Gw-1019 For VOC's
- Collect Pvp-03 From This Point at 1215
1225 - Collect water Sample L2-Gw-1019 For VOC's
1240 - Collect water Sample L4-Gw-1019 For VOC's
1309 - Collect water Sple L17-Gw-1019 For VOC's
1320 - Collect water Sample L5-Gw-1019 For VOC's
1334 - Collect water sample L16-Gw-1019 For VOC's
1345 - Collect water Sample L6-Gw-1019 For VOC's
1420 - Collect Outfall 2-Sw Surface water Sample
1425 - Collect outfall 2-Sed Sediment Sample

Greg E. Reis 10/19/21

Location FRANKFORT IN. Date 10-20-21

Project / Client EXIDE ERT

0730 - B. BEEBLE & CRAIG PETKO ON-SITE, ALSO BEN FROM PACE'S MOBILE LAB,
0800 CASCADE ON-SITE JAMES AND TONY, CASCADE SETTING UP TO DO DECON OF AUGERS, HES MEETING CONDUCTED
CRAIG PETKO SETTING UP TO SAMPLE MANHOLES,
0845 MOBED TO MW-12 WELL LOCATION (LOCATION 7B), ASPHALT 2" THICK 3" GRAVEL LAYER UNDER ASPHALT, 5" - 2' BGS SANDY BLACK GRAVEL, WET AT 2', NOT ABLE TO COLLECT SAMPLE DUE TO RED BRICK & GRAVEL, NOTE: HAND AUGERED TO 4' BGS. URBAN FILL BLACK BRICK TO 4', WILL ADVANCE 4 1/4" DIA HSA FROM 4' BGS

10-20-21

Rite in the Rain

Location FRANKFORT IN Date 10-20-21

Project / Client EXIDE ERT

0950 - COLLECTED SAMPLE OFF AUGERS AT 2', 3', # MW-12-2-3, FOR VOC & LEAD ANALYSES,

1000 - HSA's DOWN 5.5', TRANSITIONED INTO SOFTER MATERIALS,

0'-5.5' - URBAN FILL, GRAVEL, RED BRICK, 4" PIECES OF METAL, BLACK, WET

5.9' BLACK, VERY WET, SILTY, CLAYEY FINE SAND, SLOPPY MATERIAL.

9'-15' BGS BLACK SLOPPY SOUP SILT W/ TRACE FINE SAND, - BLACK SILT W/FINE SAND.

1045 - HSA's DOWN TO 15' BGS WILL BEGIN TO SET WELL @ 15', 2" DIA PVC CASING & SCREEN, SCREEN 5'-15' WELL GRAVEL SAND TO 4'

10-20-21

Location FRANKFORT IN Date 10-20-21

Project / Client EXIDE ERT

1100 - CASCADE DROPPED OFF PRT SOIL VAPOR SAMPLING EQUIPMENT.

1140 - SAND PACK TO 4' BGS BENTONITE HOLE PLUG TO 6" BGS WILL PLACED PAD & STICKUP LATER,

1145 - CASCADE DECONNING HSAs

1220 MOBED TO MW-13 TO INSTALL WELL, CRAIG PETKO ASSISTING.

2" ASPHALT, 6" TO 8" GRAVEL BASE, DK BROWN CLAYEY SAND, SOME GRAVEL, LEAD PIECES, SAMPLE MW-13-2-3 DRY, MS/MSD SAMPLE COLLECTED BY CRAIG, PETKO, HAND DRILLING 3 TO 4', URBAN FILL, RED BRICK MATERIAL,

1315-1330 CASCADE LUNCH,

10-20-21

Rite in the Rain

Location FRANKFORT IN Date 10-20-21

Project / Client OXIDE ERT

AT 4.5', DRY, STILL IN URBAN FILL WITH RED BRICK & METAL (4") OBJECTS, 4 1/2' SHAKING TO GET INTO BLACK CLAY MATERIALS, DRY.

1345 - WET AT 7', NO CUTTINGS RETURNS,

1415 - DOWN 15' BGS TO SET WELL AT 15' BGS 7'-15' SOUPY BLACK CLAY MATERIALS, WET,

1500 - COMPLETED WELL MW-13 2" DIA PVC CASING & SCREEN SCREEN 5'-15' BGS, SAND TO 4', BENTONITE HOLE PLUG, HYDRATED TO 6" BGS,

1540 AT MW-12, SAW CUTTING PAVEMENT TO SET CONCRETE PAD & STICKUP CLOSURE,

RJH 10-20-21

Location FRANKFORT IN Date 10-20-21

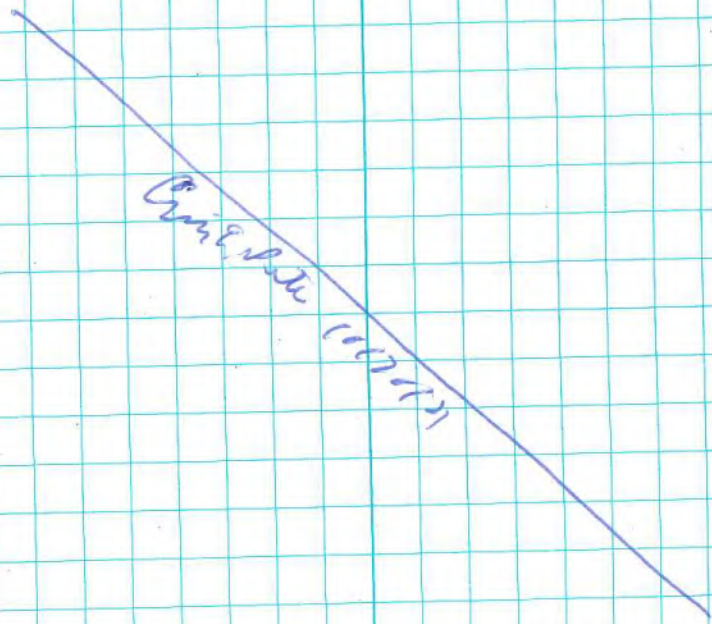
Project / Client OXIDE ERT

1600 - RPD offsite

1700 - Pads Almost Complete
- Crew Runs Out Of Concrete Until 11 AM Tomorrow
To S. Tomorrow
- Crew Cleaning Up For Day

1730 - Drillers offsite

1735 - CE Offsite
- Place Mobile Lab Readings Ongoing To Complete Analysis



Rite in the Rain

Location Frankfort, IN Date 10/20/21

Project / Client Exide ERT

- CEP Completed Supply A, Follows Today

0830 - Continue Sewer Manhole Sampling of Vapors

0835 - Manhole #15 Crack Tube A Rectangular Open Storm Grate

- Did not Sample

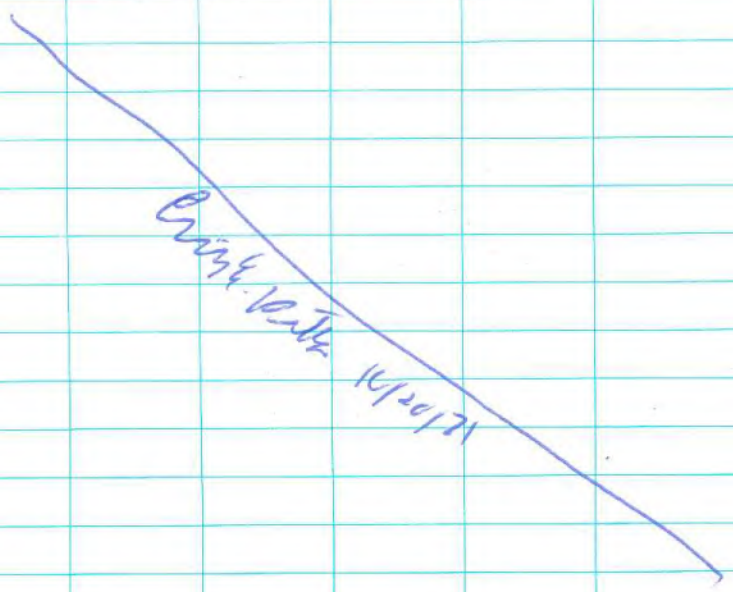
0850 - Collect Sample Manhole J For VOCs (0.0 PPM)

0920 - Collect Sample Manhole L For VOCs (0.3 PPM)

- Collect Pump-04 At 0910

0950 - Collect Sample MH-10 For VOCs (0.3 PPM)

- Significant Water Present In MH-10 @ ≈4' BGS



Location FRANKFORT IN Date 10-21-21

Project / Client EXIDE ERT

0740 - B. BEEGLE & CRAIG P. ON-SITE W/ BEN FROM FACE MOBILE LAB.

0800 CASCADE ON-SITE, JAMES & TONY, TONY TO FINISH CONCRETE PAD AT MW-13 & DEZON AUGERS, JAMES B. BEEGLE GOING TO SAMPLE PRT 3VP W/ CRAIG P. HEALTH & SAFETY MEETING HELD.

0830 - AT LOCATION 6 TO COLLECT PRT-5V SAMPLE (UTILIZING PRT SYSTEM) SAMPLE # L6-PRT-1.5 DEPTH 1.5', TIME 0844.

0855 AT LOCATION 16 TO COLLECT PRT-5V SAMPLE SAMPLE # L16-PRT-1 DEPTH 1', TIME-0858

0905 AT LOCATION 5 TO COLLECT PRT-5V SAMPLE

10-21-21

Rite in the Rain

Location FRANKFORT IN Date 10-21-21

Project / Client EXIDE ERT

SAMPLE # L5-PRT-1
DEPTH 1', TIME - 0910.
0920 AT LOCATION 17 TO
COLLECT PRT-SV SAMPLE
L17-PRT-1, DEPTH 1'
TIME - 0922
0930 - AT LOCATION 4 TO
COLLECT PRT-SV SAMPLE
L4-PRT-1, DEPTH 1',
TIME - 0944.
0955 - AT LOCATION 2 TO
COLLECT PRT-SV SAMPLE
L2-PRT-1, DEPTH 1'
TIME - 0956,
1010 AT LOCATION 13 TO
COLLECT PRT-SV SAMPLE
L13-PRT-1, DEPTH 1'
TIME - 1018.
1030 - RETURNING TO SITE
TO FINISH DECONNING
AUGURS,

TR TR 10-21-21

Location FRANKFORT IN Date 10-21-21

Project / Client EXIDE ERT

1100 MOBED TO MW-14
LOCATION TO INSTALL WELL
1115 - HAND AUGERED TO
2', WATER AT 6" BGS,
1145 - STARTED ADVANCING
4¼" DIA HSA DUE TO
REFUSAL AT 2' W/ HAND
AUGER,
1205 - DOWN 4' NO CUTTINGS
RETURNED TO GROUND, NO
SAMPLE COLLECTED,
1230 DOWN 10', CUTTING
BROWN VERY WET SOUPY
SILT, TRACE FINE SAND
0-3" ASPHALT
3"-10" FORMER BASE
1245 DOWN 15' BGS TO SET
WELL, 10"-5' URBAN FILL,
NO BRICKS OR METALS OBSERVED
5'-15' BROWN VERY WET
SOUPY SILT W/ FINE SAND

TR TR 10-21-21 Rain

SETING 2" DIA PVC CASING & SCREEN. SCREEN 5'-10' BGS, SAND (Well GRAVEL) SET TO 4' BGS, REMAINDER TO 6" BGS W/ BENTONITE CHIPS Hydrated.

1325 - WELL MW-14 completed BEGINING CLEANUP OF CUTTINGS TO SET CONCRETE PAD & STICKUP,

1345 - PACE RELOCATED GENERATOR OUTSIDE FENCE, CRAIG P. PLACED CHAIN & LOCKS, RENTAL COMPANY TO PICK UP LATER, PACE HOOKING UP MOBILE LAB TRAILER TO TRUCK, GENERATOR TO BE PICKED UP TOMORROW,

1400 - PACE MOBILE LAB & TRUCK LEAVE SITE

DL RL 10-21-21

1430 - COMPLETED CONCRETE PAD & STICKUP AT MW-14, CASCADE CLEANING UP, LOADING GEOPROBE ON TRAILER, CLEANING UP AUGER DERON AREA

1510 - MOBED TO MW-11 TO DEVELOP WELL, PUMPED 10 GALLONS TO DRY, LAST 1 GALLON STARTING TO BE CLEAR, WILL WAIT 15 MINUTES TO RECHARGE

1535 - PUMPED ANOTHER 10 GALLONS TO DRY, MUCH CLEARER, WILL LET RECHARGE AGAIN, CASCADE ADDED MORE ASPHALT PATCH TO 3 LOCATIONS ON KELLY AVE ROADWAY,

1600 PUMPED ANOTHER 8 GALLONS, RELATIVELY CLEAR WILL COME BACK TOMORROW

DL RL

Location FRANKFORT IN Date 10-21-21

Project / Client EXIDE ERT

1615 - AT MW-12 TO DEVELOP WELL,

1630 PUMPED 30 GALLONS AT MW-12, STARTING TO CLEAR UP, WILL COME BACK TOMORROW,

1635 AT MW-13 TO DEVELOP WELL,

1650 - PUMP 30 GALLONS AT MW-13, STARTING TO CLEAR A LITTLE. WILL COME BACK TOMORROW,

1655 AT MW-14 TO DEVELOP WELL

1710 - PUMPED 17 GALLONS AT MW-14, MUDDY WENT DRY, WILL COME BACK TOMORROW,

1724 - BBH OFFSITE
- Drillers Securing Site

1720 - Drillers Offsite
- CE Offsite

Chris Pitts 10/21/21

Location FRANKFORT IN Date 10-22-21

Project / Client EXIDE ERT

0740 - JB, BIZZLE & C, PETCO ON-SITE

0755 - CASCADE ON-SITE JAMES & TONY, H&S MEETING

0815 BEGIN TO CONTINUE DEVELOPING 4 NEW WELLS MW-11 - CLOUDY, NOT SILTY, PUMPED 6 GALLONS TILL DRY, WAITING 10 MINUTES, ADDITIONAL 4 GALLONS PUMPED, RELATIVELY CLEAR,

0845 AT MW-12 TO CONTINUE DEVELOPING WELL, SILTY THE FIRST 1/2 GALLON, THEN CLOUDY, PUMPED 30 GALLONS, RELATIVELY CLEAR,

0915 - AT MW-13 TO CONTINUE DEVELOPING. PUMPED 30 GALLONS WATER SILTY, WILL WAIT 60 MINUTES

10-22-21

Rite in the Rain

Location FRANKFORT IN Date 10-22-21

Project / Client EXIDE ERT)

AT MW-13, PUMPED ANOTHER 10 GALLONS, WATER WAS RELATIVELY CLEAR.
0945 AT MW-14 TO CONTINUE DEVELOPING, PUMPED 15 GALLONS, SILTY WATER, WILL WAIT 10 MINUTES, PUMPED ANOTHER 10 GALLONS, WILL WAIT AGAIN, WET DRY, PUMPED ANOTHER 18 GALLON RELATIVELY CLEAR.
1045 - WELL DEVELOPMENT COMPLETE.
1048 - Drillers Staging Drums
SS, 1 Drums & 5 Water Drums
- BBB offsite Todelio or Disposal Supplies To Lab
1050 - Drillers Loading Equipment
- Generator Is Staged Outside Gate For Pick up
1100 - Drillers offsite
- CEP Offsite
- Job Complete
- Site Secure Upon Departure
Cindy L Pate 10/22/21

Common Field Data Error Codes

Error codes are used to explain common mistakes and are written above or close to the mistake.
Commonly used error codes include:

RE	Recording Error
CE	Calculation Error
TE	Transcription Error
SE	Spelling Error
CL	Changed for Clarity
DC	Original Sample Description Changed After Further Evaluation
WO	Write Over
NI	Not Initialed and Dated at Time of Entry
OB	Not Recorded at the Time of Initial Observation

Note: Error code should be circled, dated, and initialed when recorded.

Hazard Classifications

Class 1 Explosives
Class 2 Gas
Class 3 Flammable Liquid
Class 4 Flammable Solids (Potential spontaneous combustion, or emission of flammable gases when in contact with water)
Class 5 Oxidizing Substances and Organic Peroxides
Class 6 Toxic (poisonous) and infectious substances
Class 7 Radioactive material
Class 8 Corrosives
Class 9 Miscellaneous dangerous goods

Container type abbreviations (for sampling guidelines)

BR - Boston Round • ABR - Amber Boston Round • AJ - Amber Jug • AWM - Amber Wide Mouth • Poly - Polyethylene Bottles • BOD - Bottle • CWM - Clear Wide Mouth

CONTENTS

PAGE	REFERENCE	DATE

Location: Frankfort, In — Date: 12/8/21

Project / Client: Exide

Mostly Sunny, windy, 40°

0630 - CEPC (Matrajo) Leave For Site To Perform GW Sampling Activities

0716 - CEPC onsite, Setting up For Day
- Calibrating Meters (YSI 556 MPS)

Standard	Meter Read	Adjusted To
pH 7.00	6.59	7.00
pH 4.00	3.72	4.00
SPC (1.413)	1.087	1.413
ORP (240)	260.20	240.0
DO%	74.5	98.5

- Lamotte 2020 WE

Standard	Meter Read	Adjust To
10 NTU	10.09	10.00

- Collecting Round of GW Levels

Well	DTW	DTB	
MW-5	4.48	14.75	
MW-8	5.59	20.28	
MW-6	4.13	20.38	
MW-2	8.83	20.31	
MW-3	6.67	17.32	(SB)
MW-7	9.61	24.12	
MW-10	2.42	18.34	
MW-1	7.49	19.98	
MW-12	3.82	17.39	

Rain 1.0 Ah 12/8/21

Location ~~Exide~~ Frankfort, IN Date 12/8/21

Project / Client Exide

MW-2

Well	DTW	DTB
MW-11	3.56	14.16
MW-9	1.89	17.68
MW-13	3.73	17.22
MW-14	4.48	17.28
MW-4	4.43	19.89

0945 – Removed bottom Levelog Complete.
– Head To MW-2 To Begin Sampling

0948 – AT MW-2, Begin Purging
DTW — 1 Vol (3")
DTB — Pump Start 13'

Time	Temp	SPC	DO	pH	ORP	Turb	DTW
0952	4.76	0.776	13.03	7.24	166	14.46	—
0936	9.54	0.793	9.51	7.23	129.6	8.39	—

Flow Rate = 150 ml/min DTW = 7.01 →

0944	5.47	0.800	9.39	7.23	118.9	6.46	9.61
0944	4.51	0.801	10.89	7.23	109.2	4.67	—
0948	3.62	0.794	10.17	7.23	104.4	3.46	—
0952	4.39	0.784	9.53	7.23	100.7	4.16	9.10
0956	4.92	0.790	9.72	7.23	98.4	2.78	—
1000	4.20	0.795	9.72	7.23	96.8	2.44	—

1001 – Sample MW-2 For VOC's
Removed 151 Final DTW @ 10'
– Head To MW-1

Rinse Pump 12/8/21

Location Frankfort, IN Date 12/8/21

Project / Client Exide

MW-10/MW-3

1036 – At MW-10 Begin Purging
DTW 2.42 1 Vol (3")
DTB Pump Start 13

Time	Temp	SPC	DO	pH	ORP	Turb	DTW
1038	4.25	1.563	14.26	7.12	78.8	> 78	—
1042	5.03	1.618	6.66	7.03	74.3	> 72	—

Flow Rate = 110 ml/min DTW = 2.18

1046	5.74	1.641	5.88	7.01	72.3	9.91	—
1050	5.65	1.711	5.46	7.01	71.9	11.4	—
1054	5.90	1.700	5.27	7.03	72.0	9.53	3.92
1058	5.91	1.687	5.24	7.04	72.4	8.04	—
1102	5.92	1.677	5.15	7.05	64.7	7.45	—
1106	5.80	1.678	5.17	7.04	70.6	7.82	4.28

1107 – Sample MW-10 For VOC's
– Removed @ 7.5 gal Final DTW = 4.46

1115 – Head To Starling Arms to Recon
1130 – Head To MW-3
1200 – At MW-3, Begin Purging
DTW 6.67 1 Vol
DTB Pump Start 11

Time	Temp	SPC	DO	pH	ORP	Turb	DTW
1204	6.96	0.720	15.04	7.30	76.5	72.5	—
1208	9.32	0.692	3.71	7.23	70.2	76.8	—

Flow Rate = 320 ml/min DTW = 6.93

Rinse Pump 12/8/21

Rite in the Rain

Location Frankfort, IN Date 12/8/21

Project / Client Exide

MW-3 / MW-7

Time	Temp	SPC	DO	pH	ORP	Turb	DTW
1212	9.82	0.674	2.44	7.22	66.0	54.8	—
1216	10.77	0.667	1.82	7.23	63.7	75.1	—
1220	11.23	0.666	1.43	7.23	64.5	25.4	6.79
1224	11.11	0.666	1.24	7.22	57.5	21.0	—
1228	11.39	0.661	1.04	7.23	54.8	14.9	—
1232	11.69	0.661	0.91	7.23	51.0	15.1	6.94
1236	11.64	0.658	0.84	7.23	50.5	14.84	—
1240	11.88	0.659	0.83	7.23	48.5	16.19	
1244	11.63	0.654	0.79	7.23	46.3	10.08	7.01
1245	— ~~Finished~~ Sample MW-3 For VOC						
	— Collect MS/MSD Here						
	— Finished At MW-3						
	Removed ≈ 2 gal			Final DTW = 7.01			
	— Head to MW-7						
1314	— At MW-7, Begin Purging						
	DTW			Level (2")			
	DTB			Pump Set At 17'			

Time	Temp	SPC	DO	pH	ORP	Turb	DTW
1322	9.22	1.135	4.36	6.67	56.4	8.07	—
1326	9.96	1.242	2.86	6.66	75.1	5.64	—
	Flowrate = 120 ml/min				DTW = 8.15		
1330	10.14	1.364	2.41	6.65	71.6	14.59	—
1334	10.02	1.324	2.07	6.66	71.9		

Amit Patel 12/8/21

Location Frankfort, IN Date 12/8/21

Project / Client Exide

MW-7 / EB-01 / MW-1

Time	Temp	SPC	DO	pH	ORP	Turb	DTW
1340	10.05	1.332	1.63	6.66	-72.2	11.6	6.93
1344	9.91	1.336	1.53	6.66	-72.2	12.1	—
1348	9.69	1.327	1.40	6.66	-71.8	12.4	—
1352	9.80	1.298	1.38	6.68	-71.4	13.7	—
1356	10.55	1.270	1.29	6.71	-69.7	13.2	7.64
1357	— Sample MW-7 For VOCs						
	— Finished At MW-7						
	Removed ≈ 1 gal			Final DTW = 8.71			
1410	— Collect Equipment Blank EB-01-120821						
	By Pouring Lab-Supplied Water over						
	a Decontaminated Bailer						
1415	— Head to MW-1						
1422	— At MW-1 Begin Purging						
	DTW 7.49			Level (2")			
	DTB			Pump Set To 13			

Time	Temp	SPC	DO	pH	ORP	Turb	DTW
1430	10.24	1.437	11.28	7.32	-72.3	18.0	—
1434	12.73	1.479	3.15	7.22	-38.5	12.9	—
	Flowrate = 120 ml/min				DTW = 8.41		
1438	10.63	1.494	2.90	7.22	-14.7	8.35	8.41
1442	9.78	1.496	2.78	7.22	-14.8	6.26	—
1446	9.63	1.484	2.75	7.22	-14.6	5.32	—
1450	9.46	1.485	2.58	7.22	-6.8	4.31	8.36

Amit Patel 12/8/21

Location Frankfort, IN Date 12/8/21

Project / Client Exide

MW-1

Time	Temp	SPC	DO	pH	ORP	Turb	DTW
1454	9.54	1.488	2.41	7.21	-3.3	3.14	—
1458	9.64	1.496	2.20	7.21	-7.1	2.82	—

1459 - Sample MW-1 For VOC's

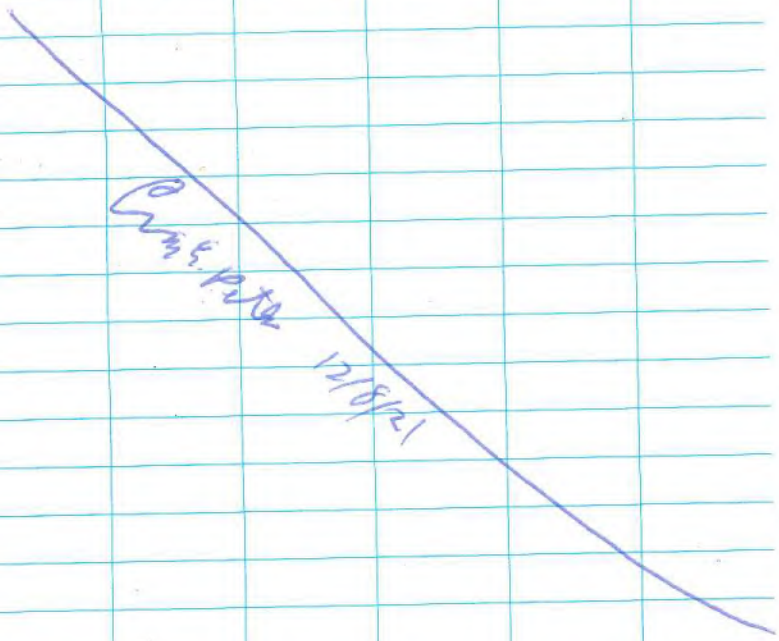
~~Pump~~

- Finished At MW-1
  Removed ≈ 1.25 gal Final DTW = 8.46

1515 - Head To Staging Area To Decon & Rotify Supervisor

1600 - Staging Purged Groundwater Completion Paperwork

1639 - Off Site To Hotel



Location Frankfort, IN Date 12/9/21

Project / Client Exide

0700 - CEP (Morning) Leave For Site

0730 - CEP Onsite To Continue Groundwater Sampling Event

- Calibrating YSI 556 MPS

Standard	Meter Read	Adjusted To
pH 7.00	7.04	7.00
pH 4.00	4.02	4.00
SPC (1413)	1.479	1.413
ORP (240)	233.8	240.0
DO (%)	137	98.4

- Calibrating Low Flow To 20 20 ave

Standard	Meter Read	Adjusted To
10.00 NTU	9.94	10.00

- Head To MW-12

0840 - At MW-12, Begin Purging

DTW Level (2")

DTD Pump Set at 12

Time	Temp	SPC	DO	pH	ORP	Turb	DTW
0846	4.85	0.761	0.27	7.20	117.3	142	—
0852	5.51	0.522	0.64	7.22	36.6	66	—
	Flow Rate To = 150 ml/min				DTW = 3.89 →		
0856	5.65	0.502	0.72	7.23	9.4	72	—
0858	9.06	0.525	0.45	7.24	-8.8	68	—
0854	9.18	0.528	0.49	7.24	-11.6	51	3.89
0910	9.51	0.537	0.34	7.23	-5.2	79.6	—

Eric E. Ade 12/9/21

10

Location Frankfort IN Date 12/9/21

Project / Client Exide

MW-12 / MW-11

Time	Temp	SPC	DO	pH	ORP	Turb	DTW
0844	9.32	0.535	0.28	7.23	-73.8	74.9	3.54
0848	9.70	0.536	0.45	7.22	-72.0	73.3	—
0852	9.80	0.540	0.43	7.21	-72.3	70.5	—
0856	9.71	0.541	0.42	7.21	-74.3	68.7	—
0857	- Sample MW-12 for VOCs						
	- Finished At MW-12						
	- Rinsed to ~2 gal			Final DTW = 3.84			
	- Decon Equipment						
	- Head To MW-11						
0947	- At MW-11, Begin Purging						
	DTW 3.56			1 Vol (3")			
	DTB			Pump Set @ 14'			

Time	Temp	SPC	DO	pH	ORP	Turb	DTW
0957	5.92	0.901	2.79	7.38	-73.9	455	—
0958	6.97	0.918	1.82	7.33	-19.4	32.4	—
	Flow Rate = 110 ml/min			DTW = 3.72 →			
1002	7.83	0.924	1.43	7.25	-5.8	23.1	—
1006	8.43	0.938	1.19	7.20	3.6	14.8	3.48
1010	8.93	0.946	1.07	7.14	11.8	13.4	—
1014	8.43	0.948	0.96	7.18	20.0	9.95	—
1018	8.48	0.946	0.88	7.17	26.2	8.28	3.51
1022	8.50	0.944	0.82	7.17	33.4	7.57	—
1026	8.54	0.944	0.77	7.16	36.7	7.23	3.54

Brian E. Veith 12/9/21

11

Location Frankfort IN Date 12/9/21

Project / Client Exide

MW-11 / MW-9

Time	Temp	SPC	DO	pH	ORP	Turb	DTW
1030	8.62	0.941	0.74	7.16	37.9	7.17	—
1031	- Sample MW-11 For VOC's						
	- Finished At MW-11						
	Removed ~1 gal			Final DTW = 3.68			
	- Decon						
	- Head To MW-9						
1145	- At MW-9, Begin Purging						
	DTW 1.89			1 Vol (3")			
	DTB			Pump Set @ 13'			

Time	Temp	SPC	DO	pH	ORP	Turb	DTW
1116	7.41	0.760	0.97	7.17	79.7	19.4	—
1114	9.28	0.704	0.64	7.69	87.5	18.8	—
	Flow Rate = 130 ml/min			DTW = 2.98 ↓			
1118	9.65	0.707	0.64	7.07	82.9	15.8	—
1122	9.61	0.708	0.63	7.07	82.0	16.0	3.72
1126	9.69	0.707	0.64	7.06	81.8	15.7	—
1132	9.70	0.708	0.62	7.06	81.9	13.9	4.71
1136	9.77	0.707	0.63	7.06	82.1	14.3	—
1140	9.82	0.708	0.63	7.06	81.8	13.2	—
1141	- Sample MW-9 For VOC's						
	- Collect Field Duplicate MW-90 at 1210						
	Brian E. Veith			12/9/21			

Rite in the Rain

Location Frankfort, IN Date 12/9/21

Project / Client Exide

MW-13

- Finished At MW-4
- Removed ≈1.25 gal Final DTW 5.67
- Decon
- Head To MW-13

Time	Temp	SPC	DO	pH	ORP	Turb	DTW
1220 - At MW-13, Begin Pumping							
	DTW 3.73		Vol (2")				
	DTB		Pump Set at 13'				
1226	7.52	0.743	0.24	7.20	81.9	123	—
1230	9.46	0.785	0.05	7.04	64.4	193	—
	Flow Rate: 110 ml/min DTW = 3.84 →						
1234	8.97	0.793	0.03	7.03	58.0	141	—
1238	8.58	0.794	0.05	7.03	54.3	188	—
1242	8.27	0.794	0.05	7.03	54.3	147	3.84
1246	8.08	0.793	0.03	7.03	54.4	104	—
1250	7.95	0.792	0.04	7.04	52.8	86.2	—
1254	7.98	0.790	0.04	7.04	52.1	55.7	3.84
1258	8.05	0.790	0.04	7.04	49.5	54.2	—
1302	8.06	0.790	0.03	7.04	48.6	52.6	—
1306	8.07	0.790	0.04	7.04	53.6	51.7	3.84
1307 - Sample MW-13 For VOCs							
	Finished At MW-13						
	Removed ≈0.75 Gal, Final DTW 3.84						
- Decon							
	Crew Left	12/9/21					

Location Frankfort, IN Date 12/9/21

Project / Client Exide

MW-14/MW-4

- Head To MW-14

Time	Temp	SPC	DO	pH	ORP	Turb	DTC
1330 - At MW-14, Begin Pumping							
	DTW		Vol (2")				
	DTB		Pump Set at 13'				
1338	5.72	0.548	0.12	7.24	42.4	65.6	—
1342	9.16	0.594	0.06	7.25	38.4	60.3	—
	Flow Rate: 100 ml/min DTW = 4.78						
1346	9.62	0.596	0.04	7.22	38.5	54.0	—
1350	10.22	0.596	0.03	7.22	37.4	50.0	4.88
1354	10.81	0.599	0.02	7.22	34.5	41.8	—
1358	11.03	0.600	0.03	7.22	31.5	34.1	—
1402	11.25	0.601	0.03	7.22	28.9	26.5	4.97
1406	11.50	0.601	0.02	7.22	28.4	28.1	—
1410	11.56	0.602	0.02	7.22	28.3	25.6	—
1411 - Sample MW-14 For VOCs							
	- Removed ≈1.25 Gal		Final DTW = 4.96				
1445 - Collect Equipment Blank EB-02-120921							
	- Head To MW-4						
1502 - At MW-4, Begin Pumping							
	DTW		(Vol)				
	DTB		Pump Set at 13				
	Crew Left	12/9/21					

Rite in the Rain

14

Location Frankfort, IN Date 12/9/21

Project / Client Exide

MW-4

Time	Temp	SPC	DO	pH	ORP	Turb	DTW
1510	10.91	1.851	5.41	6.78	49.5	78.6	—
1514	11.54	1.720	3.31	6.77	39.6	94.3	—
	Flow Rate = 120ml/min DTW = 5.04						
1518	11.85	1.794	2.78	6.77	34.9	90.5	—
1522	12.20	1.794	2.23	6.76	29.8	84.6	—
1526	12.27	1.805	2.04	6.76	27.5	78.2	5.49
1530	12.33	1.816	1.76	6.75	24.8	64.2	—
1534	12.38	1.816	1.65	6.75	23.2	58.2	—
1538	12.44	1.823	1.50	6.75	19.5	51.8	5.54
1542	12.61	1.824	1.33	6.75	16.4	51.2	—
1546	12.64	1.828	1.32	6.75	14.6	50.7	—
1550	12.60	1.830	1.30	6.75	12.6	45.6	5.46

1551 - Sample MW-4 For VOC's

- Finished AT MW-4

Removed 2 1/2 gallon Final DTW = 5.54

- Decon'ing & Staging Materials

1645 - Materials Stored

- Samples Packed

- Offsite To FedEx

Emily Pelletier 12/9/21

Location Frankfort, IN Date 12/10/21

15

Project / Client Exide

Overcast 50°

0720 - CEP (Monitoring) Leaves For Site To Deploy Biotraps+samplers

0730 - CEP On site, organizing Vehicle

0800 - Checking Status of Soil Vapor Locations

L1 - Can Be Sampled

L2 - Full of water, well vault Full of water

L3 - Can Be Sampled

L4 - Full of water

L5 - Full of water

L6 - Full of water

0845 - Prepare To Deploy Biotrap Samplers at MW-1, MW-4 & MW-9

0920 - BioTrap Deployed AT MW-1

0935 - Randall Miller Assoc. Surveyors On Site - Discuss Requirements

0945 - Resume Deployment of Biotraps

1010 - Biotrap AT MW-4 Deployed

1030 - Biotrap AT MW-9 Deployed

- Survey Work Conditions

1230 - Lunch Survey Complete

- CEP Inventorying Wells

1245 - All Wells Secure

- Site Secure

1300 - Offsite

Emily Pelletier 12/10/21

Rite in the Rain

16

Location Fort Wayne IN Date 12/13/21

Project / Client Estate

Sunny 40's

0930 - CEP (Matrose) leaves For Site To Meet with USEPA & IDEM Representatives At Site

1000 - CEP On Site - Waiting For USEPA & IDEM Arrival

1112 - Peter Rentschler & Tim Dickinson (USEPA & IDEM) On Site

1115 - Perform Overall Oversight Survey of Site & Recent Sample Locations - USEPA Indicated Additional Remediation Was To Be Required For Recent Sample Results

1200 - USEPA & IDEM Off Site - CEP Updates JSD (Matrose) On Progress

1215 - CEP Off Site

Eric Kuhn 12/13/21

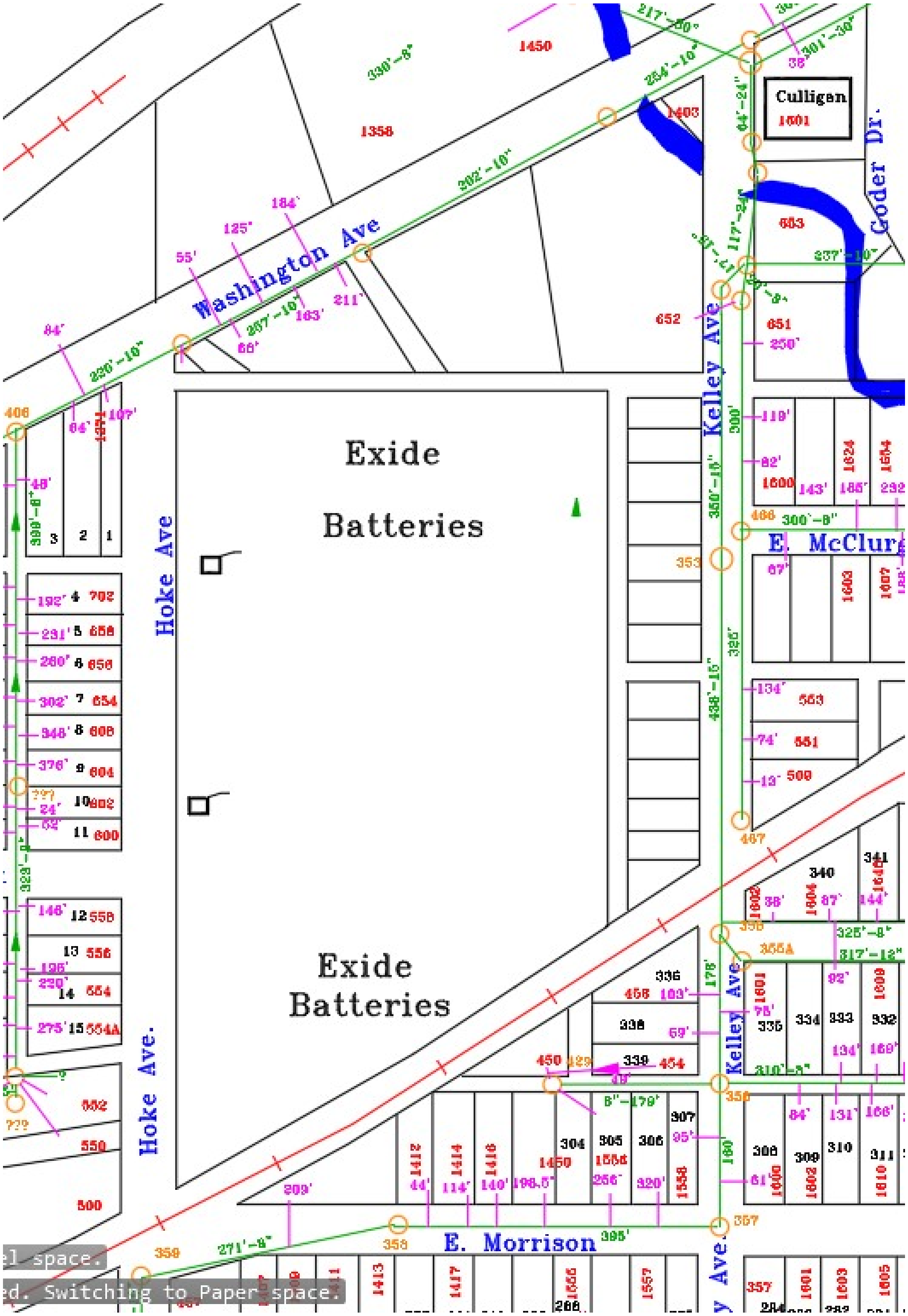
17

Location Date

Project / Client

APPENDIX B

Underground Utility Information



Washington Ave
Kelley Ave
Goder Dr.
Hoke Ave
Hoke Ave.
E. McClure
E. Morrison
Culligan
Exide
Batteries
Exide
Batteries
el space.
ed. Switching to Paper space.

85877.4741, 1093840.4912

Washington Ave

Kelley Ave

Hoke Ave

Exide Batteries

Exide Batteries

Kelley Ave

Hoke Ave.

Kelley Ave

Kelley Ave

Ave

Rockware
Intl.

Exide
Batteries

City Light
and Power

Washington Ave 12" D. I.

Beard St 6" C. I.

Hoke Ave 6" C. I.

Kelley Ave 6" C. I.

McCarty St

Valve 1396 is off

1396
1397
1257
1588
1582
1639
554
555
1640
1641
556
1766
559
661
560
561
1642
1643
1644
562
1645
1646
563
1647
564
1748
1066
1065
567
1778
1917
1930
1910
1908
1982
606
2113
1989
4" D. I.
1745
1757
552
2006
6" D. I.
553
2112
2111
2" P. E.
2" Meter
3" Meter

MANHOLES SURROUNDING FRANKFORT EXIDE PROPERTY

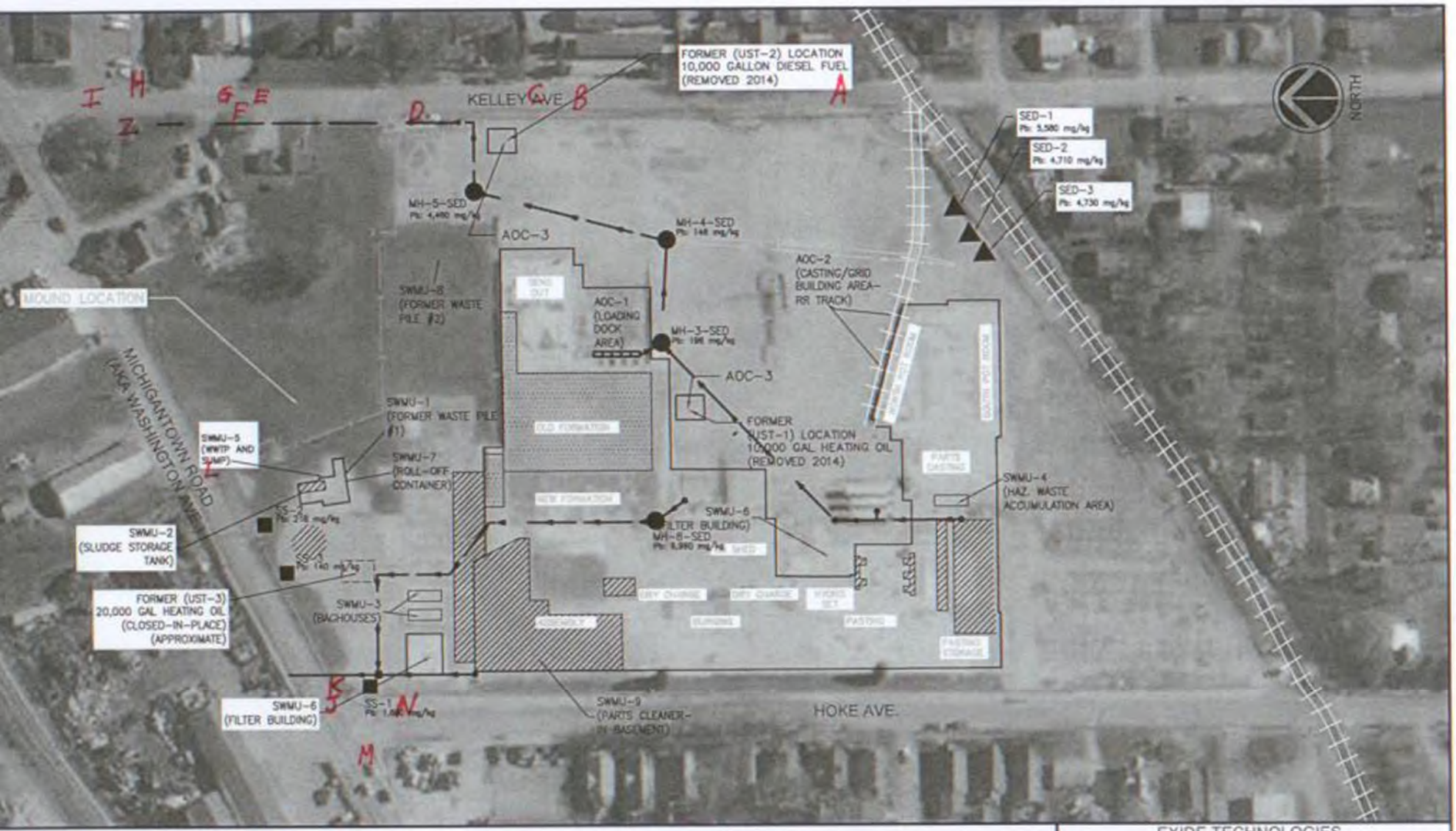
Notes:
The manholes were assigned identifying letters "A" through "N" for this report, and picture of "Z" outfall to the creek was added; The red letters on the attached figure show these locations.
"Distance From Edge Of Street" is always from the Exide direction side of street; the negative numbers represent distance before the street edge (manhole is not in the street)
The start point for "Distance From Start Point" is the railroad tracks for Kelley Avenue manholes; and the inside corner at Hoke and Washington for the Washington and Hoke Avenue manholes

MANHOLE IDENTIFICATION	AVENUE	DIRECTION PICTURES ARE FACING	TYPE	OUTLET & FLOW DIRECTION	MANHOLE INLETS	DISTANCE FROM EDGE OF STREET	DISTANCE FROM START POINT	NOTES
A	Kelley	West	Storm	North	South	14	73	1
B	Kelley	East	Sanitary	North	South	11	365	
C*	Kelley	East	Storm	North	South & East	16	404	
D	Kelley	West	Storm	North	South West & South & South East	-3	451	2
E	Kelley	West	Sanitary	North	South & South West	18	601	3
F	Kelley	North East East	Sanitary	North East	South	9	611	4
G	Kelley	South	Sanitary	North East	South West West & South West & (2) East	22	621	5
H	Kelley	West	Sanitary	North West	South West	44	734	6, 7
I	Kelley	West	Sanitary	North	South East	22	791	
J	Washington	North	Sanitary	West	East	3	25	
K	Washington	South East East	Storm	West	South West, & (2) South South West, & North East	-5	32	8
L	Washington	North	Sanitary	West	North East & (2) South South West	8	284	9
M	Hoke	North East	Storm	East	North West	-1	5	
N	Hoke	North	Storm	South East East	North West West	44	35	10
Z	Kelley	South	Storm	North	South	-14	734	11

* Montrose inspection indicates C is a sanitary sewer line

Notes:

1 No inlet pipe was actually visible in manhole "A", it seemed to be covered with sediment, just a very little flow was seeping from the South side of the manhole.
2 The "D" manhole South West inlet comes from the Exide property, and previous imaging revealed this empties into the creek (picture "Z")
3 The "E" manhole South West inlet comes from the direction of the 652 Kelley Avenue house.
4 The "F" manhole North East outlet pipe is flowing toward the "G" manhole.
5 The "G" manhole North East outlet pipe is flowing toward the "H" manhole.
6 The "H" manhole is beyond the East side of Kelley Avenue, just North of the creek, beside the Culligan driveway.
7 The "H" manhole North West outlet pipe is flowing toward the "I" manhole.
8 Exide property stormwater empties into this "K" manhole from the South.
9 The Exide Waste Water Treatment Plant previously emptied into this "L" manhole from the South, but these two pipes are now grouted closed.
10 Previous imaging of the "N" South East East pipe revealed its making a corner toward the North and then emptying into the "K" manhole.
11 Added a photo "Z" of the storm sewer outfall into the creek just West of Kelley Avenue, where Exide stormwater flows from manhole "D".



LOCATION OF SEDIMENT SAMPLE COLLECTED IN BOTTOM OF MANHOLE.
SED mg/kg LEAD CONCENTRATION LISTED IF SAMPLE EXCEEDED 800 mg/kg.

LOCATION OF SEDIMENT SAMPLE COLLECTED ON SURFACE OF ASPHALT.
mg/kg LEAD CONCENTRATION LISTED IF SAMPLE EXCEEDED 800 mg/kg.

LOCATION OF SEDIMENT SAMPLE COLLECTED ON BARE SOIL SURFACE (0-1 FT INTERVAL.).
mg/kg LEAD CONCENTRATION LISTED IF SAMPLE EXCEEDED 800 mg/kg.

REMAINING STORMWATER COLLECTION PIPING

0 50 100 200
1 INCH = 100 FT

EXIDE TECHNOLOGIES
535 HOKE AVENUE
FRANKFORT, INDIANA

RFI SEDIMENT SAMPLE LOCATIONS
AND LEAD CONCENTRATIONS

ADVANCED GeoServices
Engineering for the Environment, Planning for People

FIGURE 5

APPENDIX C

Slug Test Data Analysis

WELL ID: EXIDE FRANKFORT

Local ID: MW-1
Date: 10/13/2021
Time: 14:04

INPUT

Construction:

Casing dia. (d_c)	2	Inch
Annulus dia. (d_w)	8.25	Inch
Screen Length (L)	10	Feet

Depths to:

water level (DTW)	9.95	Feet
top of screen (TOS)	8	Feet
Base of Aquifer (DTB)	500	Feet

Annular Fill:

across screen -- Coarse Sand
above screen -- Bentonite

Aquifer Material -- Till

COMPUTED

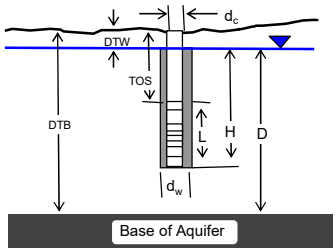
L_{wetted}	8.05	Feet
D =	490.05	Feet
H =	8.05	Feet
L/r_w =	23.42	
$y_{0\text{-DISPLACEMENT}}$ =	8.22	Feet
$y_{0\text{-SLUG}}$ =	9.19	Feet

From look-up table using L/r_w

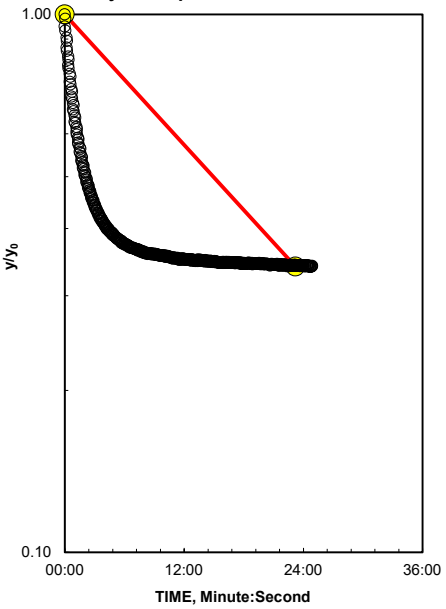
Partial penetrate A =	2.316	
B =	0.372	
ln(Re/rw) =	1.841	
Re =	2.17	Feet
Slope =	5.6E-05	$\log_{10}$/sec
$t_{90\%}$ recovery =	17843	sec

Input is consistent.

K = 0.0088 Feet/Day



Adjust slope of line to estimate K



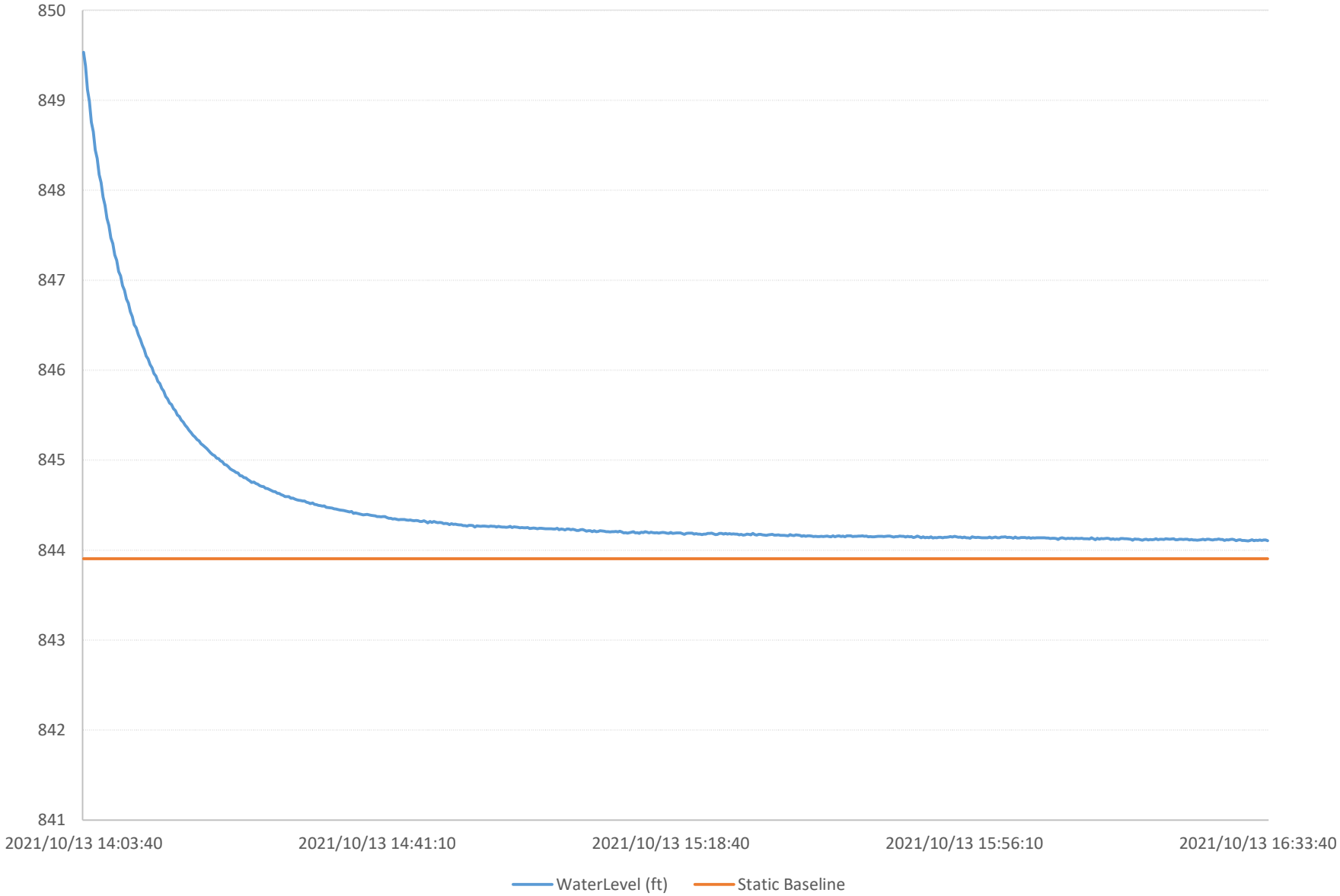
REMARKS:

Bouwer and Rice analysis of slug test, WRR 1976

Slug test was conducted in surficial aquifer, central Indiana, which is mostly glacial till.

Entry	Reduced Data Time, Hr:Min:Sec	Water Level
1	14:04:20.0	849.53
2	14:07:40.0	847.61
3	14:10:20.0	846.50
4	14:13:40.0	845.85
5	14:17:20.0	845.39
6	14:20:40.0	845.08
7	14:23:20.0	844.86
8	14:26:40.0	844.71
9	14:30:20.0	844.59
10	14:33:40.0	844.53
11	14:36:20.0	844.45
12	14:39:40.0	844.39
13	14:43:20.0	844.35
14	14:46:40.0	844.33
15	14:49:20.0	844.31
16	14:52:40.0	844.27
17	14:56:20.0	844.27
18	14:59:40.0	844.26
19	15:02:20.0	844.24
20	15:05:40.0	844.24
21	15:09:20.0	844.20
22	15:12:40.0	844.20
23	15:15:20.0	844.19
24	15:18:40.0	844.19
25	15:22:20.0	844.18
26	15:25:40.0	844.19
27	15:28:20.0	844.17
28	15:31:40.0	844.17
29	15:35:20.0	844.17
30	15:38:40.0	844.15
31	15:41:20.0	844.16
32	15:44:40.0	844.15
33	15:48:20.0	844.15
34	15:51:40.0	844.15
35	15:54:20.0	844.14
36	15:57:40.0	844.14
37	16:01:20.0	844.14
38	16:04:40.0	844.14
39	16:07:20.0	844.13
40	16:10:40.0	844.13
41	16:14:20.0	844.13
42	16:17:40.0	844.13
43	16:20:20.0	844.12
44	16:23:40.0	844.12
45	16:27:20.0	844.12

FIGURE ___
SLUG TEST DATA
MW-1
Exide Technologies
Frankfort, Indiana



G:\Projects\2020\20204123 - Exide Trust - Frankfort\Work Documents\Interim Measures Investigation Work Plan\Field Data\Diver Data\Calculations\MW-1-Reduced Data.xlsx

WELL ID: EXIDE FRANKFORT

Local ID: MW-3
Date: 10/13/2021
Time: 14:00

INPUT

Construction:

Casing dia. (d_c)	2	Inch
Annulus dia. (d_w)	8.25	Inch
Screen Length (L)	10	Feet

Depths to:

water level (DTW)	10.33	Feet
top of screen (TOS)	6	Feet
Base of Aquifer (DTB)	500	Feet

Annular Fill:

across screen -- Coarse Sand
above screen -- Bentonite

Aquifer Material -- Till

COMPUTED

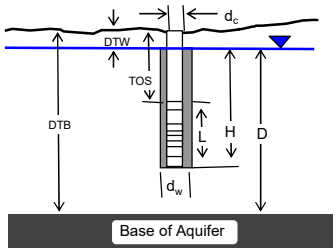
L_{wetted}	5.67	Feet
D =	489.67	Feet
H =	5.67	Feet
L/r_w =	16.49	
$y_{0\text{-DISPLACEMENT}}$ =	9.03	Feet
$y_{0\text{-SLUG}}$ =	9.19	Feet

From look-up table using L/r_w

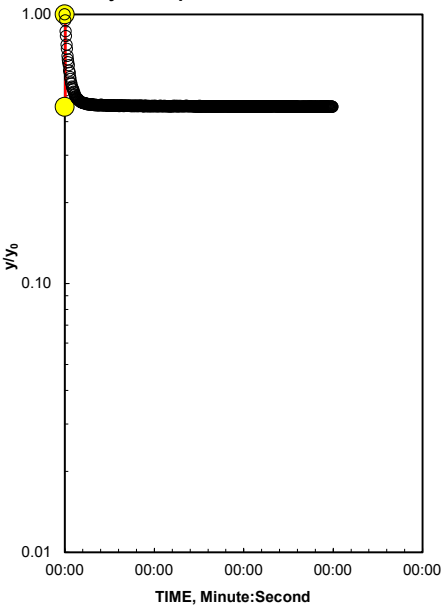
Partial penetrate A =	2.105	
B =	0.322	
ln(Re/rw) =	1.569	
Re =	1.65	Feet
Slope =	4.1E-05	$\log_{10}$/sec
$t_{90\%}$ recovery =	24377	sec

Input is consistent.

K = 0.0078 Feet/Day



Adjust slope of line to estimate K



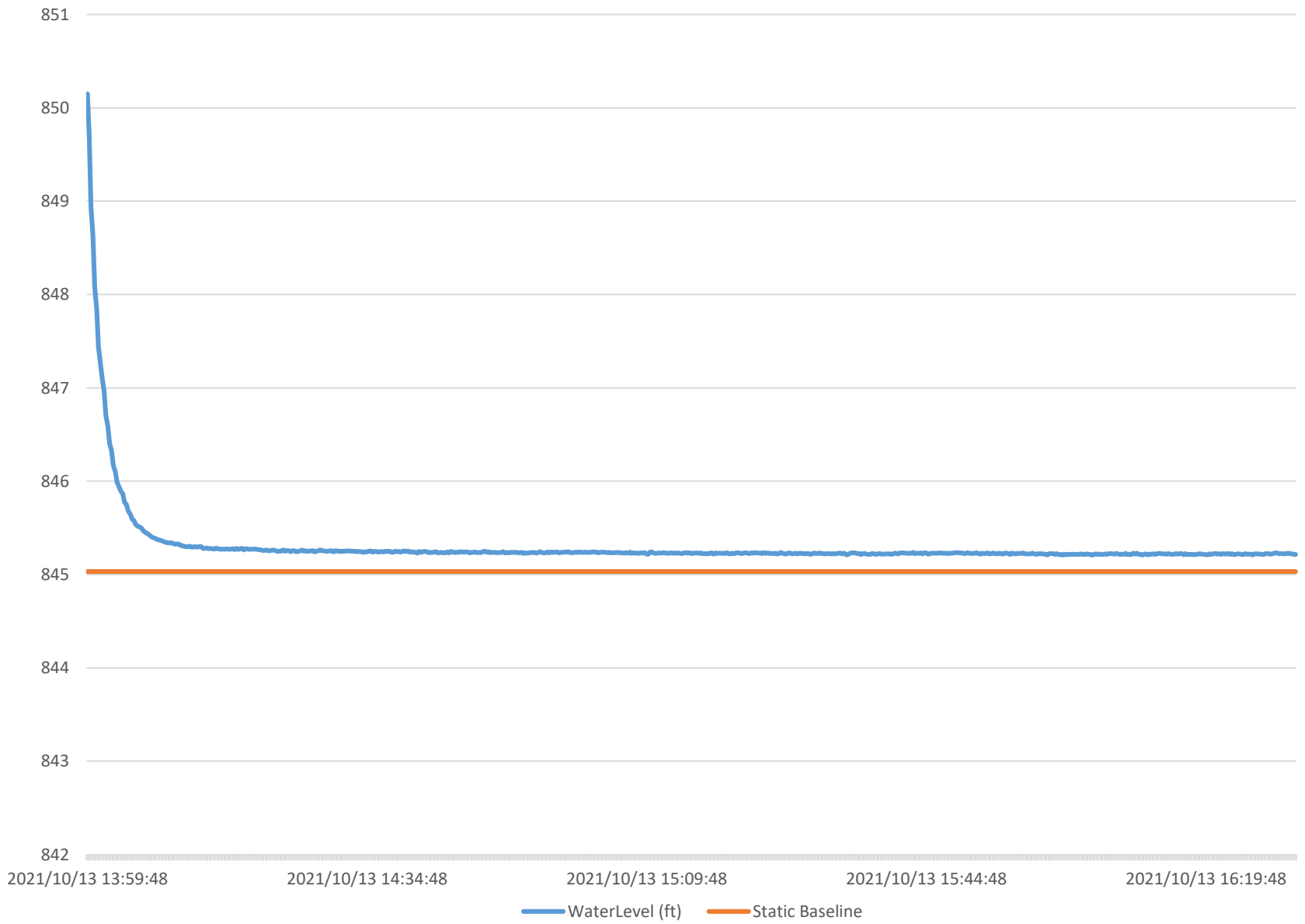
REMARKS:

Bouwer and Rice analysis of slug test, WRR 1976

Slug test was conducted in surficial aquifer, central Indiana, which is mostly glacial till.

Entry	Reduced Data Time, Hr:Min:Sec	Water Level
1	14:00:36.0	850.15
2	14:03:36.0	846.32
3	14:06:56.0	845.54
4	14:09:36.0	845.37
5	14:12:56.0	845.30
6	14:15:56.0	845.28
7	14:18:56.0	845.28
8	14:21:56.0	845.27
9	14:24:16.0	845.25
10	14:27:16.0	845.26
11	14:30:16.0	845.25
12	14:33:16.0	845.25
13	14:36:36.0	845.24
14	14:39:16.0	845.25
15	14:42:36.0	845.24
16	14:45:36.0	845.25
17	14:48:36.0	845.24
18	14:51:36.0	845.23
19	14:54:56.0	845.23
20	14:57:56.0	845.24
21	15:00:56.0	845.23
22	15:03:56.0	845.24
23	15:07:16.0	845.23
24	15:09:56.0	845.24
25	15:13:16.0	845.23
26	15:16:16.0	845.23
27	15:19:16.0	845.23
28	15:22:16.0	845.22
29	15:25:36.0	845.23
30	15:28:36.0	845.23
31	15:31:36.0	845.23
32	15:34:36.0	845.23
33	15:37:56.0	845.22
34	15:40:36.0	845.22
35	15:43:56.0	845.23
36	15:46:56.0	845.23
37	15:49:56.0	845.23
38	15:52:56.0	845.22
39	15:55:16.0	845.22
40	15:58:16.0	845.23
41	16:01:16.0	845.22
42	16:04:16.0	845.22
43	16:07:36.0	845.22
44	16:10:16.0	845.22
45	16:13:36.0	845.22

FIGURE ___
SLUG TEST DATA
MW-3
Exide Technologies
Frankfort, Indiana



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WELL ID: EXIDE FRANKFORT

Local ID: MW-4
Date: 10/13/2021
Time: 13:55

INPUT

Construction:

Casing dia. (d_c)	2	Inch
Annulus dia. (d_w)	8.25	Inch
Screen Length (L)	10	Feet

Depths to:

water level (DTW)	10.4	Feet
top of screen (TOS)	8	Feet
Base of Aquifer (DTB)	500	Feet

Annular Fill:

across screen -- Coarse Sand
above screen -- Bentonite

Aquifer Material -- Till

COMPUTED

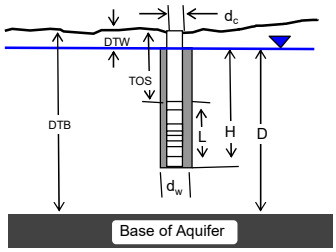
L_{wetted}	7.6	Feet
D =	489.6	Feet
H =	7.6	Feet
L/r_w =	22.11	
$y_{0\text{-DISPLACEMENT}}$ =	9.63	Feet
$y_{0\text{-SLUG}}$ =	9.19	Feet

From look-up table using L/r_w

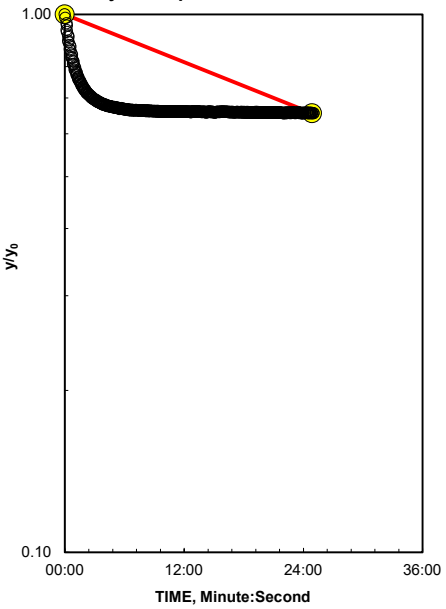
Partial penetrate A =	2.275	
B =	0.362	
ln(Re/rw) =	1.797	
Re =	2.07	Feet
Slope =	2.05E-05	$\log_{10}$/sec
$t_{90\%}$ recovery =	48760	sec

Input is consistent.

K = 0.0033 Feet/Day



Adjust slope of line to estimate K



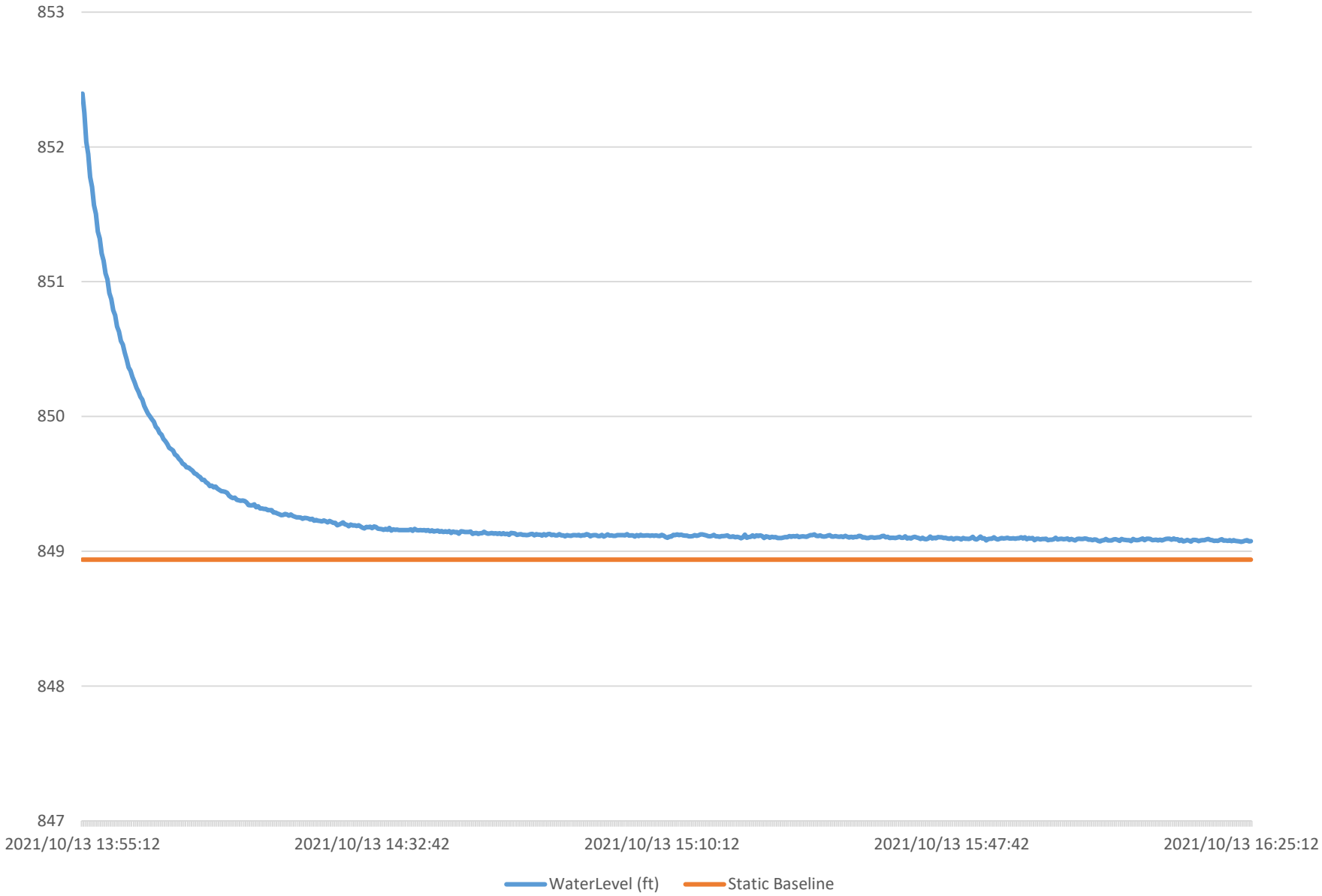
REMARKS:

Bouwer and Rice analysis of slug test, WRR 1976

Slug test was conducted in surficial aquifer, central Indiana, which is mostly glacial till.

Entry	Reduced Data Time, Hr:Min:Sec	Water Level
1	13:55:24.0	852.40
2	13:58:44.0	851.02
3	14:02:24.0	850.29
4	14:05:44.0	849.91
5	14:08:24.0	849.65
6	14:11:44.0	849.50
7	14:15:24.0	849.39
8	14:18:44.0	849.33
9	14:21:24.0	849.27
10	14:24:44.0	849.24
11	14:28:24.0	849.21
12	14:31:44.0	849.19
13	14:34:24.0	849.16
14	14:37:44.0	849.16
15	14:41:24.0	849.15
16	14:44:44.0	849.13
17	14:47:24.0	849.14
18	14:50:44.0	849.12
19	14:54:24.0	849.12
20	14:57:44.0	849.13
21	15:00:24.0	849.12
22	15:03:44.0	849.12
23	15:07:24.0	849.11
24	15:10:44.0	849.11
25	15:13:24.0	849.12
26	15:16:44.0	849.11
27	15:20:24.0	849.10
28	15:23:44.0	849.12
29	15:26:24.0	849.11
30	15:29:44.0	849.12
31	15:33:24.0	849.11
32	15:36:44.0	849.11
33	15:39:24.0	849.10
34	15:42:44.0	849.09
35	15:46:24.0	849.10
36	15:49:44.0	849.09
37	15:52:24.0	849.08
38	15:55:44.0	849.09
39	15:59:24.0	849.09
40	16:02:44.0	849.09
41	16:05:24.0	849.09
42	16:08:44.0	849.08
43	16:12:24.0	849.08
44	16:15:44.0	849.08
45	16:18:24.0	849.08

FIGURE ___
SLUG TEST DATA
MW-4
Exide Technologies
Frankfort, Indiana



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WELL ID: EXIDE FRANKFORT

Local ID: MW-7
Date: 10/13/2021
Time: 14:06

INPUT

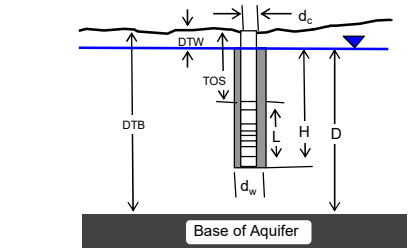
Construction:		
Casing dia. (d_c)	2	Inch
Annulus dia. (d_w)	8.25	Inch
Screen Length (L)	10	Feet
Depths to:		
water level (DTW)	10.23	Feet
top of screen (TOS)	8	Feet
Base of Aquifer (DTB)	500	Feet
Annular Fill:		
across screen --	Coarse Sand	
above screen --	Bentonite	
Aquifer Material --	Till	

COMPUTED

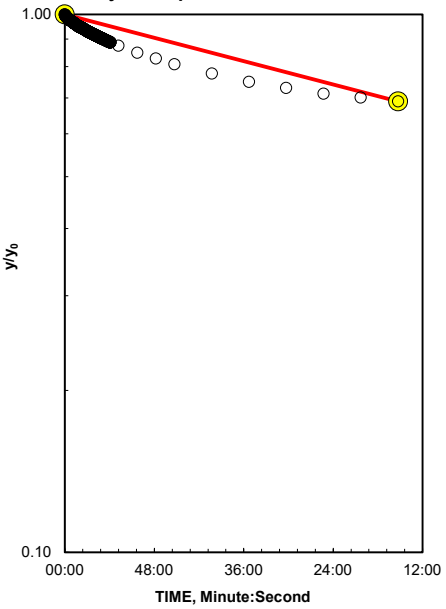
L_{wetted}	7.77	Feet
D =	489.77	Feet
H =	7.77	Feet
L/r_w =	22.60	
$y_{0\text{-DISPLACEMENT}}$ =	10.15	Feet
$y_{0\text{-SLUG}}$ =	12.25	Feet
From look-up table using L/r_w		
Partial penetrate A =	2.291	
B =	0.366	
ln(Re/rw) =	1.814	
Re =	2.11	Feet
Slope =	2.51E-06	$\log_{10}$/sec
$t_{90\%}$ recovery =	397837	sec

Input is consistent.

K = 0.0004 Feet/Day



Adjust slope of line to estimate K



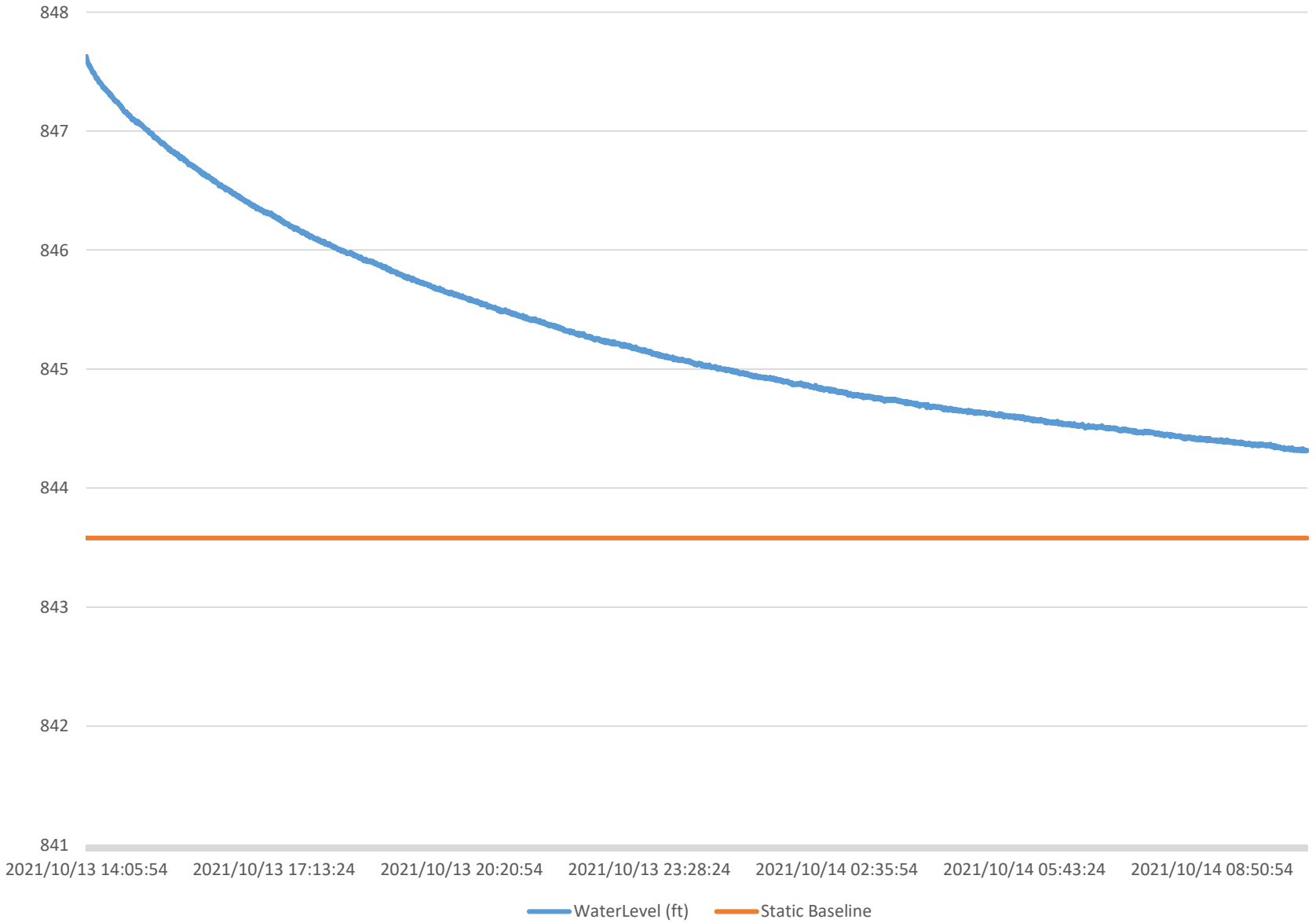
K= 0.0004 is less than likely minimum of 0.003 for Till

REMARKS: Bouwer and Rice analysis of slug test, WRR 1976

Slug test was conducted in surficial aquifer, central Indiana, which is mostly glacial till.

Entry	Reduced Data Time, Hr:Min:Sec	Water Level
1	14:06:48.0	847.62
2	14:10:08.0	847.54
3	14:13:48.0	847.50
4	14:16:08.0	847.45
5	14:19:48.0	847.41
6	14:23:08.0	847.37
7	14:26:48.0	847.34
8	14:29:08.0	847.32
9	14:32:48.0	847.29
10	14:36:08.0	847.25
11	14:39:48.0	847.22
12	14:42:08.0	847.18
13	14:45:48.0	847.16
14	14:49:08.0	847.14
15	14:52:48.0	847.10
16	14:55:08.0	847.09
17	14:58:48.0	847.06
18	15:02:08.0	847.04
19	15:05:48.0	847.02
20	15:08:08.0	847.01
21	15:11:48.0	846.97
22	15:15:08.0	846.94
23	15:18:48.0	846.92
24	15:21:08.0	846.90
25	15:24:48.0	846.88
26	15:28:08.0	846.86
27	15:31:48.0	846.83
28	15:34:08.0	846.82
29	15:37:48.0	846.81
30	15:41:08.0	846.77
31	15:44:48.0	846.75
32	15:47:08.0	846.73
33	15:50:48.0	846.72
34	15:54:08.0	846.71
35	15:57:48.0	846.68
36	16:00:08.0	846.65
37	16:03:48.0	846.63
38	16:07:08.0	846.61
39	16:10:48.0	846.61
40	16:13:08.0	846.58
41	16:16:48.0	846.57
42	16:20:08.0	846.54
43	16:23:48.0	846.53
44	16:26:08.0	846.51
45	16:29:48.0	846.50

FIGURE ___
SLUG TEST DATA
MW-7
Exide Technologies
Frankfort, Indiana



G:\Projects\2020\20204123 - Exide Trust - Frankfort\Work Documents\Interim Measures Investigation Work Plan\Field Data\Diver Data\Calculations\MW-7-Reduced Data.xlsx

WELL ID: EXIDE FRANKFORT

Local ID: MW-9
Date: 10/13/2021
Time: 14:11

INPUT

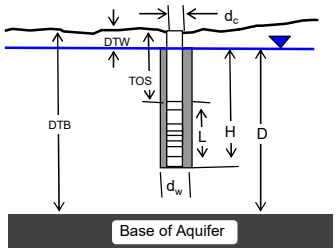
Construction:		
Casing dia. (d_c)	2	Inch
Annulus dia. (d_w)	8.25	Inch
Screen Length (L)	10	Feet
Depths to:		
water level (DTW)	9.75	Feet
top of screen (TOS)	8	Feet
Base of Aquifer (DTB)	500	Feet
Annular Fill:		
across screen --	Coarse Sand	
above screen --	Bentonite	
Aquifer Material --	Till	

COMPUTED

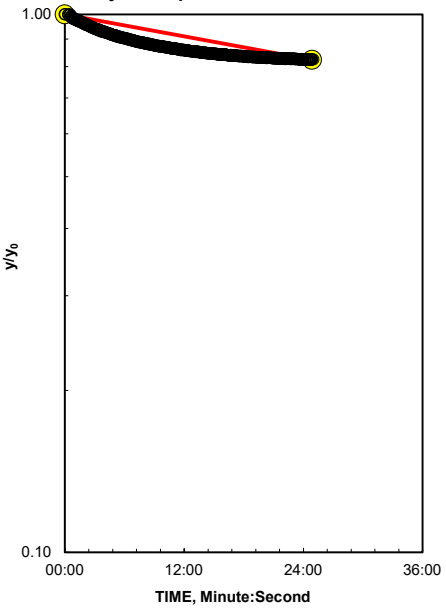
L_{wetted}	8.25	Feet
D =	490.25	Feet
H =	8.25	Feet
L/r_w =	24.00	
$y_{0\text{-DISPLACEMENT}}$ =	9.70	Feet
$y_{0\text{-SLUG}}$ =	9.19	Feet
From look-up table using L/r_w		
Partial penetrate A =	2.334	
B =	0.376	
ln(Re/rw) =	1.860	
Re =	2.21	Feet
Slope =	9.38E-06	$\log_{10}$/sec
$t_{90\%}$ recovery =	106574	sec

Input is consistent.

K = 0.0015 Feet/Day



Adjust slope of line to estimate K



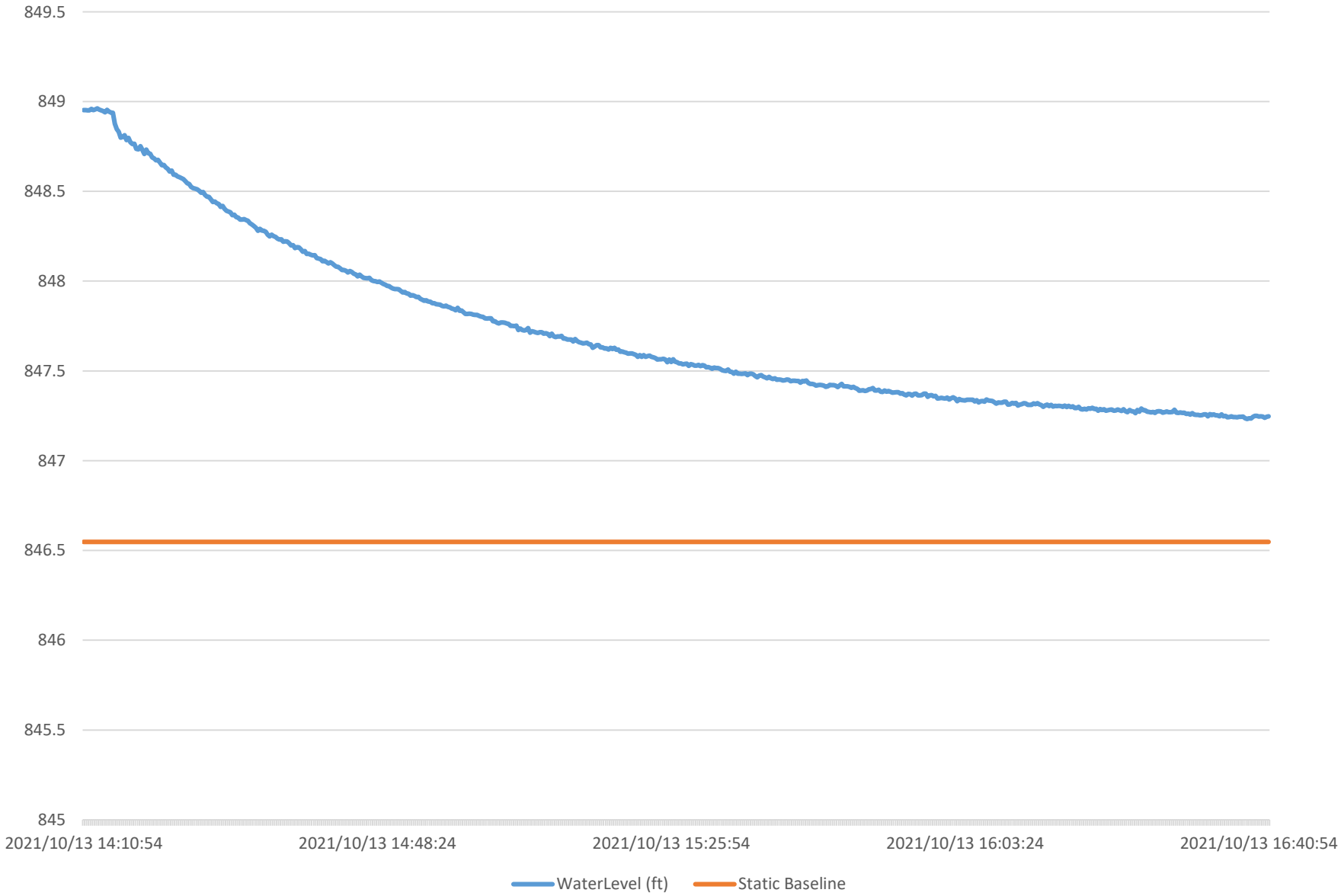
K= 0.0015 is less than likely minimum of 0.003 for Till

REMARKS: Bouwer and Rice analysis of slug test, WRR 1976

Slug test was conducted in surficial aquifer, central Indiana, which is mostly glacial till.

Entry	Reduced Data Time, Hr:Min:Sec	Water Level
1	14:11:48.0	848.95
2	14:15:08.0	848.94
3	14:18:48.0	848.73
4	14:21:08.0	848.65
5	14:24:48.0	848.54
6	14:28:08.0	848.44
7	14:31:48.0	848.34
8	14:34:08.0	848.27
9	14:37:48.0	848.20
10	14:41:08.0	848.13
11	14:44:48.0	848.06
12	14:47:08.0	848.02
13	14:50:48.0	847.96
14	14:54:08.0	847.91
15	14:57:48.0	847.86
16	15:00:08.0	847.82
17	15:03:48.0	847.78
18	15:07:08.0	847.74
19	15:10:48.0	847.71
20	15:13:08.0	847.68
21	15:16:48.0	847.64
22	15:20:08.0	847.61
23	15:23:48.0	847.58
24	15:26:08.0	847.56
25	15:29:48.0	847.53
26	15:33:08.0	847.50
27	15:36:48.0	847.48
28	15:39:08.0	847.46
29	15:42:48.0	847.43
30	15:46:08.0	847.41
31	15:49:48.0	847.41
32	15:52:08.0	847.39
33	15:55:48.0	847.38
34	15:59:08.0	847.36
35	16:02:48.0	847.35
36	16:05:08.0	847.32
37	16:08:48.0	847.33
38	16:12:08.0	847.31
39	16:15:48.0	847.30
40	16:18:08.0	847.29
41	16:21:48.0	847.28
42	16:25:08.0	847.28
43	16:28:48.0	847.27
44	16:31:08.0	847.27
45	16:34:48.0	847.25

FIGURE ___
SLUG TEST DATA
MW-9
Exide Technologies
Frankfort, Indiana



G:\Projects\2020\20204123 - Exide Trust - Frankfort\Work Documents\Interim Measures Investigation Work Plan\Field Data\Diver Data\Calculations\MW-9-Reduced Data.xlsx

WELL ID: EXIDE FRANKFORT

Local ID: MW-10
Date: 10/13/2021
Time: 14:15

INPUT

Construction:

Casing dia. (d_c)	2	Inch
Annulus dia. (d_w)	8.25	Inch
Screen Length (L)	10	Feet

Depths to:

water level (DTW)	10.02	Feet
top of screen (TOS)	8	Feet
Base of Aquifer (DTB)	500	Feet

Annular Fill:

across screen -- Coarse Sand
above screen -- Bentonite

Aquifer Material -- Till

COMPUTED

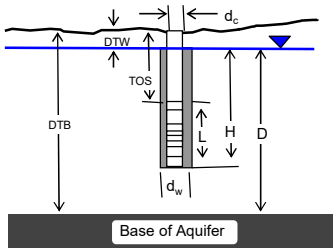
L_{wetted}	7.98	Feet
D =	489.98	Feet
H =	7.98	Feet
L/r_w =	23.21	
$y_{0\text{-DISPLACEMENT}}$ =	13.05	Feet
$y_{0\text{-SLUG}}$ =	12.25	Feet

From look-up table using L/r_w

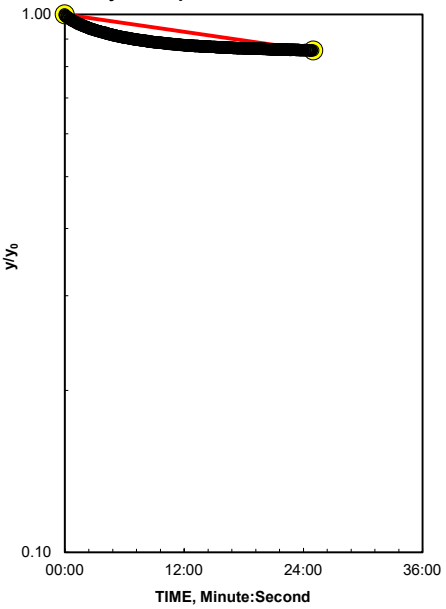
Partial penetrate A =	2.310	
B =	0.371	
ln(Re/rw) =	1.834	
Re =	2.15	Feet
Slope =	7.45E-06	$\log_{10}$/sec
$t_{90\%}$ recovery =	134290	sec

Input is consistent.

K = 0.0012 Feet/Day



Adjust slope of line to estimate K



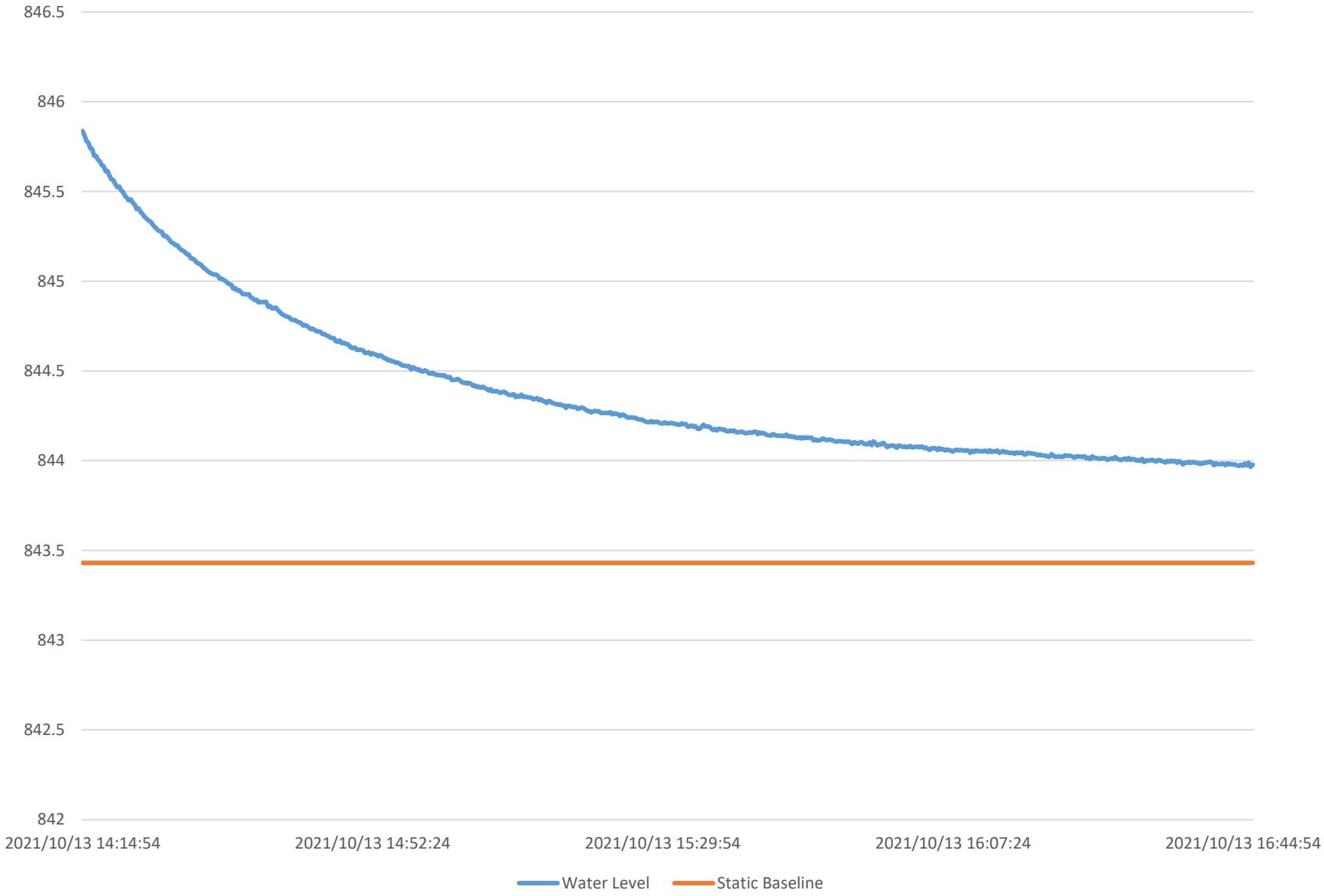
K= 0.0012 is less than likely minimum of 0.003 for Till

REMARKS: Bouwer and Rice analysis of slug test, WRR 1976

Slug test was conducted in surficial aquifer, central Indiana, which is mostly glacial till.

Entry	Reduced Data Time, Hr:Min:Sec	Water Level
1	14:15:48.0	845.84
2	14:18:48.0	845.59
3	14:22:08.0	845.43
4	14:25:48.0	845.28
5	14:28:08.0	845.16
6	14:31:48.0	845.05
7	14:35:08.0	844.96
8	14:38:48.0	844.88
9	14:41:08.0	844.80
10	14:44:48.0	844.73
11	14:48:08.0	844.67
12	14:51:48.0	844.62
13	14:54:08.0	844.57
14	14:57:48.0	844.51
15	15:01:08.0	844.48
16	15:04:48.0	844.44
17	15:07:08.0	844.40
18	15:10:48.0	844.37
19	15:14:08.0	844.35
20	15:17:48.0	844.31
21	15:20:08.0	844.28
22	15:23:48.0	844.26
23	15:27:08.0	844.23
24	15:30:48.0	844.21
25	15:33:08.0	844.19
26	15:36:48.0	844.17
27	15:40:08.0	844.16
28	15:43:48.0	844.15
29	15:46:08.0	844.13
30	15:49:48.0	844.11
31	15:53:08.0	844.11
32	15:56:48.0	844.09
33	15:59:08.0	844.08
34	16:02:48.0	844.07
35	16:06:08.0	844.07
36	16:09:48.0	844.06
37	16:12:08.0	844.06
38	16:15:48.0	844.04
39	16:19:08.0	844.03
40	16:22:48.0	844.03
41	16:25:08.0	844.01
42	16:28:48.0	844.02
43	16:32:08.0	844.00
44	16:35:48.0	843.99
45	16:38:08.0	843.99

FIGURE ___
SLUG TEST DATA
MW-10
Exide Technologies
Frankfort, Indiana



G:\Projects\2020\20204123 - Exide Trust - Frankfort\Work Documents\Interim Measures Investigation Work Plan\Field Data\Diver Data\Calculations\MW-10-Reduced Data.xlsx

APPENDIX D

New Monitoring Well Logs

MONITORING WELL LOG

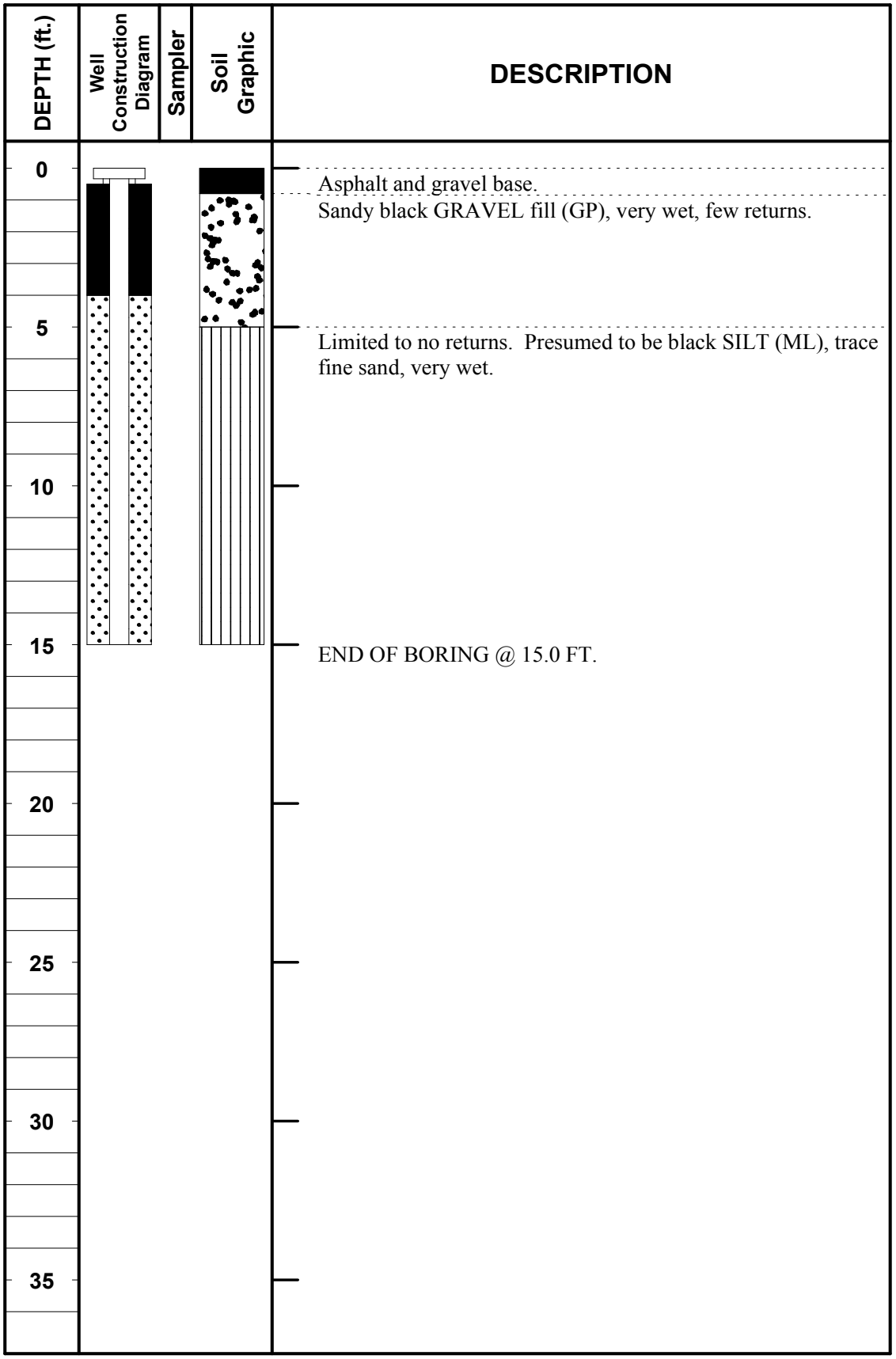
WELL NO. MW-14

PROJECT: Exide Trust - Frankfort | PROJECT NO.: 2020-4123

LOCATION: Frankfort, IN | TOIC ELEVATION:

DRILLER: James Ashe | DATE DRILLED: 10/21/21 | DATE COMPLETED: 10/21/21

WATER DEPTH: 0.5 ft. | INSPECTOR: BBB | COMPLETION DEPTH: 15 feet



COVER TYPE: Stickup

BENTONITE SEAL:

Type: Pellet

Interval: 0.5'-4'

FILTER PACK:

Type: Sand

Interval: 4'-15'

RISER:

Diameter: 2-Inch

Interval: 0'-5'

SCREEN

Type: PVC

Diameter: 2-Inch

Slot Size: 0.010

Interval: 5'-15'

COMMENTS

Figure

ADVANCED GEOSERVICES

MONITORING WELL LOG

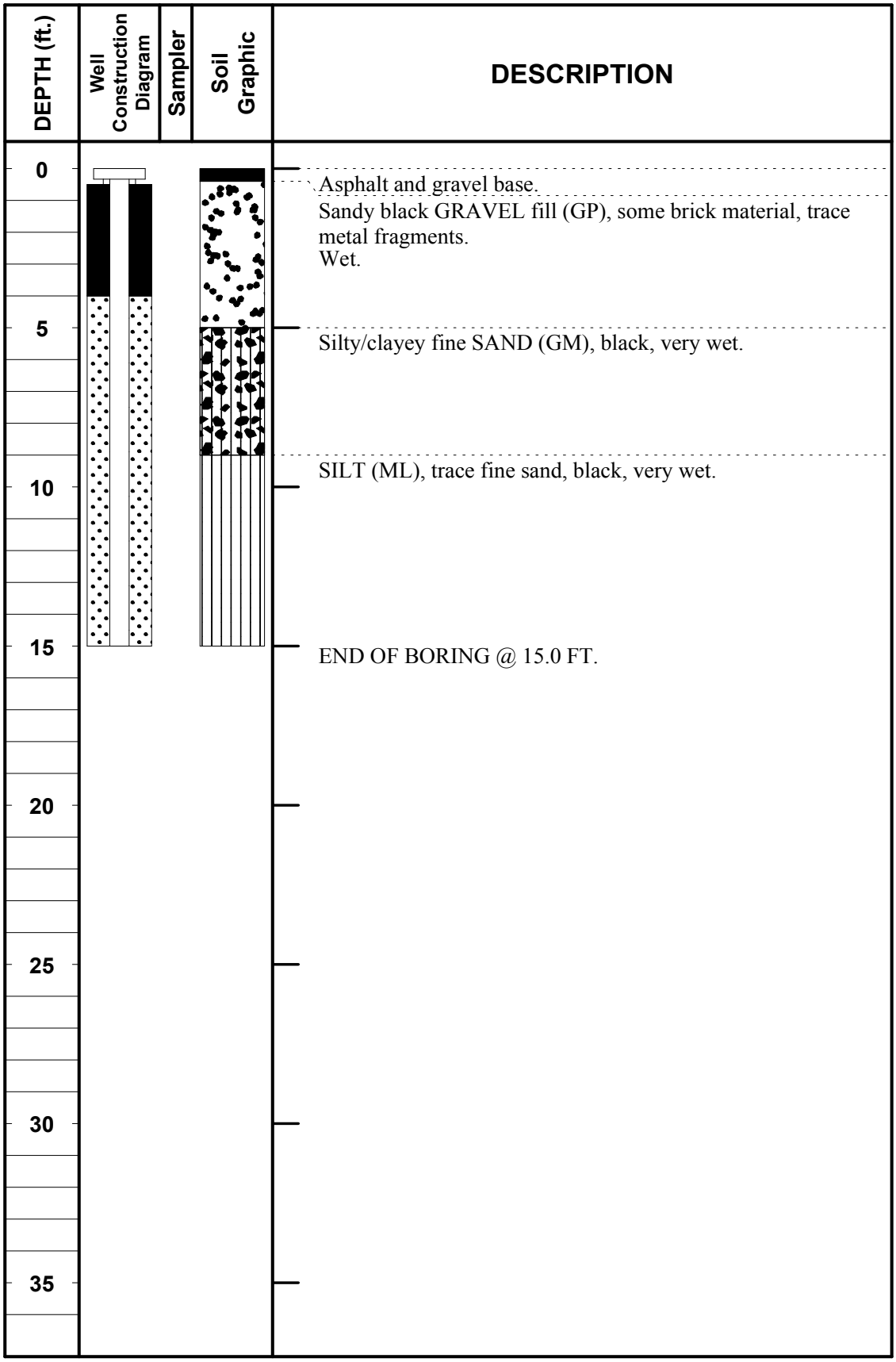
WELL NO. MW-12

PROJECT: Exide Trust - Frankfort | PROJECT NO.: 2020-4123

LOCATION: Frankfort, IN | TOIC ELEVATION:

DRILLER: James Ashe | DATE DRILLED: 10/20/21 | DATE COMPLETED: 10/20/21

WATER DEPTH: 2.0 ft. | INSPECTOR: BBB | COMPLETION DEPTH: 15 feet



COVER TYPE: Stickup

BENTONITE SEAL:

Type: Pellet

Interval: 0.5'-4'

FILTER PACK:

Type: Sand

Interval: 4'-15'

RISER:

Diameter: 2-Inch

Interval: 0'-5'

SCREEN

Type: PVC

Diameter: 2-Inch

Slot Size: 0.010

Interval: 5'-15'

COMMENTS

Figure

ADVANCED GEOSERVICES

MONITORING WELL LOG

WELL NO. MW-13

PROJECT: Exide Trust - Frankfort | PROJECT NO.: 2020-4123

LOCATION: Frankfort, IN | TOIC ELEVATION:

DRILLER: James Ashe | DATE DRILLED: 10/20/21 | DATE COMPLETED: 10/20/21

WATER DEPTH: 7.0 ft. | INSPECTOR: BBB | COMPLETION DEPTH: 15 feet

DEPTH (ft.)	Well Construction Diagram	Sampler	Soil Graphic	DESCRIPTION
0				Asphalt and gravel base.
				Sandy black GRAVEL fill (GP), some brick material, trace metal fragments.
				Hard augering.
5				CLAY (CL), trace silt, trace gravel, black, dry.
				Wet. No cutting/returns by augers, presumed to be CLAY (CL) with trace silt, black.
10				
15				END OF BORING @ 15.0 FT.
20				
25				
30				
35				

COVER TYPE: Stickup

BENTONITE SEAL:

Type: Pellet

Interval: 0.5'-4'

FILTER PACK:

Type: Sand

Interval: 4'-15'

RISER:

Diameter: 2-Inch

Interval: 0'-5'

SCREEN

Type: PVC

Diameter: 2-Inch

Slot Size: 0.010

Interval: 5'-15'

COMMENTS

Figure

ADVANCED GEOSERVICES

APPENDIX E

Investigation Derived Waste Records

Pace Analytical Services, LLC
4171 40th St. SE
Grand Rapids, MI 49512
(616)975-4500

November 05, 2021

Adam Doubleday
Advanced GeoServices Corporation
1055 Andrew Drive, Suite A
West Chester, PA 19380

RE: Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

Dear Adam Doubleday:

Enclosed are the analytical results for sample(s) received by the laboratory on October 22, 2021. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Indianapolis
- Pace Analytical Services - Greensburg

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Brian Hall
brian.hall@pacelabs.com
(616)975-4500
Project Manager

Enclosures

cc: Amy Graham, Advanced GeoServices Corporation

Pace Analytical Services, LLC
4171 40th St. SE
Grand Rapids, MI 49512
(616)975-4500

CERTIFICATIONS

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

Pace Analytical Services Pennsylvania

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
ANAB DOD-ELAP Rad Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification #: PA01547
Connecticut Certification #: PH-0694
Delaware Certification
EPA Region 4 DW Rad
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Florida: Cert E871149 SEKS WET
Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: KY90133
KY WW Permit #: KY0098221
KY WW Permit #: KY0000221
Louisiana DHH/TNI Certification #: LA180012
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: 2017020
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification #: 9991
Missouri Certification #: 235
Montana Certification #: Cert0082
Nebraska Certification #: NE-OS-29-14
Nevada Certification #: PA014572018-1
New Hampshire/TNI Certification #: 297617
New Jersey/TNI Certification #: PA051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Ohio EPA Rad Approval: #41249
Oregon/TNI Certification #: PA200002-010
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: 02867
Texas/TNI Certification #: T104704188-17-3
Utah/TNI Certification #: PA014572017-9
USDA Soil Permit #: P330-17-00091
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 9526
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Approve List for Rad
Wyoming Certification #: 8TMS-L

Pace Analytical Services Indianapolis

7726 Moller Road, Indianapolis, IN 46268
Illinois Accreditation #: 200074
Indiana Drinking Water Laboratory #: C-49-06
Kansas/TNI Certification #: E-10177
Kentucky UST Agency Interest #: 80226
Kentucky WW Laboratory ID #: 98019
Michigan Drinking Water Laboratory #9050
Ohio VAP Certified Laboratory #: CL0065
Oklahoma Laboratory #: 9204
Texas Certification #: T104704355
Wisconsin Laboratory #: 999788130
USDA Soil Permit #: P330-19-00257

Pace Analytical Services, LLC
4171 40th St. SE
Grand Rapids, MI 49512
(616)975-4500

SAMPLE SUMMARY

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

Lab ID	Sample ID	Matrix	Date Collected	Date Received
50300888001	**Water-1021**	Water	10/22/21 08:20	10/22/21 11:40
50300888002	**Soil-1021**	Solid	10/22/21 08:50	10/22/21 11:40

Pace Analytical Services, LLC
4171 40th St. SE
Grand Rapids, MI 49512
(616)975-4500

SAMPLE ANALYTE COUNT

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
50300888001	**Water-1021**	EPA 6010	JPK	7	PASI-I
		EPA 6010	RAM	7	PASI-I
		EPA 7470	ILP	1	PASI-I
		EPA 7470	DDA	1	PASI-I
		EPA 8270	JCM	18	PASI-I
		EPA 8270 by SIM	GRM	19	PASI-I
		EPA 8270	GRM	53	PASI-I
		EPA 5030/8260	TLS1	13	PASI-I
		EPA 8260	TLS1	53	PASI-I
		EPA 1020B	SWJ	1	PASI-I
		SM 4500-H+B	TKG	1	PASI-I
		EPA 9014	NAH	1	PASI-PA
		SM 4500-S2-F-2011	NAH	1	PASI-PA
50300888002	**Soil-1021**	EPA 6010	JDG	7	PASI-I
		EPA 6010	JPK	7	PASI-I
		EPA 7470	ILP	1	PASI-I
		EPA 7471	ILP	1	PASI-I
		EPA 8270	JCM	73	PASI-I
		EPA 8270	JCM	18	PASI-I
		EPA 5030/8260	TLS1	13	PASI-I
		EPA 8260	AEP	54	PASI-I
		SM 2540G	ADT	1	PASI-I
		1030	SWJ	1	PASI-I
		EPA 9045	SWJ	1	PASI-I
		EPA 9014	NAH	1	PASI-PA
		SM 4500-S2-F-2011	NAH	1	PASI-PA

PASI-I = Pace Analytical Services - Indianapolis
PASI-PA = Pace Analytical Services - Greensburg

Pace Analytical Services, LLC
4171 40th St. SE
Grand Rapids, MI 49512
(616)975-4500

SUMMARY OF DETECTION

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
50300888001	**Water-1021**					
EPA 6010	Arsenic	3.7J	ug/L	10.0	10/27/21 17:26	
EPA 6010	Barium	74.1	ug/L	10.0	10/27/21 17:26	
EPA 6010	Chromium	28.8	ug/L	10.0	10/27/21 17:26	
EPA 8270	Phenol	5.9J	ug/L	10.0	11/01/21 20:37	
EPA 8260	Acetone	159	ug/L	100	11/01/21 14:54	
EPA 8260	cis-1,2-Dichloroethene	7.8	ug/L	5.0	11/01/21 14:54	
EPA 8260	Trichloroethene	0.61J	ug/L	5.0	11/01/21 14:54	
EPA 8260	Vinyl chloride	1.9J	ug/L	2.0	11/01/21 14:54	
EPA 1020B	Flashpoint	>200.0	deg F		10/26/21 13:17	N2
SM 4500-H+B	pH at 25 Degrees C	8.7	Std. Units	0.10	10/30/21 09:37	H3
50300888002	**Soil-1021**					
EPA 6010	Arsenic	7.6	mg/kg	1.2	10/27/21 12:52	
EPA 6010	Barium	76.5	mg/kg	1.2	10/27/21 12:52	
EPA 6010	Cadmium	0.62	mg/kg	0.60	10/27/21 12:52	
EPA 6010	Chromium	14.4	mg/kg	1.2	10/27/21 12:52	
EPA 6010	Lead	47.7	mg/kg	1.2	10/27/21 12:52	
EPA 6010	Barium	0.82J	mg/L	5.0	11/04/21 00:14	
EPA 7471	Mercury	0.037J	mg/kg	0.26	11/01/21 10:00	
EPA 8260	Acetone	0.010J	mg/kg	0.096	11/04/21 21:48	
EPA 8260	Chloroform	0.00096J	mg/kg	0.0048	11/04/21 21:48	B
EPA 8260	cis-1,2-Dichloroethene	0.0037J	mg/kg	0.0048	11/04/21 21:48	
EPA 8260	Trichloroethene	0.00092J	mg/kg	0.0048	11/04/21 21:48	
EPA 8260	Vinyl chloride	0.00064J	mg/kg	0.0048	11/04/21 21:48	
SM 2540G	Percent Moisture	22.2	%	0.10	10/25/21 11:52	N2
1030	Ignitability, non-metallic	<2.2 mm/sec	mm/sec	2.2	10/27/21 10:05	N2
EPA 9045	pH at 25 Degrees C	6.8	Std. Units	0.10	10/29/21 13:07	H3

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PROJECT NARRATIVE

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

Method: **EPA 6010**
Description: 6010 MET ICP
Client: Advanced GeoServices Corporation
Date: November 05, 2021

General Information:
2 samples were analyzed for EPA 6010 by Pace Analytical Services Indianapolis. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 3010 with any exceptions noted below.
The samples were prepared in accordance with EPA 3050 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

Method: **EPA 6010**
Description: 6010 MET ICP, TCLP
Client: Advanced GeoServices Corporation
Date: November 05, 2021

General Information:
2 samples were analyzed for EPA 6010 by Pace Analytical Services Indianapolis. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 3010 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

Method: **EPA 7470**
Description: 7470 Mercury, TCLP
Client: Advanced GeoServices Corporation
Date: November 05, 2021

General Information:
2 samples were analyzed for EPA 7470 by Pace Analytical Services Indianapolis. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 7470 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 648297

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s):
50298356057,50300491001,50300517005,50300888002,50300927001,50301209001,50301220001,50301317001,50301362001,50301380001,50301536002

M0: Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

- MS (Lab ID: 2986883)
  - Mercury

Additional Comments:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

Method: **EPA 7470**
Description: 7470 Mercury
Client: Advanced GeoServices Corporation
Date: November 05, 2021

General Information:
1 sample was analyzed for EPA 7470 by Pace Analytical Services Indianapolis. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 7470 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

Method: **EPA 7471**
Description: 7471 Mercury
Client: Advanced GeoServices Corporation
Date: November 05, 2021

General Information:
1 sample was analyzed for EPA 7471 by Pace Analytical Services Indianapolis. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 7471 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

Method: **EPA 8270**
Description: 8270 SVOC SS Soil
Client: Advanced GeoServices Corporation
Date: November 05, 2021

General Information:
1 sample was analyzed for EPA 8270 by Pace Analytical Services Indianapolis. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 3546 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Surrogates:
All surrogates were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: 647839

N2: The lab does not hold NELAC/TNI accreditation for this parameter but other accreditations/certifications may apply. A complete list of accreditations/certifications is available upon request.

- BLANK (Lab ID: 2985029)
  - Atrazine
  - Biphenyl (Diphenyl)
  - Benzaldehyde
  - Caprolactam

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PROJECT NARRATIVE

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

Method: **EPA 8270**
Description: 8270 SVOC SS Soil
Client: Advanced GeoServices Corporation
Date: November 05, 2021

Analyte Comments:

QC Batch: 647839

N2: The lab does not hold NELAC/TNI accreditation for this parameter but other accreditations/certifications may apply. A complete list of accreditations/certifications is available upon request.

- Soil-1021 (Lab ID: 50300888002)
  - Atrazine
  - Biphenyl (Diphenyl)
  - Benzaldehyde
  - Caprolactam

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PROJECT NARRATIVE

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

Method: **EPA 8270**
Description: 8270 MSSV TCLP Sep Funnel
Client: Advanced GeoServices Corporation
Date: November 05, 2021

General Information:
2 samples were analyzed for EPA 8270 by Pace Analytical Services Indianapolis. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 3510 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Surrogates:
All surrogates were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

Method: **EPA 8270 by SIM**
Description: 8270 100mL Combo RV
Client: Advanced GeoServices Corporation
Date: November 05, 2021

General Information:
1 sample was analyzed for EPA 8270 by SIM by Pace Analytical Services Indianapolis. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H2: Extraction or preparation conducted outside EPA method holding time.
- Water-1021 (Lab ID: 50300888001)

H3: Sample was received or analysis requested beyond the recognized method holding time.
- Water-1021 (Lab ID: 50300888001)

Sample Preparation:
The samples were prepared in accordance with EPA 3510 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Surrogates:
All surrogates were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

QC Batch: 647400

L2: Analyte recovery in the laboratory control sample (LCS) was below QC limits. Results for this analyte in associated samples may be biased low.
- LCS (Lab ID: 2982638)
  - 2-Methylnaphthalene
  - Acenaphthene
  - Acenaphthylene
  - Fluorene
  - Naphthalene
  - Phenanthrene

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PROJECT NARRATIVE

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

Method: **EPA 8270 by SIM**
Description: 8270 100mL Combo RV
Client: Advanced GeoServices Corporation
Date: November 05, 2021

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

Method: **EPA 8270**
Description: 8270 SVOC Combo Water
Client: Advanced GeoServices Corporation
Date: November 05, 2021

General Information:
1 sample was analyzed for EPA 8270 by Pace Analytical Services Indianapolis. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 3510 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Surrogates:
All surrogates were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

Method: **EPA 5030/8260**
Description: 8260 MSV TCLP
Client: Advanced GeoServices Corporation
Date: November 05, 2021

General Information:
2 samples were analyzed for EPA 5030/8260 by Pace Analytical Services Indianapolis. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Surrogates:
All surrogates were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

Method: **EPA 8260**
Description: 8260/5030 MSV
Client: Advanced GeoServices Corporation
Date: November 05, 2021

General Information:
1 sample was analyzed for EPA 8260 by Pace Analytical Services Indianapolis. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Surrogates:
All surrogates were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

Method: **EPA 8260**
Description: 8260 MSV 5035A VOA
Client: Advanced GeoServices Corporation
Date: November 05, 2021

General Information:
1 sample was analyzed for EPA 8260 by Pace Analytical Services Indianapolis. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Surrogates:
All surrogates were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: 648672

B: Analyte was detected in the associated method blank.

- BLANK for HBN 648672 [MSV/1554 (Lab ID: 2988853)
  - Chloroform

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: 648672

N2: The lab does not hold NELAC/TNI accreditation for this parameter but other accreditations/certifications may apply. A complete list of accreditations/certifications is available upon request.

- BLANK (Lab ID: 2988853)
  - Cyclohexane
  - Methyl acetate
  - Methylcyclohexane

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PROJECT NARRATIVE

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

Method: **EPA 8260**
Description: 8260 MSV 5035A VOA
Client: Advanced GeoServices Corporation
Date: November 05, 2021

Analyte Comments:

QC Batch: 648672

N2: The lab does not hold NELAC/TNI accreditation for this parameter but other accreditations/certifications may apply. A complete list of accreditations/certifications is available upon request.

- LCS (Lab ID: 2988854)
  - Cyclohexane
  - Methyl acetate
  - Methylcyclohexane
- Soil-1021 (Lab ID: 50300888002)
  - Cyclohexane
  - Methyl acetate
  - Methylcyclohexane

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PROJECT NARRATIVE

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

Method: **EPA 1020B**
Description: 1020 Flashpoint,Closed Cup
Client: Advanced GeoServices Corporation
Date: November 05, 2021

General Information:
1 sample was analyzed for EPA 1020B by Pace Analytical Services Indianapolis. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: 646840

N2: The lab does not hold NELAC/TNI accreditation for this parameter but other accreditations/certifications may apply. A complete list of accreditations/certifications is available upon request.

- Water-1021 (Lab ID: 50300888001)
  - Flashpoint

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PROJECT NARRATIVE

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

Method: **1030**
Description: 1030 Ignitability of Solids
Client: Advanced GeoServices Corporation
Date: November 05, 2021

General Information:
1 sample was analyzed for 1030 by Pace Analytical Services Indianapolis. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: 647110

N2: The lab does not hold NELAC/TNI accreditation for this parameter but other accreditations/certifications may apply. A complete list of accreditations/certifications is available upon request.

- Soil-1021 (Lab ID: 50300888002)
  - Ignitability, non-metallic

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PROJECT NARRATIVE

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

Method: **SM 4500-H+B**
Description: 4500H+ pH, Electrometric
Client: Advanced GeoServices Corporation
Date: November 05, 2021

General Information:
1 sample was analyzed for SM 4500-H+B by Pace Analytical Services Indianapolis. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H3: Sample was received or analysis requested beyond the recognized method holding time.
- Water-1021 (Lab ID: 50300888001)

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

Method: **EPA 9045**
Description: 9045 pH Soil
Client: Advanced GeoServices Corporation
Date: November 05, 2021

General Information:
1 sample was analyzed for EPA 9045 by Pace Analytical Services Indianapolis. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H3: Sample was received or analysis requested beyond the recognized method holding time.
- Soil-1021 (Lab ID: 50300888002)

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

Method: **EPA 9014**
Description: 733C S Reactive Cyanide
Client: Advanced GeoServices Corporation
Date: November 05, 2021

General Information:
2 samples were analyzed for EPA 9014 by Pace Analytical Services Greensburg. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with SW-846 7.3.3.2 with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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4171 40th St. SE
Grand Rapids, MI 49512
(616)975-4500

PROJECT NARRATIVE

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

Method: **SM 4500-S2-F-2011**
Description: 734S Reactive Sulfide
Client: Advanced GeoServices Corporation
Date: November 05, 2021

General Information:
2 samples were analyzed for SM 4500-S2-F-2011 by Pace Analytical Services Greensburg. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with SW-846 7.3.4.2 with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

Pace Analytical Services, LLC
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Grand Rapids, MI 49512
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ANALYTICAL RESULTS

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

Sample: Water-1021 **Lab ID: 50300888001** Collected: 10/22/21 08:20 Received: 10/22/21 11:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, TCLP	Analytical Method: EPA 6010 Preparation Method: EPA 3010 Leachate Method/Date: EPA 1311; 11/01/21 20:50 Initial pH: 7.39; Final pH: 7.39 Pace Analytical Services - Indianapolis								
Arsenic	**<0.050**	mg/L	0.10	0.050	1	11/03/21 13:20	11/04/21 00:05	7440-38-2	
Barium	**<0.25**	mg/L	5.0	0.25	1	11/03/21 13:20	11/04/21 00:05	7440-39-3	
Cadmium	**<0.025**	mg/L	0.050	0.025	1	11/03/21 13:20	11/04/21 00:05	7440-43-9	
Chromium	**<0.052**	mg/L	0.10	0.052	1	11/03/21 13:20	11/04/21 00:05	7440-47-3	
Lead	**<0.050**	mg/L	0.10	0.050	1	11/03/21 13:20	11/04/21 00:05	7439-92-1	
Selenium	**<0.050**	mg/L	0.10	0.050	1	11/03/21 13:20	11/04/21 00:05	7782-49-2	
Silver	**<0.050**	mg/L	0.10	0.050	1	11/03/21 13:20	11/04/21 00:05	7440-22-4	
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010 Pace Analytical Services - Indianapolis								
Arsenic	**3.7J**	ug/L	10.0	2.6	1	10/26/21 13:30	10/27/21 17:26	7440-38-2	
Barium	**74.1**	ug/L	10.0	0.79	1	10/26/21 13:30	10/27/21 17:26	7440-39-3	
Cadmium	**<0.41**	ug/L	2.0	0.41	1	10/26/21 13:30	10/27/21 17:26	7440-43-9	
Chromium	**28.8**	ug/L	10.0	1.9	1	10/26/21 13:30	10/27/21 17:26	7440-47-3	
Lead	**<3.5**	ug/L	10.0	3.5	1	10/26/21 13:30	10/27/21 17:26	7439-92-1	
Selenium	**<4.5**	ug/L	10.0	4.5	1	10/26/21 13:30	10/27/21 17:26	7782-49-2	
Silver	**<1.4**	ug/L	10.0	1.4	1	10/26/21 13:30	10/27/21 17:26	7440-22-4	
7470 Mercury, TCLP	Analytical Method: EPA 7470 Preparation Method: EPA 7470 Leachate Method/Date: EPA 1311; 11/01/21 20:50 Initial pH: 7.39; Final pH: 7.39 Pace Analytical Services - Indianapolis								
Mercury	**<0.0010**	mg/L	0.0020	0.0010	1	11/03/21 10:41	11/04/21 11:35	7439-97-6	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470 Pace Analytical Services - Indianapolis								
Mercury	**<0.085**	ug/L	2.0	0.085	1	11/04/21 10:03	11/04/21 16:43	7439-97-6	
8270 MSSV TCLP Sep Funnel	Analytical Method: EPA 8270 Preparation Method: EPA 3510 Leachate Method/Date: EPA 1311; 11/01/21 20:50 Initial pH: 7.39; Final pH: 7.39 Pace Analytical Services - Indianapolis								
1,4-Dichlorobenzene	**<0.050**	mg/L	0.10	0.050	1	11/02/21 19:55	11/04/21 00:06	106-46-7	
2,4-Dinitrotoluene	**<0.050**	mg/L	0.10	0.050	1	11/02/21 19:55	11/04/21 00:06	121-14-2	
Hexachloro-1,3-butadiene	**<0.050**	mg/L	0.10	0.050	1	11/02/21 19:55	11/04/21 00:06	87-68-3	
Hexachlorobenzene	**<0.050**	mg/L	0.10	0.050	1	11/02/21 19:55	11/04/21 00:06	118-74-1	
Hexachloroethane	**<0.050**	mg/L	0.10	0.050	1	11/02/21 19:55	11/04/21 00:06	67-72-1	
2-Methylphenol(o-Cresol)	**<0.050**	mg/L	0.10	0.050	1	11/02/21 19:55	11/04/21 00:06	95-48-7	
3&4-Methylphenol(m&p Cresol)	**<0.10**	mg/L	0.20	0.10	1	11/02/21 19:55	11/04/21 00:06		
Nitrobenzene	**<0.050**	mg/L	0.10	0.050	1	11/02/21 19:55	11/04/21 00:06	98-95-3	
Pentachlorophenol	**<0.25**	mg/L	0.50	0.25	1	11/02/21 19:55	11/04/21 00:06	87-86-5	
Pyridine	**<0.10**	mg/L	0.10	0.10	1	11/02/21 19:55	11/04/21 00:06	110-86-1	
2,4,5-Trichlorophenol	**<0.050**	mg/L	0.50	0.050	1	11/02/21 19:55	11/04/21 00:06	95-95-4	
2,4,6-Trichlorophenol	**<0.050**	mg/L	0.10	0.050	1	11/02/21 19:55	11/04/21 00:06	88-06-2	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

Sample: Water-1021 **Lab ID: 50300888001** Collected: 10/22/21 08:20 Received: 10/22/21 11:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270 MSSV TCLP Sep Funnel	Analytical Method: EPA 8270 Preparation Method: EPA 3510 Leachate Method/Date: EPA 1311; 11/01/21 20:50 Initial pH: 7.39; Final pH: 7.39 Pace Analytical Services - Indianapolis								
Surrogates									
Nitrobenzene-d5 (S)	71	%.	40-115		1	11/02/21 19:55	11/04/21 00:06	4165-60-0	
2-Fluorobiphenyl (S)	61	%.	35-102		1	11/02/21 19:55	11/04/21 00:06	321-60-8	
p-Terphenyl-d14 (S)	81	%.	42-156		1	11/02/21 19:55	11/04/21 00:06	1718-51-0	
Phenol-d5 (S)	30	%.	15-48		1	11/02/21 19:55	11/04/21 00:06	4165-62-2	
2-Fluorophenol (S)	43	%.	21-74		1	11/02/21 19:55	11/04/21 00:06	367-12-4	
2,4,6-Tribromophenol (S)	82	%.	47-127		1	11/02/21 19:55	11/04/21 00:06	118-79-6	
8270 100mL Combo RV	Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3510 Pace Analytical Services - Indianapolis								
Acenaphthene	**<0.015**	ug/L	1.0	0.015	1	10/28/21 10:39	11/01/21 18:58	83-32-9	L2
Acenaphthene	**<0.014**	ug/L	0.95	0.014	1	11/04/21 19:31	11/05/21 14:19	83-32-9	H2
Acenaphthylene	**<0.013**	ug/L	1.0	0.013	1	10/28/21 10:39	11/01/21 18:58	208-96-8	L2
Acenaphthylene	**<0.012**	ug/L	0.95	0.012	1	11/04/21 19:31	11/05/21 14:19	208-96-8	H2
Anthracene	**<0.012**	ug/L	0.10	0.012	1	10/28/21 10:39	11/01/21 18:58	120-12-7	
Anthracene	**<0.012**	ug/L	0.095	0.012	1	11/04/21 19:31	11/05/21 14:19	120-12-7	H2
Benzo(a)anthracene	**<0.027**	ug/L	0.10	0.027	1	10/28/21 10:39	11/01/21 18:58	56-55-3	
Benzo(a)anthracene	**<0.026**	ug/L	0.095	0.026	1	11/04/21 19:31	11/05/21 14:19	56-55-3	H2
Benzo(a)pyrene	**<0.026**	ug/L	0.10	0.026	1	10/28/21 10:39	11/01/21 18:58	50-32-8	
Benzo(a)pyrene	**<0.025**	ug/L	0.095	0.025	1	11/04/21 19:31	11/05/21 14:19	50-32-8	H2
Benzo(b)fluoranthene	**<0.031**	ug/L	0.10	0.031	1	10/28/21 10:39	11/01/21 18:58	205-99-2	
Benzo(b)fluoranthene	**<0.030**	ug/L	0.095	0.030	1	11/04/21 19:31	11/05/21 14:19	205-99-2	H2
Benzo(g,h,i)perylene	**<0.024**	ug/L	0.10	0.024	1	10/28/21 10:39	11/01/21 18:58	191-24-2	
Benzo(g,h,i)perylene	**<0.022**	ug/L	0.095	0.022	1	11/04/21 19:31	11/05/21 14:19	191-24-2	H2
Benzo(k)fluoranthene	**<0.020**	ug/L	0.10	0.020	1	10/28/21 10:39	11/01/21 18:58	207-08-9	
Benzo(k)fluoranthene	**<0.019**	ug/L	0.095	0.019	1	11/04/21 19:31	11/05/21 14:19	207-08-9	H2
Chrysene	**<0.020**	ug/L	0.50	0.020	1	10/28/21 10:39	11/01/21 18:58	218-01-9	
Chrysene	**<0.019**	ug/L	0.48	0.019	1	11/04/21 19:31	11/05/21 14:19	218-01-9	H2
Dibenz(a,h)anthracene	**<0.071**	ug/L	0.10	0.071	1	10/28/21 10:39	11/01/21 18:58	53-70-3	
Dibenz(a,h)anthracene	**<0.067**	ug/L	0.095	0.067	1	11/04/21 19:31	11/05/21 14:19	53-70-3	H2
Fluoranthene	**<0.015**	ug/L	1.0	0.015	1	10/28/21 10:39	11/01/21 18:58	206-44-0	
Fluoranthene	**<0.015**	ug/L	0.95	0.015	1	11/04/21 19:31	11/05/21 14:19	206-44-0	H2
Fluorene	**<0.036**	ug/L	1.0	0.036	1	10/28/21 10:39	11/01/21 18:58	86-73-7	L2
Fluorene	**<0.034**	ug/L	0.95	0.034	1	11/04/21 19:31	11/05/21 14:19	86-73-7	H2
Indeno(1,2,3-cd)pyrene	**<0.073**	ug/L	0.10	0.073	1	10/28/21 10:39	11/01/21 18:58	193-39-5	
Indeno(1,2,3-cd)pyrene	**<0.069**	ug/L	0.095	0.069	1	11/04/21 19:31	11/05/21 14:19	193-39-5	H2
2-Methylnaphthalene	**<0.015**	ug/L	1.0	0.015	1	10/28/21 10:39	11/01/21 18:58	91-57-6	L2
2-Methylnaphthalene	**<0.014**	ug/L	0.95	0.014	1	11/04/21 19:31	11/05/21 14:19	91-57-6	H2
Naphthalene	**<0.014**	ug/L	1.0	0.014	1	10/28/21 10:39	11/01/21 18:58	91-20-3	H7,L2
Naphthalene	**<0.013**	ug/L	0.95	0.013	1	11/04/21 19:31	11/05/21 14:19	91-20-3	H2,H3
Phenanthrene	**<0.021**	ug/L	1.0	0.021	1	10/28/21 10:39	11/01/21 18:58	85-01-8	L2
Phenanthrene	**<0.020**	ug/L	0.95	0.020	1	11/04/21 19:31	11/05/21 14:19	85-01-8	H2
Pyrene	**<0.020**	ug/L	1.0	0.020	1	10/28/21 10:39	11/01/21 18:58	129-00-0	
Pyrene	**<0.019**	ug/L	0.95	0.019	1	11/04/21 19:31	11/05/21 14:19	129-00-0	H2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

Sample: Water-1021 **Lab ID: 50300888001** Collected: 10/22/21 08:20 Received: 10/22/21 11:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270 100mL Combo RV	Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3510 Pace Analytical Services - Indianapolis								
Surrogates									
2-Fluorobiphenyl (S)	69	%.	31-98		1	11/04/21 19:31	11/05/21 14:19	321-60-8	
2-Fluorobiphenyl (S)	37	%.	31-98		1	10/28/21 10:39	11/01/21 18:58	321-60-8	
p-Terphenyl-d14 (S)	66	%.	33-115		1	10/28/21 10:39	11/01/21 18:58	1718-51-0	
p-Terphenyl-d14 (S)	84	%.	33-115		1	11/04/21 19:31	11/05/21 14:19	1718-51-0	
8270 SVOC Combo Water	Analytical Method: EPA 8270 Preparation Method: EPA 3510 Pace Analytical Services - Indianapolis								
Acetophenone	**<2.8**	ug/L	10.0	2.8	1	10/28/21 10:39	11/01/21 20:37	98-86-2	
Atrazine	**<2.8**	ug/L	10.0	2.8	1	10/28/21 10:39	11/01/21 20:37	1912-24-9	
Benzaldehyde	**<4.7**	ug/L	50.0	4.7	1	10/28/21 10:39	11/01/21 20:37	100-52-7	
Biphenyl (Diphenyl)	**<5.9**	ug/L	10.0	5.9	1	10/28/21 10:39	11/01/21 20:37	92-52-4	
4-Bromophenylphenyl ether	**<5.6**	ug/L	10.0	5.6	1	10/28/21 10:39	11/01/21 20:37	101-55-3	
Butylbenzylphthalate	**<3.5**	ug/L	10.0	3.5	1	10/28/21 10:39	11/01/21 20:37	85-68-7	
Caprolactam	**<4.3**	ug/L	10.0	4.3	1	10/28/21 10:39	11/01/21 20:37	105-60-2	
Carbazole	**<3.7**	ug/L	10.0	3.7	1	10/28/21 10:39	11/01/21 20:37	86-74-8	
4-Chloro-3-methylphenol	**<5.6**	ug/L	10.0	5.6	1	10/28/21 10:39	11/01/21 20:37	59-50-7	
4-Chloroaniline	**<3.2**	ug/L	10.0	3.2	1	10/28/21 10:39	11/01/21 20:37	106-47-8	
bis(2-Chloroethoxy)methane	**<2.5**	ug/L	10.0	2.5	1	10/28/21 10:39	11/01/21 20:37	111-91-1	
bis(2-Chloroethyl) ether	**<2.9**	ug/L	10.0	2.9	1	10/28/21 10:39	11/01/21 20:37	111-44-4	
2-Chloronaphthalene	**<5.8**	ug/L	10.0	5.8	1	10/28/21 10:39	11/01/21 20:37	91-58-7	
2-Chlorophenol	**<3.6**	ug/L	10.0	3.6	1	10/28/21 10:39	11/01/21 20:37	95-57-8	
4-Chlorophenylphenyl ether	**<5.1**	ug/L	10.0	5.1	1	10/28/21 10:39	11/01/21 20:37	7005-72-3	
Dibenzofuran	**<7.0**	ug/L	10.0	7.0	1	10/28/21 10:39	11/01/21 20:37	132-64-9	
3,3'-Dichlorobenzidine	**<4.0**	ug/L	20.0	4.0	1	10/28/21 10:39	11/01/21 20:37	91-94-1	
2,4-Dichlorophenol	**<4.0**	ug/L	10.0	4.0	1	10/28/21 10:39	11/01/21 20:37	120-83-2	
Diethylphthalate	**<2.7**	ug/L	10.0	2.7	1	10/28/21 10:39	11/01/21 20:37	84-66-2	
2,4-Dimethylphenol	**<8.1**	ug/L	10.0	8.1	1	10/28/21 10:39	11/01/21 20:37	105-67-9	
Dimethylphthalate	**<3.7**	ug/L	10.0	3.7	1	10/28/21 10:39	11/01/21 20:37	131-11-3	
Di-n-butylphthalate	**<3.6**	ug/L	10.0	3.6	1	10/28/21 10:39	11/01/21 20:37	84-74-2	
4,6-Dinitro-2-methylphenol	**<5.0**	ug/L	20.0	5.0	1	10/28/21 10:39	11/01/21 20:37	534-52-1	
2,4-Dinitrophenol	**<6.6**	ug/L	50.0	6.6	1	10/28/21 10:39	11/01/21 20:37	51-28-5	
2,4-Dinitrotoluene	**<6.2**	ug/L	10.0	6.2	1	10/28/21 10:39	11/01/21 20:37	121-14-2	
2,6-Dinitrotoluene	**<4.6**	ug/L	10.0	4.6	1	10/28/21 10:39	11/01/21 20:37	606-20-2	
Di-n-octylphthalate	**<4.5**	ug/L	10.0	4.5	1	10/28/21 10:39	11/01/21 20:37	117-84-0	
bis(2-Ethylhexyl)phthalate	**<3.1**	ug/L	10.0	3.1	1	10/28/21 10:39	11/01/21 20:37	117-81-7	
Hexachloro-1,3-butadiene	**<4.1**	ug/L	10.0	4.1	1	10/28/21 10:39	11/01/21 20:37	87-68-3	
Hexachlorobenzene	**<3.0**	ug/L	10.0	3.0	1	10/28/21 10:39	11/01/21 20:37	118-74-1	
Hexachlorocyclopentadiene	**<3.0**	ug/L	10.0	3.0	1	10/28/21 10:39	11/01/21 20:37	77-47-4	
Hexachloroethane	**<2.5**	ug/L	10.0	2.5	1	10/28/21 10:39	11/01/21 20:37	67-72-1	
Isophorone	**<4.2**	ug/L	10.0	4.2	1	10/28/21 10:39	11/01/21 20:37	78-59-1	
2-Methylphenol(o-Cresol)	**<4.3**	ug/L	10.0	4.3	1	10/28/21 10:39	11/01/21 20:37	95-48-7	
3&4-Methylphenol(m&p Cresol)	**<5.4**	ug/L	10.0	5.4	1	10/28/21 10:39	11/01/21 20:37		
2-Nitroaniline	**<4.2**	ug/L	10.0	4.2	1	10/28/21 10:39	11/01/21 20:37	88-74-4	
3-Nitroaniline	**<4.8**	ug/L	10.0	4.8	1	10/28/21 10:39	11/01/21 20:37	99-09-2	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

Sample: Water-1021 **Lab ID: 50300888001** Collected: 10/22/21 08:20 Received: 10/22/21 11:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270 SVOC Combo Water	Analytical Method: EPA 8270 Preparation Method: EPA 3510 Pace Analytical Services - Indianapolis								
4-Nitroaniline	**<4.6**	ug/L	10.0	4.6	1	10/28/21 10:39	11/01/21 20:37	100-01-6	
Nitrobenzene	**<3.0**	ug/L	10.0	3.0	1	10/28/21 10:39	11/01/21 20:37	98-95-3	
2-Nitrophenol	**<3.5**	ug/L	10.0	3.5	1	10/28/21 10:39	11/01/21 20:37	88-75-5	
4-Nitrophenol	**<5.6**	ug/L	50.0	5.6	1	10/28/21 10:39	11/01/21 20:37	100-02-7	
N-Nitroso-di-n-propylamine	**<2.9**	ug/L	50.0	2.9	1	10/28/21 10:39	11/01/21 20:37	621-64-7	
N-Nitrosodiphenylamine	**<2.9**	ug/L	10.0	2.9	1	10/28/21 10:39	11/01/21 20:37	86-30-6	
2,2'-Oxybis(1-chloropropane)	**<4.6**	ug/L	10.0	4.6	1	10/28/21 10:39	11/01/21 20:37	108-60-1	
Pentachlorophenol	**<4.0**	ug/L	50.0	4.0	1	10/28/21 10:39	11/01/21 20:37	87-86-5	
Phenol	**5.9J**	ug/L	10.0	4.1	1	10/28/21 10:39	11/01/21 20:37	108-95-2	
2,3,4,6-Tetrachlorophenol	**<4.9**	ug/L	10.0	4.9	1	10/28/21 10:39	11/01/21 20:37	58-90-2	
2,4,5-Trichlorophenol	**<2.9**	ug/L	10.0	2.9	1	10/28/21 10:39	11/01/21 20:37	95-95-4	
2,4,6-Trichlorophenol	**<4.5**	ug/L	10.0	4.5	1	10/28/21 10:39	11/01/21 20:37	88-06-2	
Surrogates									
Nitrobenzene-d5 (S)	40	%.	39-115		1	10/28/21 10:39	11/01/21 20:37	4165-60-0	
Phenol-d5 (S)	26	%.	10-55		1	10/28/21 10:39	11/01/21 20:37	4165-62-2	
2-Fluorophenol (S)	34	%.	10-72		1	10/28/21 10:39	11/01/21 20:37	367-12-4	
2,4,6-Tribromophenol (S)	65	%.	34-126		1	10/28/21 10:39	11/01/21 20:37	118-79-6	
8260 MSV TCLP	Analytical Method: EPA 5030/8260 Leachate Method/Date: EPA 1311; 11/01/21 20:50 Pace Analytical Services - Indianapolis								
Benzene	**<0.010**	mg/L	0.050	0.010	1		11/04/21 05:11	71-43-2	
2-Butanone (MEK)	**<0.50**	mg/L	1.0	0.50	1		11/04/21 05:11	78-93-3	
Carbon tetrachloride	**<0.025**	mg/L	0.050	0.025	1		11/04/21 05:11	56-23-5	
Chlorobenzene	**<0.025**	mg/L	0.050	0.025	1		11/04/21 05:11	108-90-7	
Chloroform	**<0.025**	mg/L	0.050	0.025	1		11/04/21 05:11	67-66-3	
1,2-Dichloroethane	**<0.025**	mg/L	0.050	0.025	1		11/04/21 05:11	107-06-2	
1,1-Dichloroethene	**<0.025**	mg/L	0.050	0.025	1		11/04/21 05:11	75-35-4	
Tetrachloroethene	**<0.025**	mg/L	0.050	0.025	1		11/04/21 05:11	127-18-4	
Trichloroethene	**<0.025**	mg/L	0.050	0.025	1		11/04/21 05:11	79-01-6	
Vinyl chloride	**<0.010**	mg/L	0.020	0.010	1		11/04/21 05:11	75-01-4	
Surrogates									
4-Bromofluorobenzene (S)	94	%.	78-117		1		11/04/21 05:11	460-00-4	
Dibromofluoromethane (S)	107	%.	78-120		1		11/04/21 05:11	1868-53-7	
Toluene-d8 (S)	101	%.	77-118		1		11/04/21 05:11	2037-26-5	
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
Acetone	**159**	ug/L	100	5.5	1		11/01/21 14:54	67-64-1	
Benzene	**<0.31**	ug/L	5.0	0.31	1		11/01/21 14:54	71-43-2	
Bromochloromethane	**<0.42**	ug/L	5.0	0.42	1		11/01/21 14:54	74-97-5	
Bromodichloromethane	**<0.29**	ug/L	5.0	0.29	1		11/01/21 14:54	75-27-4	
Bromoform	**<0.42**	ug/L	5.0	0.42	1		11/01/21 14:54	75-25-2	
Bromomethane	**<1.6**	ug/L	5.0	1.6	1		11/01/21 14:54	74-83-9	
2-Butanone (MEK)	**<2.1**	ug/L	25.0	2.1	1		11/01/21 14:54	78-93-3	
Carbon disulfide	**<0.32**	ug/L	10.0	0.32	1		11/01/21 14:54	75-15-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
4171 40th St. SE
Grand Rapids, MI 49512
(616)975-4500

ANALYTICAL RESULTS

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

Sample: Water-1021 **Lab ID: 50300888001** Collected: 10/22/21 08:20 Received: 10/22/21 11:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
Carbon tetrachloride	**<0.48**	ug/L	5.0	0.48	1		11/01/21 14:54	56-23-5	
Chlorobenzene	**<0.33**	ug/L	5.0	0.33	1		11/01/21 14:54	108-90-7	
Chloroethane	**<1.7**	ug/L	5.0	1.7	1		11/01/21 14:54	75-00-3	
Chloroform	**<0.34**	ug/L	5.0	0.34	1		11/01/21 14:54	67-66-3	
Chloromethane	**<0.48**	ug/L	5.0	0.48	1		11/01/21 14:54	74-87-3	
Cyclohexane	**<0.36**	ug/L	100	0.36	1		11/01/21 14:54	110-82-7	
1,2-Dibromo-3-chloropropane	**<1.6**	ug/L	10.0	1.6	1		11/01/21 14:54	96-12-8	
Dibromochloromethane	**<0.34**	ug/L	5.0	0.34	1		11/01/21 14:54	124-48-1	
1,2-Dibromoethane (EDB)	**<0.42**	ug/L	5.0	0.42	1		11/01/21 14:54	106-93-4	
1,2-Dichlorobenzene	**<0.30**	ug/L	5.0	0.30	1		11/01/21 14:54	95-50-1	
1,3-Dichlorobenzene	**<0.30**	ug/L	5.0	0.30	1		11/01/21 14:54	541-73-1	
1,4-Dichlorobenzene	**<0.36**	ug/L	5.0	0.36	1		11/01/21 14:54	106-46-7	
Dichlorodifluoromethane	**<1.7**	ug/L	5.0	1.7	1		11/01/21 14:54	75-71-8	
1,1-Dichloroethane	**<0.41**	ug/L	5.0	0.41	1		11/01/21 14:54	75-34-3	
1,2-Dichloroethane	**<0.41**	ug/L	5.0	0.41	1		11/01/21 14:54	107-06-2	
1,1-Dichloroethene	**<0.37**	ug/L	5.0	0.37	1		11/01/21 14:54	75-35-4	
cis-1,2-Dichloroethene	**7.8**	ug/L	5.0	0.46	1		11/01/21 14:54	156-59-2	
trans-1,2-Dichloroethene	**<0.32**	ug/L	5.0	0.32	1		11/01/21 14:54	156-60-5	
1,2-Dichloropropane	**<0.35**	ug/L	5.0	0.35	1		11/01/21 14:54	78-87-5	
cis-1,3-Dichloropropene	**<0.34**	ug/L	5.0	0.34	1		11/01/21 14:54	10061-01-5	
trans-1,3-Dichloropropene	**<0.27**	ug/L	5.0	0.27	1		11/01/21 14:54	10061-02-6	
Ethylbenzene	**<0.26**	ug/L	5.0	0.26	1		11/01/21 14:54	100-41-4	
2-Hexanone	**<1.4**	ug/L	25.0	1.4	1		11/01/21 14:54	591-78-6	
Isopropylbenzene (Cumene)	**<0.34**	ug/L	5.0	0.34	1		11/01/21 14:54	98-82-8	
Methyl acetate	**<0.76**	ug/L	50.0	0.76	1		11/01/21 14:54	79-20-9	
Methylcyclohexane	**<0.36**	ug/L	50.0	0.36	1		11/01/21 14:54	108-87-2	
Methylene Chloride	**<0.081**	ug/L	5.0	0.081	1		11/01/21 14:54	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<1.4**	ug/L	25.0	1.4	1		11/01/21 14:54	108-10-1	
Methyl-tert-butyl ether	**<0.31**	ug/L	4.0	0.31	1		11/01/21 14:54	1634-04-4	
Styrene	**<0.26**	ug/L	5.0	0.26	1		11/01/21 14:54	100-42-5	
1,1,2,2-Tetrachloroethane	**<0.26**	ug/L	5.0	0.26	1		11/01/21 14:54	79-34-5	
Tetrachloroethene	**<0.44**	ug/L	5.0	0.44	1		11/01/21 14:54	127-18-4	
Toluene	**<0.27**	ug/L	5.0	0.27	1		11/01/21 14:54	108-88-3	
1,2,3-Trichlorobenzene	**<0.50**	ug/L	5.0	0.50	1		11/01/21 14:54	87-61-6	
1,2,4-Trichlorobenzene	**<0.44**	ug/L	5.0	0.44	1		11/01/21 14:54	120-82-1	
1,1,1-Trichloroethane	**<0.40**	ug/L	5.0	0.40	1		11/01/21 14:54	71-55-6	
1,1,2-Trichloroethane	**<0.30**	ug/L	5.0	0.30	1		11/01/21 14:54	79-00-5	
Trichloroethene	**0.61J**	ug/L	5.0	0.46	1		11/01/21 14:54	79-01-6	
Trichlorofluoromethane	**<0.24**	ug/L	5.0	0.24	1		11/01/21 14:54	75-69-4	
1,1,2-Trichlorotrifluoroethane	**<0.49**	ug/L	5.0	0.49	1		11/01/21 14:54	76-13-1	
Vinyl chloride	**1.9J**	ug/L	2.0	0.28	1		11/01/21 14:54	75-01-4	
Xylene (Total)	**<0.68**	ug/L	10.0	0.68	1		11/01/21 14:54	1330-20-7	
Surrogates									
Dibromofluoromethane (S)	105	%.	78-120		1		11/01/21 14:54	1868-53-7	
4-Bromofluorobenzene (S)	96	%.	78-117		1		11/01/21 14:54	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
4171 40th St. SE
Grand Rapids, MI 49512
(616)975-4500

ANALYTICAL RESULTS

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

Sample: Water-1021 **Lab ID: 50300888001** Collected: 10/22/21 08:20 Received: 10/22/21 11:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260/5030 MSV	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
Surrogates									
Toluene-d8 (S)	101	%.	77-118		1		11/01/21 14:54	2037-26-5	
1020 Flashpoint,Closed Cup	Analytical Method: EPA 1020B Pace Analytical Services - Indianapolis								
Flashpoint	**>200.0**	deg F			1		10/26/21 13:17		N2
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B Pace Analytical Services - Indianapolis								
pH at 25 Degrees C	**8.7**	Std. Units	0.10	0.10	1		10/30/21 09:37		H3
733C S Reactive Cyanide	Analytical Method: EPA 9014 Preparation Method: SW-846 7.3.3.2 Pace Analytical Services - Greensburg								
Cyanide, Reactive	**<0.40**	mg/kg	1.0	0.40	1	10/27/21 13:27	11/02/21 12:21		
734S Reactive Sulfide	Analytical Method: SM 4500-S2-F-2011 Preparation Method: SW-846 7.3.4.2 Pace Analytical Services - Greensburg								
Sulfide, Reactive	**<10.0**	mg/kg	10.0	10.0	1	10/29/21 14:32	10/29/21 15:02		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
4171 40th St. SE
Grand Rapids, MI 49512
(616)975-4500

ANALYTICAL RESULTS

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

Sample: Soil-1021 **Lab ID: 50300888002** Collected: 10/22/21 08:50 Received: 10/22/21 11:40 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3050 Pace Analytical Services - Indianapolis								
Arsenic	**7.6**	mg/kg	1.2	0.25	1	10/27/21 07:17	10/27/21 12:52	7440-38-2	
Barium	**76.5**	mg/kg	1.2	0.042	1	10/27/21 07:17	10/27/21 12:52	7440-39-3	
Cadmium	**0.62**	mg/kg	0.60	0.017	1	10/27/21 07:17	10/27/21 12:52	7440-43-9	
Chromium	**14.4**	mg/kg	1.2	0.089	1	10/27/21 07:17	10/27/21 12:52	7440-47-3	
Lead	**47.7**	mg/kg	1.2	0.12	1	10/27/21 07:17	10/27/21 12:52	7439-92-1	
Selenium	**<0.32**	mg/kg	1.2	0.32	1	10/27/21 07:17	10/27/21 12:52	7782-49-2	
Silver	**<0.22**	mg/kg	0.60	0.22	1	10/27/21 07:17	10/27/21 12:52	7440-22-4	
6010 MET ICP, TCLP	Analytical Method: EPA 6010 Preparation Method: EPA 3010 Leachate Method/Date: EPA 1311; 11/01/21 20:50 Initial pH: 8.87; Final pH: 6.4 Pace Analytical Services - Indianapolis								
Arsenic	**<0.050**	mg/L	0.10	0.050	1	11/03/21 13:20	11/04/21 00:14	7440-38-2	
Barium	**0.82J**	mg/L	5.0	0.25	1	11/03/21 13:20	11/04/21 00:14	7440-39-3	
Cadmium	**<0.025**	mg/L	0.050	0.025	1	11/03/21 13:20	11/04/21 00:14	7440-43-9	
Chromium	**<0.052**	mg/L	0.10	0.052	1	11/03/21 13:20	11/04/21 00:14	7440-47-3	
Lead	**<0.050**	mg/L	0.10	0.050	1	11/03/21 13:20	11/04/21 00:14	7439-92-1	
Selenium	**<0.050**	mg/L	0.10	0.050	1	11/03/21 13:20	11/04/21 00:14	7782-49-2	
Silver	**<0.050**	mg/L	0.10	0.050	1	11/03/21 13:20	11/04/21 00:14	7440-22-4	
7470 Mercury, TCLP	Analytical Method: EPA 7470 Preparation Method: EPA 7470 Leachate Method/Date: EPA 1311; 11/01/21 20:50 Initial pH: 8.87; Final pH: 6.4 Pace Analytical Services - Indianapolis								
Mercury	**<0.0010**	mg/L	0.0020	0.0010	1	11/03/21 10:41	11/04/21 11:37	7439-97-6	
7471 Mercury	Analytical Method: EPA 7471 Preparation Method: EPA 7471 Pace Analytical Services - Indianapolis								
Mercury	**0.037J**	mg/kg	0.26	0.031	1	10/31/21 13:27	11/01/21 10:00	7439-97-6	
8270 SVOC SS Soil	Analytical Method: EPA 8270 Preparation Method: EPA 3546 Pace Analytical Services - Indianapolis								
Acenaphthene	**<0.11**	mg/kg	0.42	0.11	1	10/31/21 15:40	11/01/21 15:25	83-32-9	
Acenaphthylene	**<0.13**	mg/kg	0.42	0.13	1	10/31/21 15:40	11/01/21 15:25	208-96-8	
Acetophenone	**<0.13**	mg/kg	0.42	0.13	1	10/31/21 15:40	11/01/21 15:25	98-86-2	
Anthracene	**<0.17**	mg/kg	0.42	0.17	1	10/31/21 15:40	11/01/21 15:25	120-12-7	
Atrazine	**<0.17**	mg/kg	0.42	0.17	1	10/31/21 15:40	11/01/21 15:25	1912-24-9	N2
Benzaldehyde	**<0.14**	mg/kg	0.42	0.14	1	10/31/21 15:40	11/01/21 15:25	100-52-7	N2
Benzo(a)anthracene	**<0.13**	mg/kg	0.42	0.13	1	10/31/21 15:40	11/01/21 15:25	56-55-3	
Benzo(a)pyrene	**<0.14**	mg/kg	0.42	0.14	1	10/31/21 15:40	11/01/21 15:25	50-32-8	
Benzo(b)fluoranthene	**<0.14**	mg/kg	0.42	0.14	1	10/31/21 15:40	11/01/21 15:25	205-99-2	
Benzo(g,h,i)perylene	**<0.15**	mg/kg	0.42	0.15	1	10/31/21 15:40	11/01/21 15:25	191-24-2	
Benzo(k)fluoranthene	**<0.15**	mg/kg	0.42	0.15	1	10/31/21 15:40	11/01/21 15:25	207-08-9	
Biphenyl (Diphenyl)	**<0.12**	mg/kg	0.42	0.12	1	10/31/21 15:40	11/01/21 15:25	92-52-4	N2
4-Bromophenylphenyl ether	**<0.16**	mg/kg	0.42	0.16	1	10/31/21 15:40	11/01/21 15:25	101-55-3	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
4171 40th St. SE
Grand Rapids, MI 49512
(616)975-4500

ANALYTICAL RESULTS

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

Sample: Soil-1021 **Lab ID: 50300888002** Collected: 10/22/21 08:50 Received: 10/22/21 11:40 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270 SVOC SS Soil	Analytical Method: EPA 8270 Preparation Method: EPA 3546 Pace Analytical Services - Indianapolis								
Butylbenzylphthalate	**<0.23**	mg/kg	0.42	0.23	1	10/31/21 15:40	11/01/21 15:25	85-68-7	
Caprolactam	**<0.21**	mg/kg	0.42	0.21	1	10/31/21 15:40	11/01/21 15:25	105-60-2	N2
Carbazole	**<0.17**	mg/kg	0.42	0.17	1	10/31/21 15:40	11/01/21 15:25	86-74-8	
4-Chloro-3-methylphenol	**<0.17**	mg/kg	0.85	0.17	1	10/31/21 15:40	11/01/21 15:25	59-50-7	
4-Chloroaniline	**<0.11**	mg/kg	0.85	0.11	1	10/31/21 15:40	11/01/21 15:25	106-47-8	
bis(2-Chloroethoxy)methane	**<0.14**	mg/kg	0.42	0.14	1	10/31/21 15:40	11/01/21 15:25	111-91-1	
bis(2-Chloroethyl) ether	**<0.16**	mg/kg	0.42	0.16	1	10/31/21 15:40	11/01/21 15:25	111-44-4	
2-Chloronaphthalene	**<0.12**	mg/kg	0.42	0.12	1	10/31/21 15:40	11/01/21 15:25	91-58-7	
2-Chlorophenol	**<0.15**	mg/kg	0.42	0.15	1	10/31/21 15:40	11/01/21 15:25	95-57-8	
4-Chlorophenylphenyl ether	**<0.13**	mg/kg	0.42	0.13	1	10/31/21 15:40	11/01/21 15:25	7005-72-3	
Chrysene	**<0.14**	mg/kg	0.42	0.14	1	10/31/21 15:40	11/01/21 15:25	218-01-9	
Dibenz(a,h)anthracene	**<0.15**	mg/kg	0.42	0.15	1	10/31/21 15:40	11/01/21 15:25	53-70-3	
Dibenzofuran	**<0.13**	mg/kg	0.42	0.13	1	10/31/21 15:40	11/01/21 15:25	132-64-9	
3,3'-Dichlorobenzidine	**<0.14**	mg/kg	0.85	0.14	1	10/31/21 15:40	11/01/21 15:25	91-94-1	
2,4-Dichlorophenol	**<0.15**	mg/kg	0.42	0.15	1	10/31/21 15:40	11/01/21 15:25	120-83-2	
Diethylphthalate	**<0.14**	mg/kg	0.42	0.14	1	10/31/21 15:40	11/01/21 15:25	84-66-2	
2,4-Dimethylphenol	**<0.15**	mg/kg	0.42	0.15	1	10/31/21 15:40	11/01/21 15:25	105-67-9	
Dimethylphthalate	**<0.14**	mg/kg	0.42	0.14	1	10/31/21 15:40	11/01/21 15:25	131-11-3	
Di-n-butylphthalate	**<0.15**	mg/kg	0.42	0.15	1	10/31/21 15:40	11/01/21 15:25	84-74-2	
4,6-Dinitro-2-methylphenol	**<0.26**	mg/kg	0.85	0.26	1	10/31/21 15:40	11/01/21 15:25	534-52-1	
2,4-Dinitrophenol	**<0.23**	mg/kg	2.1	0.23	1	10/31/21 15:40	11/01/21 15:25	51-28-5	
2,4-Dinitrotoluene	**<0.14**	mg/kg	0.42	0.14	1	10/31/21 15:40	11/01/21 15:25	121-14-2	
2,6-Dinitrotoluene	**<0.12**	mg/kg	0.42	0.12	1	10/31/21 15:40	11/01/21 15:25	606-20-2	
Di-n-octylphthalate	**<0.16**	mg/kg	0.42	0.16	1	10/31/21 15:40	11/01/21 15:25	117-84-0	
bis(2-Ethylhexyl)phthalate	**<0.13**	mg/kg	0.42	0.13	1	10/31/21 15:40	11/01/21 15:25	117-81-7	
Fluoranthene	**<0.16**	mg/kg	0.42	0.16	1	10/31/21 15:40	11/01/21 15:25	206-44-0	
Fluorene	**<0.14**	mg/kg	0.42	0.14	1	10/31/21 15:40	11/01/21 15:25	86-73-7	
Hexachloro-1,3-butadiene	**<0.12**	mg/kg	0.42	0.12	1	10/31/21 15:40	11/01/21 15:25	87-68-3	
Hexachlorobenzene	**<0.11**	mg/kg	0.42	0.11	1	10/31/21 15:40	11/01/21 15:25	118-74-1	
Hexachlorocyclopentadiene	**<0.21**	mg/kg	0.42	0.21	1	10/31/21 15:40	11/01/21 15:25	77-47-4	
Hexachloroethane	**<0.13**	mg/kg	0.42	0.13	1	10/31/21 15:40	11/01/21 15:25	67-72-1	
Indeno(1,2,3-cd)pyrene	**<0.15**	mg/kg	0.42	0.15	1	10/31/21 15:40	11/01/21 15:25	193-39-5	
Isophorone	**<0.14**	mg/kg	0.42	0.14	1	10/31/21 15:40	11/01/21 15:25	78-59-1	
2-Methylnaphthalene	**<0.13**	mg/kg	0.42	0.13	1	10/31/21 15:40	11/01/21 15:25	91-57-6	
2-Methylphenol(o-Cresol)	**<0.18**	mg/kg	0.42	0.18	1	10/31/21 15:40	11/01/21 15:25	95-48-7	
3&4-Methylphenol(m&p Cresol)	**<0.18**	mg/kg	0.85	0.18	1	10/31/21 15:40	11/01/21 15:25		
Naphthalene	**<0.12**	mg/kg	0.42	0.12	1	10/31/21 15:40	11/01/21 15:25	91-20-3	
2-Nitroaniline	**<0.17**	mg/kg	0.42	0.17	1	10/31/21 15:40	11/01/21 15:25	88-74-4	
3-Nitroaniline	**<0.15**	mg/kg	0.42	0.15	1	10/31/21 15:40	11/01/21 15:25	99-09-2	
4-Nitroaniline	**<0.17**	mg/kg	0.42	0.17	1	10/31/21 15:40	11/01/21 15:25	100-01-6	
Nitrobenzene	**<0.14**	mg/kg	0.42	0.14	1	10/31/21 15:40	11/01/21 15:25	98-95-3	
2-Nitrophenol	**<0.16**	mg/kg	0.42	0.16	1	10/31/21 15:40	11/01/21 15:25	88-75-5	
4-Nitrophenol	**<0.32**	mg/kg	2.1	0.32	1	10/31/21 15:40	11/01/21 15:25	100-02-7	
N-Nitroso-di-n-propylamine	**<0.16**	mg/kg	0.42	0.16	1	10/31/21 15:40	11/01/21 15:25	621-64-7	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
4171 40th St. SE
Grand Rapids, MI 49512
(616)975-4500

ANALYTICAL RESULTS

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

Sample: Soil-1021 **Lab ID: 50300888002** Collected: 10/22/21 08:50 Received: 10/22/21 11:40 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270 SVOC SS Soil	Analytical Method: EPA 8270 Preparation Method: EPA 3546 Pace Analytical Services - Indianapolis								
N-Nitrosodiphenylamine	**<0.14**	mg/kg	0.42	0.14	1	10/31/21 15:40	11/01/21 15:25	86-30-6	
2,2'-Oxybis(1-chloropropane)	**<0.15**	mg/kg	0.42	0.15	1	10/31/21 15:40	11/01/21 15:25	108-60-1	
Pentachlorophenol	**<0.33**	mg/kg	2.1	0.33	1	10/31/21 15:40	11/01/21 15:25	87-86-5	
Phenanthrene	**<0.17**	mg/kg	0.42	0.17	1	10/31/21 15:40	11/01/21 15:25	85-01-8	
Phenol	**<0.16**	mg/kg	0.42	0.16	1	10/31/21 15:40	11/01/21 15:25	108-95-2	
Pyrene	**<0.13**	mg/kg	0.42	0.13	1	10/31/21 15:40	11/01/21 15:25	129-00-0	
1,2,4,5-Tetrachlorobenzene	**<0.10**	mg/kg	0.42	0.10	1	10/31/21 15:40	11/01/21 15:25	95-94-3	
2,3,4,6-Tetrachlorophenol	**<0.15**	mg/kg	0.42	0.15	1	10/31/21 15:40	11/01/21 15:25	58-90-2	
2,4,5-Trichlorophenol	**<0.15**	mg/kg	0.42	0.15	1	10/31/21 15:40	11/01/21 15:25	95-95-4	
2,4,6-Trichlorophenol	**<0.13**	mg/kg	0.42	0.13	1	10/31/21 15:40	11/01/21 15:25	88-06-2	
Surrogates									
Nitrobenzene-d5 (S)	67	%.	32-105		1	10/31/21 15:40	11/01/21 15:25	4165-60-0	
Phenol-d5 (S)	70	%.	35-114		1	10/31/21 15:40	11/01/21 15:25	4165-62-2	
2-Fluorophenol (S)	65	%.	33-111		1	10/31/21 15:40	11/01/21 15:25	367-12-4	
2,4,6-Tribromophenol (S)	40	%.	20-121		1	10/31/21 15:40	11/01/21 15:25	118-79-6	
2-Fluorobiphenyl (S)	66	%.	35-96		1	10/31/21 15:40	11/01/21 15:25	321-60-8	
p-Terphenyl-d14 (S)	67	%.	31-145		1	10/31/21 15:40	11/01/21 15:25	1718-51-0	
8270 MSSV TCLP Sep Funnel	Analytical Method: EPA 8270 Preparation Method: EPA 3510 Leachate Method/Date: EPA 1311; 11/01/21 20:50 Initial pH: 8.87; Final pH: 6.4 Pace Analytical Services - Indianapolis								
1,4-Dichlorobenzene	**<0.050**	mg/L	0.10	0.050	1	11/02/21 19:55	11/04/21 00:24	106-46-7	
2,4-Dinitrotoluene	**<0.050**	mg/L	0.10	0.050	1	11/02/21 19:55	11/04/21 00:24	121-14-2	
Hexachloro-1,3-butadiene	**<0.050**	mg/L	0.10	0.050	1	11/02/21 19:55	11/04/21 00:24	87-68-3	
Hexachlorobenzene	**<0.050**	mg/L	0.10	0.050	1	11/02/21 19:55	11/04/21 00:24	118-74-1	
Hexachloroethane	**<0.050**	mg/L	0.10	0.050	1	11/02/21 19:55	11/04/21 00:24	67-72-1	
2-Methylphenol(o-Cresol)	**<0.050**	mg/L	0.10	0.050	1	11/02/21 19:55	11/04/21 00:24	95-48-7	
3&4-Methylphenol(m&p Cresol)	**<0.10**	mg/L	0.20	0.10	1	11/02/21 19:55	11/04/21 00:24		
Nitrobenzene	**<0.050**	mg/L	0.10	0.050	1	11/02/21 19:55	11/04/21 00:24	98-95-3	
Pentachlorophenol	**<0.25**	mg/L	0.50	0.25	1	11/02/21 19:55	11/04/21 00:24	87-86-5	
Pyridine	**<0.10**	mg/L	0.10	0.10	1	11/02/21 19:55	11/04/21 00:24	110-86-1	
2,4,5-Trichlorophenol	**<0.050**	mg/L	0.50	0.050	1	11/02/21 19:55	11/04/21 00:24	95-95-4	
2,4,6-Trichlorophenol	**<0.050**	mg/L	0.10	0.050	1	11/02/21 19:55	11/04/21 00:24	88-06-2	
Surrogates									
Nitrobenzene-d5 (S)	65	%.	40-115		1	11/02/21 19:55	11/04/21 00:24	4165-60-0	
2-Fluorobiphenyl (S)	58	%.	35-102		1	11/02/21 19:55	11/04/21 00:24	321-60-8	
p-Terphenyl-d14 (S)	75	%.	42-156		1	11/02/21 19:55	11/04/21 00:24	1718-51-0	
Phenol-d5 (S)	29	%.	15-48		1	11/02/21 19:55	11/04/21 00:24	4165-62-2	
2-Fluorophenol (S)	40	%.	21-74		1	11/02/21 19:55	11/04/21 00:24	367-12-4	
2,4,6-Tribromophenol (S)	82	%.	47-127		1	11/02/21 19:55	11/04/21 00:24	118-79-6	
8260 MSV TCLP	Analytical Method: EPA 5030/8260 Leachate Method/Date: EPA 1311; 11/01/21 20:50 Pace Analytical Services - Indianapolis								
Benzene	**<0.010**	mg/L	0.050	0.010	1		11/04/21 05:43	71-43-2	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
4171 40th St. SE
Grand Rapids, MI 49512
(616)975-4500

ANALYTICAL RESULTS

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

Sample: Soil-1021 **Lab ID: 50300888002** Collected: 10/22/21 08:50 Received: 10/22/21 11:40 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV TCLP	Analytical Method: EPA 5030/8260 Leachate Method/Date: EPA 1311; 11/01/21 20:50 Pace Analytical Services - Indianapolis								
2-Butanone (MEK)	**<0.50**	mg/L	1.0	0.50	1		11/04/21 05:43	78-93-3	
Carbon tetrachloride	**<0.025**	mg/L	0.050	0.025	1		11/04/21 05:43	56-23-5	
Chlorobenzene	**<0.025**	mg/L	0.050	0.025	1		11/04/21 05:43	108-90-7	
Chloroform	**<0.025**	mg/L	0.050	0.025	1		11/04/21 05:43	67-66-3	
1,2-Dichloroethane	**<0.025**	mg/L	0.050	0.025	1		11/04/21 05:43	107-06-2	
1,1-Dichloroethene	**<0.025**	mg/L	0.050	0.025	1		11/04/21 05:43	75-35-4	
Tetrachloroethene	**<0.025**	mg/L	0.050	0.025	1		11/04/21 05:43	127-18-4	
Trichloroethene	**<0.025**	mg/L	0.050	0.025	1		11/04/21 05:43	79-01-6	
Vinyl chloride	**<0.010**	mg/L	0.020	0.010	1		11/04/21 05:43	75-01-4	
Surrogates									
4-Bromofluorobenzene (S)	94	%.	78-117		1		11/04/21 05:43	460-00-4	
Dibromofluoromethane (S)	106	%.	78-120		1		11/04/21 05:43	1868-53-7	
Toluene-d8 (S)	100	%.	77-118		1		11/04/21 05:43	2037-26-5	
8260 MSV 5035A VOA	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
Acetone	**0.010J**	mg/kg	0.096	0.0020	1		11/04/21 21:48	67-64-1	
Benzene	**<0.00039**	mg/kg	0.0048	0.00039	1		11/04/21 21:48	71-43-2	
Bromochloromethane	**<0.00054**	mg/kg	0.0048	0.00054	1		11/04/21 21:48	74-97-5	
Bromodichloromethane	**<0.00036**	mg/kg	0.0048	0.00036	1		11/04/21 21:48	75-27-4	
Bromoform	**<0.00036**	mg/kg	0.0048	0.00036	1		11/04/21 21:48	75-25-2	
Bromomethane	**<0.00029**	mg/kg	0.0048	0.00029	1		11/04/21 21:48	74-83-9	
2-Butanone (MEK)	**<0.0066**	mg/kg	0.024	0.0066	1		11/04/21 21:48	78-93-3	
Carbon disulfide	**<0.00057**	mg/kg	0.0096	0.00057	1		11/04/21 21:48	75-15-0	
Carbon tetrachloride	**<0.00034**	mg/kg	0.0048	0.00034	1		11/04/21 21:48	56-23-5	
Chlorobenzene	**<0.00035**	mg/kg	0.0048	0.00035	1		11/04/21 21:48	108-90-7	
Chloroethane	**<0.00021**	mg/kg	0.0048	0.00021	1		11/04/21 21:48	75-00-3	
Chloroform	**0.00096J**	mg/kg	0.0048	0.00045	1		11/04/21 21:48	67-66-3	B
Chloromethane	**<0.00017**	mg/kg	0.0048	0.00017	1		11/04/21 21:48	74-87-3	
Cyclohexane	**<0.00042**	mg/kg	0.096	0.00042	1		11/04/21 21:48	110-82-7	N2
1,2-Dibromo-3-chloropropane	**<0.00065**	mg/kg	0.0096	0.00065	1		11/04/21 21:48	96-12-8	
Dibromochloromethane	**<0.00035**	mg/kg	0.0048	0.00035	1		11/04/21 21:48	124-48-1	
1,2-Dibromoethane (EDB)	**<0.00047**	mg/kg	0.0048	0.00047	1		11/04/21 21:48	106-93-4	
1,2-Dichlorobenzene	**<0.00037**	mg/kg	0.0048	0.00037	1		11/04/21 21:48	95-50-1	
1,3-Dichlorobenzene	**<0.00028**	mg/kg	0.0048	0.00028	1		11/04/21 21:48	541-73-1	
1,4-Dichlorobenzene	**<0.00035**	mg/kg	0.0048	0.00035	1		11/04/21 21:48	106-46-7	
Dichlorodifluoromethane	**<0.00015**	mg/kg	0.0048	0.00015	1		11/04/21 21:48	75-71-8	
1,1-Dichloroethane	**<0.00045**	mg/kg	0.0048	0.00045	1		11/04/21 21:48	75-34-3	
1,2-Dichloroethane	**<0.00049**	mg/kg	0.0048	0.00049	1		11/04/21 21:48	107-06-2	
1,1-Dichloroethene	**<0.00054**	mg/kg	0.0048	0.00054	1		11/04/21 21:48	75-35-4	
cis-1,2-Dichloroethene	**0.0037J**	mg/kg	0.0048	0.00046	1		11/04/21 21:48	156-59-2	
trans-1,2-Dichloroethene	**<0.00045**	mg/kg	0.0048	0.00045	1		11/04/21 21:48	156-60-5	
1,2-Dichloropropane	**<0.00041**	mg/kg	0.0048	0.00041	1		11/04/21 21:48	78-87-5	
cis-1,3-Dichloropropene	**<0.00037**	mg/kg	0.0048	0.00037	1		11/04/21 21:48	10061-01-5	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
4171 40th St. SE
Grand Rapids, MI 49512
(616)975-4500

ANALYTICAL RESULTS

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

Sample: Soil-1021 **Lab ID: 50300888002** Collected: 10/22/21 08:50 Received: 10/22/21 11:40 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV 5035A VOA	Analytical Method: EPA 8260 Pace Analytical Services - Indianapolis								
trans-1,3-Dichloropropene	**<0.00032**	mg/kg	0.0048	0.00032	1		11/04/21 21:48	10061-02-6	
1,4-Dioxane (p-Dioxane)	**<0.051**	mg/kg	0.48	0.051	1		11/04/21 21:48	123-91-1	
Ethylbenzene	**<0.00027**	mg/kg	0.0048	0.00027	1		11/04/21 21:48	100-41-4	
2-Hexanone	**<0.0011**	mg/kg	0.096	0.0011	1		11/04/21 21:48	591-78-6	
Isopropylbenzene (Cumene)	**<0.00036**	mg/kg	0.0048	0.00036	1		11/04/21 21:48	98-82-8	
Methyl acetate	**<0.00080**	mg/kg	0.0048	0.00080	1		11/04/21 21:48	79-20-9	N2
Methylcyclohexane	**<0.00034**	mg/kg	0.0048	0.00034	1		11/04/21 21:48	108-87-2	N2
Methylene Chloride	**<0.0047**	mg/kg	0.019	0.0047	1		11/04/21 21:48	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.0016**	mg/kg	0.024	0.0016	1		11/04/21 21:48	108-10-1	
Methyl-tert-butyl ether	**<0.00027**	mg/kg	0.0048	0.00027	1		11/04/21 21:48	1634-04-4	
Styrene	**<0.00034**	mg/kg	0.0048	0.00034	1		11/04/21 21:48	100-42-5	
1,1,2,2-Tetrachloroethane	**<0.00040**	mg/kg	0.0048	0.00040	1		11/04/21 21:48	79-34-5	
Tetrachloroethene	**<0.00036**	mg/kg	0.0048	0.00036	1		11/04/21 21:48	127-18-4	
Toluene	**<0.00051**	mg/kg	0.0048	0.00051	1		11/04/21 21:48	108-88-3	
1,2,3-Trichlorobenzene	**<0.00040**	mg/kg	0.0048	0.00040	1		11/04/21 21:48	87-61-6	
1,2,4-Trichlorobenzene	**<0.00039**	mg/kg	0.0048	0.00039	1		11/04/21 21:48	120-82-1	
1,1,1-Trichloroethane	**<0.00040**	mg/kg	0.0048	0.00040	1		11/04/21 21:48	71-55-6	
1,1,2-Trichloroethane	**<0.00041**	mg/kg	0.0048	0.00041	1		11/04/21 21:48	79-00-5	
Trichloroethene	**0.00092J**	mg/kg	0.0048	0.00043	1		11/04/21 21:48	79-01-6	
Trichlorofluoromethane	**<0.00014**	mg/kg	0.0048	0.00014	1		11/04/21 21:48	75-69-4	
1,1,2-Trichlorotrifluoroethane	**<0.00053**	mg/kg	0.0048	0.00053	1		11/04/21 21:48	76-13-1	
Vinyl chloride	**0.00064J**	mg/kg	0.0048	0.000095	1		11/04/21 21:48	75-01-4	
Xylene (Total)	**<0.00078**	mg/kg	0.0096	0.00078	1		11/04/21 21:48	1330-20-7	
Surrogates									
Dibromofluoromethane (S)	99	%.	73-132		1		11/04/21 21:48	1868-53-7	
Toluene-d8 (S)	98	%.	66-148		1		11/04/21 21:48	2037-26-5	
4-Bromofluorobenzene (S)	94	%.	40-149		1		11/04/21 21:48	460-00-4	
Percent Moisture	Analytical Method: SM 2540G Pace Analytical Services - Indianapolis								
Percent Moisture	**22.2**	%	0.10	0.10	1		10/25/21 11:52		N2
1030 Ignitability of Solids	Analytical Method: 1030 Pace Analytical Services - Indianapolis								
Ignitability, non-metallic	**<2.2 mm/sec**	mm/sec	2.2	2.2	1		10/27/21 10:05		N2
9045 pH Soil	Analytical Method: EPA 9045 Pace Analytical Services - Indianapolis								
pH at 25 Degrees C	**6.8**	Std. Units	0.10	0.10	1		10/29/21 13:07		H3
733C S Reactive Cyanide	Analytical Method: EPA 9014 Preparation Method: SW-846 7.3.3.2 Pace Analytical Services - Greensburg								
Cyanide, Reactive	**<0.51**	mg/kg	1.3	0.51	1	10/27/21 13:27	11/02/21 12:21		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
4171 40th St. SE
Grand Rapids, MI 49512
(616)975-4500

ANALYTICAL RESULTS

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

Sample: Soil-1021 **Lab ID: 50300888002** Collected: 10/22/21 08:50 Received: 10/22/21 11:40 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
734S Reactive Sulfide	Analytical Method: SM 4500-S2-F-2011 Preparation Method: SW-846 7.3.4.2 Pace Analytical Services - Greensburg								
Sulfide, Reactive	**<12.9**	mg/kg	12.9	12.9	1	10/29/21 14:32	10/29/21 15:02		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
4171 40th St. SE
Grand Rapids, MI 49512
(616)975-4500

QUALITY CONTROL DATA

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

QC Batch: 648297
QC Batch Method: EPA 7470
Analysis Method: EPA 7470
Analysis Description: 7470 Mercury TCLP
Laboratory: Pace Analytical Services - Indianapolis
Associated Lab Samples: 50300888001, 50300888002

METHOD BLANK: 2986870 Matrix: Water
Associated Lab Samples: 50300888001, 50300888002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	mg/L	<0.00033	0.00067	0.00033	11/04/21 11:15	

LABORATORY CONTROL SAMPLE: 2986871

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	0.005	0.0050	101	80-120	

MATRIX SPIKE SAMPLE: 2986872

Parameter	Units	50298356057 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	<0.0010	0.015	0.016	108	75-125	

MATRIX SPIKE SAMPLE: 2986873

Parameter	Units	50300491001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	ND	0.015	0.016	107	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2986874 2986875

Parameter	Units	50300888002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	<0.0010	0.015	0.015	0.016	0.016	105	106	75-125	0	20	

MATRIX SPIKE SAMPLE: 2986876

Parameter	Units	50300927001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	<0.040	0.3	0.32	105	75-125	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
4171 40th St. SE
Grand Rapids, MI 49512
(616)975-4500

QUALITY CONTROL DATA

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

MATRIX SPIKE SAMPLE: 2986877

Parameter	Units	50301317001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	<0.0020	0.015	0.013	87	75-125	

MATRIX SPIKE SAMPLE: 2986879

Parameter	Units	50301380001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	ND	0.015	0.016	103	75-125	

MATRIX SPIKE SAMPLE: 2986880

Parameter	Units	50301209001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	ND	0.015	0.016	105	75-125	

MATRIX SPIKE SAMPLE: 2986881

Parameter	Units	50301220001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	ND	0.015	0.013	89	75-125	

MATRIX SPIKE SAMPLE: 2986882

Parameter	Units	50301536002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	0.011	0.015	0.027	105	75-125	

MATRIX SPIKE SAMPLE: 2986883

Parameter	Units	50301362001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	ND	0.015	0.0079	52	75-125	M0

MATRIX SPIKE SAMPLE: 2986884

Parameter	Units	50300517005 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	ND	0.015	0.016	107	75-125	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
4171 40th St. SE
Grand Rapids, MI 49512
(616)975-4500

QUALITY CONTROL DATA

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

QC Batch: 648095
QC Batch Method: EPA 7470
Analysis Method: EPA 7470
Analysis Description: 7470 Mercury
Laboratory: Pace Analytical Services - Indianapolis
Associated Lab Samples: 50300888001

METHOD BLANK: 2985983 Matrix: Water
Associated Lab Samples: 50300888001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	<0.085	2.0	0.085	11/04/21 15:51	

LABORATORY CONTROL SAMPLE: 2985984

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	5.2	103	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2985985 2985986

Parameter	Units	50300876002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	ND	5	5	5.0	4.9	100	99	75-125	1	20	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
4171 40th St. SE
Grand Rapids, MI 49512
(616)975-4500

QUALITY CONTROL DATA

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

QC Batch: 647537
QC Batch Method: EPA 7471
Analysis Method: EPA 7471
Analysis Description: 7471 Mercury
Laboratory: Pace Analytical Services - Indianapolis
Associated Lab Samples: 50300888002

METHOD BLANK: 2983633 Matrix: Solid
Associated Lab Samples: 50300888002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	mg/kg	<0.025	0.20	0.025	11/01/21 09:38	

LABORATORY CONTROL SAMPLE: 2983634

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/kg	0.49	0.52	107	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2983635 2983636

Parameter	Units	50300743001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/kg	ND	0.54	0.59	0.61	0.66	106	105	75-125	7	20	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
4171 40th St. SE
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QUALITY CONTROL DATA

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

QC Batch: 646594
QC Batch Method: EPA 3050
Analysis Method: EPA 6010
Analysis Description: 6010 MET
Laboratory: Pace Analytical Services - Indianapolis
Associated Lab Samples: 50300888002

METHOD BLANK: 2979584 Matrix: Solid
Associated Lab Samples: 50300888002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	mg/kg	<0.19	0.91	0.19	10/27/21 11:44	
Barium	mg/kg	0.041J	0.91	0.032	10/27/21 11:44	
Cadmium	mg/kg	<0.013	0.45	0.013	10/27/21 11:44	
Chromium	mg/kg	<0.067	0.91	0.067	10/27/21 11:44	
Lead	mg/kg	<0.094	0.91	0.094	10/27/21 11:44	
Selenium	mg/kg	<0.24	0.91	0.24	10/27/21 11:44	
Silver	mg/kg	<0.16	0.45	0.16	10/27/21 11:44	

LABORATORY CONTROL SAMPLE: 2979585

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/kg	47.8	44.4	93	80-120	
Barium	mg/kg	47.8	46.2	97	80-120	
Cadmium	mg/kg	47.8	43.2	90	80-120	
Chromium	mg/kg	47.8	44.3	93	80-120	
Lead	mg/kg	47.8	42.6	89	80-120	
Selenium	mg/kg	47.8	43.6	91	80-120	
Silver	mg/kg	23.9	21.1	88	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2979586 2979587

Parameter	Units	50300963003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/kg	5.3	48.7	46.3	53.6	53.8	99	105	75-125	0	20	
Barium	mg/kg	35.0	48.7	46.3	83.2	87.8	99	114	75-125	5	20	
Cadmium	mg/kg	ND	48.7	46.3	46.2	46.6	95	100	75-125	1	20	
Chromium	mg/kg	7.3	48.7	46.3	49.6	52.3	87	97	75-125	5	20	
Lead	mg/kg	17.9	48.7	46.3	58.6	61.7	84	95	75-125	5	20	
Selenium	mg/kg	ND	48.7	46.3	45.0	46.0	92	99	75-125	2	20	
Silver	mg/kg	ND	24.3	23.2	22.8	23.0	94	99	75-125	1	20	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
4171 40th St. SE
Grand Rapids, MI 49512
(616)975-4500

QUALITY CONTROL DATA

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

QC Batch: 648249
QC Batch Method: EPA 3010
Analysis Method: EPA 6010
Analysis Description: 6010 MET TCLP
Laboratory: Pace Analytical Services - Indianapolis
Associated Lab Samples: 50300888001, 50300888002

METHOD BLANK: 2986644 Matrix: Water
Associated Lab Samples: 50300888001, 50300888002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	mg/L	<0.0050	0.010	0.0050	11/03/21 23:47	
Barium	mg/L	<0.025	0.50	0.025	11/03/21 23:47	
Cadmium	mg/L	<0.0025	0.0050	0.0025	11/03/21 23:47	
Chromium	mg/L	<0.0052	0.010	0.0052	11/03/21 23:47	
Lead	mg/L	<0.0050	0.010	0.0050	11/03/21 23:47	
Selenium	mg/L	<0.0050	0.010	0.0050	11/03/21 23:47	
Silver	mg/L	<0.0050	0.010	0.0050	11/03/21 23:47	

LABORATORY CONTROL SAMPLE: 2986645

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	1	1.0	100	80-120	
Barium	mg/L	1	0.99	99	80-120	
Cadmium	mg/L	1	0.99	99	80-120	
Chromium	mg/L	1	1.0	100	80-120	
Lead	mg/L	1	0.98	98	80-120	
Selenium	mg/L	1	0.99	99	80-120	
Silver	mg/L	0.5	0.47	94	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2986646 2986647

Parameter	Units	50300491001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	ND	10	10	10.2	10.0	102	100	50-150	2	20	
Barium	mg/L	ND	10	10	11.5	11.2	98	95	50-150	2	20	
Cadmium	mg/L	0.10	10	10	10	9.8	99	97	50-150	2	20	
Chromium	mg/L	ND	10	10	10	9.7	99	97	50-150	2	20	
Lead	mg/L	5.1	10	10	14.5	14.2	94	91	50-150	2	20	
Selenium	mg/L	ND	10	10	10.1	9.9	101	99	50-150	2	20	
Silver	mg/L	ND	5	5	4.6	4.5	91	90	50-150	2	20	

MATRIX SPIKE SAMPLE: 2986648

Parameter	Units	50300844003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	ND	10	10.2	102	50-150	
Barium	mg/L	ND	10	9.9	98	50-150	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
4171 40th St. SE
Grand Rapids, MI 49512
(616)975-4500

QUALITY CONTROL DATA

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

MATRIX SPIKE SAMPLE: 2986648

Parameter	Units	50300844003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Cadmium	mg/L	ND	10	10	100	50-150	
Chromium	mg/L	0.97	10	10.8	99	50-150	
Lead	mg/L	ND	10	9.4	94	50-150	
Selenium	mg/L	ND	10	10.0	100	50-150	
Silver	mg/L	ND	5	4.7	94	50-150	

MATRIX SPIKE SAMPLE: 2986649

Parameter	Units	50300888001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	<0.050	10	9.5	95	50-150	
Barium	mg/L	<0.25	10	9.6	96	50-150	
Cadmium	mg/L	<0.025	10	9.4	94	50-150	
Chromium	mg/L	<0.052	10	9.6	95	50-150	
Lead	mg/L	<0.050	10	9.2	92	50-150	
Selenium	mg/L	<0.050	10	9.5	95	50-150	
Silver	mg/L	<0.050	5	4.5	89	50-150	

MATRIX SPIKE SAMPLE: 2986650

Parameter	Units	50300836001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	ND	10	10.1	101	50-150	
Barium	mg/L	ND	10	10.9	96	50-150	
Cadmium	mg/L	ND	10	9.7	97	50-150	
Chromium	mg/L	ND	10	9.6	95	50-150	
Lead	mg/L	ND	10	9.0	90	50-150	
Selenium	mg/L	ND	10	10	99	50-150	
Silver	mg/L	ND	5	4.5	90	50-150	

MATRIX SPIKE SAMPLE: 2986651

Parameter	Units	50300963001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	ND	10	10.1	101	50-150	
Barium	mg/L	ND	10	10.9	96	50-150	
Cadmium	mg/L	ND	10	9.7	97	50-150	
Chromium	mg/L	ND	10	9.8	98	50-150	
Lead	mg/L	ND	10	9.2	91	50-150	
Selenium	mg/L	ND	10	10	100	50-150	
Silver	mg/L	ND	5	4.6	91	50-150	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

MATRIX SPIKE SAMPLE: 2986652

Parameter	Units	50301055002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	ND	10	9.9	98	50-150	
Barium	mg/L	ND	10	9.5	95	50-150	
Cadmium	mg/L	ND	10	9.5	95	50-150	
Chromium	mg/L	ND	10	9.6	96	50-150	
Lead	mg/L	ND	10	9.0	90	50-150	
Selenium	mg/L	ND	10	9.8	98	50-150	
Silver	mg/L	ND	5	4.5	90	50-150	

MATRIX SPIKE SAMPLE: 2986653

Parameter	Units	50301209001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	ND	10	9.7	97	50-150	
Barium	mg/L	ND	10	10.1	95	50-150	
Cadmium	mg/L	ND	10	9.4	94	50-150	
Chromium	mg/L	ND	10	9.4	94	50-150	
Lead	mg/L	ND	10	8.9	89	50-150	
Selenium	mg/L	ND	10	9.6	96	50-150	
Silver	mg/L	ND	5	4.5	89	50-150	

MATRIX SPIKE SAMPLE: 2986654

Parameter	Units	50301220001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	ND	10	10.0	100	50-150	
Barium	mg/L	ND	10	9.6	95	50-150	
Cadmium	mg/L	ND	10	9.6	96	50-150	
Chromium	mg/L	ND	10	9.7	97	50-150	
Lead	mg/L	ND	10	9.1	91	50-150	
Selenium	mg/L	ND	10	10.1	101	50-150	
Silver	mg/L	ND	5	4.5	90	50-150	

MATRIX SPIKE SAMPLE: 2986655

Parameter	Units	50301536001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	ND	10	9.9	98	50-150	
Barium	mg/L	ND	10	9.6	96	50-150	
Cadmium	mg/L	ND	10	9.5	95	50-150	
Chromium	mg/L	ND	10	9.6	96	50-150	
Lead	mg/L	ND	10	9.1	91	50-150	
Selenium	mg/L	ND	10	9.8	98	50-150	
Silver	mg/L	ND	5	4.5	91	50-150	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
4171 40th St. SE
Grand Rapids, MI 49512
(616)975-4500

QUALITY CONTROL DATA

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

MATRIX SPIKE SAMPLE: 2986656

Parameter	Units	50301362001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	ND	10	10.0	100	50-150	
Barium	mg/L	ND	10	11.0	94	50-150	
Cadmium	mg/L	ND	10	9.5	95	50-150	
Chromium	mg/L	ND	10	9.6	95	50-150	
Lead	mg/L	47.0	10	54.8	78	50-150	
Selenium	mg/L	ND	10	9.8	98	50-150	
Silver	mg/L	ND	5	4.4	88	50-150	

MATRIX SPIKE SAMPLE: 2986657

Parameter	Units	50300517005 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	ND	10	9.9	99	50-150	
Barium	mg/L	ND	10	10.4	95	50-150	
Cadmium	mg/L	ND	10	9.5	95	50-150	
Chromium	mg/L	ND	10	9.5	95	50-150	
Lead	mg/L	ND	10	8.9	89	50-150	
Selenium	mg/L	ND	10	9.8	98	50-150	
Silver	mg/L	ND	5	4.5	89	50-150	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
4171 40th St. SE
Grand Rapids, MI 49512
(616)975-4500

QUALITY CONTROL DATA

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

QC Batch: 646674
QC Batch Method: EPA 3010
Analysis Method: EPA 6010
Analysis Description: 6010 MET
Laboratory: Pace Analytical Services - Indianapolis
Associated Lab Samples: 50300888001

METHOD BLANK: 2979830 Matrix: Water
Associated Lab Samples: 50300888001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	ug/L	<2.6	10.0	2.6	10/27/21 16:28	
Barium	ug/L	<0.79	10.0	0.79	10/27/21 16:28	
Cadmium	ug/L	<0.41	2.0	0.41	10/27/21 16:28	
Chromium	ug/L	<1.9	10.0	1.9	10/27/21 16:28	
Lead	ug/L	<3.5	10.0	3.5	10/27/21 16:28	
Selenium	ug/L	<4.5	10.0	4.5	10/27/21 16:28	
Silver	ug/L	<1.4	10.0	1.4	10/27/21 16:28	

LABORATORY CONTROL SAMPLE: 2979831

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	ug/L	1000	936	94	80-120	
Barium	ug/L	1000	953	95	80-120	
Cadmium	ug/L	1000	906	91	80-120	
Chromium	ug/L	1000	940	94	80-120	
Lead	ug/L	1000	891	89	80-120	
Selenium	ug/L	1000	912	91	80-120	
Silver	ug/L	500	464	93	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2979832 2979833

Parameter	Units	50300796003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	ND	1000	1000	1000	984	100	98	75-125	2	20	
Barium	ug/L	12.0	1000	1000	1010	988	99	98	75-125	2	20	
Cadmium	ug/L	0.54J	1000	1000	944	932	94	93	75-125	1	20	
Chromium	ug/L	ND	1000	1000	948	936	95	94	75-125	1	20	
Lead	ug/L	ND	1000	1000	874	862	87	86	75-125	1	20	
Selenium	ug/L	ND	1000	1000	958	943	96	94	75-125	2	20	
Silver	ug/L	ND	500	500	485	473	97	95	75-125	3	20	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
4171 40th St. SE
Grand Rapids, MI 49512
(616)975-4500

QUALITY CONTROL DATA

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

QC Batch: 648494
QC Batch Method: EPA 5030/8260
Analysis Method: EPA 5030/8260
Analysis Description: 8260 MSV TCLP
Laboratory: Pace Analytical Services - Indianapolis
Associated Lab Samples: 50300888001, 50300888002

METHOD BLANK: 2987966 Matrix: Water
Associated Lab Samples: 50300888001, 50300888002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,1-Dichloroethene	mg/L	<0.025	0.050	0.025	11/04/21 03:03	
1,2-Dichloroethane	mg/L	<0.025	0.050	0.025	11/04/21 03:03	
2-Butanone (MEK)	mg/L	<0.50	1.0	0.50	11/04/21 03:03	
Benzene	mg/L	<0.010	0.050	0.010	11/04/21 03:03	
Carbon tetrachloride	mg/L	<0.025	0.050	0.025	11/04/21 03:03	
Chlorobenzene	mg/L	<0.025	0.050	0.025	11/04/21 03:03	
Chloroform	mg/L	<0.025	0.050	0.025	11/04/21 03:03	
Tetrachloroethene	mg/L	<0.025	0.050	0.025	11/04/21 03:03	
Trichloroethene	mg/L	<0.025	0.050	0.025	11/04/21 03:03	
Vinyl chloride	mg/L	<0.010	0.020	0.010	11/04/21 03:03	
4-Bromofluorobenzene (S)	%.	91	78-117		11/04/21 03:03	
Dibromofluoromethane (S)	%.	106	78-120		11/04/21 03:03	
Toluene-d8 (S)	%.	100	77-118		11/04/21 03:03	

LABORATORY CONTROL SAMPLE: 2987967

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1-Dichloroethene	mg/L	0.5	0.48	97	67-136	
1,2-Dichloroethane	mg/L	0.5	0.49	97	69-135	
2-Butanone (MEK)	mg/L	2.5	2.1	85	56-164	
Benzene	mg/L	0.5	0.43	85	77-128	
Carbon tetrachloride	mg/L	0.5	0.51	102	61-139	
Chlorobenzene	mg/L	0.5	0.44	89	76-124	
Chloroform	mg/L	0.5	0.47	94	77-120	
Tetrachloroethene	mg/L	0.5	0.47	94	70-124	
Trichloroethene	mg/L	0.5	0.44	89	75-130	
Vinyl chloride	mg/L	0.5	0.51	103	51-140	
4-Bromofluorobenzene (S)	%.			93	78-117	
Dibromofluoromethane (S)	%.			108	78-120	
Toluene-d8 (S)	%.			98	77-118	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
4171 40th St. SE
Grand Rapids, MI 49512
(616)975-4500

QUALITY CONTROL DATA

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

QC Batch: 647925
QC Batch Method: EPA 8260
Analysis Method: EPA 8260
Analysis Description: 8260 MSV
Laboratory: Pace Analytical Services - Indianapolis

Associated Lab Samples: 50300888001

METHOD BLANK: 2985354 Matrix: Water
Associated Lab Samples: 50300888001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	<0.40	5.0	0.40	11/01/21 11:41	
1,1,2,2-Tetrachloroethane	ug/L	<0.26	5.0	0.26	11/01/21 11:41	
1,1,2-Trichloroethane	ug/L	<0.30	5.0	0.30	11/01/21 11:41	
1,1,2-Trichlorotrifluoroethane	ug/L	<0.49	5.0	0.49	11/01/21 11:41	
1,1-Dichloroethane	ug/L	<0.41	5.0	0.41	11/01/21 11:41	
1,1-Dichloroethene	ug/L	<0.37	5.0	0.37	11/01/21 11:41	
1,2,3-Trichlorobenzene	ug/L	<0.50	5.0	0.50	11/01/21 11:41	
1,2,4-Trichlorobenzene	ug/L	<0.44	5.0	0.44	11/01/21 11:41	
1,2-Dibromo-3-chloropropane	ug/L	<1.6	10.0	1.6	11/01/21 11:41	
1,2-Dibromoethane (EDB)	ug/L	<0.42	5.0	0.42	11/01/21 11:41	
1,2-Dichlorobenzene	ug/L	<0.30	5.0	0.30	11/01/21 11:41	
1,2-Dichloroethane	ug/L	<0.41	5.0	0.41	11/01/21 11:41	
1,2-Dichloropropane	ug/L	<0.35	5.0	0.35	11/01/21 11:41	
1,3-Dichlorobenzene	ug/L	<0.30	5.0	0.30	11/01/21 11:41	
1,4-Dichlorobenzene	ug/L	<0.36	5.0	0.36	11/01/21 11:41	
2-Butanone (MEK)	ug/L	<2.1	25.0	2.1	11/01/21 11:41	
2-Hexanone	ug/L	<1.4	25.0	1.4	11/01/21 11:41	
4-Methyl-2-pentanone (MIBK)	ug/L	<1.4	25.0	1.4	11/01/21 11:41	
Acetone	ug/L	<5.5	100	5.5	11/01/21 11:41	
Benzene	ug/L	<0.31	5.0	0.31	11/01/21 11:41	
Bromochloromethane	ug/L	<0.42	5.0	0.42	11/01/21 11:41	
Bromodichloromethane	ug/L	<0.29	5.0	0.29	11/01/21 11:41	
Bromoform	ug/L	<0.42	5.0	0.42	11/01/21 11:41	
Bromomethane	ug/L	<1.6	5.0	1.6	11/01/21 11:41	
Carbon disulfide	ug/L	<0.32	10.0	0.32	11/01/21 11:41	
Carbon tetrachloride	ug/L	<0.48	5.0	0.48	11/01/21 11:41	
Chlorobenzene	ug/L	<0.33	5.0	0.33	11/01/21 11:41	
Chloroethane	ug/L	<1.7	5.0	1.7	11/01/21 11:41	
Chloroform	ug/L	<0.34	5.0	0.34	11/01/21 11:41	
Chloromethane	ug/L	<0.48	5.0	0.48	11/01/21 11:41	
cis-1,2-Dichloroethene	ug/L	<0.46	5.0	0.46	11/01/21 11:41	
cis-1,3-Dichloropropene	ug/L	<0.34	5.0	0.34	11/01/21 11:41	
Cyclohexane	ug/L	<0.36	100	0.36	11/01/21 11:41	
Dibromochloromethane	ug/L	<0.34	5.0	0.34	11/01/21 11:41	
Dichlorodifluoromethane	ug/L	<1.7	5.0	1.7	11/01/21 11:41	
Ethylbenzene	ug/L	<0.26	5.0	0.26	11/01/21 11:41	
Isopropylbenzene (Cumene)	ug/L	<0.34	5.0	0.34	11/01/21 11:41	
Methyl acetate	ug/L	<0.76	50.0	0.76	11/01/21 11:41	
Methyl-tert-butyl ether	ug/L	<0.31	4.0	0.31	11/01/21 11:41	
Methylcyclohexane	ug/L	<0.36	50.0	0.36	11/01/21 11:41	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
4171 40th St. SE
Grand Rapids, MI 49512
(616)975-4500

QUALITY CONTROL DATA

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

METHOD BLANK: 2985354 Matrix: Water
Associated Lab Samples: 50300888001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Methylene Chloride	ug/L	<0.081	5.0	0.081	11/01/21 11:41	
Styrene	ug/L	<0.26	5.0	0.26	11/01/21 11:41	
Tetrachloroethene	ug/L	<0.44	5.0	0.44	11/01/21 11:41	
Toluene	ug/L	<0.27	5.0	0.27	11/01/21 11:41	
trans-1,2-Dichloroethene	ug/L	<0.32	5.0	0.32	11/01/21 11:41	
trans-1,3-Dichloropropene	ug/L	<0.27	5.0	0.27	11/01/21 11:41	
Trichloroethene	ug/L	<0.46	5.0	0.46	11/01/21 11:41	
Trichlorofluoromethane	ug/L	<0.24	5.0	0.24	11/01/21 11:41	
Vinyl chloride	ug/L	<0.28	2.0	0.28	11/01/21 11:41	
Xylene (Total)	ug/L	<0.68	10.0	0.68	11/01/21 11:41	
4-Bromofluorobenzene (S)	%.	96	78-117		11/01/21 11:41	
Dibromofluoromethane (S)	%.	105	78-120		11/01/21 11:41	
Toluene-d8 (S)	%.	99	77-118		11/01/21 11:41	

LABORATORY CONTROL SAMPLE: 2985355

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	50	53.9	108	73-132	
1,1,2,2-Tetrachloroethane	ug/L	50	52.9	106	65-131	
1,1,2-Trichloroethane	ug/L	50	52.5	105	74-127	
1,1,2-Trichlorotrifluoroethane	ug/L	50	60.8	122	70-133	
1,1-Dichloroethane	ug/L	50	48.7	97	73-133	
1,1-Dichloroethene	ug/L	50	54.7	109	67-136	
1,2,3-Trichlorobenzene	ug/L	50	58.6	117	58-136	
1,2,4-Trichlorobenzene	ug/L	50	59.6	119	48-149	
1,2-Dibromo-3-chloropropane	ug/L	50	56.0	112	71-133	
1,2-Dibromoethane (EDB)	ug/L	50	57.0	114	76-126	
1,2-Dichlorobenzene	ug/L	50	53.7	107	75-114	
1,2-Dichloroethane	ug/L	50	57.9	116	69-135	
1,2-Dichloropropane	ug/L	50	49.8	100	78-134	
1,3-Dichlorobenzene	ug/L	50	53.9	108	70-119	
1,4-Dichlorobenzene	ug/L	50	53.0	106	69-117	
2-Butanone (MEK)	ug/L	250	278	111	56-164	
2-Hexanone	ug/L	250	270	108	63-137	
4-Methyl-2-pentanone (MIBK)	ug/L	250	280	112	64-134	
Acetone	ug/L	250	290	116	46-140	
Benzene	ug/L	50	47.3	95	77-128	
Bromochloromethane	ug/L	50	51.3	103	71-124	
Bromodichloromethane	ug/L	50	54.1	108	70-124	
Bromoform	ug/L	50	55.0	110	65-116	
Bromomethane	ug/L	50	60.1	120	10-200	
Carbon disulfide	ug/L	50	46.1	92	70-131	
Carbon tetrachloride	ug/L	50	58.3	117	61-139	
Chlorobenzene	ug/L	50	53.4	107	76-124	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
4171 40th St. SE
Grand Rapids, MI 49512
(616)975-4500

QUALITY CONTROL DATA

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

LABORATORY CONTROL SAMPLE: 2985355

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloroethane	ug/L	50	54.6	109	56-142	
Chloroform	ug/L	50	51.6	103	77-120	
Chloromethane	ug/L	50	43.2	86	29-141	
cis-1,2-Dichloroethene	ug/L	50	53.7	107	72-127	
cis-1,3-Dichloropropene	ug/L	50	54.8	110	71-131	
Cyclohexane	ug/L	50	49.6J	99	58-141	
Dibromochloromethane	ug/L	50	57.8	116	69-132	
Dichlorodifluoromethane	ug/L	50	43.3	87	23-139	
Ethylbenzene	ug/L	50	52.9	106	76-119	
Isopropylbenzene (Cumene)	ug/L	50	54.5	109	77-128	
Methyl acetate	ug/L	250	250	100	33-200	
Methyl-tert-butyl ether	ug/L	50	54.3	109	75-129	
Methylcyclohexane	ug/L	50	40.4J	81	71-136	
Methylene Chloride	ug/L	50	47.9	96	72-129	
Styrene	ug/L	50	54.0	108	66-123	
Tetrachloroethene	ug/L	50	56.9	114	70-124	
Toluene	ug/L	50	52.7	105	72-117	
trans-1,2-Dichloroethene	ug/L	50	53.0	106	75-133	
trans-1,3-Dichloropropene	ug/L	50	54.4	109	75-111	
Trichloroethene	ug/L	50	52.0	104	75-130	
Trichlorofluoromethane	ug/L	50	70.1	140	63-162	
Vinyl chloride	ug/L	50	56.8	114	51-140	
Xylene (Total)	ug/L	150	161	107	73-117	
4-Bromofluorobenzene (S)	%.			99	78-117	
Dibromofluoromethane (S)	%.			104	78-120	
Toluene-d8 (S)	%.			102	77-118	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
4171 40th St. SE
Grand Rapids, MI 49512
(616)975-4500

QUALITY CONTROL DATA

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

QC Batch: 648672
QC Batch Method: EPA 8260
Analysis Method: EPA 8260
Analysis Description: 8260 MSV 5035A Volatile Organics
Laboratory: Pace Analytical Services - Indianapolis

Associated Lab Samples: 50300888002

METHOD BLANK: 2988853 Matrix: Solid
Associated Lab Samples: 50300888002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,1,1-Trichloroethane	mg/kg	<0.00042	0.0050	0.00042	11/04/21 13:58	
1,1,2,2-Tetrachloroethane	mg/kg	<0.00042	0.0050	0.00042	11/04/21 13:58	
1,1,2-Trichloroethane	mg/kg	<0.00043	0.0050	0.00043	11/04/21 13:58	
1,1,2-Trichlorotrifluoroethane	mg/kg	<0.00055	0.0050	0.00055	11/04/21 13:58	
1,1-Dichloroethane	mg/kg	<0.00046	0.0050	0.00046	11/04/21 13:58	
1,1-Dichloroethene	mg/kg	<0.00056	0.0050	0.00056	11/04/21 13:58	
1,2,3-Trichlorobenzene	mg/kg	0.00097J	0.0050	0.00041	11/04/21 13:58	
1,2,4-Trichlorobenzene	mg/kg	0.00079J	0.0050	0.00041	11/04/21 13:58	
1,2-Dibromo-3-chloropropane	mg/kg	<0.00068	0.010	0.00068	11/04/21 13:58	
1,2-Dibromoethane (EDB)	mg/kg	<0.00049	0.0050	0.00049	11/04/21 13:58	
1,2-Dichlorobenzene	mg/kg	<0.00039	0.0050	0.00039	11/04/21 13:58	
1,2-Dichloroethane	mg/kg	<0.00051	0.0050	0.00051	11/04/21 13:58	
1,2-Dichloropropane	mg/kg	<0.00043	0.0050	0.00043	11/04/21 13:58	
1,3-Dichlorobenzene	mg/kg	<0.00029	0.0050	0.00029	11/04/21 13:58	
1,4-Dichlorobenzene	mg/kg	<0.00036	0.0050	0.00036	11/04/21 13:58	
1,4-Dioxane (p-Dioxane)	mg/kg	<0.053	0.50	0.053	11/04/21 13:58	
2-Butanone (MEK)	mg/kg	<0.0068	0.025	0.0068	11/04/21 13:58	
2-Hexanone	mg/kg	<0.0012	0.10	0.0012	11/04/21 13:58	
4-Methyl-2-pentanone (MIBK)	mg/kg	<0.0016	0.025	0.0016	11/04/21 13:58	
Acetone	mg/kg	<0.0021	0.10	0.0021	11/04/21 13:58	
Benzene	mg/kg	<0.00040	0.0050	0.00040	11/04/21 13:58	
Bromochloromethane	mg/kg	<0.00056	0.0050	0.00056	11/04/21 13:58	
Bromodichloromethane	mg/kg	<0.00038	0.0050	0.00038	11/04/21 13:58	
Bromoform	mg/kg	<0.00038	0.0050	0.00038	11/04/21 13:58	
Bromomethane	mg/kg	<0.00030	0.0050	0.00030	11/04/21 13:58	
Carbon disulfide	mg/kg	<0.00059	0.010	0.00059	11/04/21 13:58	
Carbon tetrachloride	mg/kg	<0.00035	0.0050	0.00035	11/04/21 13:58	
Chlorobenzene	mg/kg	<0.00037	0.0050	0.00037	11/04/21 13:58	
Chloroethane	mg/kg	<0.00022	0.0050	0.00022	11/04/21 13:58	
Chloroform	mg/kg	0.0015J	0.0050	0.00047	11/04/21 13:58	
Chloromethane	mg/kg	<0.00018	0.0050	0.00018	11/04/21 13:58	
cis-1,2-Dichloroethene	mg/kg	<0.00048	0.0050	0.00048	11/04/21 13:58	
cis-1,3-Dichloropropene	mg/kg	<0.00038	0.0050	0.00038	11/04/21 13:58	
Cyclohexane	mg/kg	<0.00044	0.10	0.00044	11/04/21 13:58	N2
Dibromochloromethane	mg/kg	<0.00037	0.0050	0.00037	11/04/21 13:58	
Dichlorodifluoromethane	mg/kg	<0.00016	0.0050	0.00016	11/04/21 13:58	
Ethylbenzene	mg/kg	<0.00028	0.0050	0.00028	11/04/21 13:58	
Isopropylbenzene (Cumene)	mg/kg	<0.00037	0.0050	0.00037	11/04/21 13:58	
Methyl acetate	mg/kg	<0.00084	0.0050	0.00084	11/04/21 13:58	N2
Methyl-tert-butyl ether	mg/kg	<0.00028	0.0050	0.00028	11/04/21 13:58	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
4171 40th St. SE
Grand Rapids, MI 49512
(616)975-4500

QUALITY CONTROL DATA

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

METHOD BLANK: 2988853 Matrix: Solid
Associated Lab Samples: 50300888002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Methylcyclohexane	mg/kg	<0.00036	0.0050	0.00036	11/04/21 13:58	N2
Methylene Chloride	mg/kg	<0.0049	0.020	0.0049	11/04/21 13:58	
Styrene	mg/kg	<0.00035	0.0050	0.00035	11/04/21 13:58	
Tetrachloroethene	mg/kg	<0.00037	0.0050	0.00037	11/04/21 13:58	
Toluene	mg/kg	<0.00053	0.0050	0.00053	11/04/21 13:58	
trans-1,2-Dichloroethene	mg/kg	<0.00047	0.0050	0.00047	11/04/21 13:58	
trans-1,3-Dichloropropene	mg/kg	<0.00033	0.0050	0.00033	11/04/21 13:58	
Trichloroethene	mg/kg	<0.00045	0.0050	0.00045	11/04/21 13:58	
Trichlorofluoromethane	mg/kg	<0.00014	0.0050	0.00014	11/04/21 13:58	
Vinyl chloride	mg/kg	<0.000099	0.0050	0.000099	11/04/21 13:58	
Xylene (Total)	mg/kg	<0.00081	0.010	0.00081	11/04/21 13:58	
4-Bromofluorobenzene (S)	%.	97	40-149		11/04/21 13:58	
Dibromofluoromethane (S)	%.	100	73-132		11/04/21 13:58	
Toluene-d8 (S)	%.	97	66-148		11/04/21 13:58	

LABORATORY CONTROL SAMPLE: 2988854

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	mg/kg	0.05	0.041	83	68-129	
1,1,2,2-Tetrachloroethane	mg/kg	0.05	0.044	88	67-137	
1,1,2-Trichloroethane	mg/kg	0.05	0.044	87	68-137	
1,1,2-Trichlorotrifluoroethane	mg/kg	0.05	0.041	83	76-135	
1,1-Dichloroethane	mg/kg	0.05	0.042	84	69-126	
1,1-Dichloroethene	mg/kg	0.05	0.043	86	53-135	
1,2,3-Trichlorobenzene	mg/kg	0.05	0.043	86	57-117	
1,2,4-Trichlorobenzene	mg/kg	0.05	0.044	88	46-134	
1,2-Dibromo-3-chloropropane	mg/kg	0.05	0.045	89	65-132	
1,2-Dibromoethane (EDB)	mg/kg	0.05	0.042	85	68-125	
1,2-Dichlorobenzene	mg/kg	0.05	0.042	85	63-122	
1,2-Dichloroethane	mg/kg	0.05	0.043	85	69-128	
1,2-Dichloropropane	mg/kg	0.05	0.041	82	70-130	
1,3-Dichlorobenzene	mg/kg	0.05	0.042	85	61-121	
1,4-Dichlorobenzene	mg/kg	0.05	0.042	85	59-117	
1,4-Dioxane (p-Dioxane)	mg/kg	0.25	0.24J	95	53-151	
2-Butanone (MEK)	mg/kg	0.25	0.21	83	57-149	
2-Hexanone	mg/kg	0.25	0.21	83	54-140	
4-Methyl-2-pentanone (MIBK)	mg/kg	0.25	0.22	86	65-150	
Acetone	mg/kg	0.25	0.20	82	48-151	
Benzene	mg/kg	0.05	0.043	87	69-125	
Bromochloromethane	mg/kg	0.05	0.043	86	64-136	
Bromodichloromethane	mg/kg	0.05	0.044	87	70-124	
Bromoform	mg/kg	0.05	0.044	87	61-119	
Bromomethane	mg/kg	0.05	0.040	80	15-185	
Carbon disulfide	mg/kg	0.05	0.040	81	52-125	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
4171 40th St. SE
Grand Rapids, MI 49512
(616)975-4500

QUALITY CONTROL DATA

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

LABORATORY CONTROL SAMPLE: 2988854

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Carbon tetrachloride	mg/kg	0.05	0.043	87	65-129	
Chlorobenzene	mg/kg	0.05	0.042	83	66-121	
Chloroethane	mg/kg	0.05	0.032	63	50-146	
Chloroform	mg/kg	0.05	0.039	77	66-123	
Chloromethane	mg/kg	0.05	0.029	58	22-144	
cis-1,2-Dichloroethene	mg/kg	0.05	0.042	83	67-122	
cis-1,3-Dichloropropene	mg/kg	0.05	0.046	92	68-136	
Cyclohexane	mg/kg	0.05	0.042J	84	48-136	N2
Dibromochloromethane	mg/kg	0.05	0.045	89	69-129	
Dichlorodifluoromethane	mg/kg	0.05	0.022	43	10-161	
Ethylbenzene	mg/kg	0.05	0.042	84	57-126	
Isopropylbenzene (Cumene)	mg/kg	0.05	0.042	83	62-132	
Methyl acetate	mg/kg	0.25	0.20	80	49-200	N2
Methyl-tert-butyl ether	mg/kg	0.05	0.041	82	66-136	
Methylcyclohexane	mg/kg	0.05	0.041	81	52-121	N2
Methylene Chloride	mg/kg	0.05	0.044	87	59-148	
Styrene	mg/kg	0.05	0.042	84	67-125	
Tetrachloroethene	mg/kg	0.05	0.043	86	61-123	
Toluene	mg/kg	0.05	0.042	83	67-128	
trans-1,2-Dichloroethene	mg/kg	0.05	0.042	84	61-127	
trans-1,3-Dichloropropene	mg/kg	0.05	0.045	91	69-131	
Trichloroethene	mg/kg	0.05	0.042	84	64-122	
Trichlorofluoromethane	mg/kg	0.05	0.033	66	59-129	
Vinyl chloride	mg/kg	0.05	0.034	67	42-148	
Xylene (Total)	mg/kg	0.15	0.12	81	62-126	
4-Bromofluorobenzene (S)	%.			99	40-149	
Dibromofluoromethane (S)	%.			101	73-132	
Toluene-d8 (S)	%.			103	66-148	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
4171 40th St. SE
Grand Rapids, MI 49512
(616)975-4500

QUALITY CONTROL DATA

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

QC Batch: 647839
QC Batch Method: EPA 3546
Analysis Method: EPA 8270
Analysis Description: 8270 Solid MSSV Microwave Short Spike
Laboratory: Pace Analytical Services - Indianapolis

Associated Lab Samples: 50300888002

METHOD BLANK: 2985029 Matrix: Solid
Associated Lab Samples: 50300888002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,2,4,5-Tetrachlorobenzene	mg/kg	<0.079	0.33	0.079	11/01/21 13:59	
2,2'-Oxybis(1-chloropropane)	mg/kg	<0.11	0.33	0.11	11/01/21 13:59	
2,3,4,6-Tetrachlorophenol	mg/kg	<0.12	0.33	0.12	11/01/21 13:59	
2,4,5-Trichlorophenol	mg/kg	<0.12	0.33	0.12	11/01/21 13:59	
2,4,6-Trichlorophenol	mg/kg	<0.10	0.33	0.10	11/01/21 13:59	
2,4-Dichlorophenol	mg/kg	<0.11	0.33	0.11	11/01/21 13:59	
2,4-Dimethylphenol	mg/kg	<0.11	0.33	0.11	11/01/21 13:59	
2,4-Dinitrophenol	mg/kg	<0.18	1.6	0.18	11/01/21 13:59	
2,4-Dinitrotoluene	mg/kg	<0.11	0.33	0.11	11/01/21 13:59	
2,6-Dinitrotoluene	mg/kg	<0.094	0.33	0.094	11/01/21 13:59	
2-Chloronaphthalene	mg/kg	<0.093	0.33	0.093	11/01/21 13:59	
2-Chlorophenol	mg/kg	<0.12	0.33	0.12	11/01/21 13:59	
2-Methylnaphthalene	mg/kg	<0.098	0.33	0.098	11/01/21 13:59	
2-Methylphenol(o-Cresol)	mg/kg	<0.14	0.33	0.14	11/01/21 13:59	
2-Nitroaniline	mg/kg	<0.14	0.33	0.14	11/01/21 13:59	
2-Nitrophenol	mg/kg	<0.13	0.33	0.13	11/01/21 13:59	
3&4-Methylphenol(m&p Cresol)	mg/kg	<0.14	0.66	0.14	11/01/21 13:59	
3,3'-Dichlorobenzidine	mg/kg	<0.11	0.66	0.11	11/01/21 13:59	
3-Nitroaniline	mg/kg	<0.12	0.33	0.12	11/01/21 13:59	
4,6-Dinitro-2-methylphenol	mg/kg	<0.20	0.66	0.20	11/01/21 13:59	
4-Bromophenylphenyl ether	mg/kg	<0.12	0.33	0.12	11/01/21 13:59	
4-Chloro-3-methylphenol	mg/kg	<0.13	0.66	0.13	11/01/21 13:59	
4-Chloroaniline	mg/kg	<0.087	0.66	0.087	11/01/21 13:59	
4-Chlorophenylphenyl ether	mg/kg	<0.10	0.33	0.10	11/01/21 13:59	
4-Nitroaniline	mg/kg	<0.13	0.33	0.13	11/01/21 13:59	
4-Nitrophenol	mg/kg	<0.25	1.6	0.25	11/01/21 13:59	
Acenaphthene	mg/kg	<0.088	0.33	0.088	11/01/21 13:59	
Acenaphthylene	mg/kg	<0.099	0.33	0.099	11/01/21 13:59	
Acetophenone	mg/kg	<0.099	0.33	0.099	11/01/21 13:59	
Anthracene	mg/kg	<0.14	0.33	0.14	11/01/21 13:59	
Atrazine	mg/kg	<0.14	0.33	0.14	11/01/21 13:59	N2
Benzaldehyde	mg/kg	<0.11	0.33	0.11	11/01/21 13:59	N2
Benzo(a)anthracene	mg/kg	<0.098	0.33	0.098	11/01/21 13:59	
Benzo(a)pyrene	mg/kg	<0.11	0.33	0.11	11/01/21 13:59	
Benzo(b)fluoranthene	mg/kg	<0.11	0.33	0.11	11/01/21 13:59	
Benzo(g,h,i)perylene	mg/kg	<0.12	0.33	0.12	11/01/21 13:59	
Benzo(k)fluoranthene	mg/kg	<0.12	0.33	0.12	11/01/21 13:59	
Biphenyl (Diphenyl)	mg/kg	<0.091	0.33	0.091	11/01/21 13:59	N2
bis(2-Chloroethoxy)methane	mg/kg	<0.11	0.33	0.11	11/01/21 13:59	
bis(2-Chloroethyl) ether	mg/kg	<0.13	0.33	0.13	11/01/21 13:59	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
4171 40th St. SE
Grand Rapids, MI 49512
(616)975-4500

QUALITY CONTROL DATA

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

METHOD BLANK: 2985029 Matrix: Solid
Associated Lab Samples: 50300888002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
bis(2-Ethylhexyl)phthalate	mg/kg	<0.10	0.33	0.10	11/01/21 13:59	
Butylbenzylphthalate	mg/kg	<0.18	0.33	0.18	11/01/21 13:59	
Caprolactam	mg/kg	<0.16	0.33	0.16	11/01/21 13:59	N2
Carbazole	mg/kg	<0.13	0.33	0.13	11/01/21 13:59	
Chrysene	mg/kg	<0.11	0.33	0.11	11/01/21 13:59	
Di-n-butylphthalate	mg/kg	<0.12	0.33	0.12	11/01/21 13:59	
Di-n-octylphthalate	mg/kg	<0.12	0.33	0.12	11/01/21 13:59	
Dibenz(a,h)anthracene	mg/kg	<0.12	0.33	0.12	11/01/21 13:59	
Dibenzofuran	mg/kg	<0.10	0.33	0.10	11/01/21 13:59	
Diethylphthalate	mg/kg	<0.11	0.33	0.11	11/01/21 13:59	
Dimethylphthalate	mg/kg	<0.11	0.33	0.11	11/01/21 13:59	
Fluoranthene	mg/kg	<0.13	0.33	0.13	11/01/21 13:59	
Fluorene	mg/kg	<0.11	0.33	0.11	11/01/21 13:59	
Hexachloro-1,3-butadiene	mg/kg	<0.090	0.33	0.090	11/01/21 13:59	
Hexachlorobenzene	mg/kg	<0.084	0.33	0.084	11/01/21 13:59	
Hexachlorocyclopentadiene	mg/kg	<0.16	0.33	0.16	11/01/21 13:59	
Hexachloroethane	mg/kg	<0.10	0.33	0.10	11/01/21 13:59	
Indeno(1,2,3-cd)pyrene	mg/kg	<0.12	0.33	0.12	11/01/21 13:59	
Isophorone	mg/kg	<0.11	0.33	0.11	11/01/21 13:59	
N-Nitroso-di-n-propylamine	mg/kg	<0.13	0.33	0.13	11/01/21 13:59	
N-Nitrosodiphenylamine	mg/kg	<0.11	0.33	0.11	11/01/21 13:59	
Naphthalene	mg/kg	<0.095	0.33	0.095	11/01/21 13:59	
Nitrobenzene	mg/kg	<0.11	0.33	0.11	11/01/21 13:59	
Pentachlorophenol	mg/kg	<0.25	1.6	0.25	11/01/21 13:59	
Phenanthrene	mg/kg	<0.13	0.33	0.13	11/01/21 13:59	
Phenol	mg/kg	<0.12	0.33	0.12	11/01/21 13:59	
Pyrene	mg/kg	<0.10	0.33	0.10	11/01/21 13:59	
2,4,6-Tribromophenol (S)	%.	87	20-121		11/01/21 13:59	
2-Fluorobiphenyl (S)	%.	77	35-96		11/01/21 13:59	
2-Fluorophenol (S)	%.	76	33-111		11/01/21 13:59	
Nitrobenzene-d5 (S)	%.	65	32-105		11/01/21 13:59	
p-Terphenyl-d14 (S)	%.	86	31-145		11/01/21 13:59	
Phenol-d5 (S)	%.	80	35-114		11/01/21 13:59	

LABORATORY CONTROL SAMPLE: 2985030

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
2,4-Dinitrotoluene	mg/kg	1.7	1.4	82	48-116	
2-Chlorophenol	mg/kg	1.7	1.3	77	58-100	
2-Methylnaphthalene	mg/kg	1.7	1.3	77	53-99	
4-Chloro-3-methylphenol	mg/kg	1.7	1.4	85	57-112	
4-Nitrophenol	mg/kg	1.7	1.2J	74	36-133	
Acenaphthene	mg/kg	1.7	1.4	82	61-98	
Acenaphthylene	mg/kg	1.7	1.3	79	61-98	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
4171 40th St. SE
Grand Rapids, MI 49512
(616)975-4500

QUALITY CONTROL DATA

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

LABORATORY CONTROL SAMPLE: 2985030

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Anthracene	mg/kg	1.7	1.4	86	62-100	
Benzo(a)anthracene	mg/kg	1.7	1.4	86	64-101	
Benzo(a)pyrene	mg/kg	1.7	1.4	82	60-104	
Benzo(b)fluoranthene	mg/kg	1.7	1.6	93	65-107	
Benzo(g,h,i)perylene	mg/kg	1.7	1.5	90	61-108	
Benzo(k)fluoranthene	mg/kg	1.7	1.5	90	61-109	
Chrysene	mg/kg	1.7	1.5	88	64-101	
Dibenz(a,h)anthracene	mg/kg	1.7	1.5	90	65-106	
Fluoranthene	mg/kg	1.7	1.5	88	63-111	
Fluorene	mg/kg	1.7	1.4	84	64-100	
Indeno(1,2,3-cd)pyrene	mg/kg	1.7	1.5	89	64-106	
N-Nitroso-di-n-propylamine	mg/kg	1.7	1.3	76	48-101	
Naphthalene	mg/kg	1.7	1.3	75	58-93	
Pentachlorophenol	mg/kg	1.7	1.3J	76	33-117	
Phenanthrene	mg/kg	1.7	1.5	88	62-102	
Phenol	mg/kg	1.7	1.3	79	56-101	
Pyrene	mg/kg	1.7	1.3	80	60-105	
2,4,6-Tribromophenol (S)	%.			87	20-121	
2-Fluorobiphenyl (S)	%.			79	35-96	
2-Fluorophenol (S)	%.			70	33-111	
Nitrobenzene-d5 (S)	%.			70	32-105	
p-Terphenyl-d14 (S)	%.			84	31-145	
Phenol-d5 (S)	%.			82	35-114	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2985031 2985032

Parameter	Units	50300743001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
2,4-Dinitrotoluene	mg/kg	ND	1.8	1.9	1.5	1.5	81	80	13-119	0	20	
2-Chlorophenol	mg/kg	ND	1.8	1.9	1.5	1.5	82	77	16-116	4	20	
2-Methylnaphthalene	mg/kg	ND	1.8	1.9	1.5	1.5	78	81	19-120	5	20	
4-Chloro-3-methylphenol	mg/kg	ND	1.8	1.9	1.5	1.5	83	81	22-124	1	20	
4-Nitrophenol	mg/kg	ND	1.8	1.9	1.5J	1.4J	80	76	10-139		20	
Acenaphthene	mg/kg	ND	1.8	1.9	1.5	1.5	83	81	25-114	1	20	
Acenaphthylene	mg/kg	ND	1.8	1.9	1.5	1.5	78	77	21-116	0	20	
Anthracene	mg/kg	ND	1.8	1.9	1.6	1.6	84	84	23-116	2	20	
Benzo(a)anthracene	mg/kg	ND	1.8	1.9	1.6	1.6	84	85	14-128	2	20	
Benzo(a)pyrene	mg/kg	ND	1.8	1.9	1.5	1.5	79	79	12-127	1	20	
Benzo(b)fluoranthene	mg/kg	ND	1.8	1.9	1.7	1.7	89	93	10-142	4	20	
Benzo(g,h,i)perylene	mg/kg	ND	1.8	1.9	1.6	1.6	84	85	16-120	2	20	
Benzo(k)fluoranthene	mg/kg	ND	1.8	1.9	1.6	1.6	86	85	15-131	0	20	
Chrysene	mg/kg	ND	1.8	1.9	1.5	1.6	82	84	11-132	3	20	
Dibenz(a,h)anthracene	mg/kg	ND	1.8	1.9	1.6	1.6	84	85	21-117	2	20	
Fluoranthene	mg/kg	ND	1.8	1.9	1.6	1.6	87	87	10-143	1	20	
Fluorene	mg/kg	ND	1.8	1.9	1.6	1.6	83	83	18-122	0	20	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
4171 40th St. SE
Grand Rapids, MI 49512
(616)975-4500

QUALITY CONTROL DATA

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2985031 2985032

Parameter	Units	50300743001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Indeno(1,2,3-cd)pyrene	mg/kg	ND	1.8	1.9	1.6	1.6	84	85	19-120	2	20	
N-Nitroso-di-n-propylamine	mg/kg	ND	1.8	1.9	1.7	1.4	91	75	24-109	18	20	
Naphthalene	mg/kg	ND	1.8	1.9	1.5	1.4	78	77	22-112	1	20	
Pentachlorophenol	mg/kg	ND	1.8	1.9	1.3J	1.4J	71	76	10-123		20	
Phenanthrene	mg/kg	ND	1.8	1.9	1.6	1.7	85	88	10-136	4	20	
Phenol	mg/kg	ND	1.8	1.9	1.5	1.5	80	78	14-122	2	20	
Pyrene	mg/kg	ND	1.8	1.9	1.6	1.7	88	89	10-144	2	20	
2,4,6-Tribromophenol (S)	%.						84	90	20-121			
2-Fluorobiphenyl (S)	%.						76	79	35-96			
2-Fluorophenol (S)	%.						80	76	33-111			
Nitrobenzene-d5 (S)	%.						74	70	32-105			
p-Terphenyl-d14 (S)	%.						84	84	31-145			
Phenol-d5 (S)	%.						83	80	35-114			

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
4171 40th St. SE
Grand Rapids, MI 49512
(616)975-4500

QUALITY CONTROL DATA

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

QC Batch: 648252
QC Batch Method: EPA 3510
Analysis Method: EPA 8270
Analysis Description: 8270 TCLP MSSV
Laboratory: Pace Analytical Services - Indianapolis
Associated Lab Samples: 50300888001, 50300888002

METHOD BLANK: 2986665 Matrix: Water
Associated Lab Samples: 50300888001, 50300888002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,4-Dichlorobenzene	mg/L	<0.0050	0.010	0.0050	11/03/21 18:37	
2,4,5-Trichlorophenol	mg/L	<0.0050	0.050	0.0050	11/03/21 18:37	
2,4,6-Trichlorophenol	mg/L	<0.0050	0.010	0.0050	11/03/21 18:37	
2,4-Dinitrotoluene	mg/L	<0.0050	0.010	0.0050	11/03/21 18:37	
2-Methylphenol(o-Cresol)	mg/L	<0.0050	0.010	0.0050	11/03/21 18:37	
3&4-Methylphenol(m&p Cresol)	mg/L	<0.010	0.020	0.010	11/03/21 18:37	
Hexachloro-1,3-butadiene	mg/L	<0.0050	0.010	0.0050	11/03/21 18:37	
Hexachlorobenzene	mg/L	<0.0050	0.010	0.0050	11/03/21 18:37	
Hexachloroethane	mg/L	<0.0050	0.010	0.0050	11/03/21 18:37	
Nitrobenzene	mg/L	<0.0050	0.010	0.0050	11/03/21 18:37	
Pentachlorophenol	mg/L	<0.025	0.050	0.025	11/03/21 18:37	
Pyridine	mg/L	<0.010	0.010	0.010	11/03/21 18:37	
2,4,6-Tribromophenol (S)	%.	79	47-127		11/03/21 18:37	
2-Fluorobiphenyl (S)	%.	55	35-102		11/03/21 18:37	
2-Fluorophenol (S)	%.	37	21-74		11/03/21 18:37	
Nitrobenzene-d5 (S)	%.	62	40-115		11/03/21 18:37	
p-Terphenyl-d14 (S)	%.	86	42-156		11/03/21 18:37	
Phenol-d5 (S)	%.	25	15-48		11/03/21 18:37	

LABORATORY CONTROL SAMPLE: 2986666

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,4-Dichlorobenzene	mg/L	0.05	0.028	57	30-85	
2,4,5-Trichlorophenol	mg/L	0.05	0.041J	82	52-117	
2,4,6-Trichlorophenol	mg/L	0.05	0.039	78	52-114	
2,4-Dinitrotoluene	mg/L	0.05	0.040	80	58-107	
2-Methylphenol(o-Cresol)	mg/L	0.05	0.032	65	40-95	
3&4-Methylphenol(m&p Cresol)	mg/L	0.1	0.061	61	37-89	
Hexachloro-1,3-butadiene	mg/L	0.05	0.027	54	22-78	
Hexachlorobenzene	mg/L	0.05	0.032	64	46-79	
Hexachloroethane	mg/L	0.05	0.027	54	17-85	
Nitrobenzene	mg/L	0.05	0.038	77	50-110	
Pentachlorophenol	mg/L	0.05	0.041J	83	32-126	
Pyridine	mg/L	0.05	0.017	33	18-69	
2,4,6-Tribromophenol (S)	%.			80	47-127	
2-Fluorobiphenyl (S)	%.			66	35-102	
2-Fluorophenol (S)	%.			43	21-74	
Nitrobenzene-d5 (S)	%.			72	40-115	
p-Terphenyl-d14 (S)	%.			87	42-156	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
4171 40th St. SE
Grand Rapids, MI 49512
(616)975-4500

QUALITY CONTROL DATA

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

LABORATORY CONTROL SAMPLE: 2986666

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Phenol-d5 (S)	%.			30	15-48	

MATRIX SPIKE SAMPLE: 2986667

Parameter	Units	50300799004 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
1,4-Dichlorobenzene	mg/L	ND	0.5	0.31	63	24-81	
2,4,5-Trichlorophenol	mg/L	ND	0.5	0.47J	94	34-129	
2,4,6-Trichlorophenol	mg/L	ND	0.5	0.43	85	33-123	
2,4-Dinitrotoluene	mg/L	ND	0.5	0.43	87	35-116	
2-Methylphenol(o-Cresol)	mg/L	ND	0.5	0.32	64	24-102	
3&4-Methylphenol(m&p Cresol)	mg/L	ND	1	0.63	63	18-99	
Hexachloro-1,3-butadiene	mg/L	ND	0.5	0.31	61	15-79	
Hexachlorobenzene	mg/L	ND	0.5	0.34	68	29-86	
Hexachloroethane	mg/L	ND	0.5	0.31	62	14-79	
Nitrobenzene	mg/L	ND	0.5	0.40	79	27-117	
Pentachlorophenol	mg/L	ND	0.5	0.40J	81	15-151	
Pyridine	mg/L	ND	0.5	0.26	52	12-75	
2,4,6-Tribromophenol (S)	%.				87	47-127	
2-Fluorobiphenyl (S)	%.				64	35-102	
2-Fluorophenol (S)	%.				46	21-74	
Nitrobenzene-d5 (S)	%.				75	40-115	
p-Terphenyl-d14 (S)	%.				85	42-156	
Phenol-d5 (S)	%.				33	15-48	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
4171 40th St. SE
Grand Rapids, MI 49512
(616)975-4500

QUALITY CONTROL DATA

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

QC Batch: 647400
QC Batch Method: EPA 3510
Analysis Method: EPA 8270 by SIM
Analysis Description: 8270 Water PAH Low Volume
Laboratory: Pace Analytical Services - Indianapolis

Associated Lab Samples: 50300888001

METHOD BLANK: 2982637 Matrix: Water
Associated Lab Samples: 50300888001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
2-Methylnaphthalene	ug/L	<0.015	1.0	0.015	11/01/21 17:15	
Acenaphthene	ug/L	<0.015	1.0	0.015	11/01/21 17:15	
Acenaphthylene	ug/L	<0.013	1.0	0.013	11/01/21 17:15	
Anthracene	ug/L	<0.012	0.10	0.012	11/01/21 17:15	
Benzo(a)anthracene	ug/L	<0.027	0.10	0.027	11/01/21 17:15	
Benzo(a)pyrene	ug/L	<0.026	0.10	0.026	11/01/21 17:15	
Benzo(b)fluoranthene	ug/L	<0.031	0.10	0.031	11/01/21 17:15	
Benzo(g,h,i)perylene	ug/L	<0.024	0.10	0.024	11/01/21 17:15	
Benzo(k)fluoranthene	ug/L	<0.020	0.10	0.020	11/01/21 17:15	
Chrysene	ug/L	<0.020	0.50	0.020	11/01/21 17:15	
Dibenz(a,h)anthracene	ug/L	0.090J	0.10	0.071	11/01/21 17:15	
Fluoranthene	ug/L	<0.015	1.0	0.015	11/01/21 17:15	
Fluorene	ug/L	<0.036	1.0	0.036	11/01/21 17:15	
Indeno(1,2,3-cd)pyrene	ug/L	<0.073	0.10	0.073	11/01/21 17:15	
Naphthalene	ug/L	0.18J	1.0	0.014	11/01/21 17:15	
Phenanthrene	ug/L	<0.021	1.0	0.021	11/01/21 17:15	
Pyrene	ug/L	<0.020	1.0	0.020	11/01/21 17:15	
2-Fluorobiphenyl (S)	%.	56	31-98		11/01/21 17:15	
p-Terphenyl-d14 (S)	%.	92	33-115		11/01/21 17:15	

LABORATORY CONTROL SAMPLE: 2982638

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
2-Methylnaphthalene	ug/L	10	3.3	33	46-95	L2
Acenaphthene	ug/L	10	3.7	37	49-103	L2
Acenaphthylene	ug/L	10	4.6	46	53-102	L2
Anthracene	ug/L	10	5.1	51	47-104	
Benzo(a)anthracene	ug/L	10	6.6	66	44-107	
Benzo(a)pyrene	ug/L	10	6.6	66	33-101	
Benzo(b)fluoranthene	ug/L	10	6.3	63	34-105	
Benzo(g,h,i)perylene	ug/L	10	5.2	52	21-95	
Benzo(k)fluoranthene	ug/L	10	5.1	51	29-113	
Chrysene	ug/L	10	5.3	53	48-96	
Dibenz(a,h)anthracene	ug/L	10	5.3	53	21-102	
Fluoranthene	ug/L	10	5.6	56	50-116	
Fluorene	ug/L	10	4.6	46	51-103	L2
Indeno(1,2,3-cd)pyrene	ug/L	10	5.3	53	22-102	
Naphthalene	ug/L	10	3.4	34	44-97	L2
Phenanthrene	ug/L	10	4.9	49	53-101	L2

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
4171 40th St. SE
Grand Rapids, MI 49512
(616)975-4500

QUALITY CONTROL DATA

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

LABORATORY CONTROL SAMPLE: 2982638

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Pyrene	ug/L	10	6.0	60	58-106	
2-Fluorobiphenyl (S)	%.			37	31-98	
p-Terphenyl-d14 (S)	%.			64	33-115	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
4171 40th St. SE
Grand Rapids, MI 49512
(616)975-4500

QUALITY CONTROL DATA

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

QC Batch: 648745
QC Batch Method: EPA 3510
Analysis Method: EPA 8270 by SIM
Analysis Description: 8270 Water PAH Low Volume
Laboratory: Pace Analytical Services - Indianapolis

Associated Lab Samples: 50300888001

METHOD BLANK: 2989319 Matrix: Water
Associated Lab Samples: 50300888001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
2-Methylnaphthalene	ug/L	<0.015	1.0	0.015	11/05/21 13:56	
Acenaphthene	ug/L	<0.015	1.0	0.015	11/05/21 13:56	
Acenaphthylene	ug/L	<0.013	1.0	0.013	11/05/21 13:56	
Anthracene	ug/L	<0.012	0.10	0.012	11/05/21 13:56	
Benzo(a)anthracene	ug/L	<0.027	0.10	0.027	11/05/21 13:56	
Benzo(a)pyrene	ug/L	<0.026	0.10	0.026	11/05/21 13:56	
Benzo(b)fluoranthene	ug/L	<0.031	0.10	0.031	11/05/21 13:56	
Benzo(g,h,i)perylene	ug/L	<0.024	0.10	0.024	11/05/21 13:56	
Benzo(k)fluoranthene	ug/L	<0.020	0.10	0.020	11/05/21 13:56	
Chrysene	ug/L	<0.020	0.50	0.020	11/05/21 13:56	
Dibenz(a,h)anthracene	ug/L	<0.071	0.10	0.071	11/05/21 13:56	
Fluoranthene	ug/L	<0.015	1.0	0.015	11/05/21 13:56	
Fluorene	ug/L	<0.036	1.0	0.036	11/05/21 13:56	
Indeno(1,2,3-cd)pyrene	ug/L	<0.073	0.10	0.073	11/05/21 13:56	
Naphthalene	ug/L	<0.014	1.0	0.014	11/05/21 13:56	
Phenanthrene	ug/L	<0.021	1.0	0.021	11/05/21 13:56	
Pyrene	ug/L	<0.020	1.0	0.020	11/05/21 13:56	
2-Fluorobiphenyl (S)	%.	64	31-98		11/05/21 13:56	
p-Terphenyl-d14 (S)	%.	89	33-115		11/05/21 13:56	

LABORATORY CONTROL SAMPLE: 2989320

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
2-Methylnaphthalene	ug/L	10	6.7	67	46-95	
Acenaphthene	ug/L	10	7.0	70	49-103	
Acenaphthylene	ug/L	10	8.3	83	53-102	
Anthracene	ug/L	10	8.2	82	47-104	
Benzo(a)anthracene	ug/L	10	9.7	97	44-107	
Benzo(a)pyrene	ug/L	10	8.8	88	33-101	
Benzo(b)fluoranthene	ug/L	10	6.9	69	34-105	
Benzo(g,h,i)perylene	ug/L	10	6.2	62	21-95	
Benzo(k)fluoranthene	ug/L	10	8.0	80	29-113	
Chrysene	ug/L	10	7.7	77	48-96	
Dibenz(a,h)anthracene	ug/L	10	6.1	61	21-102	
Fluoranthene	ug/L	10	8.5	85	50-116	
Fluorene	ug/L	10	8.2	82	51-103	
Indeno(1,2,3-cd)pyrene	ug/L	10	6.2	62	22-102	
Naphthalene	ug/L	10	6.9	69	44-97	
Phenanthrene	ug/L	10	8.1	81	53-101	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
4171 40th St. SE
Grand Rapids, MI 49512
(616)975-4500

QUALITY CONTROL DATA

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

LABORATORY CONTROL SAMPLE: 2989320

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Pyrene	ug/L	10	9.0	90	58-106	
2-Fluorobiphenyl (S)	%.			70	31-98	
p-Terphenyl-d14 (S)	%.			81	33-115	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
4171 40th St. SE
Grand Rapids, MI 49512
(616)975-4500

QUALITY CONTROL DATA

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

QC Batch: 647394
QC Batch Method: EPA 3510
Analysis Method: EPA 8270
Analysis Description: 8270 Water Scan LV
Laboratory: Pace Analytical Services - Indianapolis

Associated Lab Samples: 50300888001

METHOD BLANK: 2982615 Matrix: Water
Associated Lab Samples: 50300888001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
2,2'-Oxybis(1-chloropropane)	ug/L	<4.6	10.0	4.6	11/01/21 18:11	
2,3,4,6-Tetrachlorophenol	ug/L	<4.9	10.0	4.9	11/01/21 18:11	
2,4,5-Trichlorophenol	ug/L	<2.9	10.0	2.9	11/01/21 18:11	
2,4,6-Trichlorophenol	ug/L	<4.5	10.0	4.5	11/01/21 18:11	
2,4-Dichlorophenol	ug/L	<4.0	10.0	4.0	11/01/21 18:11	
2,4-Dimethylphenol	ug/L	<8.1	10.0	8.1	11/01/21 18:11	
2,4-Dinitrophenol	ug/L	<6.6	50.0	6.6	11/01/21 18:11	
2,4-Dinitrotoluene	ug/L	<6.2	10.0	6.2	11/01/21 18:11	
2,6-Dinitrotoluene	ug/L	<4.6	10.0	4.6	11/01/21 18:11	
2-Chloronaphthalene	ug/L	<5.8	10.0	5.8	11/01/21 18:11	
2-Chlorophenol	ug/L	<3.6	10.0	3.6	11/01/21 18:11	
2-Methylphenol(o-Cresol)	ug/L	<4.3	10.0	4.3	11/01/21 18:11	
2-Nitroaniline	ug/L	<4.2	10.0	4.2	11/01/21 18:11	
2-Nitrophenol	ug/L	<3.5	10.0	3.5	11/01/21 18:11	
3&4-Methylphenol(m&p Cresol)	ug/L	<5.4	10.0	5.4	11/01/21 18:11	
3,3'-Dichlorobenzidine	ug/L	<4.0	20.0	4.0	11/01/21 18:11	
3-Nitroaniline	ug/L	<4.8	10.0	4.8	11/01/21 18:11	
4,6-Dinitro-2-methylphenol	ug/L	<5.0	20.0	5.0	11/01/21 18:11	
4-Bromophenylphenyl ether	ug/L	<5.6	10.0	5.6	11/01/21 18:11	
4-Chloro-3-methylphenol	ug/L	<5.6	10.0	5.6	11/01/21 18:11	
4-Chloroaniline	ug/L	<3.2	10.0	3.2	11/01/21 18:11	
4-Chlorophenylphenyl ether	ug/L	<5.1	10.0	5.1	11/01/21 18:11	
4-Nitroaniline	ug/L	<4.6	10.0	4.6	11/01/21 18:11	
4-Nitrophenol	ug/L	<5.6	50.0	5.6	11/01/21 18:11	
Acetophenone	ug/L	<2.8	10.0	2.8	11/01/21 18:11	
Atrazine	ug/L	<2.8	10.0	2.8	11/01/21 18:11	
Benzaldehyde	ug/L	<4.7	50.0	4.7	11/01/21 18:11	
Biphenyl (Diphenyl)	ug/L	<5.9	10.0	5.9	11/01/21 18:11	
bis(2-Chloroethoxy)methane	ug/L	<2.5	10.0	2.5	11/01/21 18:11	
bis(2-Chloroethyl) ether	ug/L	<2.9	10.0	2.9	11/01/21 18:11	
bis(2-Ethylhexyl)phthalate	ug/L	<3.1	10.0	3.1	11/01/21 18:11	
Butylbenzylphthalate	ug/L	<3.5	10.0	3.5	11/01/21 18:11	
Caprolactam	ug/L	<4.3	10.0	4.3	11/01/21 18:11	
Carbazole	ug/L	<3.7	10.0	3.7	11/01/21 18:11	
Di-n-butylphthalate	ug/L	<3.6	10.0	3.6	11/01/21 18:11	
Di-n-octylphthalate	ug/L	<4.5	10.0	4.5	11/01/21 18:11	
Dibenzofuran	ug/L	<7.0	10.0	7.0	11/01/21 18:11	
Diethylphthalate	ug/L	<2.7	10.0	2.7	11/01/21 18:11	
Dimethylphthalate	ug/L	<3.7	10.0	3.7	11/01/21 18:11	
Hexachloro-1,3-butadiene	ug/L	<4.1	10.0	4.1	11/01/21 18:11	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
4171 40th St. SE
Grand Rapids, MI 49512
(616)975-4500

QUALITY CONTROL DATA

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

METHOD BLANK: 2982615 Matrix: Water
Associated Lab Samples: 50300888001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Hexachlorobenzene	ug/L	<3.0	10.0	3.0	11/01/21 18:11	
Hexachlorocyclopentadiene	ug/L	<3.0	10.0	3.0	11/01/21 18:11	
Hexachloroethane	ug/L	<2.5	10.0	2.5	11/01/21 18:11	
Isophorone	ug/L	<4.2	10.0	4.2	11/01/21 18:11	
N-Nitroso-di-n-propylamine	ug/L	<2.9	50.0	2.9	11/01/21 18:11	
N-Nitrosodiphenylamine	ug/L	<2.9	10.0	2.9	11/01/21 18:11	
Nitrobenzene	ug/L	<3.0	10.0	3.0	11/01/21 18:11	
Pentachlorophenol	ug/L	<4.0	50.0	4.0	11/01/21 18:11	
Phenol	ug/L	<4.1	10.0	4.1	11/01/21 18:11	
2,4,6-Tribromophenol (S)	%.	112	34-126		11/01/21 18:11	
2-Fluorophenol (S)	%.	60	10-72		11/01/21 18:11	
Nitrobenzene-d5 (S)	%.	89	39-115		11/01/21 18:11	
Phenol-d5 (S)	%.	46	10-55		11/01/21 18:11	

LABORATORY CONTROL SAMPLE: 2982616

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
2,4-Dimethylphenol	ug/L	100	54.9	55	26-142	
2,4-Dinitrotoluene	ug/L	100	63.0	63	55-141	
2-Chlorophenol	ug/L	100	47.4	47	26-110	
4-Chloro-3-methylphenol	ug/L	100	63.4	63	34-140	
4-Nitrophenol	ug/L	100	55.6	56	10-94	
bis(2-Ethylhexyl)phthalate	ug/L	100	75.5	76	48-160	
Dibenzofuran	ug/L	100	51.0	51	38-125	
N-Nitroso-di-n-propylamine	ug/L	100	50.6	51	48-126	
Pentachlorophenol	ug/L	100	69.9	70	43-144	
Phenol	ug/L	100	41.1	41	10-73	
2,4,6-Tribromophenol (S)	%.			68	34-126	
2-Fluorophenol (S)	%.			48	10-72	
Nitrobenzene-d5 (S)	%.			54	39-115	
Phenol-d5 (S)	%.			42	10-55	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
4171 40th St. SE
Grand Rapids, MI 49512
(616)975-4500

QUALITY CONTROL DATA

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

QC Batch: 646639
QC Batch Method: SM 2540G
Analysis Method: SM 2540G
Analysis Description: Dry Weight/Percent Moisture
Laboratory: Pace Analytical Services - Indianapolis

Associated Lab Samples: 50300888002

SAMPLE DUPLICATE: 2979704

Parameter	Units	50300947003 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	54.6	54.9	1	5	N2

SAMPLE DUPLICATE: 2979705

Parameter	Units	50300913001 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	11.7	11.9	2	5	N2

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
4171 40th St. SE
Grand Rapids, MI 49512
(616)975-4500

QUALITY CONTROL DATA

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

QC Batch: 647806
QC Batch Method: SM 4500-H+B
Analysis Method: SM 4500-H+B
Analysis Description: 4500H+B pH
Laboratory: Pace Analytical Services - Indianapolis

Associated Lab Samples: 50300888001

SAMPLE DUPLICATE: 2984774

Parameter	Units	50301006004 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.2	7.2	0	2	H3

SAMPLE DUPLICATE: 2984775

Parameter	Units	50301172001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	8.4	8.5	0	2	H3

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Grand Rapids, MI 49512
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QUALITY CONTROL DATA

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

QC Batch: 647576
QC Batch Method: EPA 9045
Analysis Method: EPA 9045
Analysis Description: 9045 pH
Laboratory: Pace Analytical Services - Indianapolis
Associated Lab Samples: 50300888002

SAMPLE DUPLICATE: 2983806

Parameter	Units	50301213001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	10.2	10.2	0	2	H3,PO

SAMPLE DUPLICATE: 2983807

Parameter	Units	50301215001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	6.9	6.8	1	2	H3

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
4171 40th St. SE
Grand Rapids, MI 49512
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QUALITY CONTROL DATA

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

QC Batch: 469753
QC Batch Method: SW-846 7.3.3.2
Analysis Method: EPA 9014
Analysis Description: 733C Reactive Cyanide
Laboratory: Pace Analytical Services - Greensburg
Associated Lab Samples: 50300888001, 50300888002

METHOD BLANK: 2268143 Matrix: Solid
Associated Lab Samples: 50300888001, 50300888002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Cyanide, Reactive	mg/kg	<0.40	1.0	0.40	11/02/21 12:13	

LABORATORY CONTROL SAMPLE: 2268144

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Cyanide, Reactive	mg/kg	1	<0.40	4	0-8	

SAMPLE DUPLICATE: 2268145

Parameter	Units	30446864001 Result	Dup Result	RPD	Max RPD	Qualifiers
Cyanide, Reactive	mg/kg	ND	<0.70		20	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
4171 40th St. SE
Grand Rapids, MI 49512
(616)975-4500

QUALITY CONTROL DATA

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

QC Batch: 470138
QC Batch Method: SW-846 7.3.4.2
Analysis Method: SM 4500-S2-F-2011
Analysis Description: 734S Reactive Sulfide
Laboratory: Pace Analytical Services - Greensburg
Associated Lab Samples: 50300888001, 50300888002

METHOD BLANK: 2269458 Matrix: Solid
Associated Lab Samples: 50300888001, 50300888002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfide, Reactive	mg/kg	<10.0	10.0	10.0	10/29/21 15:02	

LABORATORY CONTROL SAMPLE: 2269459

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide, Reactive	mg/kg	200	<10.0	4	0-52	

SAMPLE DUPLICATE: 2269460

Parameter	Units	50300888001 Result	Dup Result	RPD	Max RPD	Qualifiers
Sulfide, Reactive	mg/kg	<10.0	<10.0		20	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
4171 40th St. SE
Grand Rapids, MI 49512
(616)975-4500

QUALIFIERS

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Reported results are not rounded until the final step prior to reporting. Therefore, calculated parameters that are typically reported as "Total" may vary slightly from the sum of the reported component parameters.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
H2	Extraction or preparation conducted outside EPA method holding time.
H3	Sample was received or analysis requested beyond the recognized method holding time.
H7	Re-extraction or re-analysis could not be performed within method holding time.
L2	Analyte recovery in the laboratory control sample (LCS) was below QC limits. Results for this analyte in associated samples may be biased low.
M0	Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
N2	The lab does not hold NELAC/TNI accreditation for this parameter but other accreditations/certifications may apply. A complete list of accreditations/certifications is available upon request.
PO	The reported result is outside the range of the pH buffer solutions used to check the calibration of the pH meter.

Pace Analytical Services, LLC
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Grand Rapids, MI 49512
(616)975-4500

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Exide ERT Frankfort Site
Pace Project No.: 50300888

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
50300888002	**Soil-1021**	EPA 3050	646594	EPA 6010	647161
50300888001	**Water-1021**	EPA 3010	648249	EPA 6010	648527
50300888002	**Soil-1021**	EPA 3010	648249	EPA 6010	648527
50300888001	**Water-1021**	EPA 3010	646674	EPA 6010	647125
50300888001	**Water-1021**	EPA 7470	648297	EPA 7470	648541
50300888002	**Soil-1021**	EPA 7470	648297	EPA 7470	648541
50300888001	**Water-1021**	EPA 7470	648095	EPA 7470	648661
50300888002	**Soil-1021**	EPA 7471	647537	EPA 7471	647854
50300888002	**Soil-1021**	EPA 3546	647839	EPA 8270	647946
50300888001	**Water-1021**	EPA 3510	648252	EPA 8270	648457
50300888002	**Soil-1021**	EPA 3510	648252	EPA 8270	648457
50300888001	**Water-1021**	EPA 3510	647400	EPA 8270 by SIM	648006
50300888001	**Water-1021**	EPA 3510	648745	EPA 8270 by SIM	648909
50300888001	**Water-1021**	EPA 3510	647394	EPA 8270	648005
50300888001	**Water-1021**	EPA 5030/8260	648494		
50300888002	**Soil-1021**	EPA 5030/8260	648494		
50300888001	**Water-1021**	EPA 8260	647925		
50300888002	**Soil-1021**	EPA 8260	648672		
50300888002	**Soil-1021**	SM 2540G	646639		
50300888001	**Water-1021**	EPA 1020B	646840		
50300888002	**Soil-1021**	1030	647110		
50300888001	**Water-1021**	SM 4500-H+B	647806		
50300888002	**Soil-1021**	EPA 9045	647576		
50300888001	**Water-1021**	SW-846 7.3.3.2	469753	EPA 9014	470778
50300888002	**Soil-1021**	SW-846 7.3.3.2	469753	EPA 9014	470778
50300888001	**Water-1021**	SW-846 7.3.4.2	470138	SM 4500-S2-F-2011	470445
50300888002	**Soil-1021**	SW-846 7.3.4.2	470138	SM 4500-S2-F-2011	470445

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ADVANCED GEOSERVICES CORP.
CHAIN OF CUSTODY

WO# : 50300888

Project Name: Eide Trust - Frankfort
Project No.: 2020-4123 Shipment No.: 1
AGC Contact Person: Amy Graham
Shipment Tracking No.: Lab Delivery
Laboratory Name/Location: Pace - Indianapolis
Sampler's Name(s) (Print): Craig Petko / Bernie Beegle

Sample ID/Location	Date	Times	Sample Type C or G	Sample Matrix	Field Filtered Y or N	Total Number of Containers	ANALYSIS & METHOD: VOC	SVOC	T.A. Metals - RCRA 8	TCLP VOC/SVOC Metals	pH/Flashpoint	Reactive Cyanide/Sulfide					PRESERVATIVE	Remarks
Water-1021	10/22/21	0820	C	GW	N		X	X	X	X	X	X					1,3,4	001
Soil-1021	10/22/21	0850	C	GW	N		X	X	X	X	X	X					1,7,8	002

Turnaround time (circle one): Standard 2 Weeks (Rush) 1 Week (Rush) 72 Hours (Rush) 24 Hours (Rush)
Deliverables (circle one): Results Only Results/QC Summary CLP-Like NJ Reduced NJ Full Other

Relinquished by:	Date/Time:	Received by:	Date/Time:
Craig Petko	10/22/21 1140		10/22/21 1140
Relinquished by:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Date/Time:	Received by:	Date/Time:

Preservative: 1-ice, 2-H_2SO_4, 3-HCl, 4-HNO_3, 5-NaOH, 6-ZnOAC, 7-Methanol, 8-DI water
Sample Matrix: SW - Surface Water, GW - Groundwater, Sed - Sediment, S - Soil, Sld - Sludge, A - Air

WHITE COPY - LABORATORY YELLOW COPY - LABORATORY PINK COPY - SAMPLER'S COPY

Pace Analytical®

SAMPLE CONDITION UPON RECEIPT FORM

Date/Time and Initials of person examining contents: MCS 10/22/21

1. **Courier:** ☐ FED EX ☐ UPS ☒ CLIENT ☐ PACE ☐ USPS ☐ OTHER _____
2. **Custody Seal on Cooler/Box Present:** ☐ Yes ☒ No
   (If yes)Seals Intact: ☐ Yes ☐ No **(leave blank if no seals were present)**
3. **Thermometer:** 1 2 3 4 5 6 A B C D E F
4. **Cooler Temperature:** 3.0/3.0°C
   Temp should be above freezing to 6°C **(Initial/Corrected)**

5. **Packing Material:** ☐ Bubble Wrap ☒ Bubble Bags ☐ None ☐ Other _____
6. **Ice Type:** ☒ Wet ☐ Blue ☐ None
7. **If temp. is over 6°C or under 0°C, was the PM notified?:** ☐ Yes ☐ No

All discrepancies will be written out in the comments section below.

	Yes	No		Yes	No	N/A
USDA Regulated Soils? (HI, ID, NY, WA, OR,CA, NM, TX, OK, AR, LA, TN, AL, MS, NC, SC, GA, FL, or Puerto Rico)		—	All containers needing acid/base pres. Have been CHECKED?: **exceptions: VOA, coliform, LLHg, O&G, and any container with a septum cap or preserved with HCl.** **Circle: HNO3 (<2) H2SO4 (<2) NaOH (>10) NaOH/ZnAc (>9)** Any non-conformance to pH recommendations will be noted on the container count form	✓		
Short Hold Time Analysis (48 hours or less)? **Analysis:** DI TC		—				
Time 5035A TC placed in Freezer or Short Holds To Lab	Time: 1158			Present	Absent	N/A
			Residual Chlorine Check (SVOC 625 Pest/PCB 608)			—
Rush TAT Requested (4 days or less):		—	Residual Chlorine Check (Total/Amenable/Free Cyanide)			—
Custody Signatures Present?	—		Headspace Wisconsin Sulfide?			—
Containers Intact?:	—		Headspace in VOA Vials (>6mm): See Containter Count form for details	Present	Absent —	No VOA Vials Sent
Sample Label (IDs/Dates/Times) Match COC?: Except TCs, which only require sample ID	—		Trip Blank Present?		—	
Extra labels on Terracore Vials? (soils only)		—	Trip Blank Custody Seals?:		—	

COMMENTS:

COC PAGE ____ of ____

Sample Container Count

SBS
~~01~~ 5
MeOH (only)
BK
Kit

** Place a RED dot on containers that are out of conformance **

COC Line Item	WGFU	R	DG9H / VG9H	VOA VIAL HS (>6mm)	VG9U	DG9U	VG9T	AG0U	AG1H	AG1U	AG2U	AG3S	AG3SF	AG3C	BP1U	BP1N	BP2U	BP3U	BP3N	BP3F	BP3S	BP3B	BP3Z	CG3H	Syringe Kit	WGKU		Matrix	HNO3/ H2SO4 pH <2	NaOH/ ZNAc pH >9	NaOH pH>10
1			3					2		2								2	1									WS	✓		
2	1	4																								3		SL			
3																															
4																															
5																															
6																															
7																															
8																															
9																															
10																															
11																															
12																															

Container Codes

Glass

DG9H	40mL HCl amber voa vial	BG1T	1L Na Thiosulfate clear glass	BP1B	1L NaOH plastic
DG9P	40mL TSP amber vial	BG1U	1L unpreserved glass	BP1N	1L HNO3 plastic
DG9S	40mL H2SO4 amber vial	BG3H	250mL HCl Clear Glass	BP1S	1L H2SO4 plastic
DG9T	40mL Na Thio amber vial	BG3U	250mL Unpres Clear Glass	BP1U	1L unpreserved plastic
DG9U	40mL unpreserved amber vial	AG0U	100mL unpres amber glass	BP1Z	1L NaOH, Zn, Ac
VG9H	40mL HCl clear vial	AG1H	1L HCl amber glass	BP2N	500mL HNO3 plastic
VG9T	40mL Na Thio. clear vial	AG1S	1L H2SO4 amber glass	BP2C	500mL NaOH plastic
VG9U	40mL unpreserved clear vial	AG1T	1L Na Thiosulfate amber glass	BP2S	500mL H2SO4 plastic
I	40mL w/hexane wipe vial	AG1U	1liter unpres amber glass	BP2U	500mL unpreserved plastic
WGKU	8oz unpreserved clear jar	AG2N	500mL HNO3 amber glass	BP2Z	500mL NaOH, Zn Ac
WGFU	4oz clear soil jar	AG2S	500mL H2SO4 amber glass	BP3B	250mL NaOH plastic
JGFU	4oz unpreserved amber wide	AG2U	500mL unpres amber glass	BP3N	250mL HNO3 plastic
CG3H	250mL clear glass HCl	AG3S	250mL H2SO4 amber glass	BP3F	250mL HNO3 plastic-field filtered
BG1H	1L HCl clear glass	AG3SF	250mL H2SO4 amb glass -field filtered	BP3U	250mL unpreserved plastic
BG1S	1L H2SO4 clear glass	AG3U	250mL unpres amber glass	BP3S	250mL H2SO4 plastic
GN	General	AG3C	250mL NaOH amber glass	BP3Z	250mL NaOH, ZnAc plastic

Plastic / Misc.

BP4U	125mL unpreserved plastic
BP4N	125mL HNO3 plastic
BP4S	125mL H2SO4 plastic

Syringe Kit	LL Cr+6 sampling kit

AF	Air Filter
C	Air Cassettes
R	Terracore kit
SP5T	120mL Coliform Na Thiosulfate
U	Summa Can
ZPLC	Ziploc Bag

WT		Water	
SL		Solid	
NAL	OL	Non-aqueous liquid	Oil
WP		Wipe	

RE-APPROVAL NOTICE

Customer Account: 601139

December 17, 2021

Vanessa Bravo
VISION ENVIRONMENTAL, LLC
57 4TH STREET, UNIT B
SOMERVILLE, NJ 08876

Thank you for selecting US Ecology ("USE") as your environmental management partner. In the event that a waste stream has not changed, the generator may use this form to re-approve the waste profile.

Generator Name: EXIDE ENVIRONMENTAL RESPONSE TRUST **EPA ID No.:** IND001647460

Waste Common Name: Drill Cuttings & PPE

Waste Code(s):

Approval No.: K196084DET **Expiration Date:** 11/13/2020

USE Facility Name & ID Number: EQ Detroit, Inc. (MID980991566)

This Re-approval Notice acknowledges the acceptability of waste material(s) into the noted USE facility(s) and ensures each facility has the appropriate permit(s) issued by federal and state regulatory agencies to properly transport, treat, and/or dispose of the waste material(s). Upon signature and submittal of this form, the waste stream will be reviewed by USE. The expiration will be extended for one year, unless you are contacted otherwise.

I certify that all information (including attachments) is complete and factual and is an accurate representation of the known and suspected hazards, pertaining to the waste described herein. I authorize USE to add supplemental information to the waste approval file, provided I am contacted and give verbal permission. I authorize USE to obtain a sample from any waste shipment for purposes of verification and confirmation. I agree that, if USE approves the waste described herein, all such wastes that are transported, delivered, or tendered to USE by Generator or on Generator's behalf shall be subject to, and Generator shall be bound by, the Standard Terms and Conditions associated with the original Waste Profile Form. (The Standard Terms and Conditions are incorporated into the Waste Profile Form as Page 4.)

Generator Signature: _____ Printed Name: _____

Company Name: _____ Date: _____

Please return this form via fax (800) 592-5329 or email customer.service@usecology.com. Questions? Please call (800) 592-5489.

RE-APPROVAL NOTICE

Customer Account: 601139

December 17, 2021

Vanessa Bravo
VISION ENVIRONMENTAL, LLC
57 4TH STREET, UNIT B
SOMERVILLE, NJ 08876

Thank you for selecting US Ecology ("USE") as your environmental management partner. In the event that a waste stream has not changed, the generator may use this form to re-approve the waste profile.

Generator Name: EXIDE ENVIRONMENTAL RESPONSE TRUST **EPA ID No.:** IND001647460

Waste Common Name: Non Haz Soil

Waste Code(s):

Approval No.: L199075DET **Expiration Date:** 11/13/2020

USE Facility Name & ID Number: EQ Detroit, Inc. (MID980991566)

This Re-approval Notice acknowledges the acceptability of waste material(s) into the noted USE facility(s) and ensures each facility has the appropriate permit(s) issued by federal and state regulatory agencies to properly transport, treat, and/or dispose of the waste material(s). Upon signature and submittal of this form, the waste stream will be reviewed by USE. The expiration will be extended for one year, unless you are contacted otherwise.

I certify that all information (including attachments) is complete and factual and is an accurate representation of the known and suspected hazards, pertaining to the waste described herein. I authorize USE to add supplemental information to the waste approval file, provided I am contacted and give verbal permission. I authorize USE to obtain a sample from any waste shipment for purposes of verification and confirmation. I agree that, if USE approves the waste described herein, all such wastes that are transported, delivered, or tendered to USE by Generator or on Generator's behalf shall be subject to, and Generator shall be bound by, the Standard Terms and Conditions associated with the original Waste Profile Form. (The Standard Terms and Conditions are incorporated into the Waste Profile Form as Page 4.)

Generator Signature: _____ Printed Name: _____

Company Name: _____ Date: _____

Please return this form via fax (800) 592-5329 or email customer.service@usecology.com. Questions? Please call (800) 592-5489.

RE-APPROVAL NOTICE

Customer Account: 601139

December 17, 2021

Vanessa Bravo
VISION ENVIRONMENTAL, LLC
57 4TH STREET, UNIT B
SOMERVILLE, NJ 08876

Thank you for selecting US Ecology ("USE") as your environmental management partner. In the event that a waste stream has not changed, the generator may use this form to re-approve the waste profile.

Generator Name: EXIDE ENVIRONMENTAL RESPONSE TRUST **EPA ID No.:** IND001647460

Waste Common Name: Drilling Water

Waste Code(s): 029L

Approval No.: K196082DET **Expiration Date:** 11/13/2020

USE Facility Name & ID Number: EQ Detroit, Inc. (MID980991566)

This Re-approval Notice acknowledges the acceptability of waste material(s) into the noted USE facility(s) and ensures each facility has the appropriate permit(s) issued by federal and state regulatory agencies to properly transport, treat, and/or dispose of the waste material(s). Upon signature and submittal of this form, the waste stream will be reviewed by USE. The expiration will be extended for one year, unless you are contacted otherwise.

I certify that all information (including attachments) is complete and factual and is an accurate representation of the known and suspected hazards, pertaining to the waste described herein. I authorize USE to add supplemental information to the waste approval file, provided I am contacted and give verbal permission. I authorize USE to obtain a sample from any waste shipment for purposes of verification and confirmation. I agree that, if USE approves the waste described herein, all such wastes that are transported, delivered, or tendered to USE by Generator or on Generator's behalf shall be subject to, and Generator shall be bound by, the Standard Terms and Conditions associated with the original Waste Profile Form. (The Standard Terms and Conditions are incorporated into the Waste Profile Form as Page 4.)

Generator Signature: _____ Printed Name: _____

Company Name: _____ Date: _____

Please return this form via fax (800) 592-5329 or email customer.service@usecology.com. Questions? Please call (800) 592-5489.

APPENDIX F

Bio-Trap Protocols and Results

10515 Research Drive
Knoxville, TN 37932
Phone: (865) 573-8188
Fax: (865) 573-8133

Client: Gregory Smoot
Advanced GeoServices Corp
1055 Andrew Drive
Suite A
West Chester, PA 19380

Phone: 610-745-4624

Fax:

Identifier: 041TC **Date Rec:** 03/10/2022 **Report Date:** 03/16/2022

Client Project #: 2020-4123-02 **Client Project Name:** Exide Trust - Frankfort

Purchase Order #: 2020-4123-02

Test results provided for: CENSUS

Reviewed By:

Charles Slater

Results relate only to the items tested and the sample(s) as received by the laboratory.

MICROBIAL INSIGHTS, INC.

10515 Research Dr., Knoxville, TN 37932
Tel. (865) 573-8188 Fax. (865) 573-8133

CENSUS

Client: **Advanced GeoServices Corp**
Project: Exide Trust - Frankfort

MI Project Number: **041TC**
Date Received: 03/10/2022

Sample Information

Client Sample ID:		**MW-1 MNA**	**MW-1 BioStim SRS**	**MW-1 BioAug SRS SDC-9**	**MW-4 MNA**	**MW-4 BioStim SRS**
Sample Date:		03/09/2022	03/09/2022	03/09/2022	03/09/2022	03/09/2022
Units:		cells/bead	cells/bead	cells/bead	cells/bead	cells/bead
Analyst/Reviewer:		BB/CS	BB/CS	BB/CS	BB/CS	BB/CS
Dechlorinating Bacteria						
Dehalococcoides	*DHC*	**2.03E+04**	**8.45E+03**	**7.18E+06**	**9.12E+03**	**2.66E+04**
tceA Reductase	TCE	**1.59E+03**	**5.95E+02**	**6.80E+05**	**4.68E+02**	**1.77E+03**
BAV1 Vinyl Chloride Reductase	BVC	<2.50E+01	<2.50E+01	<2.50E+01	**5.75E+01**	**3.83E+01**
Vinyl Chloride Reductase	VCR	**1.62E+03**	**7.11E+02**	**3.23E+05**	**5.14E+02**	**2.17E+03**

Legend:
NA = Not Analyzed NS = Not Sampled J = Estimated gene copies below PQL but above LQL I = Inhibited
< = Result not detected

MICROBIAL INSIGHTS, INC.

10515 Research Dr., Knoxville, TN 37932
Tel. (865) 573-8188 Fax. (865) 573-8133

CENSUS

Client: **Advanced GeoServices Corp**
Project: Exide Trust - Frankfort

MI Project Number: **041TC**
Date Received: 03/10/2022

Sample Information

Client Sample ID:		**MW-4 BioAug SRS SDC-9**	**MW-9 MNA**	**MW-9 BioStim SRS**	**MW-9 BioAug SRS SDC-9**
Sample Date:		03/09/2022	03/09/2022	03/09/2022	03/09/2022
Units:		cells/bead	cells/bead	cells/bead	cells/bead
Analyst/Reviewer:		BB/CS	BB/CS	BB/CS	BB/CS
Dechlorinating Bacteria					
Dehalococcoides	*DHC*	**1.27E+07**	**8.08E+03**	**4.28E+03**	**3.00E+06**
tceA Reductase	TCE	**1.28E+06**	**4.16E+02**	**3.66E+02**	**3.45E+05**
BAV1 Vinyl Chloride Reductase	BVC	**6.98E+01**	<2.50E+01	**7.80E+00 (J)**	<2.50E+01
Vinyl Chloride Reductase	VCR	**8.72E+05**	**4.89E+02**	**3.89E+02**	**2.42E+05**

Legend:
NA = Not Analyzed NS = Not Sampled J = Estimated gene copies below PQL but above LQL I = Inhibited
< = Result not detected

Quality Assurance/Quality Control Data

Samples Received **3/10/2022**

Component	Date Prepared	Date Analyzed	Arrival Temperature	Positive Control	Extraction Blank	Negative Control
BVC	03/10/2022	03/16/2022	0 °C	105%	non-detect	non-detect
TCE	03/10/2022	03/16/2022	0 °C	101%	non-detect	non-detect
DHC	03/10/2022	03/16/2022	0 °C	100%	non-detect	non-detect
VCR	03/10/2022	03/16/2022	0 °C	106%	non-detect	non-detect

REPORT TO:
Reports will be provided to the contact(s) listed below. Parties other than the contact(s) listed below will require prior approval.

Name: Greg Smoot
Company: Montrose Environmental
Address: 1055 Andrew Dr. Suite A West Chester, PA 19380
email: gsmoot@montrose-env.com
Phone: (610) 840-9142
Fax: (610) 840-9199

Project Manager: Jan Dobinsky
Project Name: Exide Trust - FRANKFORT
Project No.: 2020-4123-02

INVOICE TO:
For Invoices **paid by a third party** it is imperative that contact information & corresponding reference No. be provided.

Name:
Company:
Address:
email:
Phone: ( )
Fax: ( )

Purchase Order No. 2020-4123-02
Subcontract No.

microbialinsights
10515 Research Drive.
Knoxville TN 37932
phone (865) 573-8188
fax: (865) 573-8133
email: info@microbe.com
www.microbe.com

Please Check One:
☐ More samples to follow
☐ No Additional Samples

Saturday Delivery
Please see sampling protocol for instructions

Report Type: ☒ Standard (< ☐ Comprehensive (15% surcharge) ☐ Historical (30% surcharge)

Please contact us prior to submitting samples regarding questions about the analyses you are requesting at (865) 573-8188 (8:00 am to 4:00 pm M-F). After these hours please call (865) 300-8053.

Sample Information						MICRO									COC										GEO											
MI ID (Laboratory Use Only)	Monitoring Well	Unit Type	TIME COLLECTED	Date Deployed	Date Retrieved	CENSUS DHC	CENSUS BVC, TCE, VCR								COC	Dissolved Gases (MEE)									Volatile Fatty Acids (VFAs)	Anions										
041TC 1	MW-1	MNA	1200	12/10/21	3/9/22	X	X								X	X									X	X										
2	MW-1	BioStim SRS	1145	12/10/21	3/9/22	X	X								X	X									X	X										
3	MW-1	BioAug SRS SDC-9	1130	12/10/21	3/9/22	X	X								X	X									X	X										
4	MW-4	MNA	1300	12/10/21	3/9/22	X	X								X	X									X	X										
5	MW-4	BioStim SRS	1245	12/10/21	3/9/22	X	X								X	X									X	X										
6	MW-4	BioAug SRS SDC-9	1230	12/10/21	3/9/22	X	X								X	X									X	X										
7	MW-9	MNA	1400	12/10/21	3/9/22	X	X								X	X									X	X										
8	MW-9	BioStim SRS	1345	12/10/21	3/9/22	X	X								X	X									X	X										
9	MW-9	BioAug SRS SDC-9	1330	12/10/21	3/9/22	X	X								X	X									X	X										

Relinquished by: AJ Hessale 3/10/22

In order for analysis to be completed correctly, it is vital that chain of custody is filled out correctly & that all relative information is provided. Failure to provide sufficient and/or correct information regarding reporting, invoicing & analyses requested information may result in delays for which MI will not be liable. * additional cost and sample preservation are associated with RNA samples.

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Knoxville, TN 37932
Phone: 865.573.8188
Fax: 865.573.8133
Web: www.microbe.com

SITE LOGIC Report

Bio-Trap In Situ Microcosm Study

Contact: Gregory Smoot
Address: Advanced GeoServices Corp
1055 Andrew Drive
Suite A
West Chester, PA 19380

Phone: 610-745-4624

Email: gpsmoot@montrose-env.com

MI Identifier: 041TC **Report Date:** March 25, 2022

Project: Exide Trust – Frankfort; 2020-4123-02

Comments:

Executive Summary

A Bio-Trap® *In Situ* Microcosm (ISM) study was performed in monitoring wells MW-1, MW-4, and MW-9 to investigate whether the addition of an exogenous amendment and/or bioaugmentation would enhance the biodegradation of chlorinated ethenes. The ISM assemblies deployed in all three wells consisted of three Bio-Trap units each: (i) a control monitored natural attenuation (MNA) unit with no exogenous amendment, (ii) a BioStim unit amended with SRS as the electron donor, and (iii) a BioAug unit amended with SRS as the electron donor and the exogenous SDC-9 dechlorinating bacterial culture. Following the deployment period, the Bio-Trap units were recovered for CENSUS® analysis and quantification of contaminant concentrations, dissolved gases, volatile fatty acids (VFAs), and anions. A summary of the data is provided in Tables 1 - 3. Key observations from the results obtained for each *in situ* microcosm are described below.

MW-1 MNA, BioStim and BioAug Units

- The concentrations of *Dehalococcoides* (DHC) in the MNA and BioAug SRS SDC-9 units were measured at concentrations of 10^4 cells/bead and 10^6 cells/bead, respectively, which met the 10^4 cells/mL density threshold proposed by Lu et al. as a screening criterion for generally useful rates of biological reductive dechlorination[1]. However, the DHC concentration in the BioStim SRS unit (10^3 cells/bead) was below the 10^4 cells/mL density threshold proposed by Lu et al. (2006). DHC is capable of mediating the complete reductive dechlorination of tetrachloroethene (PCE) and trichloroethene (TCE) to ethene under anaerobic conditions.
- In addition, the TCE reductase gene and vinyl chloride reductase gene VCR were detected at higher concentrations in BioAug unit (10^5 cells/bead, each) compared to the MNA unit (10^3 cells/bead, each). However, in the BioStim unit, the TCE reductase gene and vinyl chloride reductase gene VCR were an order of magnitude lower (10^2 cells/bead, each) compared to the MNA unit. The vinyl chloride reductase gene BVC was below the detection limit under all conditions. Collectively, the microbial and functional gene data suggest that the potential for the complete reductive dechlorination of PCE and TCE to ethene at well MW-1 is moderate under MNA conditions, low in the BioStim unit, and high under the BioAug condition assessed.
- CENSUS® analysis indicated that the genetic potential for the anaerobic biodegradation of chlorinated ethenes was highest in the BioAug unit with SRS amendment with SDC-9 culture compared to the MNA and SRS BioStim units deployed at this well location.
- Contaminant analysis indicated that *cis*-1,2-DCE was the primary chlorinated ethene present in all units deployed in MW-1 and was detected at concentrations of 24.3 µg/L, 316 µg/L, and 278 µg/L, in MNA, BioStim and BioAug units, respectively. Vinyl chloride was the second highest contaminant detected in the BioStim (27.0 µg/L) and BioAug (28.6 µg/L) units, whereas in the MNA unit, it was TCE (23.5 µg/L). The elevated concentration of chlorinated compounds in the BioStim and BioAug units relative to the MNA unit may be due to vertical heterogeneity of contaminant distribution in the subsurface. The detection of vinyl chloride and ethene daughter products in all ISM units suggested that complete reductive dechlorination occurred during the deployment period.

[1] Lu, X., Wilson, J. T. & Kampbell, D. H. Relationship between *Dehalococcoides* DNA in ground water and rates of reductive dechlorination at field scale. Water Research **40,** 3131–3140 (2006).

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Fax: 865.573.8133
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- Dissolved methane ranged from 9 µg/L in the MNA unit to 30 µg/L in the BioAug unit, and the ethene concentration was less than 3 µg/L in all units.
- Sulfate was detected at concentrations of 559 mg/L, 401 mg/L, 271 mg/L, in the MNA, BioStim and BioAug units, respectively. The presence of alternative electron acceptors such as sulfate suggests that dechlorinating bacteria may be competing with other hydrogen-consuming microorganisms (*e.g.*, sulfate-reducing bacteria) for shared electron donors.
- Acetic acid was noticeably higher in the BioStim (51 mg/L) and BioAug (110 mg/L) units, compared to the MNA unit (0.2 mg/L, below the practical quantitation limit). Lactic acid was also detected in the MNA (2 mg/L), BioStim (2.1 mg/L), and BioAug (0.72 mg/L) units. Concentrations of other volatile fatty acids were below 1 mg/L. These results suggest that microorganisms were actively fermenting the electron donor components of the SRS amendments.

MW-4 MNA, BioStim and BioAug Units

- DHC concentrations were noticeably higher in the BioStim and BioAug Units deployed in well MW-4 (detected at concentrations of 10^4 cells/bead, and 10^7 cells/bead respectively) compared to the MNA unit (10^3 cells/bead). The higher DHC concentrations indicate an enhancement of the genetic potential for complete reductive dechlorination under SRS biostimulation and SDC-9 amendments.
- TCE and VCR reductase gene concentrations were detected on the order of 10^2 cells/bead in the MNA unit and 10^3 cells/bead in the BioStim unit, whereas TCE and VCR reductase gene concentrations were measured at concentrations of 10^6 cells/bead and 10^5 cells/bead, respectively, in the BioAug unit. The BVC gene was detected at a similar concentration of 10^1 cells/bead in all units. The results indicate that the both SRS amendment and SDC-9 bioaugmentation stimulated the overall growth of DHC and functional genes.
- The primary chlorinated contaminant in all Bio-Trap ISM units was *cis*-1,2-DCE, followed by TCE. The concentrations of *cis*-1,2-DCE were measured at 216000 µg/L, 389000 µg/L and 145000 µg/L in the MNA, BioStim and BioAug units, respectively. Ethene was detected in all units at high concentrations ranging from 2600 µg/L to 3000 µg/L. These results suggest that complete reductive dechlorination to ethene occurred in all three Bio-Trap ISM units during the deployment period.
- Methane concentrations were 3100 µg/L, 2900 µg/L and 2400 µg/L in MNA, BioStim and BioAug units, respectively. In addition, sulfate was detected in all units at concentrations ranging from 16.5 mg/L to 32.1 mg/L. The geochemical data suggest that site-specific well conditions may have been strongly reducing in all ISM units deployed in MW-4.
- Only acetic acid was detected in the BioAug unit (14 mg/L), whereas the concentrations of the other volatile fatty acids, including lactic acids, pyruvic acid, propionic acid, and butyric acid were either below the detection limit or below the practical quantitation limit for all units deployed at the MW-4 well location.

MW-9 MNA, BioStim and BioAug Units

- In the MNA and BioStim Units deployed in well MW-9, DHC was detected at a similar concentration of 10^3 cells/bead, whereas the DHC concentration was three orders of magnitude higher in the BioAug unit, indicating an enhancement of the genetic potential for complete reductive dechlorination under bioaugmentation with SDC-9 and SRS. TCE and VCR reductase genes were also higher in the BioAug unit (10^5 cells/bead each) compared to

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the MNA and BioStim units (10^2 cells/bead each), while BVC was either below the detection limit or below the practical quantitation limit in all units. These results indicate an increase in the genetic potential for the complete anaerobic reductive dechlorination of PCE and TCE under bioaugmentation with SDC-9 and SRS amendment at this well location.

- The primary chlorinated contaminant in all three Bio-Trap ISM units was *cis*-1,2-DCE, followed by vinyl chloride. *cis*-1,2-DCE measured at concentrations of 678 µg/L, 590 µg/L and 452 µg/L in the MNA, BioStim and BioAug units, respectively. Ethene was detected at concentrations of 14 µg/L, 12 µg/L and 10 µg/L in MNA, BioStim and BioAug units, suggesting that some complete reductive dechlorination had occurred in all three units. Ethane was also detected in all unit, at concentrations ranging from 74 µg/L to 82 µg/L.
- High methane concentrations were detected in the MNA (1200 µg/L), BioStim (1400 µg/L) and BioAug (1800 µg/L) units. Sulfate was only detected in the BioAug unit at a low concentration of 0.4 mg/L. The geochemical data suggest that site-specific well conditions may be reducing in all ISM units at this location.
- The VFA analysis indicated that acetic acid and propionic acid were detected in the MNA (51 mg/L, and 46 mg/L, respectively), BioStim (57 mg/L, and 48 mg/L, respectively) and BioAug (15 mg/L, and 18 mg/L, respectively) units. Concentrations of other volatile fatty acids were below 2 mg/L.

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Overview of Approach

Site managers have frequently turned to laboratory microcosms or small pilot studies to evaluate bioremediation. However, duplication of *in situ* conditions in the laboratory is difficult and the results often do not correlate to the field. Pilot studies are performed in the field but are often prohibitively expensive as an investigative tool. Bio-Trap studies serve as cost-effective, *in situ* microcosms providing microbial, chemical, and geochemical evidence to evaluate biodegradation as a treatment mechanism and to screen remedial alternatives.

Typically each Bio-Trap Unit will contain samplers to evaluate the following:

Geochemical Fingerprint (GEO)	•40 mL VOA vial with a nylon screened cap designed for assessment of a variety of geochemical parameters including anions and metabolic acids.
Contaminant of Concern (COC)	•Passive diffusion bag designed for analysis of a variety of COCs including chlorinated solvents and petroleum hydrocarbons.
Microbial Populations (MICRO)	•PVC cassette containing Bio-Sep® beads, which provide a large surface area for microbial attachment and were designed for analysis by a variety of molecular biological tools (MBTs).

How does it work?

The MICRO sampler (microbial populations) contains Bio-Sep® beads, an engineered composite of Nomex® and powdered activated carbon which provides an incredibly large surface area (~600 m^2/g) that is readily colonized by subsurface microorganisms. In addition to a matrix for microbial growth, the Bio-Sep® beads can be "baited" with amendments including electron donors (e.g. hydrogen releasing compounds) to investigate biostimulation approaches to enhance biodegradation. The Bio-Trap units also contain a COC (contaminant of concern) sampler to measure contaminant concentrations, daughter product formation, and dissolved gases and a GEO (geochemical fingerprint) sampler for quantification of geochemical parameters (nitrate, iron, sulfate, etc.), chloride production, and metabolic acids (pyruvic, lactic, acetic, propionic, etc.).

Bio-Trap® *In Situ* Microcosm studies at chlorinated solvent sites typically include three types of Bio-Trap Units deployed within a monitoring well. Each Bio-Trap Unit corresponds to one of the three most common remedial options: monitored natural attenuation (MNA), Biostimulation (BioStim), and Bioaugmentation (BioAug). All three Bio-Trap Units contain COC and GEO samplers for chemical and geochemical analyses. The key difference between the Bio-Trap Units is in the MICRO sampler.

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Types of Bio-Trap Units typically deployed and MICRO sampler configurations:

Control (MNA)	•Bio-Sep® beads contain no additional amendment and represent current aquifer conditions.
Biostimulation (BioStim)	•An amendment supplier is used to release the desired specified electron donor (sodium lactate, molasses, EVO, etc.) or electron acceptor (oxygen release compound, sulfate, etc.).
Bioaugmentation (BioAug)	•Bio-Sep® beads are pre-inoculated with a bioaugmentation culture, such as *Dehalococcoides*. These units can also be baited with an additional amendment.

MNA Unit: The purpose of the Control Bio-Trap Unit is to quantify contaminant degrading bacteria and daughter product formation under monitored natural attenuation (MNA) conditions and to serve as a baseline for comparison to BioStim and/or BioAug Units.

Following in-well deployment, DNA or phospholipid fatty acids (PLFA) can be extracted from the Bio-Sep beads for further analysis. For example, DNA extracted from the Bio-Sep beads can be used in CENSUS analysis of *Dehalococcoides* (DHC) and vinyl chloride reductase (*bvcA* and *vcrA*) genes to evaluate the potential for complete reductive dechlorination of PCE to ethene under MNA conditions. The VOC and anion samplers can be used to determine concentrations of contaminants, daughter products, dissolved gases, terminal electron acceptors, and chloride.

BioStim Unit: The Biostimulation Bio-Trap Unit is designed to test the hypothesis that electron donor addition will stimulate growth of dechlorinating bacteria and enhance biodegradation. As with the MNA Unit, the BioStim Unit contains COC and GEO samplers for chemical analyses. The BioStim Unit contains an amendment supplier to release the desired amendment over the incubation time.

BioAug Unit: The Bioaugmentation Bio-Trap Unit is designed to evaluate bioaugmentation as a treatment technology. The MICRO sampler contains Bio-Sep® beads pre-inoculated with the desired commercial culture. An amendment supplier may also be used to deliver an amendment. As with the MNA and BioStim Units, the BioAug Unit also contains a COC and GEO samplers for chemical analyses.

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Results

Table 1. Summary of the results obtained for *In Situ* Microcosm Units.

Sample Information	MW-1	MW-1	MW-1
Treatment	MNA	BioStim SRS	BioAug SRS SDC-9
Sample Date	03/09/2022	03/09/2022	03/09/2022
MI ID	041TC-1	041TC-2	041TC-3
Microbial Populations (cells/bd)			
Dehalococcoides (DHC)	**2.03E+04**	**8.45E+03**	**7.18E+06**
tceA Reductase (TCE)	**1.59E+03**	**5.95E+02**	**6.80E+05**
bvcA Reductase (BVC)	< 2.50E+01	< 2.50E+01	< 2.50E+01
vcrA Reductase (VCR)	**1.62E+03**	**7.11E+02**	**3.23E+05**
Contaminant of Concern (µg/L)			
Tetrachloroethene	<5.00	<25.0	<25.0
Trichloroethene	**23.5**	**8.8 J**	**7.0 J**
cis-1,2-Dichloroethene	**24.3**	**316**	**278**
trans-1,2-Dichloroethene	**0.5 J**	**1.2 J**	<25.0
Vinyl chloride	**2.8**	**27.0**	**28.6**
Dissolved Gases (µg/L)			
Methane	**9**	**16**	**30**
Ethane	<1.0	<1.0	**0.2 J**
Ethene	**2.7**	**1.3**	**1.1**
VFAs (mg/L)			
Lactic Acid	**2**	**2.1**	**0.72**
Pyruvic Acid	<0.50	<0.50	<0.50
Acetic Acid	**0.2 J**	**51**	**110**
Propionic Acid	<0.50	<0.50	<0.50
Butyric Acid	<0.50	**0.5**	**0.5**
Anions (mg/L)			
Chloride	**2.5**	**5.3 J**	**6.1 J**
Nitrate	<0.4	<0.4	<0.4
Nitrite	<0.4	<0.4	<0.4
Sulfate	**559**	**401**	**271**

Legend: NA = Not analyzed NS = Not sampled J = Estimated result below PQL but above LQL I = Inhibited <= Result not detected.

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Table 2. Summary of the results obtained for *In Situ* Microcosm Units.

Sample Information	MW-4	MW-4	MW-4
Treatment	MNA	BioStim SRS	BioAug SRS SDC-9
Sample Date	03/09/2022	03/09/2022	03/09/2022
MI ID	041TC-4	041TC-5	041TC-6
Microbial Populations (cells/bd)			
Dehalococcoides (DHC)	**9.12E+03**	**2.66E+04**	**1.27E+07**
tceA Reductase (TCE)	**4.68E+02**	**1.77E+03**	**1.28E+06**
bvcA Reductase (BVC)	**5.75E+01**	**3.83E+01**	**6.98E+01**
vcrA Reductase (VCR)	**5.14E+02**	**2.17E+03**	**8.72E+05**
Contaminant of Concern (µg/L)			
Tetrachloroethene	<25000	<50000	<12500
Trichloroethene	**69000**	**98700**	**11200 J**
cis-1,2-Dichloroethene	**216000**	**389000**	**145000**
trans-1,2-Dichloroethene	<25000	<50000	<12500
Vinyl chloride	**11100**	**19200 J**	**4390 J**
Dissolved Gases (µg/L)			
Methane	**3100**	**2900**	**2400**
Ethane	**1900**	**1500**	**1100**
Ethene	**3000**	**2700**	**2600**
VFAs (mg/L)			
Lactic Acid	<10	<10	<10
Pyruvic Acid	<10	<10	<10
Acetic Acid	**8.8 J**	**10.0 J**	**14**
Propionic Acid	<10	**7.4 J**	**6.6 J**
Butyric Acid	<10	<10	<10
Anions (mg/L)			
Chloride	**378**	**440**	**549**
Nitrate	<20.0	<0.4	<40.0
Nitrite	<20.0	<20.0	<1.0
Sulfate	**32.1**	**30.9**	**16.5**

Legend: NA = Not analyzed NS = Not sampled J = Estimated result below PQL but above LQL I = Inhibited <= Result not detected.

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Table 3. Summary of the results obtained for *In Situ* Microcosm Units.

Sample Information	MW-9	MW-9	MW-9
Treatment	MNA	BioStim SRS	BioAug SRS SDC-9
Sample Date	03/09/2022	03/09/2022	03/09/2022
MI ID	041TC-7	041TC-8	041TC-9
Microbial Populations (cells/bd)			
Dehalococcoides (DHC)	**8.08E+03**	**4.28E+03**	**3.00E+06**
tceA Reductase (TCE)	**4.16E+02**	**3.66E+02**	**3.45E+05**
bvcA Reductase (BVC)	< 2.50E+01	**7.80E+00 J**	< 2.50E+01
vcrA Reductase (VCR)	**4.89E+02**	**3.89E+02**	**2.42E+05**
Contaminant of Concern (µg/L)			
Tetrachloroethene	<500	<250	<125
Trichloroethene	<500	<250	<125
cis-1,2-Dichloroethene	**678**	**590**	**452**
trans-1,2-Dichloroethene	<500	<250	<125
Vinyl chloride	**146 J**	**110**	**173**
Dissolved Gases (µg/L)			
Methane	**1200**	**1400**	**1800**
Ethane	**82**	**74**	**74**
Ethene	**14**	**12**	**10**
VFAs (mg/L)			
Lactic Acid	**0.7**	**1.1**	<10
Pyruvic Acid	**0.2 J**	**0.2 J**	<10
Acetic Acid	**51**	**57**	**15**
Propionic Acid	**46**	**48**	**18**
Butyric Acid	**0.6**	**0.9**	<10
Anions (mg/L)			
Chloride	**17.4**	**41.9**	**19**
Nitrate	**0.1 J**	<10.0	<10.0
Nitrite	<0.2	<0.2	**0.1 J**
Sulfate	<0.2	<0.2	**0.4**

Legend: NA = Not analyzed NS = Not sampled J = Estimated result below PQL but above LQL I = Inhibited <= Result not detected.

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Glossary

Amendment Supplier: a component that fits inside the Bio-Trap unit at the top and/or bottom. This component is designed to slowly diffuse a desired amendment within a BioStim and/or a BioAug Unit during the incubation time.

Sampler: Individual components consisting either of a geochemical (GEO), contaminant of concern (COC) or microbial (MICRO) sampler. Geochemical samplers are essentially VOA vials with special septa that facilitate transfer. The microbial samplers are made from a smaller PVC pipe ~1" x 3 ½" and contains Bio-Sep® beads which serve as a microbial growth matrix.

> **COC Sampler:** a passive diffusion bag designed for analysis of a variety of COCs, including chlorinated solvents and petroleum hydrocarbons
>
> **GEO Sampler:** a 40 mL amber VOA with a nylon-based membrane permitting passive diffusion of anionic species
>
> **MICRO Sampler:** a polyvinylchloride cassette containing Bio-Sep® beads which provide a large surface area for microbial growth. In addition to a matrix for microbial growth, the Bio-Sep® beads can be "baited" with bioaugmentation cultures or ^{13}C-labeled compounds. Bio-Sep® beads were designed to allow extraction of phospholipids fatty acids and DNA for analysis of microbial communities.

Unit: 1.25" x 15" PVC housing that all of the samplers are place into for deployment. Units will have baffled end caps to separate different zones within the monitoring well. Typically, each unit will correspond to a treatment approach.

Assembly: Collections of Units for a particular monitoring well. Samplers (GEO, COC, and MICRO) are placed in each unit. Units are linked to form an Assembly. An entire Assembly (consisting of multiple units) is deployed in each wel**l.**

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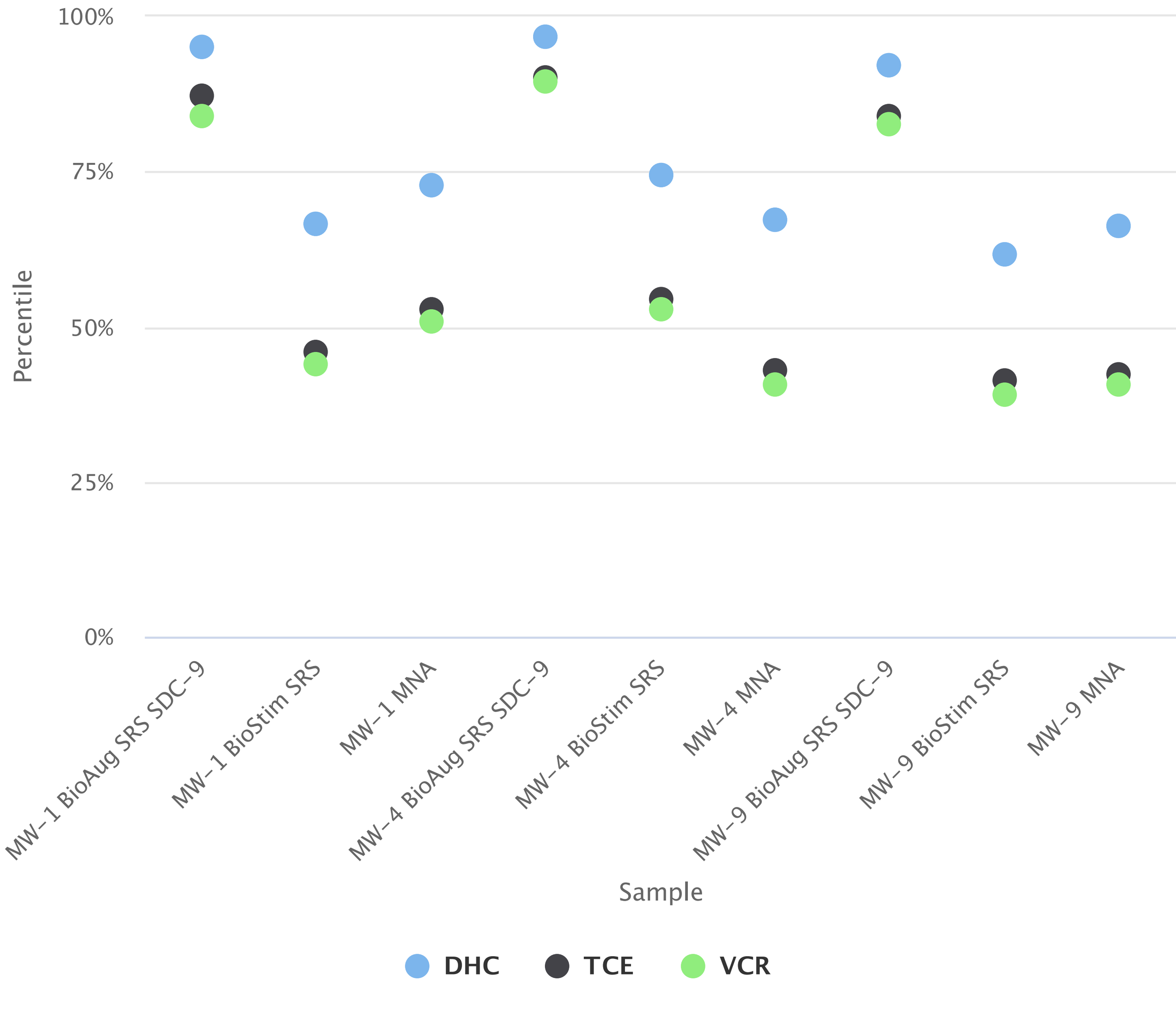
Target Percentiles



Sampling Instructions

Storage:

It is important to minimize the amount of time that Bio-Trap Samplers are stored prior to being installed in the field. The physical properties of the Bio-Trap Samplers that make them an ideal medium for collecting microbes also increase the chances of microbial or chemical contamination. **Bio-Trap Samplers need to remain sealed and refrigerated** (not frozen) until they can be installed in the field.

Note: Clean sterile gloves should be used at all times when handling Bio-Trap Samplers.

Installation:

- Prior to installing Bio-Trap Units, the monitoring well may need to be purged if it has not been sampled recently. If purging is necessary, MI recommends that three well volumes be removed to ensure contact with formation water and reduce well bore effect.
- Assemble the Bio-Trap Units as described in this protocol. Attach the top Bio-Trap Unit to a nylon line (not provided) and suspend the units at a depth where significant contaminant concentrations exist. If data is not available on the vertical distribution of contaminants, suspend the Bio-Trap Units in the middle of the saturated screened interval. **If deploying multiple Bio-Trap Units, be sure that all units are placed within the screened interval and that they remain covered by water for the entire deployment period.**
- Be sure not to suspend the bio-trap in the NAPL zone.

Helpful Hints

Do:

- **Do wear gloves when handling all Bio-Trap components.**
- **Do remove and discard the clear end cap covers from all vials.**
- **Do keep assembled Bio-Traps in an upright position.**

Do not:

- **Do NOT remove the units from the well during the entire incubation period. Cross-talk can result from any disturbance to the units.**
- **Do NOT prepare multiple units at the same time. Preparing each unit separately minimizes the potential for mistakes to occur.**
- **Do NOT cut the rubber baffles. The baffles are sized to the well diameter to prevent cross-talk between the Units.**

Remember:

- **Amber vials are samplers**
- **Clear vials and sponges are suppliers**
- **Color dictates type of sampler or supplier**

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Supply List - Deployment

Following is a table detailing the supplies that were sent for deployment of the bio-trap units and the colors used for the amendment suppliers.

No.	Item	Image
9	Housing Unit	
3	Weight	
10	40 mL GEO Sampler*	
10	COC Sampler*	
6	Standard MICRO Sampler	
3	SDC-9 MICRO Sampler	
12	SRS Amendment Supplier	
3	Gray PVC Spacer	

* Extra samplers provided in case of breakage during shipping

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Terminology

Samplers are placed in each slotted PVC housing unit. Housing units (e.g. Control, BioStim-LACTATE, BioAug-DHC, etc.) are linked to form an Assembly. An entire Assembly (consisting of 2 or more units) is deployed in each well. **See Figure 1.**

Assembly: An assembly is a collection of two or more units (20" PVC housings) for deployment in a particular monitoring well.

Unit: A unit is a 1.25" x 20" slotted PVC housing to hold samplers. Units have baffled end caps to separate different zones within the monitoring well and are sized according to the well diameter. Typically each unit will correspond to a treatment (labeled "Control-MNA", "BioStim-LACTATE", "BioAug-DHC"). The metal nameplate is on the bottom of the Unit.

Samplers: ALL units will contain three samplers – One geochemical fingerprint sampler (GEO), one contaminant of concern sampler (COC), and one microbial population sampler (MICRO).

- The **GEO** sampler is a 40 mL amber VOA vial, with Teal screw cap.
- The **COC** sampler is a ~ 6 ½" Passive Diffusion Bag.
- The **MICRO** sampler is a ~ 1" x 1 ½" slotted PVC pipe containing Bio-Sep beads.

Amendment Supplier: BioStim and/or BioAug units will include an "Amendment Supplier" which provides an electron donor (e.g. LACTATE, EOS), or an electron acceptor (e.g. ORC, PermeOx, nitrate, sulfate), or a nutrient source intended to stimulate microbial activity. Depending on the type of amendment, the amendment supplier will be one of the following:

- a sponge, or
- a nylon pouch, or
- a clear VOA vial

A sponge placed in the bottom of the unit is typically used as the amendment supplier for viscous amendments such as LACTATE or EOS. For powdered or granular amendments, a nylon pouch is often used as the amendment supplier. A clear VOA vial is used for dissolved amendment solutions. The Control-MNA units have a solid gray PVC spacer as a substitute for the amendment supplier.

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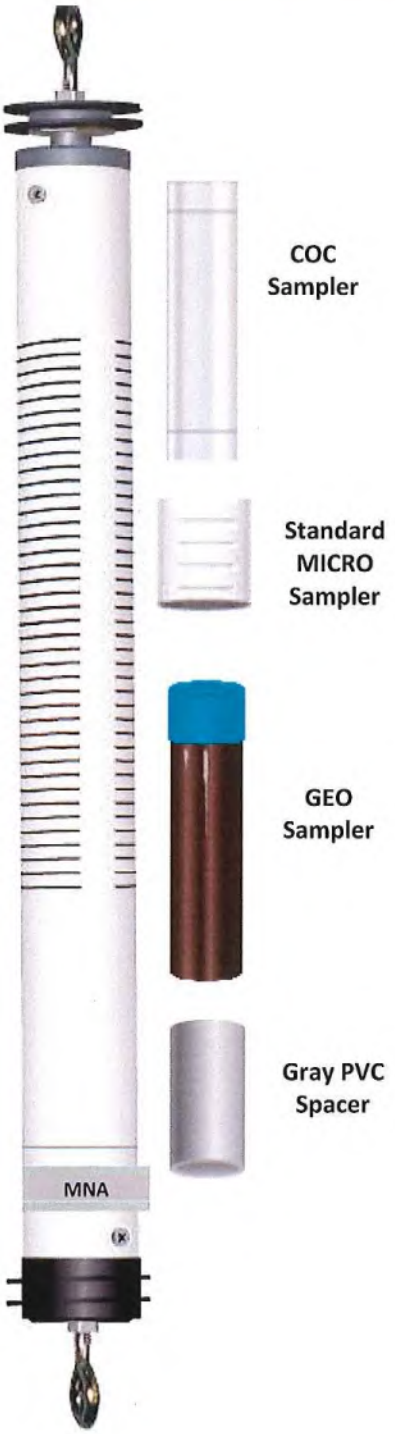
Pre-deployment Instructions

- Remove the **clear end cap covers** from all glass VOA vials. Colored screw caps should NOT be removed.
- The BOTTOM of the unit has the metal nameplate (e.g. MNA, LACTATE, BioAug-DHC, etc.)

Control – MNA unit assembly

- Twist off the bottom of unit labeled "MNA" to fill with samplers.
- First, place the COC Sampler in the housing unit.
- Next, insert the Standard MICRO sampler. It does not matter which end goes in first. Be sure to wear gloves.
- Then, place the 40 mL amber VOA vial with the Teal screw cap (GEO Sampler) into the housing so that the cap is facing the MICRO sampler and the top of the unit.
- Please insert one gray PVC spacer as a substitute for an amendment supplier.
- Hand-tighten the threaded cap back onto unit until it is secure. Remember to store the unit in an upright position.
- A total of three (3) units of this configuration will be required.



Unit

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Bio-Stim – SRS

- Twist off the bottom of unit labeled "BIOSTIM SRS" to fill with samplers.
- First, place one of the SRS amendment supplier sponges into the unit.
- Then, place the COC Sampler in the housing unit.
- Next, insert the MICRO sampler. It does not matter which end goes in first. Be sure to wear gloves.
- Next, place the 40 mL VOA vial with the Teal screw cap (GEO Sampler) into the housing so that the cap is facing the MICRO sampler and the top unit.
- Next, insert another SRS amendment supplier sponge into the unit.
- Carefully hand-tighten the threaded cap back onto unit until it is secure. Remember to store the unit in an upright position.
- A total of three (3) units of this configuration will be required.

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Bio-Aug – SRS, SDC-9 culture

- Twist off the bottom of unit labeled "BIOAUG SRS SDC-9" to fill with samplers.
- First, place one of the SRS amendment supplier sponges into the unit.
- Then, place the COC Sampler in the housing unit.
- Next insert the SDC-9 MICRO sampler. It does not matter which end goes in first.
  Be sure to wear gloves.
- Next, place the 40 mL VOA vial with the Teal screw cap (GEO Sampler) into the housing so that the cap is facing the MICRO sampler and the top unit.
- Next, insert another SRS amendment supplier sponge into the unit.
- Carefully hand-tighten the threaded cap back onto unit until it is secure. Remember to store the unit in an upright position.
- A total of three (3) units of this configuration will be required.

Unit

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Bio-Trap Assembly and Deployment

Once all PVC units contain the required samplers, the units can be connected to form an assembly for in well deployment.

- **Control-MNA Unit –** The control unit is usually placed at the top of the assembly (shallowest position in the well). Be sure to securely attach a nylon rope or cable to the top of this unit to suspend the assembly in the well. BioStim units will be attached with metal fasteners to the bottom of this unit.

- **BioStim-Treatment A Unit –** Using the metal fasteners, attach the top of this unit to the bottom of the unit above. Repeat

- Repeat as necessary

Please note: Microbial Insights will send a separate shipment arriving on a later date with the retrieval supplies.

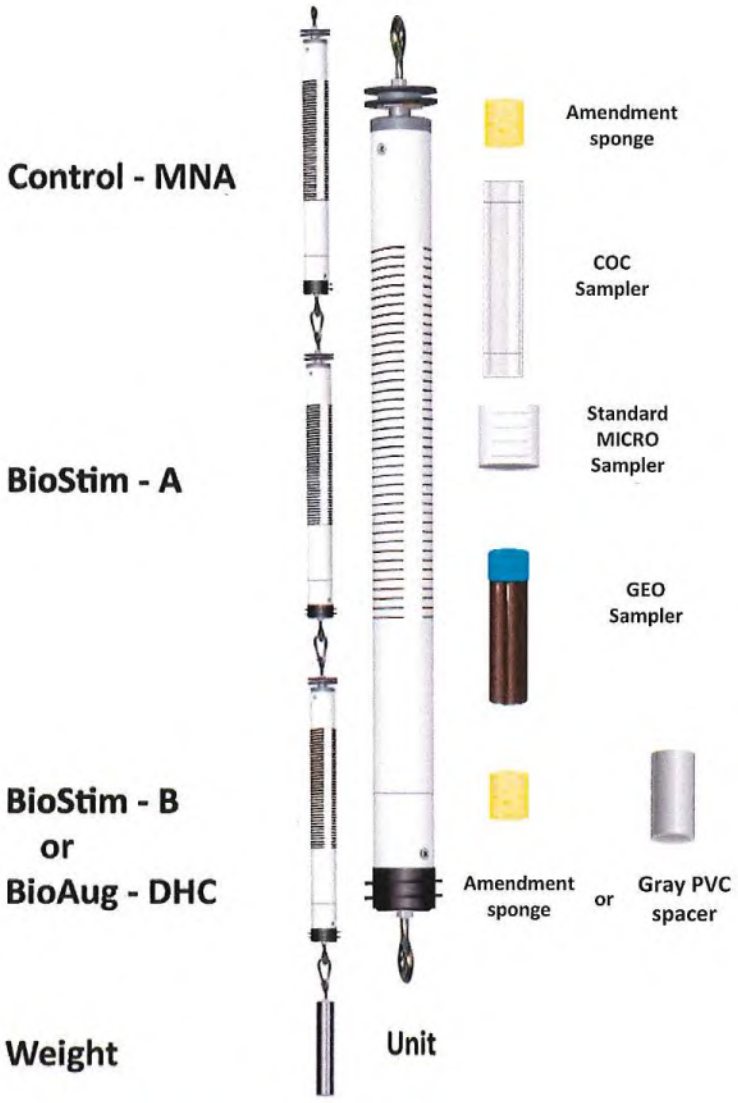

Illustration of Bio-Trap Assembly, Unit, and Samplers. Actual configuration may vary depending on the number of units per well

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Supply List – Return Kit

Following is a list of the supplies that are being shipped separately (from the deployment supplies) for retrieval of the Bio-Trap Units and their return to Microbial Insights for analysis.

Item
40mL clear VOA w/White Cap TSP preserved
40 mL clear VOA w/Red Cap HCl preserved
GEO Sampler w/ Teal return Caps
Clear ~ 5" straws for COC sampler (use one per bag)
Labels for COC and GEO samplers
Bubble Bags for VOA vials
Small Zippered Bag labeled for MICRO samplers
Large Clear Zippered Bags for Unit Samplers (COC, GEO, and MICRO)
MI Chain of Custody Form

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Bio-Trap Assembly Retrieval

- After the desired incubation period, carefully retrieve the assembly and remove the nylon line and the weights. **Units contain glass vials that can be broken so please handle with care.**
- Separate the Bio-Trap housing Units from each other and keep in an upright position.
- Open one Unit at a time and carefully remove all contents. DO NOT DISCARD THE PVC HOUSING UNIT.
- **Label and Package all contents from one unit before opening another unit.**
- Label the vials with the provided preprinted labels directly onto all vials. It is ok if the label overlaps the writing or covers the cap. Please include the well and unit type (Control, BioStim, BioAug, etc.) Please do not place the labels on the bubble wrap.
- Place the MICRO sampler (1" x 1 ½" slotted PVC containing bio-sep beads) into the silver zippered bag (provided) and label appropriately.
- Two 40-mL preserved vials are provided per unit to be filled with the water from the COC sampler bag.
    - First, open the cap for the 40mL HCl preserved vial (with red cap) and, holding the COC sampler bag upright above the vial, poke the bag with one end of the clear straw provided, making sure that the other end is positioned inside the vial. This ensures the flow of the liquid from the bag to the vial. Be careful not to spill any liquid. Fill the vial completely so that there is no head space / air bubble and then screw the cap back on it. Please ensure COC vial is full before proceeding to the next step.
    - Next, fill the 40 mL TSP preserved vial (with white cap) in the same way.
- Then, remove the Teal screw cap from the 40 mL VOA vial (GEO sampler) and replace with the extra blue screw cap provided. Please note that it is okay for the GEO sampler to be exposed to air. The original membrane will be removed with the cap.
- Sponge and nylon pouch amendment suppliers can be discarded as investigation derived waste.
- Once all screw caps have been replaced, tightly wrap each vial in a bubble wrap bag.
- Place all of the vials and MICRO sampler from one unit into a large clear zippered bag so that all samplers from a unit are in one bag.
- Place large clear bag containing all samplers within a cooler packed with ice as quickly as possible after retrieval and for shipping.
- Complete the MI chain of custody form.
- Ship all samplers along with the chain of custody form to Microbial Insights on ice. Ship the Bio-Trap housing units, weights, well caps, and PVC spacers to Microbial Insights separately. See shipping instructions below:

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Shipping Instructions

MICRO samplers and all VOA vials need to be shipped on ice (or blue ice) for next day delivery. If regular ice is used, the ice should be double bagged. **The Bio-Trap housing units, PVC spacers, well caps, and weights must be returned to Microbial Insights but should be shipped separately without ice.**

Samples should be shipped to:

Sample Custodian
Microbial Insights, Inc.
10515 Research Drive
Knoxville, TN 37932-2536
(865) 573-8188

Saturday Delivery:

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Please Check One:
☐ More samples to follow
☐ No Additional Samples

Saturday Delivery
Please see sampling protocol for instructions

Please contact us prior to submitting samples regarding questions about the analyses you are requesting at (865) 573-8188 (8:00 am to 4:00 pm M-F). After these hours please call (865) 300-8053.

Sample Information					MICRO									COC								GEO										
MI ID (Laboratory Use Only)	Monitoring Well	Unit Type	Date Deployed	Date Retrieved	CENSUS DHC	CENSUS BVC, TCE, VCR								COC	Dissolved Gases (MEE)								Volatile Fatty Acids (VFAs)	Anions									
		MNA			X	X								X	X								X	X									
		BioStim SRS			X	X								X	X								X	X									
		BioAug SRS SDC-9			X	X								X	X								X	X									
		MNA			X	X								X	X								X	X									
		BioStim SRS			X	X								X	X								X	X									
		BioAug SRS SDC-9			X	X								X	X								X	X									
		MNA			X	X								X	X								X	X									
		BioStim SRS			X	X								X	X								X	X									
		BioAug SRS SDC-9			X	X								X	X								X	X									

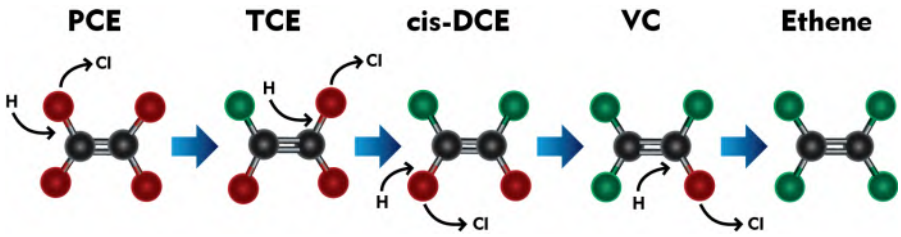
Relinquished by:

In order for analysis to be completed correctly, it is vital that chain of custody is filled out correctly & that all relative information is provided. Failure to provide sufficient and/or correct information regarding reporting, invoicing & analyses requested information may result in delays for which MI will not be liable. * additional cost and sample preservation are associated with RNA samples.

DHC Interpretation

Dehalococcoides 16S rRNA gene (qDHC)

Under anaerobic conditions, tetrachloroethene (PCE) and trichloroethene (TCE) can undergo sequential reductive dechlorination through the daughter products *cis*-dichloroethene (*cis*-DCE) and vinyl chloride to nontoxic ethene (1,2).



While a number of bacterial cultures capable of utilizing PCE and TCE as growth supporting electron acceptors have been isolated (3-7), *Dehalococcoides* spp. may be the most important because they are the only bacterial group that has been isolated to date which is capable of complete reductive dechlorination of PCE to ethene (8). In fact, the presence of *Dehalococcoides* spp. has been associated with complete dechlorination to ethene at sites across North America and Europe (9).

Status	*Dehalococcoides spp.*	Observation
	**≥ 10^4** (cells/mL)	Lu et al. proposed that a concentration of 1 x 10^4 DHC cells/mL could be used as a screening criterion to identify sites where reductive dechlorination will yield a generally useful biodegradation rate (10). Similarly, in an internal study conducted with nearly 1000 groundwater samples obtained from sites across the US, ethene production was observed in approximately 80% of samples in which CENSUS® qDHC results were greater than or equal to 10^4 DHC cells/mL.
	**10^1 to < 10^4** (cells/mL)	When vinyl chloride reductase genes (See DHC functional genes discussion below) are also detected, complete reductive dechlorination of PCE and TCE to ethene may still occur even with moderate DHC concentrations. When the DHC population is below the 10^4 cells/mL criterion proposed by Lu et al. (10), project managers should carefully consider other site-specific data to determine whether subsurface conditions may be limiting reductive dechlorination. For example, the addition of an electron donor may be able to stimulate DHC growth and enhance anaerobic bioremediation.
	**< 10^1** (cells/mL)	DHC concentrations are low suggesting that complete reductive dechlorination of PCE and TCE to ethene is unlikely to occur under existing conditions. Enhanced anaerobic bioremediation options (biostimulation or bioaugmentation) may need to be considered.

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DHC Functional Genes (*tce*A, *bvc*A, *vcr*A)

A "stall" where daughter products *cis*-DCE and vinyl chloride accumulate can occur at PCE- and TCE-impacted sites especially under MNA conditions. The accumulation of vinyl chloride, generally considered more carcinogenic than the parent compounds, is particularly problematic. Although elevated *Dehalococcoides* concentrations correspond to ethene production in numerous studies, the range of chlorinated ethenes metabolized and cometabolized varies among species and strains within the *Dehalococcoides* genus. For example, *Dehalococcoides ethenogenes* str. 195 metabolizes PCE, TCE, and *cis*-DCE and cometabolizes vinyl chloride (8) to produce ethene. Conversely, *Dehalococcoides* sp. CBDB1 utilizes PCE and TCE but does not cometabolize additional chloroethenes (11). Other *Dehalococcoides* strains, such as BAV1, GT and VS, are known to fully dechlorinate cis-DCE and VC to ethene (14,16,19). Quantification of reductive dehalogenase genes is used to more definitively confirm the potential for reductive dechlorination of TCE, cis-DCE, and vinyl chloride (12-15).

Functional Gene	Observation
TCE Reductase	
***tce*A gene**	The *tce*A gene encodes the enzyme responsible for reductive dechlorination of TCE to *cis*-DCE in some strains of *Dehalococcoides*. Absence of *tce*A does not preclude the potential for reductive dechlorination of TCE in the field since the *tce*A gene is not universally distributed among all DHC and is not present in other microorganisms capable of reductive dechlorination of TCE (e.g. *Dehalobacter*). Detection of the *tce*A gene provides an additional line of evidence indicating the potential for dechlorination of TCE.
Vinyl Chloride Reductase	
***bvc*A gene**	The *bvc*A gene encodes the vinyl chloride reductase enzyme responsible for reductive dechlorination of vinyl chloride to ethene by *Dehalococcoides* sp. str. BAV1 (16). Presence of *bvc*A gene indicates the potential for reductive dechlorination of VC to ethene. Absence of both *bvc*A and *vcr*A genes suggests VC may accumulate. An internal study with ~1,000 samples showed ethene production was observed in 80% of the samples that the DHC population was greater than or equal to 10^4 cells/mL. The *bvc*A gene was detected in over 50% of these samples. Van Der Zaan et al (17) noted that the bvcA gene was the only VC reductase gene detected at three of their sites. Alfred Spormann's laboratory at Stanford University (18) reported that the *bvc*A gene was the most abundant and active at the outflow of a PCE fed column study. This section of the column was in the DCE to VC stages of reductive dechlorination thus confirming the importance of the *bvc*A gene for complete reductive dechlorination.
***vcr*A gene**	The *vcr*A gene encodes the vinyl chloride reductase enzyme responsible for reductive dechlorination of *cis*-DCE and vinyl chloride by *Dehalococcoides* sp. strain VS (14). Presence of *vcr*A gene indicates the potential for reductive dechlorination of DCE and/or VC to ethene. Absence of both *bvc*A and *vcr*A genes suggest VC may accumulate. As with the *bvc*A gene, detection of the *vcr*A gene is associated with ethene production in internal studies (67%) and vinyl chloride reduction in independent studies (14, 17).

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Reporting

Microbial Insights can provide a variety of data packages and reporting levels to suit the needs of any project. Data packages range from simple analytical reports with results only to more complex data packages that include a report narrative, analytical results, QC data, and supporting materials including all raw data and chain-of-custody documentation. The figure below shows our standard report and explains the way values are reported.

Microbial Insights, Inc.

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CENSUS

Client: Company Name
Project: Your Project Name

MI Project Number: Unique Laboratory Identifier
Date Received: Date Samples Arrived

Sample Information

Client Sample ID:		Sample A	Sample B	Sample C
Sample Date:		00/00/0000	00/00/0000	00/00/0000
Units:		cells/mL	cells/mL	cells/mL
Analyst:		Intials	Intials	Intials
Dechlorinating Bacteria				
Dehalococcoides spp.	DHC	**1.84E+05**	**2.76E+02**	**2.28E+01 (J)**
Functional Genes				
tceA Reductase	TCE	**6.00E+01**	**3.23E+01**	<4.00E-01
bvcA Reductase	BVC	**1.17E+04**	**1.81E+01**	<4.00E-01
vcrA Reducatase	VCR	**8.42E+04**	**1.74E+02**	<4.00E-01

Legend:
NA = Not Analyzed NS = Not Sampled J = Estimated gene copies below PQL but above LQL I = Inhibited
< = Result not detected

"J" value
Result is an estimated value. This data qualifier (flag) is used when the target gene is detected but at a concentration or abundance below the practical quantification limit (PQL).

< value
The target gene was not detected at the limit of quantitation (LOQ) reported for that sample.

"I" value
QA Procedure indicated that the sample may have exhibited PCR inhibition. Although relatively rare, PCR inhibition can occur due to the presence of metals or humic acids at high concentrations in the sample.

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Quality Assurance

Microbial Insights' comprehensive Quality Assurance (QA) Program is the foundation of all laboratory analyses, ensuring that our clients receive high-quality analytical services that are timely, reliable, and meet their intended purpose in a cost effective manner. MI is committed to providing quality data that surpasses regulatory and industry standards, thus enabling the client to make well-informed decisions. MI maintains strict standard operating procedures and QA/QC measures throughout all of the analyses offered. The following Table details specific QA/QC procedures that are used for CENSUS.

QA/QC	Description
Date of Extraction	DNA and RNA extractions are performed the day the samples are received by MI to minimize the possibility of any changes to the microbial community prior to analysis.
Laboratory Method Blanks	An extraction blank (no sample added) is processed alongside each set of field samples from DNA extraction through CENSUS® analysis to ensure that cross contamination has not occurred. Although MI has never experienced this issue, the detection of the CENSUS® target (e.g. *Dehalococcoides*) in an extraction blank is direct evidence of cross contamination with a sample or contamination of a reagent and would invalidate the results. If this were to occur, MI would re-extract the sample. If not possible to re-extract, MI would contact the client immediately and notate it on the laboratory report.
Laboratory Control Samples (LCS)	A laboratory control sample (LCS) or positive control (target DNA) is included with each CENSUS® plate to confirm amplification and as a continuing calibration check.
Negative Controls	A negative control (no DNA) is included with each CENSUS plate to ensure that cross contamination has not occurred during amplification. As with the extraction blank, detection of CENSUS target (e.g. DHC) in a negative control is direct evidence of contamination and would invalidate the results. If this were to occur, MI would rerun the analysis.

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How to Use Estimated Percentile Ranks from the Microbial Insights Database

The MI Database and Client Portal

The Microbial Insights Database is the largest collection of field concentrations of key microorganisms and functional genes currently containing qPCR and QuantArray results for more than 32,000 unique groundwater, soil, and sediment samples from all 50 states and 33 countries worldwide. Driven by field samples, the database reflects the impacts of common contaminants, geochemical conditions, and site management practices on critical microbial populations.

With your report, you received a passcode enabling you to retrieve estimates of the percentile ranks of your results based on those compiled in the MI database at no additional charge. When accessing the database, you will be asked to provide background information about the sample (e.g. contaminant concentrations) to aid in understanding the links between environmental conditions and microbial populations. As with all client information provided to MI, site specific data will be treated as confidential.

Is that low, medium or high?

In practice, biodegradation depends not just on the presence but the actual concentrations of the contaminant degrading microorganisms. Simply put, qPCR and QuantArray results demonstrating high concentrations of target microorganisms or functional genes suggest in situ selection, enrichment and growth of those specific contaminant degraders and therefore a greater probability that monitored natural attenuation (MNA) or bioremediation will be successful.

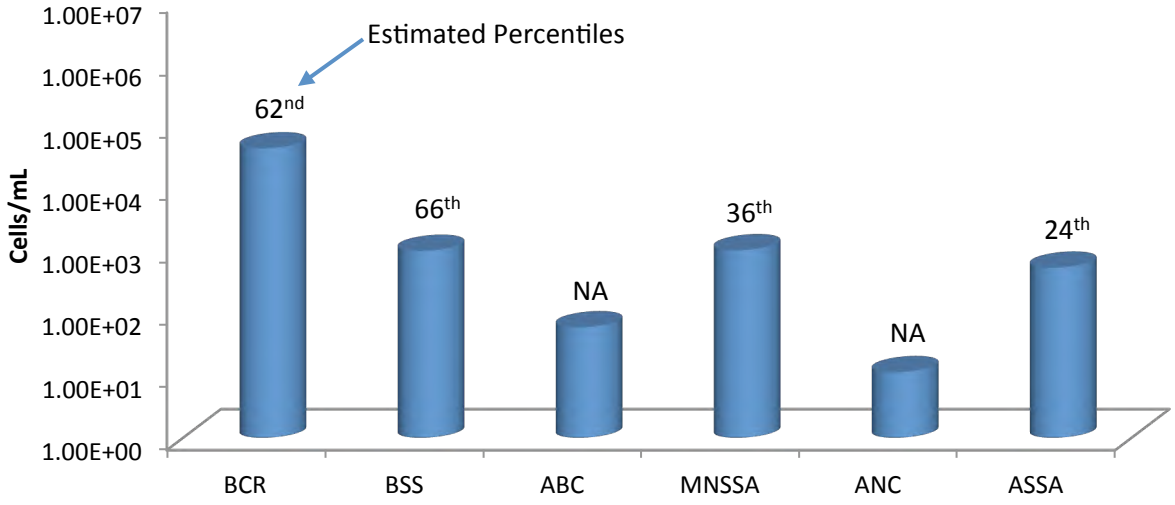
Is that a low, medium, or high concentration? The estimated percentile ranks retrieved from the MI Database answer that question by comparing your qPCR and QuantArray results to those of the literally thousands of other environmental samples submitted to MI for analysis over the last 20+ years.

Using the Estimated Percentile - Interpretation Examples

MNA Assessment – Petroleum Hydrocarbon Site:

Whenever possible, interpretation of qPCR and QuantArray results should include comparisons between samples obtained from background and impacted wells. The estimated percentile ranks however provide an additional avenue for comparison and evaluation of treatment options as shown below.

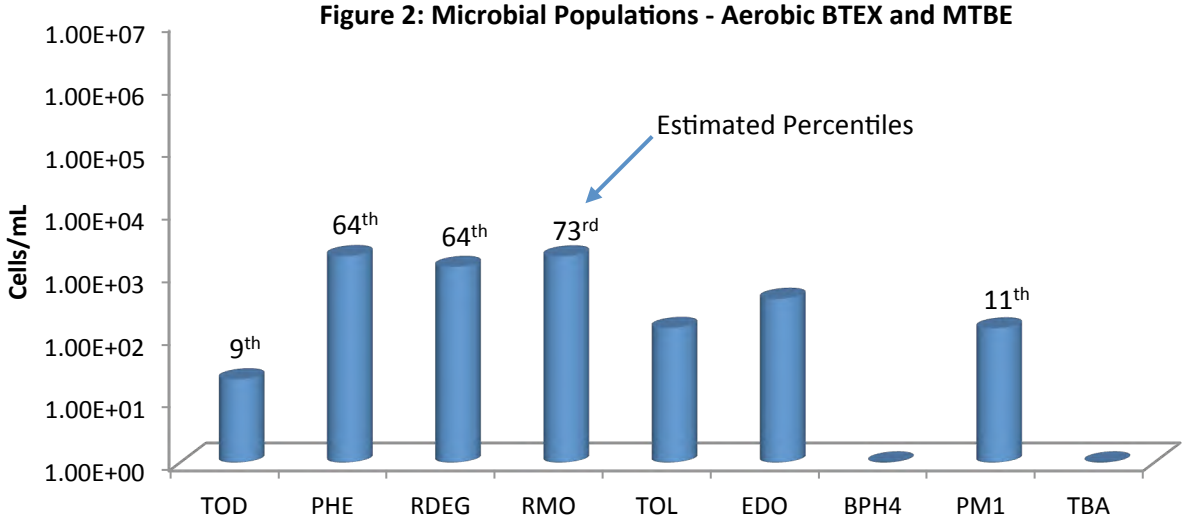
Figure 1: Microbial Populations - Anaerobic BTEX and PAHs



Anaerobic BTEX and PAH Biodegradation (Figure 1):

- With moderate concentrations of functional genes involved in anaerobic BTEX metabolism detected, the QuantArray-Petro® results were encouraging in terms of evaluating biodegradation potential under existing site conditions.
- More specifically, benzylsuccinate synthase (BSS) was detected on the order of nearly 10^3 cells/mL indicating the presence of a substantial population (66^{th} percentile) capable of anaerobic biodegradation of toluene and other alkyl substituted benzenes.
- Naphthyl-2-methylsuccinate synthase (MNSSA) and alkylsuccinate synthase (ASSA) genes were also detected indicating the potential for anaerobic biodegradation of 2-methylnaphthalene and normal alkanes.
- The concentration of MNSSA genes would be considered modest with an estimated percentile of 36^{th}.
- While the percentile rank for MNSSA would be "below average", a number of additional factors should be considered.
    - First, anaerobic hydrocarbon degraders are less prevalent than aerobic BTEX degraders and overall detection frequencies for many genes involved in anaerobic hydrocarbon biodegradation are less than 50%.
    - Therefore, the detection of genes like BSS, MNSSA, ASSA, anaerobic benzene carboxylase (ABC), and anaerobic naphthalene carboxylase (ANC) even at low concentrations is certainly noteworthy and inherently "better than average".
    - The estimated percentiles for all assays are based only on samples where the concentration of the target gene was greater than the practical quantitation limit (PQL).
    - For less commonly detected targets like many of the genes involved in anaerobic hydrocarbon biodegradation this is an especially important consideration.
    - Excluding samples where a gene target is below the PQL ensured that the median concentrations of less commonly detected targets would not be unduly biased low by the fact that the gene is not detected in most samples.
- Anaerobic benzene carboxylase (ABC) and naphthalene carboxylase (ANC) genes were also detected indicating the presence of bacterial populations capable of anaerobic biodegradation of benzene and naphthalene.
- For newly identified genes like ABC and ANC, estimated percentile ranks are not yet available due to the limited number of field samples that have been analyzed to date.
- However, like MNSSA and other genes involved in anaerobic hydrocarbon biodegradation, ABC and ANC detection frequencies are relatively low so the detection of these genes even at low concentrations should be considered when evaluating biodegradation potential under existing site conditions.

Figure 2: Microbial Populations - Aerobic BTEX and MTBE



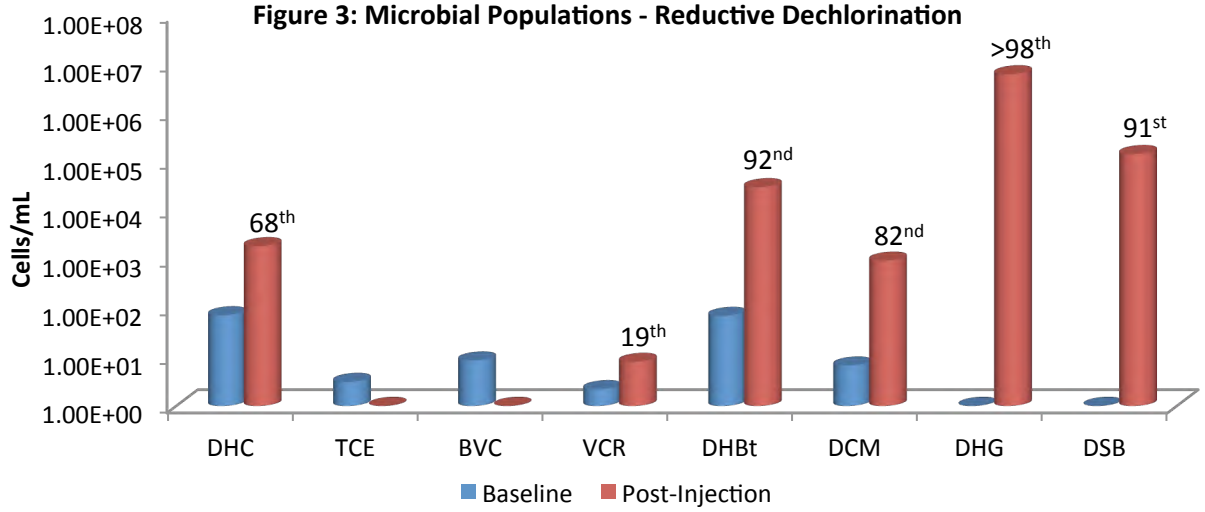
Aerobic BTEX and MTBE Biodegradation (Figure 2):

- With growing evidence that aromatic oxygenases function at low dissolved oxygen concentrations, aerobic BTEX biodegradation pathways should also be evaluated when considering MNA.
- Again, the QuantArray-Petro results were encouraging – genes encoding the first step in multiple pathways for aerobic BTEX biodegradation were detected indicating the presence of a diverse population of aerobic BTEX degraders.
- However, aerobic BTEX degraders are often considered ubiquitous. Therefore answering the question "Is that low, medium or high?" becomes especially important when evaluating aerobic BTEX biodegradation at petroleum hydrocarbon sites.
- In this case, the estimated percentile ranks of the concentrations of toluene/benzene monooxygenase (RMO and RDEG) and phenol hydroxylase (PHE) genes ranged from the 64th to 73rd percentile.
- In other words, the concentrations of RMO, RDEG, and PHE detected in this groundwater sample were greater than the concentrations detected in 64% to 73% of all other groundwater samples where these genes were analyzed and detected above the PQL.
- Aerobic BTEX degraders are common in the environment, but in this sample concentrations of toluene/benzene monooxygenase genes could be viewed as "better than average" when compared to the MI Database.

Biostimulation – Chlorinated Solvent Site:

Whenever possible, interpretation of qPCR and QuantArray results should include comparisons between baseline and post-injection monitoring events as shown below (Figure 3). The estimated percentile ranks however provide an additional avenue for comparison and evaluation of remedy performance.

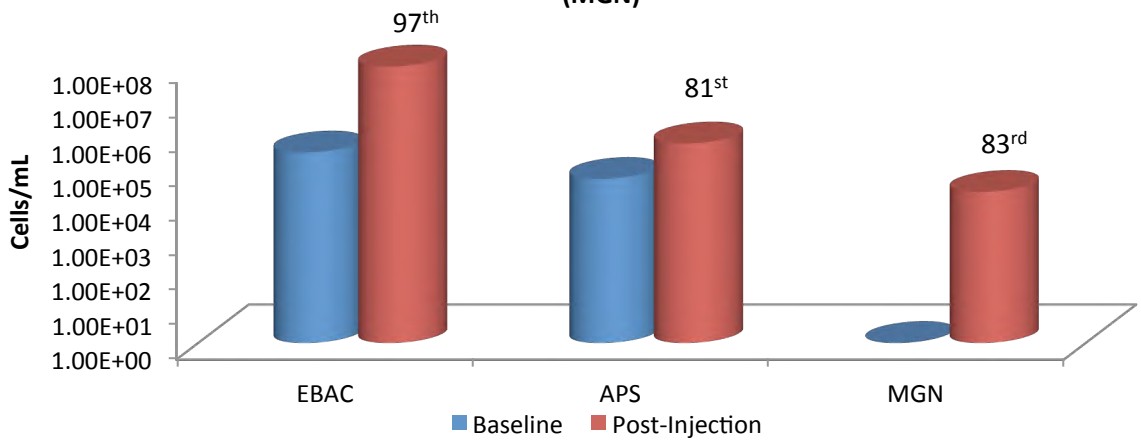
Figure 3: Microbial Populations - Reductive Dechlorination



- During the baseline groundwater sampling event, *Dehalococcoides* and vinyl chloride reductase genes were detected indicating the potential for complete reductive dechlorination of PCE and TCE to ethene.
- However, the *Dehalococcoides* concentration was well below the 10^4 cells/mL recommended by Lu et al. (2006) for generally effective rates of reductive dechlorination.
- Based on qPCR results as well as traditional groundwater monitoring, biostimulation with electron donor addition was selected as the site management plan.
- By the first monitoring event after injection, populations of halorespiring bacteria had increased substantially in response to electron donor addition.
    - *Dehalobacter* populations increased by more than two orders of magnitude to post-injection concentrations greater than 10^4 cells/mL (92^{nd} percentile).
    - *Dehalogenimonas* (10^6 cells/mL) and *Desulfitobacterium* (10^5 cells/mL) which had not been detected prior electron donor addition were present at concentrations greater than observed in over 90% of other groundwater samples where these halorespiring bacteria were detected.
- After injection, *Dehalococcoides* populations increased by more than an order of magnitude to a concentration of over 10^3 cells/mL (68^{th} percentile) demonstrating growth of this key group of halorespiring bacteria.
- Despite a substantial increase and a "better than average" concentration, the *Dehalococcoides* population was still below the 10^4 cells/mL threshold and vinyl chloride reductase gene copies were low (19^{th} percentile).
    - In terms of electron donors and acceptors, the metabolic capabilities of *Dehalococcoides* are rather specialized (hydrogen utilizing obligate halorespiring bacteria) so the median concentration is low. With a low median concentration across the database, a "better than average" *Dehalococcoides* concentration in a given sample may not exceed the 10^4 cells/mL threshold established for effective reductive dechlorination (Lu et al. 2006) and ethene production (Microbial Insights, unpublished data).

- In this case, the initial growth of *Dehalococcoides* was substantial but may have been somewhat hindered by competition with sulfate reducing bacteria (Figure 4 below).
    - The baseline population of sulfate reducing bacteria was moderate (10^4 cells/mL; 63rd percentile). Consistent with an observed decreased in dissolved sulfate concentrations, populations of sulfate reducing bacteria increased and were detected at a relatively high concentration (81st percentile) after electron donor addition.
    - After injection, methanogen populations also increased to a relatively high concentration (83rd percentile) suggesting generation of methanogenic conditions.
- With sulfate depletion and generation of highly anaerobic conditions more conducive to reductive dechlorination, *Dehalococcoides* populations may continue to increase and exceed the 10^4 *Dehalococcoides* cells/mL threshold in subsequent monitoring events.
- Overall, QuantArray analysis conclusively demonstrated that electron donor addition stimulated growth of halorespiring bacteria with the estimated percentiles retrieved from the MI Database providing the "low, medium or high" perspective to the observed changes in microbial populations.

Figure 4: Total Bacteria (EBAC), Sulfate Reducering Bacteria (APS) and Methanogens (MGN)



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Lu, X., J.T. Wilson, and D.H. Kampbell. 2006. Relationship between *Dehalococcoides* DNA in ground water and rates of reductive dechlorination at field scale. *Water Research* 40 no. 16: 3131-3140.

APPENDIX G

Validation Packages

(Available Upon

Request)

APPENDIX H

Laboratory Packages (Available Upon Request)