Revitalizing Auto Communities
Environmental Response Trust

February 22, 2021

Laurie A. Stevenson, Director
c/o Division of Environmental Response and Revitalization, Engineering and Risk Assessment Support
Attn. Mr. Erik Hagen
P.O. Box 1049
Columbus, Ohio 43216-1049

RE: Petition for Class 2 Modification
Amended Post-Closure Care Plan for Elyria Landfill
RACER Trust Property
U.S. EPA RCRA ID No. 004 201 091
1400 Lowell St.
Elyria, Ohio

Dear Ms. Stevenson:

The Revitalizing Automotive Communities Environmental Response Trust (RACER) is submitting the enclosed *Amended Post-Closure Care Plan for the Elyria Landfill* (PCCP) for the Former General Motors Inland Fisher Guide Division facility located at RACER Trust Elyria Site, 1400 Lowell Street, Elyria, Ohio as a Class 2 modification. The Amended PCCP outlines proposed changes to the leachate removal activities at the closed RCRA landfill in accordance with OAC Rules 3745-55-12, 3745-55-13, 3745-55-18 and 3745-50-51. RACER remains committed to the continued monitoring and maintenance of the landfill to ensure ongoing protection of public health and the environment.

If you have any questions concerning the information presented in the enclosed document, please contact me at 1-855-RACER-411 or by email at pbarnett@racertrust.org.

Sincerely,

Pamela Barnett
Cleanup Manager (DE, LA, MA, OH, PA, VA)
RACER Trust

Enclosure

HALEY ALDRICH

www.haleyaldrich.com

AMENDMENT TO

POST-CLOSURE PLAN FOR RACER ELYRIA

by
Haley & Aldrich, Inc.
Cleveland, Ohio

for
RACER Trust
Detroit, Michigan

File No. 129862
February 2021

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SIGNATURE PAGE FOR

AMENDMENT TO:
POST-CLOSURE PLAN
RACER ELYRIA
ELYRIA, OHIO

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1. Introduction

This amendment to the Approved Amended Post-Closure Care Plan (PCCP) for the Revitalizing Automotive Communities Environmental Response (RACER) Trust facility in Elyria, Ohio (Site) (December 2015) is proposed in accordance with OAC Rules 3745-55-12, 3745-55-13, 3745-55-18, and 3745-50-51 and will replace the December 2015 PCCP upon approval.

The 2015 PCCP amendment consolidated the original Post-Closure Care Plan which was included in Section F2 of the Closure Plan (May 2014) and the Revised Post-Closure Groundwater Monitoring Plan (April 2007) into a single document. The changes to the 2015 Post-Closure Care Plan included:

- Reduction in frequency of groundwater monitoring from annually to biennially; and
- Changes to the inspection and security frequency.

The changes in this amendment to the 2015 PCCP include:

- A trial period of three years is proposed for exploring the reduction in frequency of leachate extraction events. An evaluation of optimal leachate extraction frequency will be made upon completion of the trial period. During the trial period, a reduction in minimum frequency of leachate extraction events will occur quarterly in the first year of the trial period and biannually (twice per year) or as needed based on the action levels provided in Section 4.5 for the remaining two years of the trial period;
- Addition of regular camera inspection of the landfill drainage tiles;
- Minor revisions for clarification and readability; and
- Removal of the requirement for extraction of secondary sumps when liquid is present.

The following is a summary of the landfill operation and maintenance and groundwater monitoring program described herein:

ELYRIA POST-CLOSURE PROGRAM FOR CLOSED HAZARDOUS WASTE LANDFILL	
O&M and Groundwater Monitoring Activities	
Landfill Cover Inspections	Twice per month or within 5 days of a 2.2 inch 24-hour storm event or snowpack of 10-inch melt within 24 hours
Drain Tile Inspections	Twice per month inspections of critter traps, drainage clearing, and drain tile camera inspections every 5 years
Security	Twice per month fence inspection
Grass Mowing	Four events (from April to October)
Cover Maintenance	As needed
Leachate Removal	Sump levels monitored twice per month
	Extraction quarterly for the first year of the trial period and biannually (twice a year) at a minimum or as needed for the remaining two years of the trial period.*

ELYRIA POST-CLOSURE PROGRAM FOR CLOSED HAZARDOUS WASTE LANDFILL	
O&M and Groundwater Monitoring Activities	
Groundwater Monitoring	Biennial (Every other year with first event in 2016)
Reporting	Biennial (by March 1 the year following groundwater monitoring sampling)

*Action level for more frequent removal defined in Section 4.5 and on the inspection form (Appendix A). Trial period will begin upon approval of this modified PCCP.

The post-closure period for the facility was extended to 2038 as requested in the letter *Petition for Post Closure Plan Amendment* dated 28 August 2014.

1.1 GENERAL SITE DESCRIPTION

The RACER Trust facility is located in Lorain County, Ohio, at 1400 Lowell Street, in the City of Elyria. The plant operated during the time period from 1952 to 1988. Operations at the Site ceased in July 1988. The location of the facility is presented in Figure 1.

During the course of conducting Site closure activities, the Site's RCRA treatment, storage, and disposal units were closed in accordance with Ohio Environmental Protection Agency (Ohio EPA) and or U.S. EPA approved plans and specifications. These closed units included three sludge dewatering surface impoundment units. In 1988, closure of the surface impoundment units was accomplished by removing all hazardous wastes and contaminated soil in accordance with the approved closure plan and disposing of those materials in an onsite landfill disposal unit. This landfill disposal unit was designed and constructed in accordance with RCRA standards and in accordance with Ohio EPA and U.S. EPA-approved closure plans. Following receipt of all surface impoundment closure wastes, the landfill was capped and closed. The landfill disposal unit is located on an approximate 95-acre parcel of land that is currently owned by the RACER Trust. Figure 2 depicts the location of the landfill unit with respect to the 95-acre land parcel.

1.2 LOCATION INFORMATION

The Site is located in an industrial, commercial, and agricultural area approximately 25 miles southwest of Cleveland, Ohio. The landfill is bounded to the west by the former General Motors Inland Fisher Guide Division Plant, which is currently used for commercial/industrial purposes. Vacant industrial and agricultural properties bound the landfill to the southwest, south, and east. A railway right-of-way separates the Site from additional commercial and industrial properties farther to the north.

1.3 GROUNDWATER MONITORING PLANS

Groundwater detection monitoring was performed at the Site under an approved Groundwater Monitoring Plan (September 1993) consistent with 40 CFR 270.14(c), 40 CFR 265 Subpart F, and OAC Chapter 3745-65 for an Interim Status facility. The Groundwater Monitoring Plan (September 1993) was approved by the Ohio EPA on 6 January 1994. A modified post-closure plan was requested by the Director of the Ohio EPA in 2001, which would conform to the post-closure requirement for groundwater monitoring and cap maintenance under OAC Chapters 3745-54 and 3745-55. The goal of the request was to meet Government Performance and Results Act (GPRA) post-closure requirements

for the Site by having "an approved control in place." The Revised Post-Closure Groundwater Monitoring Plan (2001) was revised to include:

- Installation of new background monitoring wells;
- A revised list of Site-specific monitoring parameters;
- Statistical analysis consistent with OAC 3745-54-98 (Detection Monitoring Program); and
- OAC 3745-54-97 (General Ground Water Monitoring Requirements), which consisted of inter-well comparisons of downgradient to upgradient wells.

A proposed Revised Post-Closure Groundwater Monitoring Plan (March 2004) introduced several changes based on a review of Site data. The Ohio EPA requested that the proposed Post-Closure Groundwater Monitoring Plan (March 2004) be revised to include a reduction in monitoring frequency to once per year; evaluation of the Site-specific monitoring parameters that currently have Maximum Contaminant Levels (MCLs); and no other evaluation of any analytical data including statistical comparison and comparison to Alternate Concentration Limits (ACLs).

The Revised Post-Closure Groundwater Monitoring Plan (April 2007) was approved by Ohio EPA on 10 October 2008 and Ohio EPA's clarified approval was provided on 3 December 2008. The Approved Amended Post-Closure Plan (last amended in October 2008) and associated Revised Post-Closure Groundwater Monitoring Plan (April 2007) were consolidated into the December 2015 Post-Closure Plan with the following changes:

- Reduction in frequency of groundwater monitoring from annual to biennial; and
- Changes to the inspection frequency.

The December 2015 Post-Closure Care Plan was approved in a letter dated 29 December 2015. Upon approval this plan will replace the 2015 Post-Closure Care Plan.

1.4 LANDFILL EVALUATION

In 2020, Haley & Aldrich evaluated the potential interaction between water within the landfill and the surrounding groundwater at the Site. The evaluation was conducted based on observed increased leachate volume extracted during the first quarter of 2019 and the similar groundwater elevations observed within the Site monitoring wells and the landfill's primary sumps during the 2018 Groundwater Monitoring event. The evaluation included inspection of the upper landfill cap and surface drainage network and monitoring groundwater elevation data from Site monitoring wells and leachate elevation data from primary landfill sumps for a period of 80 days.

The results of the cap evaluation indicated that the cap and surface drainage system were in good condition. Grates were added to the exposed drainage pipe outlets to prevent burrowing animals from entering the system. Hydraulic data collected both manually and with transducers indicated that there was no evidence of a connection between groundwater and the leachate sumps. The results of the landfill evaluation were submitted to the Ohio EPA in the RACER Elyria Landfill Memorandum dated 4 September 2020, and provided in Appendix B.

2. Landfill Background

The following information is based on details from the approved Post-Closure Plan (December 2015) and subsequent improvement activities.

2.1 GENERAL

The Site landfill was constructed in 1988 as part of the closure of three surface impoundments previously used for the handling of sludge from the former General Motors Inland Fisher Guide Division Plant wastewater treatment system, which operated in the western area of the Site. The sludge was originally generated from copper, nickel, and chrome electroplating operations.

The landfill disposal unit was designed and constructed for the sole purpose of achieving effective closure of the surface impoundment units at the facility. The only hazardous waste placed in any of the surface impoundments was the F006 electroplating sludge as described above. Therefore, the wastes placed in the landfill unit consist of CKD-stabilized sludge and contaminated impoundment-bottom soils containing waste constituents of the sludge, and the impoundment dewatering system components.

Based on analytical sample results of the un-stabilized sludge, the sludge was classified as an F006 hazardous waste, but was not characteristically hazardous with regard to pH, flashpoint, corrosivity, or reactivity. Analytical results for the sludge are presented in the Post-Closure Groundwater Monitoring Plan (September 1993). The analytical results documented detectable concentrations of chromium, copper, nickel, and zinc in the un-stabilized sludge. Leachable concentrations of chromium, nickel, and silver were also reported. In addition, detectable concentrations of carbon disulfide, methylene chloride, and trichloroethene were also detected in the sludge.

Each of three surface impoundments contained approximately 13,000 cubic yards of sludge, for a total sludge volume of approximately 40,000 cubic yards. To stabilize and solidify the sludge, approximately 8,800 tons of cement kiln dust (CKD) was added. The landfill was also utilized for the disposal of approximately 1,200 cubic yards of underlying contaminated soils. Thus, the total estimated volume of materials placed in the landfill unit is approximately 50,000 cubic yards. The landfill unit is closed and will not receive any additional wastes.

2.2 LINER SYSTEM DESCRIPTION

The landfill disposal unit was constructed within the limits of sludge impoundment Nos. 1 and 2. The landfill disposal cell was designed with an integrated primary and secondary liner system. Construction of the landfill components was performed under a rigorous construction quality assurance (CQA) program that verified compliance with design performance and material specifications. Specifically, the primary and secondary liner system consists of the following components listed in ascending order from the cell foundation:

2.2.1 Primary Liner

- A 40-mil HDPE membrane liner;
- A high-density polyethylene (HDPE) "geonet" synthetic drainage layer; and
- A geotextile filter fabric layer.

2.2.2 Secondary Liner

- A 36-inch-thick, low permeability ($1x10^{-7}$ cm/sec) recompacted clay layer;
- A 40-mil HDPE membrane liner; and
- An HDPE "geonet" synthetic drainage layer.

This liner system extends throughout the entire bottom and sidewalls of the cell and is keyed into the multi-layered top cover system to eliminate any infiltration of precipitation or runoff. A cross-section of the bottom liner system is presented on Sheet 4 of the 1988 as-built construction drawings.

2.2.3 Liner Systems Foundation Description

Prior to installation of the re-compacted soil and synthetic liner components, the cell foundation was constructed. The existing natural soils beneath the excavated impoundments were graded and roller-compacted to form an even working surface as well as to provide the design specified bottom slopes for the cell.

A sub-base layer was installed following initial grading and compaction of the foundation. This sub-base was constructed by compacting sandy clay obtained from the offsite borrow area. It was proof-rolled with a drum roller to detect any soft or undesirable areas before placement of the first clay liner lift. The 8-inch sub-base was constructed to provide a stable and uniform surface beneath the 36-inch compacted clay component of the secondary liner system.

2.2.4 Leachate Collection/Detection System Operation and Design

Primary and secondary leachate detection/collection systems were installed in the sludge disposal cell. The primary system collects leachate present above the primary HDPE liner, and the secondary system will detect and collect leachate present above the secondary HDPE liner, in the event that there is leakage or failure of the primary liner system.

Both systems utilize four collection sumps located at the perimeter base of the cell. Conveyance of leachate to the sumps is accomplished by the slope of the bottom of the cell towards each sump and by the high transmissivity of the synthetic geonet layer.

The four primary collection sumps are 42-inch-diameter, precast concrete, vertical risers that extend from the cell floor above the primary liner, through the stabilized waste and cover system, to the surface of the landfill. The four secondary leachate collection sumps are located beneath the primary sumps.

Formerly, automatic, level-actuated, submersible sump pumps installed in the four primary sumps were used to detect and remove leachate when the sump liquid levels exceeded a predetermined set point. Leachate was pumped through conveyance pipes that connected the risers to former storage tanks located above-grade, adjacent to the disposal cells. These two 1,000-gallon tanks were located at grade adjacent to the north and south sides of the cell to serve as short-term storage units (less than 90 days) for collected leachates. The above-ground tanks were provided with a secondary containment system that included a continuously bermed, 12-inch, reinforced concrete pad underlain by a 6-mil polyethylene liner.

Based on changes in operations, the tanks were no longer required to manage the leachate from the landfill and were decontaminated in May 2017 to allow for generator closure and removal of the tank system from the Site. The decontamination of the tank system was completed in accordance with

performance standards in Ohio Administrative Code (3745-66-11), as discussed in the Tanks Closure Memorandum (Haley & Aldrich, 2018) (Appendix C). After decontamination, the tanks, secondary containment pads, buildings, and associated equipment were demolished and removed from the Site for disposal.

Leachate is currently removed from the sumps via a direct transfer of the leachate from each primary collection sump to a tank truck that travels on an access road constructed for this purpose. Leachate is pumped from each primary collection sump to the tank truck and then taken to an acceptable permitted offsite treatment or disposal facility. Leachate extraction events will be scheduled when leachate levels rise to within 90 percent of their corresponding action level as defined in Section 4.5 below, or biannually, at a minimum, as discussed in Section 4.5.

2.2.5 Run-on Control System

Primary run-on control for the landfill area is currently provided by the above-grade construction of the landfill unit. The landfill grades are approximately 12 to 15 feet above surrounding grades. Surrounding areas are adequately drained by existing drainage patterns.

During the active period of the landfill, the cell was surrounded by berms in order to prevent run-on. Rainwater that fell directly on the decontaminated excavation prior to waste placement was managed as stormwater. Rainwater that accumulated in the containment cell after waste placement was collected and managed as a hazardous waste by pumping from the leachate collection system directly to the plant wastewater treatment facility for treatment.

2.2.6 Runoff Control System

Runoff from the landfill during active operations was collected within the cell and managed as leachate. Following closure of the landfill cell, runoff is managed by uniform sheet flow across the vegetated cover system and conveyed to perimeter drainage swales. Perimeter drainage swales direct runoff to existing onsite drainage swales.

Due to a higher-than-expected volume of leachate generation, post-closure maintenance was performed on the perimeter drainage swales and letdowns in 2008 to 2009 to reduce stormwater infiltration into the landfill. The leachate generation of the landfill decreased by over 90 percent after completion of the maintenance on the stormwater system.

2.2.7 Control of Wind Dispersal

The moisture content of sludges was utilized as a primary means to control wind dispersal during active landfill operations. During the post-closure period wind dispersal will not occur since no waste will be exposed by maintaining the existing cover.

3. Geologic and Hydrogeologic Conditions Summary

This section describes the geology and hydrogeology as summarized in the Approved Closure Plan.

3.1 REGIONAL STRATIGRAPHY

Lorain County is located on the eastern fringe of the till plain of the Great Central Lowlands. The topography within the vicinity is relatively flat to gently rolling. The landfill has an approximate elevation of 750 feet above mean sea level. The general area was subject to Wisconsinan glaciation, leaving a thin layer of drift material known as the Hiram Till over the southern two-thirds of Lorain County and lacustrine silty clay across the northern one-third of the county. The drift material consists of clay-rich soil up to 25 feet in thickness. Elyria lies on glaciated, lake plain deposits and beach ridges of Old Lake Whittlesey, Lake Maumee, and Lake Warren (Stout et al., 1943). The area is located near the eastern boundary of the till plain area of the Central Lowland physiographic province.

The bedrock underlying Lorain County consists of relatively flat-lying sedimentary strata and includes the upper Devonian and lower Mississippian Cleveland Shale, Bedford Shale, Berea Sandstone, and Cuyahoga Shale. Bedrock dips slightly to the south or southeast. The most important bedrock aquifer in Lorain County is the Berea Sandstone, which typically yields 3 to 10 gallons per minute under long-term withdrawal (Barber, 1988).

3.2 SITE STRATIGRAPHY

There are three main stratigraphic units at the Site: proceeding from the surface downwards are drift deposits (clay till), Berea Sandstone, and Bedford Shale. All three stratigraphic units are laterally continuous beneath the landfill. The till unit is comprised of soft, silty clay till that varies from light brown to greenish gray and ranges in thickness from 8 to 15 feet. The Berea Sandstone, referred to as the bedrock unit, is comprised of a hard, fine-grained sandstone with occasional thin interbedded shale units. The top of the Berea Sandstone is encountered at an approximate depth of 8 to 15 feet below ground surface (bgs). The Berea Sandstone is thickest (23 feet thick) in the northwestern portion of the Site. The Bedford Shale is comprised of a silty shale with some thin sand horizons and varies in color from gray to reddish gray. No borings penetrated the full thickness of the Bedford Shale beneath the Site, but the Bedford Shale is estimated to be 50 to 90 feet thick in the vicinity of the Site based on background literature. The Bedford Shale has a lower permeability overall than the Berea Sandstone aquifer and is considered a confining unit for the Berea Sandstone aquifer. Onsite borings that partially penetrate the Bedford Shale indicate that no map-able sandy horizons exist within the shale for at least 10 feet below the Berea Sandstone (Simon Hydro-Search, 1992). Boring logs are presented in Appendix D.

3.3 GROUNDWATER FLOW DIRECTION

Based upon the groundwater elevation data provided in a hydrogeologic investigation conducted by CRA in 2001, it is likely that a hydraulic connection exists between the till unit and the underlying bedrock aquifer unit. The two monitoring units for the landfill are: (1) the Bedrock Unit; and (2) the Till Unit. For the purposes of monitoring, the Bedrock Unit and the Till Unit are considered two distinct units in the current plan and the previously approved plan.

Representative groundwater elevations from April 2015 and contours for the Bedrock Unit and the Till Unit are presented on Figure 3 and Figure 4, respectively. Based on groundwater measurements made during monitoring of the landfill and the remedial investigation, groundwater flow beneath the landfill within the bedrock and till units is predominantly to the northeast.

The hydraulic conductivity of the Bedrock Unit is estimated to be 0.2 feet/day (Weston, 1993). Based on the estimates of hydraulic conductivity for the Bedrock Unit, the flow velocity is estimated to be 12 feet per year.

3.4 GROUNDWATER USE WITHIN THE VICINTY OF THE SITE

Ten offsite wells have been identified within one mile of the Site based on a search of Ohio Department of Natural Resources (ODNR) well logs. The closest well is approximately 0.6-mile to the northwest of the Site.

Areas within the City of Elyria have access to the public water supply including the area within the vicinity of the Site. The City of Elyria obtains its water from Lake Erie. Installation of private potable water supply wells is discouraged by the permitting and approvals process, and associated costs of installing, operating, and maintaining a private water supply well. Some locations within Lorain County may also experience issues regarding taste and odor, which also discourages private water well installation.

3.5 PRECIPITATION

The Site is located approximately 25 miles southwest of Cleveland, Ohio. Elyria experiences a continental climate with strong modifying influences due to the presence of Lake Erie. Summers are moderately warm and humid. Winters are cold and cloudy with the average temperatures in December, January, and February below freezing. Consistent with a continental climate, precipitation can vary widely; however, it is normally abundant and well distributed over the year.

3.6 SURFACE WATER

There is no known groundwater discharge to surface water in the immediate vicinity of the Site. However, groundwater flow north of the landfill is influenced by storm sewers. Intermittent flow has been observed in the Site drainage ditches after precipitation events.

The nearest surface water body is the Black River located less than one mile to the east of the Site.

4. Post-Closure Plan

4.1 POST-CLOSURE CONTACT

The contact for questions regarding the facility during the post-closure period is:

Cleanup Manager – Ohio
c/o RACER Trust
1505 Woodward Avenue
Suite 200
Detroit, Michigan 48226
Phone: 1-855-RACER-411

4.2 POST-CLOSURE SECURITY

Post-Closure security and Site access control will be provided by a seven-foot industrial mesh fence surrounding the property area. Access to the property area is provided by authorized entry through a locked personnel and equipment access gate. Railcar access through the Site is obtained via two railroad gates. In the event that access to the Site is required by authorized personnel, the post-closure contact should be notified, and appropriate access arrangements will be made by RACER Trust.

In addition, inspections of the Site and fence will be conducted at least twice monthly to identify any trespassing or damage to the fence as described in Section 4.4.

This post-closure security system is anticipated to provide adequate access control. Further, since all wastes are encapsulated by the multi-layered landfill liner and cover systems, unknowing access to the area or trespassing is not believed to pose a hazard to human health.

4.3 SYSTEM DESIGN DESCRIPTION

This subsection presents an overview of the system design components and inspection and maintenance requirements associated with the system.

4.3.1 Leachate Collection/Detection System

The leachate collection/detection system is comprised of eight in-cell sumps; the four primary and four secondary sumps are located in pairs along the bottom perimeter of the sloped containment cell. The primary sumps collect leachate present above the first synthetic bottom liner, and the secondary sumps collect liquid present above the second synthetic liner. See Section 2.2.4 for a more detailed description of leachate removal activities.

4.3.2 Gas Venting System

The design and installation of the landfill disposal unit does not have a gas venting system. The primary wastes placed within the cell are inorganic and therefore are not expected to produce decomposition gases that would necessitate a gas venting system.

4.4 INSPECTION PLAN

The following inspection program will be implemented by RACER Trust to ensure continued integrity and effective performance of the landfill disposal unit containment systems and appurtenances throughout the post-closure period. Detailed inspection sheets to be utilized in implementing this inspection plan are presented in Appendix A. In general, and unless otherwise stated, the following will be inspected twice a month:

- Security control devices;
- Erosion damage;
- Cover settlement, subsidence, and displacement;
- Vegetative cover condition;
- Integrity of run-on and runoff control measures;
- Cover drainage system functioning;
- Leachate collection/detection and removal system;
- Well condition; and
- Benchmark integrity.

RACER Trust will contract with qualified personnel to conduct these inspections and transmit appropriate documentation and accurate assessments to the RACER Trust post-closure contact.

Inspection forms discussed below will be provided to Ohio EPA by the 5th of every month for the prior month's inspections. Copies of completed inspection sheets are maintained in the office of the post-closure contact. These inspection log sheets are maintained chronologically. All inspection records are kept until the completion of the post-closure care period.

4.4.1 Landfill Cover System Inspection

The cover system for the closed landfill disposal unit will be inspected to detect signs of:

- Excessive or differential settlement and subsidence;
  Observation of ponding water during more than one consecutive inspection may be an indication of subsidence. If subsidence is determined to be the issue, appropriate corrective actions will be implemented.
- Soil erosion;
- Inadequate, sparse, or stressed vegetative cover; and
- Impact to cover system integrity by burrowing animals or deep-rooted vegetation.

4.4.2 Stormwater Management System Inspection

The landfill disposal unit run-on and runoff control structures will be inspected to detect:

- Conditions which may cause erosion or piping of cover soils;
- Blockage or excessive sedimentation of drainage structure which may induce backup or ponding of stormwaters; and
- The system piping entrances will be visually inspected twice per month for obstructions and every five years with a camera for the presence of obstructions and deformation.

4.4.3 Groundwater Monitoring System Inspection

The groundwater monitoring well network at the facility will be inspected to detect for:

- Well protective casing lock function;
- Protective casing and well apron integrity;
- Presence of legible well identification number; and
- Well conditions during post-closure sampling.

4.4.4 Leachate Detection/Collection System Inspection

The leachate detection/collection system will be inspected to:

- Detect changes in primary sump liquid levels;
- Determine when an extraction event is necessary.

4.4.5 Security System/Benchmarks

The security system at the Site will be inspected to determine:

- Condition of warning signs;
- Perimeter fence condition; and
- Gate and lock condition.

In addition, surveyed benchmarks will be inspected to verify their integrity.

4.5 LEACHATE DETECTION/COLLECTION SYSTEM MONITORING AND LEACHATE REMOVAL

Monitoring leachate generation volumes collected by the primary sump system will be utilized as a means for detecting potential cover system failure. In this manner, any unusual changes in leachate volumes collected will be evaluated as an indicator of possible cover system failure.

The secondary leachate detection/collection system has been designed as a system to provide early warning of potential failure of the primary landfill liner system. Therefore, RACER Trust will provide routine monitoring of this secondary leachate detection system throughout the post-closure period.

The four secondary sumps are situated between the primary and secondary synthetic liners. An evaluation conducted by CRA in 2003 indicated that connectivity between the primary and secondary sumps was evident. Therefore, it is unlikely that the secondary sumps will be void of liquid and will be monitored or pumped during extraction events. The sumps are designed to collect leachate that is intercepted by the secondary liner. A water level meter will be used to determine if liquid is present in the secondary sump. If liquid is detected in the secondary sump the liquid level will be recorded on the Inspection Log.

Each of the primary sumps in the leachate detection/collection system will be monitored for the presence of leachate at least twice per month during routine inspections. Leachate removal from the primary sumps will be conducted when the leachate rises to 90 percent of the action levels defined below or biannually at a minimum. In addition, based on an evaluation of the construction drawings in the *Closure Certification Report* (Weston Services, Inc., September 1988), the position of the primary

liner/drainage in each of the primary sumps was estimated. If water levels exceed this level during a bimonthly inspection, then additional leachate removal will be conducted within 48 hours.

The actions levels that are included on the inspection form are listed in the table below:

Primary Sump	Depth to Water (ft)	Depth to Water - Leachate Removal Action Level (ft)	Approximate Water Thickness in Sump (ft)	Approximate Water Thickness in Sump - Leachate Removal Action Level (ft)
Northwest	13.2	11.9	4.2	3.8
Northeast	13.4	12.1	5.0	4.5
Southwest	13.7	12.3	2.6	2.3
Southeast	12.4	11.2	4.0	3.6

4.6 MAINTENANCE PLAN

This subsection describes preventative and corrective maintenance procedures, anticipated equipment requirements, and material needs during the post-closure period. RACER Trust anticipates that the inspections described in Section 4.4 can result in any determinations for a particular item:

1. Acceptable condition;
2. Unacceptable condition-nonemergency (preventative) maintenance; and
3. Unacceptable condition-emergency (corrective) maintenance.

The "acceptable condition" status requires no repair before the next inspection. "Unacceptable condition-nonemergency maintenance" indicates that repair is needed to avoid further damage and perhaps to avoid the need for emergency repairs. In this case, maintenance will be performed as soon as possible. Any item that qualifies as "unacceptable condition-emergency maintenance" will receive immediate attention. The inspector will notify the RACER Trust post-closure contact or other designated person of any repair requirements; RACER Trust will then initiate the appropriate corrective maintenance or repair.

Specific approaches to maintenance of the landfill system components are outlined below.

4.6.1 Landfill Cover System Maintenance

Timely action will be taken by RACER Trust upon detection or notification of any cover system maintenance needs. RACER Trust anticipates that maintenance activities may include, but not be limited to:

- Routine, periodic mowing of vegetative cover or when vegetation has reached 6 inches or more in height;
- Placement of additional cover soils to correct areas of erosion or settlement; and
- Re-vegetation and mulching to re-establish adequate vegetative growth.

The vegetative cover will be mowed up to four times annually during the growing season (from April to October) to prevent the growth of woody or deep-rooted vegetation. The final cover of the landfill unit will be maintained at the approximate slopes and grades specified in the closure plan.

4.6.2 Stormwater Management System Maintenance

The runoff control structures for the landfill disposal unit, including perimeter stormwater diversion channels and swales will be maintained to ensure intended performance. Maintenance activities that may be required for stormwater management structures include, but may not be limited to:

- Removal of excess sediments or other blockage of drainage channels;
- Replacement of channel linings as necessary; and
- Re-vegetation and mulching to re-establish vegetative growth within the drainage channels.

The vegetative growth within the drainage channels and swales, which are not lined with riprap, will be mowed at least annually to facilitate flow and reduce the occurrence of siltation, while maintaining resistance to erosion and excessive flow velocities.

4.6.3 Groundwater Monitoring System Maintenance

During each sampling event, monitoring wells will be inspected to ensure integrity of the monitoring system. Monitoring well inspection will include:

- Ensure that the well identification number is present;
- Check for the presence and condition of the lock;
- Check the condition of the protective casing (i.e., heavily rusted, dented);
- Inspect the integrity of the concrete runoff diversion apron; and
- Sound the bottom of the well to determine the accumulated thickness of sediment within the well.

A monitoring well inspection log will be maintained documenting the condition of the wells. If it is determined that corrective measures are necessary, the following maintenance activities may be required:

- Painting of protective casings to reduce rust damage;
- Replacement of locks, protective casing or runoff diversion aprons;
- Redevelopment of silty wells; and
- Replacement of damaged or nonfunctioning wells

Criteria for implementing the first two corrective measures will be primarily based on visual observations and good judgment. The decision to redevelop a monitoring well will be based on the quantity of sediment accumulation. A well will be redeveloped if the accumulated sediment thickness exceeds one-third of the length of the screen or is equal to and/or exceeds the height of the water column in the well. Redevelopment procedures will be in accordance with accepted protocols outlined in the Ohio EPA Technical Guidance Manual for Hydrogeologic Investigations and Groundwater Monitoring (February 2009). A monitoring well will be abandoned and completely replaced if the structural integrity of the well casing has been damaged to the point of inhibiting sample collection or compromising sample integrity, or if redevelopment of silted wells does not improve the yield of the well, thereby inhibiting sample collection.

4.6.4 Leachate Detection/Collection System Maintenance

Surface components of the primary and secondary leachate detection/collection system including storage tanks, berms, and buildings were removed in 2017, as discussed in Section 2.2.4. Therefore, RACER Trust anticipates that only limited maintenance requirements for this system may include:

- Maintaining above-grade concrete structures associated with the primary sumps;
- Maintaining above-grade piping associated with the secondary sumps; and
- Maintaining the road to allow for ease of access for leachate removal.

Specific maintenance work orders will be conducted based upon notifications presented on the inspection logs maintained for the system.

4.6.5 Security System/Benchmark Maintenance

The security system will be maintained by repairing or replacing damaged fencing, gates, or locks as needed to ensure the integrity of the system. Surveyed benchmarks will be maintained to prevent damage or disturbance.

4.7 PERSONNEL TRAINING

It is anticipated that RACER Trust will contract with outside firms to implement specific post-closure activities related to inspection, monitoring, and maintenance of the landfill disposal unit. Contractors responsible for conducting these activities will report directly to the RACER Trust post-closure contact. Contractors and RACER Trust personnel who may be associated with post-closure activities at the Site will be trained in accordance with the training plan outlined herein. Contractor personnel will maintain proficient knowledge of this training program content as a stipulation of their contracted work scope. Monitoring requirements, including sampling, analysis, and reporting are anticipated to be conducted by an independent contractor or analytical laboratory. Further, well redevelopment and/or replacement, if required, will be conducted by a qualified contractor under the direction of RACER Trust.

Post-Closure leachate management (i.e., removal, transport, and off-site treatment) will be accomplished through an appropriately qualified and licensed transport and disposal contractor.

4.7.1 Purpose of Training Program

The purpose of this training program is to define the operating principles and regulatory framework under which the post-closure activities at the facility are to be accomplished. The objectives of the training program include:

- Identify and familiarize contractor and RACER Trust personnel with specific requirements pertaining to the closed waste management unit.
- Develop and maintain the proficiency of contractor and RACER Trust personnel carrying out tasks related to post-closure inspection and maintenance.

The training program will provide varying degrees of training for individuals based on their scope of work, function, and responsibilities. The training program will be modified, as deemed necessary, when changes in facility operation occur, or when required by local, state, or federal regulations.

4.7.2 Implementation of Training Program

All designated contractor and RACER Trust personnel will complete the training program prior to participating in work scope activities associated with the Site post-closure tasks. Contractor personnel will participate in an initial training and annual refresher training, pertinent to their post-closure scope of work. Refresher training may be in the form of written guidance or standard operating procedures issued to contractor personnel.

4.7.3 Content of Training Program

The following outline will be followed in RACER Trust's administration of the contractor training program.

I.) General Site Location/Background Information
   a) Site conditions/location
   b) Site access
   c) Hazardous wastes disposed at the Site

II.) Regulatory Requirements
   a) General post-closure inspection, monitoring, and maintenance
   b) Impacts to contractor work scope

III.) Documentation and Reporting
   a) Use of inspection sheets
   b) Communications with RACER Trust post-closure contact
   c) Frequency/schedule for inspection and reporting

IV.) Recognizing Maintenance Needs
   a) Emergency vs. Non-emergency
   b) Interpretation of Site conditions
   c) RACER Trust authorization for maintenance work

4.8 NOTICE TO LOCAL LAND AUTHORITY

A survey plat, indicating the location and dimension of the closed landfill disposal unit, has been submitted to the local zoning authority concurrent with the submittal of the previous post-closure permit application. This survey plat was prepared with respect to permanent benchmarks and has been certified by a licensed professional land surveyor.

4.9 NOTICE IN DEED

A notice has been filed in the deed to the facility property, that will, in perpetuity notify any potential purchaser of the property that: (1) the land has been used to manage hazardous wastes; (2) its use is restricted; and (3) the survey plat and record of the type, location, and quantity of hazardous wastes disposed of has been filed with the local zoning authority or the authority with jurisdiction over local land use and with the U.S. EPA and the Ohio EPA.

4.10 POST-CLOSURE ESTIMATE

A part of the settlement of the General Motors Corporation bankruptcy, a remediation cost estimate was estimated and agreed upon by both lead agency (Ohio EPA) and support agency (U.S. EPA). On 31 March 2011, this agreed upon amount of $2,634,063 was set aside specifically for the facility. This estimate included costs associated with post-closure care and monitoring of the landfill through 2038. It

also included funds associated with RCRA Corrective Action for the remainder of the solid waste management units (SWMUs) located on the RACER Trust parcel.

5. Post-Closure Groundwater Monitoring Plan

This section represents the amended monitoring locations, analytical methods, sampling frequency, and other pertinent information for the Site groundwater monitoring program.

5.1 MONITORING WELL NETWORK

The Revised Groundwater Monitoring Plan (April 2007) identified 18 monitoring wells to be sampled annually. These wells are divided into two groups according to geographic unit:

- Till Unit wells: P-02T, P-03T, P-08T, P-12TR, P-14T, P-15T, P-16T, P-18T, and P-21T; and
- Bedrock Unit wells: P-02, P-03R, P-08R, P-12, P-14, P-15, P-16, P-18, and P-21.

In addition, the following locations are considered piezometers in the monitoring network:

- Three piezometers in the Till Unit (P-1T, P-11, and P-13T); and
- Five piezometers in the Bedrock Unit (P-1, P-13, P-17, P-19, and P-20).

The following locations are also included in the monitoring program:

- Four primary sumps (northeast, northwest, southeast, and southwest); and
- Four secondary sumps (northeast, northwest, southeast, and southwest).

The monitoring well network for groundwater monitoring will include the following monitoring wells:

- West side (up-gradient): monitoring wells
    1. P-12TR (till);
    2. P-12 (bedrock);
    3. P-14T (till);
    4. P-14 (bedrock);
    5. P-15T (till); and
    6. P-15 (bedrock).

- Northeast corner (down-gradient): monitoring wells
    7. P-08T (till);
    8. P-08R (bedrock);
    9. P-21T(till);
    10. P-16T (till);
    11. P-16 (bedrock); and
    12. P-21 (bedrock).

- Southeast corner (down/side-gradient): monitoring wells
    13. P-03T (till);
    14. P-03R (bedrock);
    15. P-02T (till);
    16. P-02 (bedrock);
    17. P-18T (till); and
    18. P-18 (bedrock).

These monitoring wells will be used to monitor groundwater quality and groundwater elevations.

In addition, the following locations are considered piezometers in the monitoring network and will be used to monitor water elevations:

- Three piezometers in the Till Unit (P-1T, P-11 and P-13T); and
- Five piezometers in the Bedrock Unit (P-1, P-13, P-17, P-19, and P-20).

5.2 SITE–SPECIFIC PARAMETERS

Consistent with the2007 and 2015 groundwater monitoring plan, the site-specific groundwater monitoring parameters for the Site are:

- Barium (waste-indicator parameter);
- Select additional metals (calcium, chromium, iron, magnesium, manganese, nickel, potassium, and sodium);
- Total cyanide; and
- Chloride and sulfate.

5.3 MONITORING FREQUENCY

For 16 years of monitoring (2004 to 2020), no parameter concentrations above groundwater quality criteria (MCLs) were observed in any of the monitoring wells at the RCRA landfill. This indicates that a long-term in-compliance situation exists regarding groundwater quality surrounding the RCRA landfill. A variety of decreasing trends over time were observed for certain parameters at certain wells. A lower number of increasing trends were also observed, most of which occur at monitoring well nest P-02T/P-02. Most of the data sets considered did not exhibit any trend in parameter concentrations over time.

Due to these trend findings and the maturity of the monitoring program, it is appropriate to reduce the frequency of groundwater sampling at the Site to biennial sampling from annual sampling.

5.4 MONITORING PROGRAM SUMMARY

The table below summarizes the groundwater monitoring program. The monitoring well, piezometer, and sump locations are presented on Figure 2. A full round of groundwater elevations for the monitoring wells, piezometers, and sumps will also be measured on a biennial basis. Following five sampling events, the water level monitoring program will be evaluated to determine if any revisions to the water level program are appropriate.

Biennial Groundwater Monitoring Plan Summary

LOCATION	ANALYTE LIST
Monitoring Wells	Barium, calcium, chromium, iron, magnesium, manganese, nickel, potassium, sodium, total cyanide, chloride, and sulfate
Till Contact Unit	
P-02T, P-03T, P-14T, P-15T, P-16T, P-21T, P-08T, P-18T, and P-12TR	
Bedrock Aquifer Unit	
P-02, P-03R, P-12, P-08R, P-14, P-15, P-16, P-18, and P-21	
Piezometers	Water levels only
Till Contact Unit	
P-1T, P-11, and P-13T	
Bedrock Aquifer Unit	
P-1, P-13, P-17, P-19, and P-20	

5.5 FIELD AND ANALYTICAL METHODS

This section presents field methods for water level measurements, well depth measurements, well inspection, well evacuation, sample collection, sample preservation, sample shipment, documentation requirements, quality assurance/quality control (QA/QC) procedures, data review, and data validation. These methods are designed to achieve the program objectives without introducing artifacts into the process from monitoring well cross-contamination or contamination from non-well sources. A summary of the sampling and analysis plan is summarized in Table 1.

5.5.1 Water Level and Well Depth Measurements

Prior to purging and sampling, depths to groundwater and to the bottom of monitoring well will be measured in each well. The depth to liquid in the primary sumps and secondary sumps will also be measured. The reference point for a monitoring well, piezometer, or sump is the marked location of the highest point of the riser. The elevations of the reference points on the risers and wet wells have been determined by a registered surveyor.

5.5.2 Water Level Measurements

Water levels measurements will be collected from piezometers, monitoring wells, and sumps on a biennial basis as proposed in this amendment. The depth to groundwater will be measured and recorded for the Site monitoring network (wells and piezometers) and sumps (primary and secondary sumps). Water levels at the Site will be measured, if possible, within a 24-hour period. Water level measurements will be made from the reference point on the top of the riser or top of the sump (primary sump wet wells or secondary sump riser pipe) to the static water level. Depth to water to the nearest one hundredth of a foot (0.01) will be determined using a wetted tape, mechanical sounding device, or electrical water level probe following the manufacturer's recommended procedure. The probe cable and tip will be rinsed with a soapy (Alconox) water wash and distilled water, as the equipment is withdrawn from each well. Care will be taken to minimize disturbance to the water column in the wells. Immiscible layers have not been reported at the Site to date. If encountered, the presence of immiscible layers will be identified and noted in the field notes.

Representative examples of maintenance and calibrations logs for the depth measurement instruments are presented in Appendix E. Water level data will be recorded with the well number, date, and time in the field logs.

5.5.3 Well Depth Measurements

On a biennial basis, the depth to the bottom of the well or piezometer will be measured for the Site monitoring network. The depth to the bottom of the well or piezometer will be measured after depth to water has been determined. Measurements will be made from the same reference point on the top of the riser that was used for the depth to water measurement. Depth to the bottom will be determined using weighted tape, or similar device, graduated to the nearest one-hundredth (0.01) of a foot. The equipment and cable will be cleaned with a soapy (Alconox) water wash and distilled water rinse, after the equipment is used at each well. Care will be taken to minimize disturbance to the water column of the wells.

Well depth measurements will be recorded with the well number, date, and time in the field logs.

5.5.4 Well Evacuations

After water level and well depth measurements have been completed, the wells will be purged of standing water within the well riser. The monitoring wells will be purged in order from least contaminated to most contaminated. In addition, the monitoring wells will be purged in an order that will allow for the collection of samples as soon as feasible following purging taking into consideration wells that may potentially be purged dry and require recharge.

Purging will be completed using a peristaltic pump with dedicated tubing. The tubing will be positioned in the well at the desired sample intake (the midpoint of the wetted interval of the screen). Replacement tubing will be installed if necessary, after depth to water and depth to the bottom of the well measurements have been taken. New replacement polyethylene tubing, if required, will be used at each well. Purging will be performed in a manner to minimize agitation of any sediment in the well.

Wells will be pumped to dryness or until a minimum of three well volumes to a maximum of five well volumes of groundwater are removed. A well volume (V) is defined by the equation:

$$V = HA$$

Where:
V = Well Volume;
H = Height of standing water in the riser (difference between the depth to groundwater and the depth to the bottom of the well); and
A = Horizontal, cross-sectional area of the well riser.

A generator, if used, will be placed so that the exhaust from the engine is downwind of the working area. The well will be pumped at a flow rate that should approximate the natural flow gradient, if possible, but at a maximum rate of 500 milliliters per minute (mL/min). The water level in the well will be monitored and the purge rate will be incrementally adjusted to maintain a drawdown of 0.3 foot or less to the extent possible. The purge rate will be reduced to the minimum capabilities of the pump to avoid pumping the well dry and/or to facilitate stabilization of parameters. Care will be taken not to cause pump suction to be broken. If the recharge rate of the well is very low, purging will be interrupted so as not to cause the drawdown within the well to advance below the pump intake. However, a steady flow rate will be maintained to the extent practicable. Purge rates will be recorded.

During well purging, field parameters (i.e., temperature, specific conductivity, turbidity, dissolved oxygen (DO), oxidation-reduction potential (ORP) and pH) will be monitored at a minimum at the start of purging and after every well volume. Measurement of the field parameters will be taken using a clean container such as a plastic beaker or from a flow-through cell. The well is considered stabilized when three consecutive readings for each field parameter are within the following limits:

- Temperature ±0.5 degrees Celsius of the average value of the three readings
- Specific conductivity ±3% of the average value of the three readings
- Turbidity ≤ 10 NTUs or ± 10% if > 10 NTUs
- DO ±10% of the average value of the three readings
- ORP ±20 millivolts of the average value of the three readings
- pH ±0.2 pH units of the average value of the three readings.

An additional sample may be collected, filtered in the field using 0.45 µm filter, and analyzed for dissolved metals in addition to total metals, particularly if stabilized turbidity results for the monitoring well is greater than 10 Nephelometric Turbidity Units (NTUs). Both the total and dissolved analytical results will be evaluated.

No immiscible layers have been encountered at the Site; however, if any immiscible layers are identified, the layers will be sampled separately on a one-time basis. Any immiscible layers will be sampled prior to well evacuation using a disposable, bottom-loading bailer for light immiscible layers or a disposable, dual-check valve bailer for denser immiscible layers. Sampling of immiscible layers will be performed in a manner to minimize mixing of any immiscible layers. The volume of water purged from the well and other pertinent information (such as observation of a separated phase liquid, odor, color, relative turbidity, temperature, specific conductivity, turbidity, pH) will be recorded in the field log. The completed field log will be kept on file for review. Any potential problems in complying with the well evacuation procedures will be noted in the appropriate reports. Representative examples of the maintenance logs and field log forms are presented in Appendix C.

The purge water from the monitoring wells will be poured on the ground at least 30 feet away from the monitoring location after completion of sampling at the well. If the well is known to contain contaminants at levels exceeding primary MCLs, the purge water will be containerized and handled appropriately based on contaminant concentration.

5.5.5 Sample Collection

Each well will be sampled as soon as feasible after purging, depending on the rate of recharge to the well. Groundwater sample storage and preservation procedures are summarized in Table 2. Laboratory-supplied containers that have been pre-cleaned by the laboratory or supplier will be used. All sample containers will be filled directly from the sampling equipment (dedicated polyethylene tubing used with a peristaltic pump) to the sample containers. Care will be taken to minimize agitation and aeration during sample collection. The sample containers will be filled following standard SW-846 sampling protocols. Sample containers will be filled in the order of metals (barium, calcium, chromium, iron, magnesium, manganese, nickel, potassium, sodium) and inorganics (total cyanide, chloride, and sulfate). If applicable, samples for dissolved metals will be filtered using a new, disposable, 0.45-micron filter. Samples will be preserved with the appropriate preservative for the particular parameter.

Samples from the primary sumps and secondary sumps will be grab samples collected using a peristaltic pump and polyethylene tubing. Measurements of temperature, specific conductivity, turbidity, and pH from the same sample aliquot will be recorded after the samples are collected.

Quality assurance/quality control (QA/QC) samples will be included in each monitoring event, as specified in Section 5.6, and will be used to validate the analytical results. A minimum of one field duplicate sample will be included in the analysis along with the SW-846 standard laboratory blanks reported for each analytical run. The field duplicate will be prepared as a split sample of one of the monitoring wells and will be submitted blind to the laboratory to avoid laboratory bias of field QA/QC samples. The sample will be split by alternately filling the investigative and duplicate sample bottles for the same parameters from the pump tubing to ensure that the samples represent water from the same interval of the well. Each sample container will be labeled with the following information using a waterproof marker:

- Sample number (cross-referenced in the field log to the groundwater monitoring well location);
- Time and date of sampling;
- Initials of sampler;
- Analyses required (e.g., nickel, cyanide); and
- Type of preservative added.

This same information will be reported on the chain of custody record as detailed below. A representative example of the chain of custody record is presented in Appendix E.

5.5.6 Decontamination

Measuring equipment, including the pH meter, conductivity meter, turbidity meter, and temperature meter, that contacts the groundwater will be decontaminated using a soapy (Alconox) water wash and distilled water rinse between wells.

Dedicated tubing and new filters will be used at each well location, as required. The peristaltic pump will not come in direct contact with the groundwater and will not require decontamination.

5.5.7 Sample Preservation Chain of Custody and Shipment

Sample preservation is specific to the analysis performed, which are included in Table 2. The transport container provided by the laboratory will be used for storage of the collected samples and transportation of the samples to the analytical laboratory. The samples will be kept in the transport container, which will be cooled to approximately 4 °C from the time of sample collection to the time of delivery to the laboratory. The transport container will be packed with the samples, wet ice, and packing material to ensure that the appropriate sample temperature is maintained and that the sample containers are not broken in transit.

The appropriate chain of custody record will be signed and included in each of the transport containers, and the transport containers will be sealed with packing tape and custody seals. The transport containers will be delivered to the analytical laboratory by overnight courier service. Laboratory personnel will inspect the transport containers upon receipt and notify the project personnel of any difficulties with sample integrity, sample temperature, or holding time. Samples are tracked internally by the laboratory throughout all phases of analysis, with access restricted to authorized personnel. Completion of the field forms, sample key, and chain of custody forms will help to prevent misidentification of samples and to track the samples. A representative example of a chain of custody form is included in Appendix E.

5.6 ANALYTICAL QA/QC PROCEDURES

The selected analytical laboratory will perform all analyses in accordance with accepted industry methods. The samples will be analyzed using U.S. EPA-approved methods contained in U.S. EPA publication SW-846, *Test Methods for Evaluating Solid Waste Physical/Chemical Methods,* Third Edition, November 1986 with promulgated updates. A complete list of parameters, U.S. EPA test method numbers, and quantitation limits are provided in Table 3.

5.6.1 Level of QA/QC Effort

To assess samples of data resulting from the field sampling program, field duplicate samples, field blank samples (equipment rinse), and matrix spike samples will be collected and submitted to the analytical laboratory. The QA/QC samples will be collected and assessed following Ohio EPA's Data Validation Plan Review Form Tier 1, Version 4.0, 19 February 2009.

Field duplicate samples will be collected at a frequency of one per ten or fewer investigative samples per parameter set, with a minimum of one field duplicate sample submitted per sampling event. For the inorganic analyses, one matrix spike and matrix spike duplicate (MS/MSD) will be analyzed at a minimum frequency of one per twenty or fewer investigative samples.

Field duplicate samples will be analyzed to check for sampling and analytical reproducibility. Field duplicate samples are to be used as a measure or precision throughout the sampling event. Comparison of field duplicate samples will be based upon the target analytes, both non-detected and detected, and the relative percent differences (RPD) of each analyte's concentration.

The sampling and analysis program is summarized in Table 1, which lists the specific parameters to be measured and the number and frequency of sampling. The level of QA effort required for each matrix is also summarized in this table. The QA/QC samples will be used to qualify the data in accordance with standard data validation procedures and not to correct the data.

5.6.2 Data Review and Validation

Upon receipt of the data packages from the project laboratory, the data will be reviewed and validated. The data review will evaluate the finished data sheets, field blank data, field duplicate data, and recover and RPD data for surrogate spikes, MS/MSD samples and MS/DUP samples. Validation of the data will consist of evaluating the QA/QC data based on the applicable review criteria specified in "U.S. EPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," dated February 1994.

Assessment of analytical data will include checks for data consistency by looking for comparability of duplicate analysis, potential sample contamination as indicated by results of rinsate sample analyses, laboratory QA procedures, and adherence to accuracy and precision criteria, transmittal errors, and anomalously high or low parameter values. The results of these data validation will be presented in a data quality assessment and validation that is included with the data submittals.

5.6.3 Comparison to MCLs

Validated analytical results will be compared to the current MCL. If any of the validated analytical results exceed their respective MCL, confirmation samples will be collected from the location within 30 days of the determination of the initial exceedance. The Ohio EPA will be notified in writing of the potential exceedance of the MCL within 7 days of the initial sample or subsequent confirmation sample

exceedance. The notification will include a request to meet with representatives of the Northeast District Office of the Ohio EPA to discuss any additional actions, including confirmation sampling, if necessary.

6. Biennial Reporting

Post Closure and groundwater monitoring results will be submitted biennially before 1 March on the calendar year following groundwater sampling. The last biennial sampling event was conducted in 2020; therefore, the next report will be submitted no later than 1 March 2021. The reports will include the following information:

- Groundwater elevation figures for the Till Unit and Bedrock Unit with generalized flow direction arrows;
- Field sampling and inspection forms;
- Chain of custody documentation;
- Data validation memorandum;
- Determination of groundwater flow rate and direction in the Till and Bedrock Units;
- Evaluation of the monitoring program including well locations, parameters, and sampling frequency; and
- Summary of the monitoring results for the sampling period.

The report will be submitted no later than 1 March of the reporting year using the forms supplied by the Ohio EPA and the datafile formats specified by the Ohio EPA for the biennial reports.

Inspection records, field forms, and laboratory analytical reports will be maintained for 3 years from the date of the activity. Field logs and reports will be kept and maintained at the RACER Project Manager's office through the post-closure period. The Groundwater Monitoring Plan documentation will be available for inspection at reasonable times.

TABLES

TABLE 1
SAMPLING AND ANALYSIS PLAN
RACER ELYRIA
ELYRIA, OHIO

					QC Samples				
Task	**Sampling Locations**	**Field Parameters**	**Laboratory Parameters**	**Investigative Samples**	**Equipment Blank**	**Field Duplicate**	**MS[2]**	**MSD**	**Total Samples**
Groundwater Monitoring	P-02T, P-03T, P-03R, P-08T, P-12, P-12TR, P-14T, P-15T, P-16T, P-21T, P-02, P-08R, P-14, P-15, P-16, P-18, P-18T and P-21	Temperature, specific conductivity, turbidity, pH, water levels	Metals[1] (barium, calcium, chromium, iron, magnesium, manganese, nickel, potassium, and sodium), total cyanide, and chloride and sulfate	18	1	2	1	1	23
Water Levels	P-1, P-1T, P-11,P-13, P-13T, P-17, P-19, and P-20	Water levels	NA	--	-	--	--	--	--

Notes:
1. Metal analyses performed on unfiltered samples. Samples for dissolved metals may also be collected, field filtered, preserved, and analyzed.
2. Matrix spike/matrix spike duplicate (MS/MSD) are required for data validation.
Samples designated for MS/MSD analyses will be collected at a minimum frequency of one in twenty investigative samples or one per sample round.

TABLE 2
GROUNDWATER SAMPLE STORAGE AND PRESERVATION PROCEDURES
RACER ELYRIA
ELYRIA, OHIO

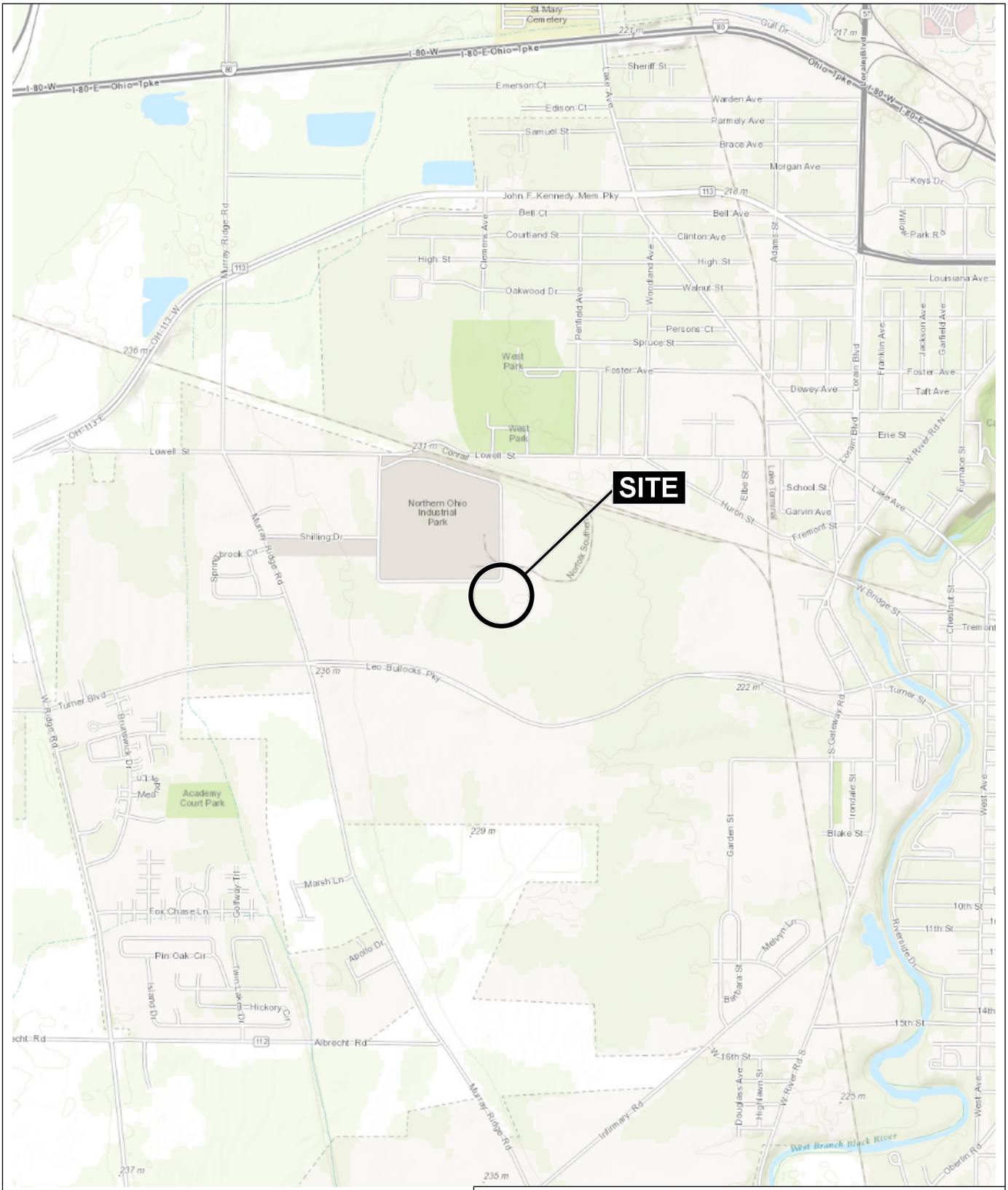
Analyses	Sample Containers	Preservation	Maximum Holding Time after Sample Collection	Sample Filling	Shipping	Packaging
Barium, calcium, chromium, iron, magnesium, manganese, nickel, potassium, and sodium	One 1-liter glass or plastic bottle	HNO_3 to pH <2, Iced, </= 4° C	180 days for analysis	Fill to neck of bottle	Overnight or hand deliver	Bubble Pack or Foam Chips
Total cyanide	One 500-mL plastic bottle	NaOH to pH >12, Iced, </= 4°C	14 days to analysis	Fill to neck of bottle	Overnight or hand deliver	Bubble Pack or Foam Chips
Chloride and sulfate	One 250-mL plastic bottle	Iced, </= 4°C	28 days for analysis	Fill to neck of bottle	Overnight or hand deliver	Bubble Pack or Foam Chips

TABLE 3
ANALYTICAL METHODS AND TARGETED QUANTITATION LIMITS FOR GROUNDWATER ANALYSES
RACER ELYRIA
ELYRIA, OHIO

Parameter	Parameters and Analytical Methods	Analytical Technique	Targeted Quantitation Limits (mg/L)
Barium	Metals by SW-846[1] Method 6010B	Inductively Coupled Plasma Spectroscopy	0.025
Calcium			5.0
Chromium			0.07
Iron			0.1
Magnesium			5.0
Manganese			0.015
Nickel			0.05
Potassium			5.0
Sodium			5.0
Total cyanide	EPA-WW 335.2	Spectrophorometric	0.040
Chloride	EPA-WW[2] 300.0	Ion Chromatography	1.0
Sulfate			5.0

Notes:
1. SW-846: "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods," SW-846, Third Edition, November 1986 with promulgated updates.
2. EPA-WW: "Methods for Chemical Analysis of Water and Wastes," EPA-600/4-79-020, Revised March 1982 and subsequent revisions.
3. mg/L = milligrams per liter

FIGURES



MAP SOURCE: ESRI

SITE COORDINATES: 41°22'11"N, 82°8'8"W

HALEY ALDRICH

RACER TRUST LANDFILL
1400 LOWELL STREET
ELRYRIA, OHIO

PROJECT LOCUS

APPROXIMATE SCALE: 1 IN = 2000 FT
JUNE 2015

FIGURE 1

41753-001_1_LOCUS.PDF

OHIO NORTHERN INDUSTRIAL PARK

P-01T
P-01

P-08T
P-08R
INACTIVE COLLECTION TANKS
P-21
P-21T
P-14T
P-14
P-16T
P-16
NW SECONDARY SUMP
NE SECONDARY SUMP
NW PRIMARY SUMP
NE PRIMARY SUMP
RCRA CLOSED LANDFILL
P-11 (HERRON)
P-12
P-12TR
P-20
P-02T
P-02
SW PRIMARY SUMP
SE PRIMARY SUMP
P-17
SW SECONDARY SUMP
SE SECONDARY SUMP
P-15T
P-15
P-18T
P-18
P-03T
P-03R
P-13T
P-13
P-19

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

LEGEND

- BIENNIAL MONITORING WELLS
- PIEZOMETER FOR POST CLOSURE CARE WATER ELEVATION MONITORING
- PRIMARY SUMP
- SECONDARY SUMP
- SITE BOUNDARY

NOTES

1. AERIAL IMAGE PROVIDED AS PART OF ESRI BASEMAP WORLD IMAGERY.
2. ALL LOCATIONS AND ELEVATIONS BASED UPON A PRE-EXISTING SURVEY.

N

0 80 160 240 320
SCALE IN FEET

HALEY ALDRICH

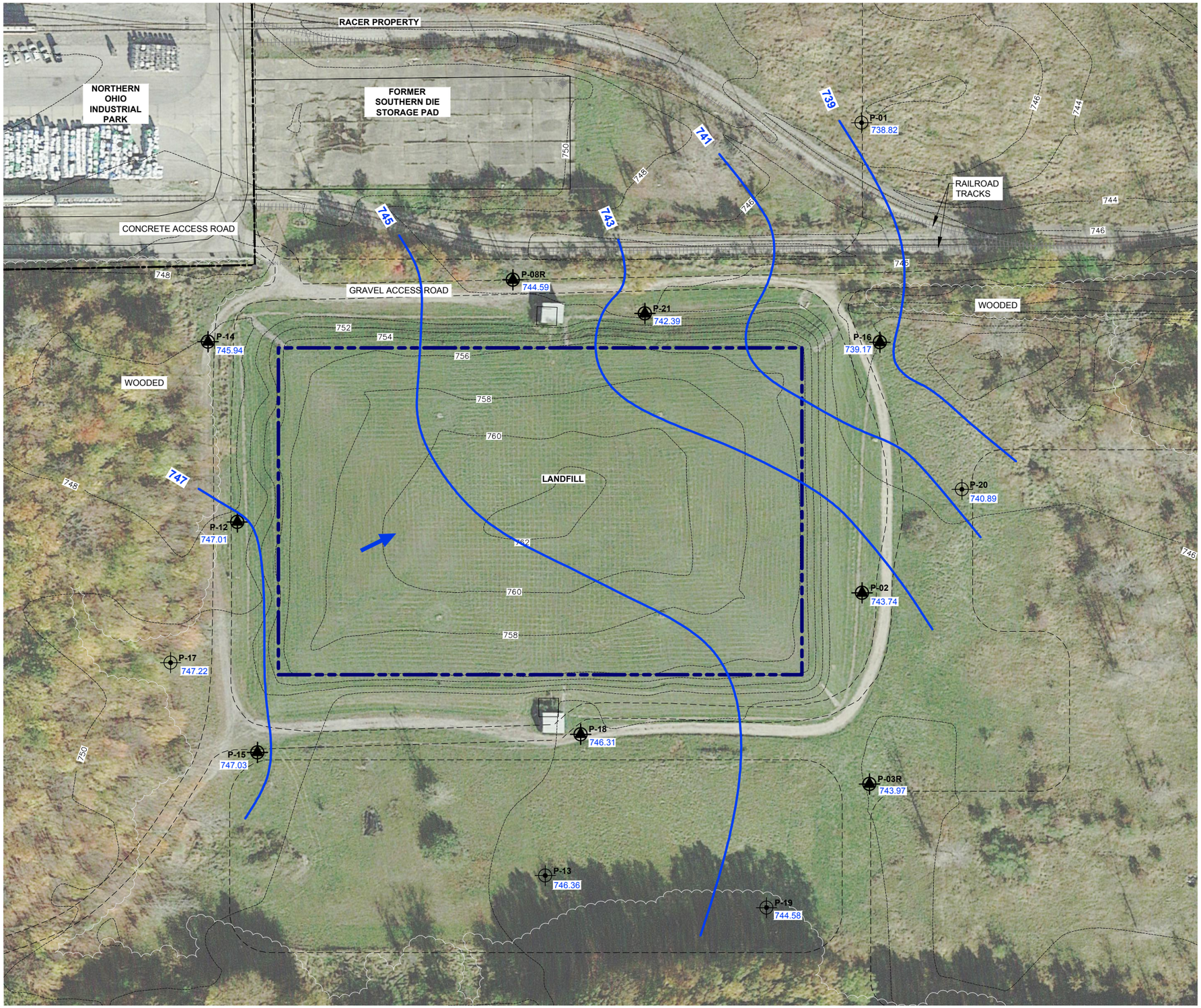
RACER ELYRIA
ELYRIA, OHIO

SITE LAYOUT MAP

DECEMBER 2015

FIGURE 2

GIS FILE PATH: G:\41753_RacerElyria\Global\GIS\RECOVERED 06.30.15\Groundwater Contours\41753-001-0002-SITE_MAP_d2.mxd — USER: dquatfiel — LAST SAVED: 12/2/2015 10:17:07 AM



LEGEND

- 750 — SURFACE CONTOUR/ELEVATION
- SITE BOUNDARY
- x — FENCE
- BIENNIAL MONITORING WELLS
- PIEZOMETER FOR POST CLOSURE CARE WATER ELEVATION MONITORING
- 738.82 — GROUNDWATER ELEVATION IN FEET
- 739 — INTERPRETED GROUNDWATER ELEVATION CONTOUR IN FEET, DASHED WHERE INFERRED
- GROUNDWATER FLOW DIRECTION

NOTES

1. SURVEY PROVIDED BY CRA, DRAWING 12616-TO1 (PRES040GN-WA001), DATED FEBRUARY 26, 2015.
2. IMAGE FROM GOOFLE EARTH PRO, DATED OCTOBER 25, 2015.

N

0 100 200
SCALE IN FEET

HALEY ALDRICH

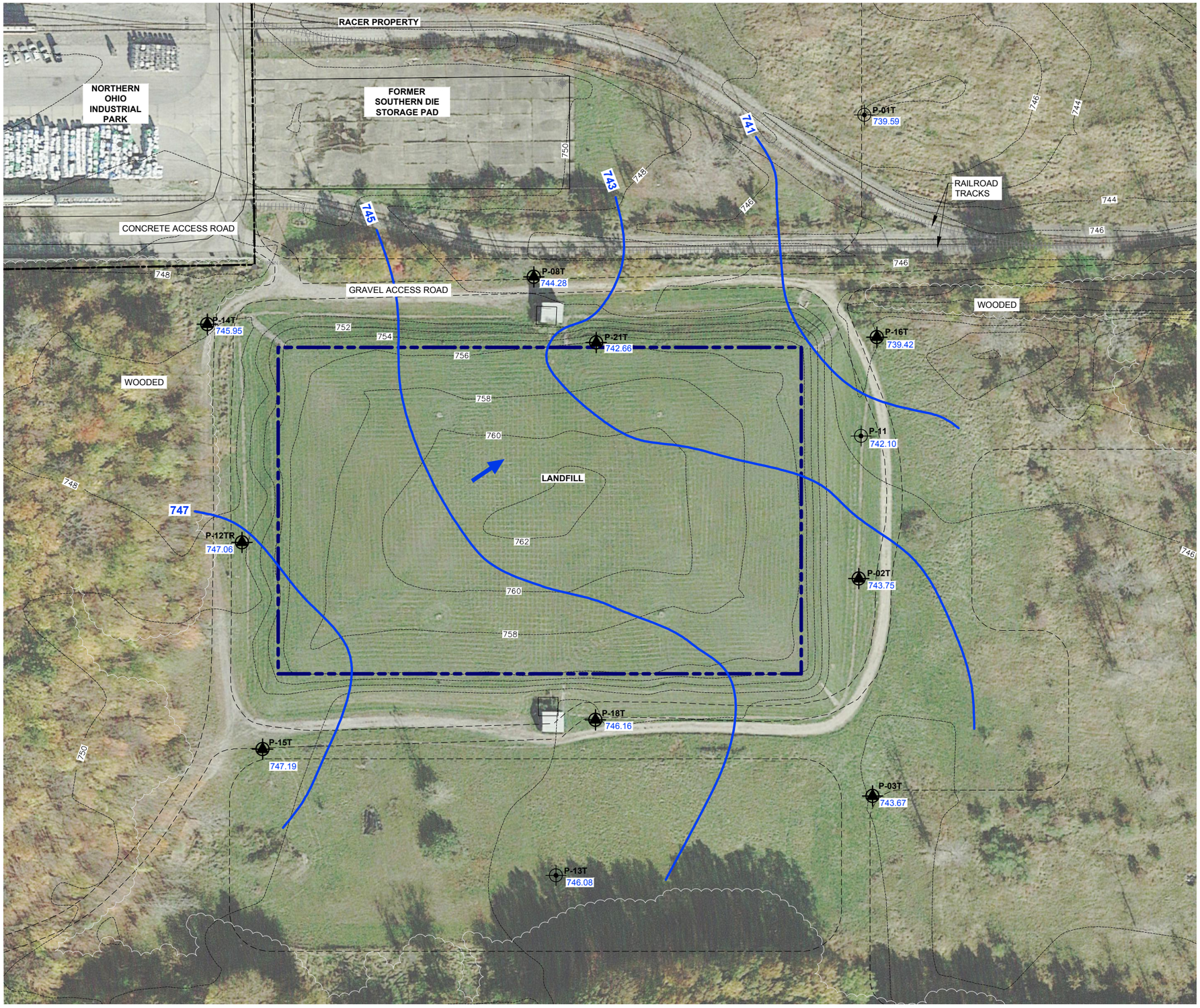
RACER TRUST ELYRIA
1400 LOWELL STREET
ELYRIA, OHIO

BEDROCK GROUNDWATER ELEVATIONS JUNE 2018

SCALE: AS SHOWN
JULY 2018

FIGURE 3

VARI, KATALIN Printed: 7/3/2018 11:30 AM Layout: JUNE 2018
G:\129862_RACER ELYRIA\CAD\FIGURES\129862-005_0003_GW 06-18 ROCK.DWG



LEGEND

- 750 — SURFACE CONTOUR/ELEVATION
- SITE BOUNDARY
- x — FENCE
- BIENNIAL MONITORING WELLS
- PIEZOMETER FOR POST CLOSURE CARE WATER ELEVATION MONITORING
- 739.59 — GROUNDWATER ELEVATION IN FEET
- 741 — INTERPRETED GROUNDWATER ELEVATION CONTOUR IN FEET, DASHED WHERE INFERRED
- GROUNDWATER FLOW DIRECTION

NOTES

1. SURVEY PROVIDED BY CRA, DRAWING 12616-TO1 (PRES040GN-WA001), DATED FEBRUARY 26, 2015.
2. IMAGE FROM GOOFLE EARTH PRO, DATED OCTOBER 25, 2015.

N

0 100 200
SCALE IN FEET

HALEY ALDRICH

RACER TRUST ELYRIA
1400 LOWELL STREET
ELYRIA, OHIO

TILL CONTACT GROUNDWATER ELEVATIONS JUNE 2018

SCALE: AS SHOWN
JULY 2018

FIGURE 4

VARI, KATALIN Printed: 7/3/2018 11:28 AM Layout: JUNE 2018
G:\129862_RACER ELYRIA\CAD\FIGURES\129862-005_0002_GW 06-18 TILL.DWG

APPENDIX A

Inspection Form

Semi-Monthly Inspection Form

Inspector Name:_____
Company:_____
Date:_____

ALL FAILURES ARE TO BE ADDRESSED WITH PROPER NOTIFICATION OF AUTHORITIES AND CORRECTIVE ACTION.

LANDFILL INSPECTION GUIDE CLOSED LANDFILL ELYRIA, OHIO

CAP & BERM

Inspect for deep root penetration, burrowing animals, soil erosion and slope failures.
Inspect the landfill cap and berm for water ponding and washouts.
OBSERVATION_____
_____
CORRECTIVE ACTION _____
_____Date_____

VEGETATION

Inspect for proper vegetation height (max. 6") and solid growth.
OBSERVATION_____
_____
CORRECTIVE ACTION_____
_____Date_____

ACCESS ROADS

Inspect for sufficient gravel and proper drainage.
OBSERVATION_____
_____ CORRECTIVE
ACTION_____
_____Date_____

MONITORING WELLS

Inspect for secure guard casings, locking caps, proper vegetation height around well (4' radius), corrosion of guard casing, visible ID number.
OBSERVATION_____
_____ CORRECTIVE
ACTION_____
_____Date_____

SITE PRIMARY FENCE

Inspect all perimeter fencing and gates for damage or unauthorized entry and proper warning signs.
OBSERVATION_____
_____ CORRECTION
ACTION_____
_____

SURVEY BENCHMARKS

Inspect for signs of disturbance.
OBSERVATION_____
_____
CORRECTIVE ACTION_____
_____Date_____

PRIMARY SUMP

Measure liquid level in each primary sump:

Sump	Depth to Water	Action Level*	90% of Action Level**
NW Primary Sump	_____ ft	13.2 ft	12.8 ft
NE Primary Sump	_____ ft	13.4 ft	12.9 ft
SW Primary Sump	_____ ft	13.7 ft	13.4 ft
SE Primary Sump	_____ ft	12.4 ft	12.0 ft

*Remove leachate within 48 hours if depth to water equal to or greater than action level.

**Schedule leachate removal when depth to water reaches 90% of action level.

CORRECTIVE ACTION_____
_____Date_____

APPENDIX B

Landfill Evaluation Memorandum

HALEY & ALDRICH, INC.
6500 Rockside Road
Suite 200
Cleveland, OH 44131
216.739.0555

MEMORANDUM

4 September 2020
File No. 129862-008

TO: Ohio EPA
Sylvia Chinn-Levy

C: RACER Trust
Pam Barnett

FROM: Haley & Aldrich, Inc.
Ban Aragona *BNA*
Brian Lowes, P.E. BL

SUBJECT: RACER Elyria Landfill Evaluation

Haley & Aldrich, Inc. is pleased to present this technical memorandum to Revitalizing Auto Communities Environmental Response Trust (RACER) that reviews the potential interaction between water within the landfill and surrounding groundwater at the Elyria Landfill (Site). The work is being conducted pursuant to an observed increase in leachate extraction volumes.

Landfill leachate is extracted from the landfill on a monthly basis in general accordance with the Post Closure Care (PCC) Plan[1]. The PCC plan requires a minimum of primary sumps extraction once per month despite sump level elevations consistently observed less than action levels, which are also defined within the plan. The PCC Plan also requires secondary sumps extraction if water is observed.

An increase in leachate extraction volumes was observed during Q1 2019 which initiated review of observations and data associated with the landfill. The preliminary review indicated that the landfill's upper drainage layer has not been inspected nor cleaned since installation. In addition, groundwater elevations collected during the 2018 groundwater monitoring event were similar in elevation to the static water elevations within the landfill's primary sumps.

As a result of the observations, an evaluation of the landfill was conducted. This evaluation includes upper drainage layer observations and cleaning, a transducer study, and collection of leachate water samples for analysis, as detailed further below.

UPPER DRAINAGE LAYER EVALUATION

Camera observations and jetting of the upper drainage layer piping was completed by Bloodhound Underground Utility Locators (Bloodhound) on 31 October 2019. Debris and obstructions were observed in drainage pipe including rocks, animals, and nests. These obstructions were removed to the extent possible and pipes were left clear for drainage. The live animals were left undisturbed. As precipitation persisted throughout the day (<1 inch per 24 hours), water was observed to be flowing through the backfill of the pipes, indicating that some drainage has continued to occur over previous years. A summary of the inspection, including photos, is included in Bloodhound's report as Attachment A.

Based on the observations, the upper drainage layer appears to be in good condition and operating as intended since retrofitted drainage tile installation[2]. Animal guards were installed at the end of each drainage pipe to prevent animal habitation in the drainage layer. Haley & Aldrich does not currently recommend additional repairs.

LANDFILL/GROUNDWATER INTERACTION EVALUATION

To evaluate the current conditions of the landfill and its potential interaction with groundwater, a transducer study was completed which monitored the fluctuations in groundwater elevations compared to liquid elevations within the landfill sumps. Annotated Charts illustrating well and sump transducer data are included as Attachment B.

Observations based on data provided in the charts include:

- Following each extraction event, the immediate recharge within individual sumps rebounds to within several inches of the pre-extraction water elevation. This is indicative of rapid recharge from the lower drainage layer but an overall reduction of water level within the drainage layer.
- The month following each extraction event show a linear and gradual rebound to elevation inches below the previous month's elevation. This gradual rebound is indicative of water entering the landfill cap and slowly percolating through the landfill.
- In general, there was an overall decline in water elevation within sumps despite moderate precipitation events and a general increase in groundwater elevations surrounding the landfill.
- Groundwater elevations rose following precipitation events; however, sump levels did not react in the same manner. This further indicates no significant damage to the upper cap is evident.
- Throughout the observation period, the water levels within the wells at the Site increased by up to four feet; however, the water levels in the primary sumps either remained the same or decreased slightly. Even with groundwater elevation fluctuation during the monitoring period, sump elevations remained steady with a gradual increase between extraction events as expected.
- Early in the observation period, groundwater elevations were less than the sump elevations. Measurable leakage from the sumps to the groundwater was not observed. This inverse

relationship further indicates a lack of connection between the landfill and the surrounding groundwater elevations.

- Direct interaction between groundwater and the landfill sumps do not appear to be evident.

Based on the observations during this study, the landfill sumps do not appear to interact with the groundwater to a measurable extent. Manual measurements of water levels will continue to further confirm these findings over time.

CONCLUSION AND RECOMMENDED NEXT STEPS

Based on current evaluation data, there does not appear to be a significant issue with the drainage pipes within the upper drainage layer. However, this drainage layer was a retrofit to the existing landfill and may not be optimal for slopes, drainage mat sizing, etc. Stormwater that accumulates at low spots within the drainage mat will still eventually percolate through the landfill very slowly over time, consistent with landfill models. Based on the hydrographs, the gradual recharge of sumps following rain events do not indicate a direct channel or conduit connection from the surface to the sumps.

Connection to the groundwater is not evident based on the elevations of groundwater and leachate within the sumps observed during the time of study. During the study, water elevations in the sumps did not increase along with the groundwater network indicating that there is not a connection between the groundwater and landfill leachate sumps. Following monthly extractions from the sumps, water elevations slowly rise (as observed in Attachment B), but this is typical as water percolates through the landfill waste and is collected in the leachate collection system. This is consistent with previous landfill modeling efforts.

Based on the good condition of the upper drainage layer and cap and the lack of evidence for connection between groundwater and the leachate sumps, the following operational changes are recommended:

- Revise the PCC Plan to include the following:
  - Reduce the frequency of extraction events required per year. Currently the plan indicates a minimum of one extraction event per month. The plan can be modified to be action level based with an updated minimum extraction requirement (i.e., quarterly or 2x per year);
  - Remove the requirement for extraction of secondary sumps when water is present. An evaluation conducted in 2003[3] indicated that connectivity between the secondary and primary sumps is evident. Therefore, it is unlikely that the secondary sumps will be void of leachate. Based on the data provided in this study, the liner effectively protects groundwater from directly interacting with landfill leachate; and
  - A trial period approach should be considered to include a limited pumping frequency over a 2-3 years duration prior to revising the PCC Plan.

- Re-evaluate discharge and offsite treatment options based on recent leachate analytical data and anticipated quantities per leachate event.
- To prevent animals from entering the upper drainage layer piping, grated animal guards have been recommended and are installed at each drainage pipe location. A variety was selected such that animals that dwelled in the pipes can leave but will be unable to re-enter.

Attachments
Attachment A – Upper Drainage Layer Inspection and Cleaning Report
Attachment B – Annotated Transducer Study Charts

Works Cited
[1] Haley & Aldrich, Inc. Amendment to: Post-Closure Plan for RACER Elyria. Cleveland, Ohio, 2015.
[2] Construction Documentation Report Post Closure Maintenance Activities, Elyria, Ohio: Conestoga-Rovers & Associates, 2011.
[3] REALM, INC. Primary and Secondary Sump Pumping Test Report. Elyria, Ohio: Conestoga-Rovers & Associates, 2003.

ATTACHMENT A

Upper Drainage Layer Inspection and Cleaning Report

Project

Project	157069 - Haley & Aldrich - Northern Ohio Industrial Park
Start Date	10/31/2019
End Date	10/31/2019

Blood Hound
750 Patricks Place, Brownsburg, IN 46112
Tel. (888) 858-9830
bhi@bhug.com

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157069 - Haley & Aldrich - Northern Ohio Industrial Park		**10/31/2019**

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Blood Hound
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bhi@bhug.com

Project Information

Project	
157069 - Haley & Aldrich - Northern Ohio Industrial Park	**10/31/2019**

Contractor

Company:	Blood Hound
Responsible person:	
Division:	
Street:	750 Patricks Place
City:	Brownsburg, IN 46112
Phone:	(888) 858-9830
Fax:	
Mobile:	
E-Mail:	bhi@bhug.com

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Section Profile

Project	
157069 - Haley & Aldrich - Northern Ohio Industrial Park	**10/31/2019**

Nr.	Upstream MH	Downstream MH	Date	Street	Media Label	Material	Total Length	Length Surveyed
6	Northeast South	West	10/31/2019	1400 Lowell St.		Polyethylene	341.26	341.26
8	South	North Central	10/31/2019	1400 Lowell St.		Polyethylene	15.74	15.74
9	South	Northwest South	10/31/2019	1400 Lowell St.		Polyethylene	327.74	327.74

3 x Circular 8 = 1925.72 Total Length (1924.95 Length Surveyed)

Total: 3 = 1925.72 Total Length (684.74 Length Surveyed)

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Section Summary

Project	
157069 - Haley & Aldrich - Northern Ohio Industrial Park	**10/31/2019**

Number of sections	10
Total length of sewer network	1925.72 ft
Inspected length of sewer network	1924.95 ft
Not inspected length of sewer network	0.77 ft
Total abandoned inspections	7
Number of section inspection photos	56
Number of section inspection videos	10
Number of section inspection scans	0
Number of section inclination measurements	0

Pipe Segment Reference	**South-North Central**	Upstream MH	**South**
City	**Elyria, OH**	Downstream MH	**North Central**
Street	**1400 Lowell St.**	Shape	**Circular 8inch**
Total Length	**12.0**	Material	**Polyethylene**

	Distance	PACP Code	Observation
1	0.00	ADP	Discharge Point
2	0.00	MWL	Water Level, 5% of the vertical dimension
3	6.23	DSC	Deposits Settled Compacted, 15% of cross sectional area from 5 o'clock to 7 o'clock
4	11.55	DSC	Deposits Settled Compacted, 35% of cross sectional area from 3 o'clock to 6 o'clock
5	11.56	MSA	Survey Abandoned

Pipe Segment Reference	**West-Northeast North**	Upstream MH	**West**
City	**Elyria, OH**	Downstream MH	**Northeast North**
Street	**1400 Lowell St.**	Shape	**Circular 8inch**
Total Length	**65.0**	Material	**Polyethylene**

	Distance	PACP Code	Observation
1	0.00	ADP	Discharge Point
2	0.00	MWL	Water Level, 5% of the vertical dimension
3	12.70	D	Deformed, 20% changed
4	64.67	MSA	Survey Abandoned

Pipe Segment Reference	**South-Northeast South**	Upstream MH	**South**
City	**Elyria, OH**	Downstream MH	**Northeast South**
Street	**1400 Lowell St.**	Shape	**Circular 8inch**
Total Length	**3.7**	Material	**Polyethylene**

	Distance	PACP Code	Observation
1	0.00	ADP	Discharge Point

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Section Summary

Project	
157069 - Haley & Aldrich - Northern Ohio Industrial Park	**10/31/2019**

	Distance	PACP Code	Observation
2	0.00	MWL	Water Level, 5% of the vertical dimension
3	3.72	MSA	Survey Abandoned

Pipe Segment Reference	**North-Southeast North**	Upstream MH	**North**
City	**Elyria, OH**	Downstream MH	**Southeast North**
Street	**1400 Lowell St.**	Shape	**Circular 8inch**
Total Length	**4.7**	Material	**Polyethylene**

	Distance	PACP Code	Observation
1	0.00	ADP	Discharge Point
2	0.00	MWL	Water Level, 5% of the vertical dimension
3	4.69	MSA	Survey Abandoned

Pipe Segment Reference	**West-Southeast South**	Upstream MH	**West**
City	**Elyria, OH**	Downstream MH	**Southeast South**
Street	**1400 Lowell St.**	Shape	**Circular 8inch**
Total Length	**5.9**	Material	**Polyethylene**

	Distance	PACP Code	Observation
1	0.00	ADP	Discharge Point
2	0.00	MWL	Water Level, 5% of the vertical dimension
3	2.93	DSGV	Deposits Settled Gravel, 20% of cross sectional area from 5 o'clock to 7 o'clock
4	5.94	MSA	Survey Abandoned

Pipe Segment Reference	**Northeast South-West**	Upstream MH	**Northeast South**
City	**Elyria, OH**	Downstream MH	**West**
Street	**1400 Lowell St.**	Shape	**Circular 8inch**
Total Length	**341.3**	Material	**Polyethylene**

	Distance	PACP Code	Observation
1	0.00	ADP	Discharge Point
2	0.00	MWL	Water Level, 5% of the vertical dimension
3	14.66	D	Deformed, 10% changed
4	27.06	MWLS	Water Level, Sag in pipe, 10% of the vertical dimension, Start
5	33.35	MWLS	Water Level, Sag in pipe, 10% of the vertical dimension, Finish
6	52.12	D	Deformed, 20% changed
7	52.81	MWLS	Water Level, Sag in pipe, 5% of the vertical dimension
8	65.62	D	Deformed, 10% changed
9	85.39	D	Deformed, 25% changed
10	91.20	D	Deformed, 10% changed
11	106.55	MWLS	Water Level, Sag in pipe, 5% of the vertical dimension, Start
12	118.44	MWLS	Water Level, Sag in pipe, 5% of the vertical dimension, Finish
13	121.59	MGO	General Observation
14	168.33	MWLS	Water Level, Sag in pipe, 10% of the vertical dimension
15	180.39	D	Deformed, 10% changed
16	194.99	D	Deformed, 10% changed
17	273.19	D	Deformed, 15% changed
18	341.26	ADP	Discharge Point

Pipe Segment Reference	**West-Southeast South**	Upstream MH	**West**
City	**Elyria, OH**	Downstream MH	**Southeast South**
Street	**1400 Lowell St.**	Shape	**Circular 8inch**
Total Length	**783.6**	Material	**Polyethylene**

Blood Hound
750 Patricks Place, Brownsburg, IN 46112
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Section Summary

Project	
157069 - Haley & Aldrich - Northern Ohio Industrial Park	**10/31/2019**

	Distance	PACP Code	Observation
1	0.00	ADP	Discharge Point
2	0.00	MWL	Water Level, 5% of the vertical dimension
3	74.56	D	Deformed, 15% changed
4	138.07	D	Deformed, 5% changed
5	170.53	D	Deformed, 5% changed
6	247.95	TF	Tap Factory Made at 9 o'clock, 8inch dim
7	272.39	D	Deformed, 10% changed
8	296.46	RFJ	Roots Fine Joint at 1 o'clock, within 8 inch
9	297.25	RFJ	Roots Fine Joint at 1 o'clock, within 8 inch
10	312.36	D	Deformed, 15% changed
11	380.85	D	Deformed, 15% changed
12	783.62	MSA	Survey Abandoned

Pipe Segment Reference	**South-North Central**	Upstream MH	**South**
City	**Elyria, OH**	Downstream MH	**North Central**
Street	**1400 Lowell St.**	Shape	**Circular 8inch**
Total Length	**15.7**	Material	**Polyethylene**

	Distance	PACP Code	Observation
1	0.00	ADP	Discharge Point
2	0.00	MWL	Water Level, 5% of the vertical dimension
3	15.74	ATC	Tee Connection at 12 o'clock, 8"inch vertical, 8"inch horizontal

Pipe Segment Reference	**South-Northwest South**	Upstream MH	**South**
City	**Elyria, OH**	Downstream MH	**Northwest South**
Street	**1400 Lowell St.**	Shape	**Circular 8inch**
Total Length	**327.7**	Material	**Polyethylene**

	Distance	PACP Code	Observation
1	0.00	ADP	Discharge Point
2	0.00	MWL	Water Level, 5% of the vertical dimension
3	327.74	AEP	End of Pipe

Pipe Segment Reference	**West-Northwest North**	Upstream MH	**West**
City	**Elyria, OH**	Downstream MH	**Northwest North**
Street	**1400 Lowell St.**	Shape	**Circular 8inch**
Total Length	**366.0**	Material	**Polyethylene**

	Distance	PACP Code	Observation
1	0.00	ADP	Discharge Point
2	0.00	MWL	Water Level, 5% of the vertical dimension
3	43.33	MWLS	Water Level, Sag in pipe, 5% of the vertical dimension
4	113.43	D	Deformed, 5% changed
5	168.61	MWLS	Water Level, Sag in pipe, 15% of the vertical dimension
6	190.61	MWLS	Water Level, Sag in pipe, 15% of the vertical dimension
7	215.54	MWLS	Water Level, Sag in pipe, 5% of the vertical dimension
8	231.37	DSC	Deposits Settled Compacted, 30% of cross sectional area from 5 o'clock to 7 o'clock
9	283.05	TF	Tap Factory Made at 9 o'clock, 8inch dim
10	366.01	MSA	Survey Abandoned

Blood Hound
750 Patricks Place, Brownsburg, IN 46112
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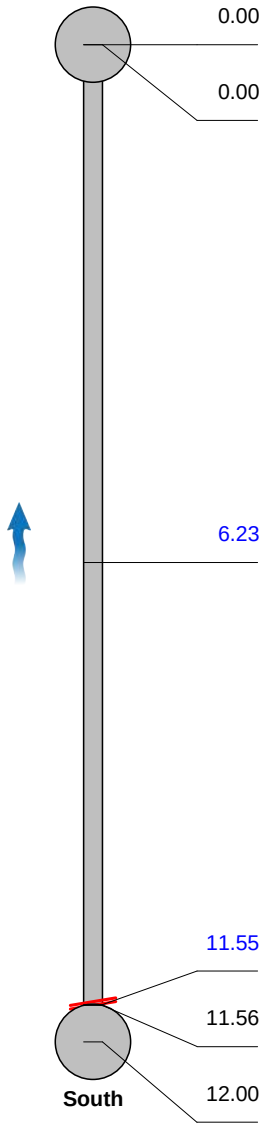
Inspection report

Date:	Work Order:	Weather:	Surveyed By:	Certificate Number:	Pipe Segment Ref.:
10/31/2019			**Eric Mandery**	**U-117-07006590**	**South-North Central**
Year laid:	Pre-cleaning:	Direction:	Pipe Joint Length:	Total Length:	Length Surveyed:
		Upstream		**12.0 '**	**11.6 '**

City:	**Elyria, OH**	Drainage Area:		Upstream MH:	**South**
Street:	**1400 Lowell St.**	Media Label:		Up Rim to Invert:	**0.0**
Location Code:		Flow Control:		Downstream MH:	**North Central**
Location Details:		Sheet Number:		Down Rim to Invert:	**0.0**
Pipe shape:	**Circular**	Sewer Use:		Total gallons used:	**0.0**
Pipe size:	**8 "**	Sewer Category:	**SEC**	Joints passed:	**0**
Pipe material:	**Polyethylene**	Purpose:		Joints failed:	**0**
Lining Method:		Owner:			
Additional Info:					



1:91	Distance	Code	Observation	Counter	Photo	Grade
	0.00	ADP	Discharge Point / North Central discharge heading South.	00:00:00		
	0.00	MWL	Water Level, 5% of the vertical dimension	00:00:07		
	6.23	DSC	Deposits Settled Compacted, 15% of cross sectional area from 5 o'clock to 7 o'clock	00:01:02		M3
	11.55	DSC	Deposits Settled Compacted, 35% of cross sectional area from 3 o'clock to 6 o'clock / Large rock.	00:02:07		M5
	11.56	MSA	Survey Abandoned / Can not pass rocks in pipe.	00:02:32		
	12.00		End of pipe			

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	5131	0.0	8.0	8.0	0.0	4.0	4.0

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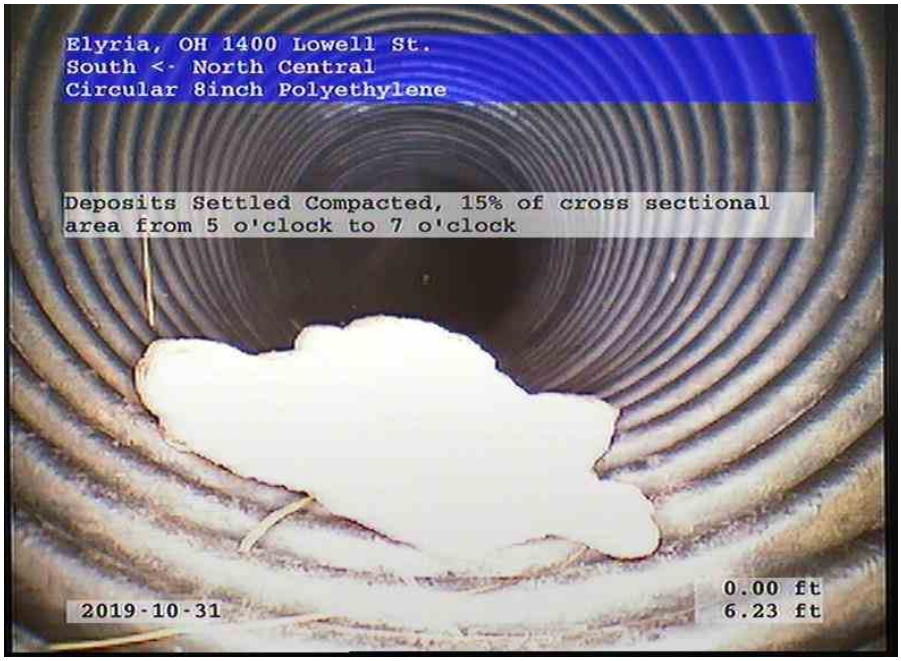
Section Pictures - 10/31/2019 - South-North Central

City	Street	Date	Pipe Segment Reference	Nr.
Elyria, OH	**1400 Lowell St.**	**10/31/2019**	**South-North Central**	**1**

South-North Central_c99a7571-8043-4589-9d6e-2ca9758d3c5a_20191031_084252_495.jpg, 00:00:00, 0.00ft
Discharge Point



South-North Central_f308c9af-d8ca-474b-aba3-ebc824385c99_20191031_084411_735.jpg, 00:01:02, 6.23ft
Deposits Settled Compacted, 15% of cross sectional area from 5 o'clock to 7 o'clock

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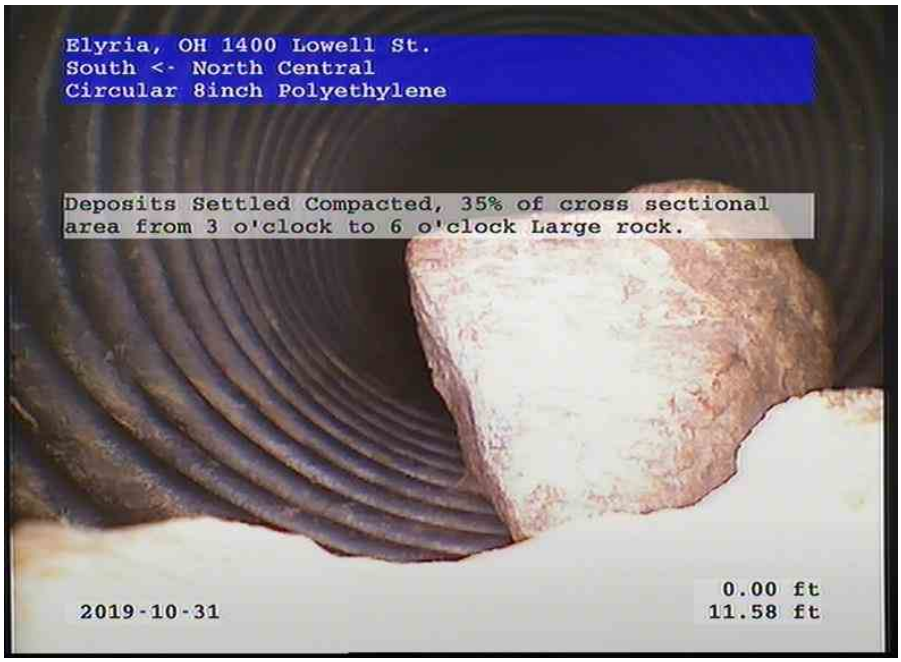
Section Pictures - 10/31/2019 - South-North Central

City	Street	Date	Pipe Segment Reference	Nr.
Elyria, OH	**1400 Lowell St.**	**10/31/2019**	**South-North Central**	**1**



South-North Central_b4e06e87-dd69-474f-a0c0-e46d20e5f38d_20191031_084540_895.jpg, 00:02:07, 11.55ft
Deposits Settled Compacted, 35% of cross sectional area from 3 o'clock to 6 o'clock

South-North Central_f0f16c76-02e4-473b-9105-7029c37c4d01_20191031_084656_395.jpg, 00:02:32, 11.56ft
Survey Abandoned

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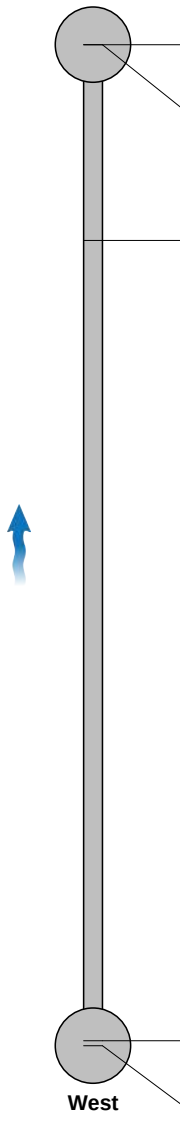
Inspection report

Date:	Work Order:	Weather:	Surveyed By:	Certificate Number:	Pipe Segment Ref.:
10/31/2019			**Eric Mandery**	**U-117-07006590**	**West-Northeast North**
Year laid:	Pre-cleaning:	Direction:	Pipe Joint Length:	Total Length:	Length Surveyed:
		Upstream		**65.0 '**	**64.7 '**

City:	**Elyria, OH**	Drainage Area:		Upstream MH:	**West**
Street:	**1400 Lowell St.**	Media Label:		Up Rim to Invert:	**0.0**
Location Code:		Flow Control:		Downstream MH:	**Northeast North**
Location Details:		Sheet Number:		Down Rim to Invert:	**0.0**
Pipe shape:	**Circular**	Sewer Use:		Total gallons used:	**0.0**
Pipe size:	**8 "**	Sewer Category:	**SEC**	Joints passed:	**0**
Pipe material:	**Polyethylene**	Purpose:		Joints failed:	**0**
Lining Method:		Owner:			
Additional Info:					



1:491 Distance	Code	Observation	Counter	Photo	Grade
0.00	ADP	Discharge Point / Northeast North	00:00:00		
0.00	MWL	Water Level, 5% of the vertical dimension	00:00:08		
12.70	D	Deformed, 20% changed	00:01:01		S5
64.67	MSA	Survey Abandoned / Can not pass racoon.	00:07:00		
65.00		End of pipe			

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
5100	0000	5.0	0.0	5.0	5.0	0.0	5.0

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Section Pictures - 10/31/2019 - West-Northeast North

City	Street	Date	Pipe Segment Reference	Nr.
Elyria, OH	**1400 Lowell St.**	**10/31/2019**	**West-Northeast North**	**2**

West-Northeast North_d0968b40-9ab4-4928-a4b0-4167495754e9_20191031_092840_070.jpg, 00:00:00, 0.00ft
Discharge Point

West-Northeast North_ea25ff16-b098-4eea-8c57-f587963d3b40_20191031_093015_990.jpg, 00:01:01, 12.70ft
Deformed, 20% changed

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Section Pictures - 10/31/2019 - West-Northeast North

City	Street	Date	Pipe Segment Reference	Nr.
Elyria, OH	**1400 Lowell St.**	**10/31/2019**	**West-Northeast North**	**2**

West-Northeast North_019c96a4-564a-49cf-ab16-098a7b071397_20191031_093956_600.jpg, 00:07:00, 64.67ft
Survey Abandoned

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Inspection report

Date:	Work Order:	Weather:	Surveyed By:	Certificate Number:	Pipe Segment Ref.:
10/31/2019			**Eric Mandery**	**U-117-07006590**	**South-Northeast South**
Year laid:	Pre-cleaning:	Direction:	Pipe Joint Length:	Total Length:	Length Surveyed:
		Upstream		**3.7 '**	**3.7 '**

City:	**Elyria, OH**	Drainage Area:		Upstream MH:	**South**
Street:	**1400 Lowell St.**	Media Label:		Up Rim to Invert:	**0.0**
Location Code:		Flow Control:		Downstream MH:	**Northeast South**
Location Details:		Sheet Number:		Down Rim to Invert:	**0.0**
Pipe shape:	**Circular**	Sewer Use:		Total gallons used:	**0.0**
Pipe size:	**8 "**	Sewer Category:	**SEC**	Joints passed:	**0**
Pipe material:	**Polyethylene**	Purpose:		Joints failed:	**0**
Lining Method:		Owner:			
Additional Info:					

1:50 Distance	Code	Observation	Counter	Photo	Grade
0.00	ADP	Discharge Point / Northeast South	00:00:00		
0.00	MWL	Water Level, 5% of the vertical dimension	00:00:12		
3.72	MSA	Survey Abandoned / Can not pass rocks.	00:00:54		
3.72		End of pipe			

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	0000	0.0	0.0	0.0	0.0	0.0	0.0

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Section Pictures - 10/31/2019 - South-Northeast South

City	Street	Date	Pipe Segment Reference	Nr.
Elyria, OH	**1400 Lowell St.**	**10/31/2019**	**South-Northeast South**	**3**

South-Northeast
South_406ce8ba-2203-49f8-8e1b-991e7a9781ac_20191031_095500_247.jpg, 00:00:00, 0.00ft
Discharge Point

South-Northeast
South_de225c83-cf7a-408c-8adc-360815883731_20191031_102206_004.jpg, 00:00:54, 3.72ft
Survey Abandoned

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Inspection report

Date:	Work Order:	Weather:	Surveyed By:	Certificate Number:	Pipe Segment Ref.:
10/31/2019			**Eric Mandery**	**U-117-07006590**	**North-Southeast North**
Year laid:	Pre-cleaning:	Direction:	Pipe Joint Length:	Total Length:	Length Surveyed:
		Upstream		**4.7 '**	**4.7 '**

City:	**Elyria, OH**	Drainage Area:		Upstream MH:	**North**
Street:	**1400 Lowell St.**	Media Label:		Up Rim to Invert:	**0.0**
Location Code:		Flow Control:		Downstream MH:	**Southeast North**
Location Details:		Sheet Number:		Down Rim to Invert:	**0.0**
Pipe shape:	**Circular**	Sewer Use:		Total gallons used:	**0.0**
Pipe size:	**8 "**	Sewer Category:	**SEC**	Joints passed:	**0**
Pipe material:	**Polyethylene**	Purpose:		Joints failed:	**0**
Lining Method:		Owner:			
Additional Info:					

1:50 Distance	Code	Observation	Counter	Photo	Grade
0.00	ADP	Discharge Point / Southeast North	00:00:00		
0.00	MWL	Water Level, 5% of the vertical dimension	00:00:07		
4.69	MSA	Survey Abandoned / Can not pass rocks in pipe.	00:00:36		
4.69		End of pipe			

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	0000	0.0	0.0	0.0	0.0	0.0	0.0

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Section Pictures - 10/31/2019 - North-Southeast North

City	Street	Date	Pipe Segment Reference	Nr.
Elyria, OH	**1400 Lowell St.**	**10/31/2019**	**North-Southeast North**	**4**

North-Southeast North_a4fb8c06-b238-4cfe-aa60-2f0a0399c305_20191031_105636_789.jpg, 00:00:00, 0.00ft
Discharge Point

North-Southeast North_737c3bbf-e285-464a-86a9-b0f90fc366b9_20191031_105730_215.jpg, 00:00:36, 4.69ft
Survey Abandoned

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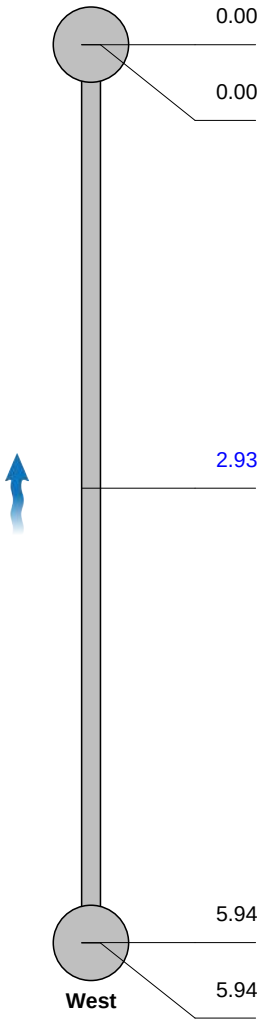
Inspection report

Date:	Work Order:	Weather:	Surveyed By:	Certificate Number:	Pipe Segment Ref.:
10/31/2019			**Eric Mandery**	**U-117-07006590**	**West-Southeast South**
Year laid:	Pre-cleaning:	Direction:	Pipe Joint Length:	Total Length:	Length Surveyed:
		Upstream		**5.9 '**	**5.9 '**

City:	**Elyria, OH**	Drainage Area:		Upstream MH:	**West**
Street:	**1400 Lowell St.**	Media Label:		Up Rim to Invert:	**0.0**
Location Code:		Flow Control:		Downstream MH:	**Southeast South**
Location Details:		Sheet Number:		Down Rim to Invert:	**0.0**
Pipe shape:	**Circular**	Sewer Use:		Total gallons used:	**0.0**
Pipe size:	**8 "**	Sewer Category:	**SEC**	Joints passed:	**0**
Pipe material:	**Polyethylene**	Purpose:		Joints failed:	**0**
Lining Method:		Owner:			
Additional Info:					



1:50 Distance	Code	Observation	Counter	Photo	Grade
0.00	ADP	Discharge Point / Southeast South	00:00:00		
0.00	MWL	Water Level, 5% of the vertical dimension	00:00:13		
2.93	DSGV	Deposits Settled Gravel, 20% of cross sectional area from 5 o'clock to 7 o'clock	00:00:31		M3
5.94	MSA	Survey Abandoned / Can not pass rocks.	00:01:27		
5.94		End of pipe			

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	3100	0.0	3.0	3.0	0.0	3.0	3.0

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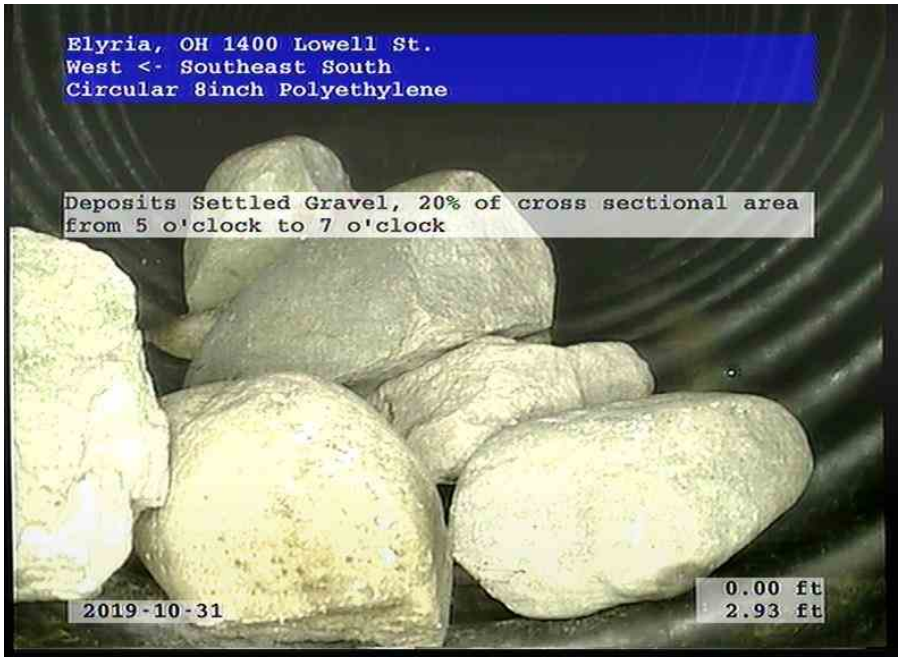
Section Pictures - 10/31/2019 - West-Southeast South

City	Street	Date	Pipe Segment Reference	Nr.
Elyria, OH	**1400 Lowell St.**	**10/31/2019**	**West-Southeast South**	**5**

West-Southeast South_48dce329-3f1d-46e8-8c1b-5b46760ac551_20191031_105906_665.jpg, 00:00:00, 0.00ft
Discharge Point



West-Southeast South_b7f531f0-1a3f-464e-b715-54dadc8e5b8b_20191031_105956_768.jpg, 00:00:31, 2.93ft
Deposits Settled Gravel, 20% of cross sectional area from 5 o'clock to 7 o'clock

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Section Pictures - 10/31/2019 - West-Southeast South

City	Street	Date	Pipe Segment Reference	Nr.
Elyria, OH	**1400 Lowell St.**	**10/31/2019**	**West-Southeast South**	**5**

West-Southeast South_a2626f22-b425-43cb-aa93-49e1a4e88ae2_20191031_110102_020.jpg, 00:01:27, 5.94ft
Survey Abandoned

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Inspection report

Date:	Work Order:	Weather:	Surveyed By:	Certificate Number:	Pipe Segment Ref.:
10/31/2019			**Eric Mandery**	**U-117-07006590**	**Northeast South-West**
Year laid:	Pre-cleaning:	Direction:	Pipe Joint Length:	Total Length:	Length Surveyed:
		Upstream		**341.3 '**	**341.3 '**

City:	**Elyria, OH**	Drainage Area:		Upstream MH:	**Northeast South**
Street:	**1400 Lowell St.**	Media Label:		Up Rim to Invert:	**0.0**
Location Code:		Flow Control:		Downstream MH:	**West**
Location Details:		Sheet Number:		Down Rim to Invert:	**0.0**
Pipe shape:	**Circular**	Sewer Use:		Total gallons used:	**0.0**
Pipe size:	**8 "**	Sewer Category:	**SEC**	Joints passed:	**0**
Pipe material:	**Polyethylene**	Purpose:		Joints failed:	**0**
Lining Method:		Owner:			
Additional Info:	**After Jetting**				

1:1767 Distance		Code	Observation	Counter	Photo	Grade
0.00		ADP	Discharge Point / Northeast South after jetting.	00:00:00		
0.00		MWL	Water Level, 5% of the vertical dimension	00:00:07		
14.66		D	Deformed, 10% changed	00:01:02		S4
27.06	S01	MWLS	Water Level, Sag in pipe, 10% of the vertical dimension, Start	00:01:53		
33.35	F01	MWLS	Water Level, Sag in pipe, 10% of the vertical dimension, Finish	00:02:10		S2
52.12		D	Deformed, 20% changed	00:02:49		S5
52.81		MWLS	Water Level, Sag in pipe, 5% of the vertical dimension	00:04:59		S2
65.62		D	Deformed, 10% changed	00:05:25		S4
85.39		D	Deformed, 25% changed	00:06:19		S5
91.20		D	Deformed, 10% changed	00:06:41		S4
106.55	S02	MWLS	Water Level, Sag in pipe, 5% of the vertical dimension, Start	00:07:38		
118.44	F02	MWLS	Water Level, Sag in pipe, 5% of the vertical dimension, Finish	00:08:12		S2
121.59		MGO	General Observation / Seam appears to be seperating.	00:09:26		
168.33		MWLS	Water Level, Sag in pipe, 10% of the vertical dimension	00:11:19		S2
180.39		D	Deformed, 10% changed	00:11:41		S4
194.99		D	Deformed, 10% changed	00:12:18		S4

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Inspection report

Date:	Work Order:	Weather:	Surveyed By:	Certificate Number:	Pipe Segment Ref.:
10/31/2019			**Eric Mandery**	**U-117-07006590**	**Northeast South-West**
Year laid:	Pre-cleaning:	Direction:	Pipe Joint Length:	Total Length:	Length Surveyed:
		Upstream		**341.3 '**	**341.3 '**

Northeast South

1:1767 Distance	Code	Observation	Counter	Photo	Grade
273.19	D	Deformed, 15% changed	00:15:13		S5
341.26	ADP	Discharge Point / Southeast North	00:17:24		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
5345	0000	45.0	0.0	45.0	3.5	0.0	3.5

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Section Pictures - 10/31/2019 - Northeast South-West

City	Street	Date	Pipe Segment Reference	Nr.
Elyria, OH	**1400 Lowell St.**	**10/31/2019**	**Northeast South-West**	**6**

Northeast South-West_7ff63e6d-4ada-4def-a0c8-998b8147ff0e_20191031_112836_015.jpg, 00:00:00, 0.00ft
Discharge Point

Northeast South-West_6fe19efa-8ec1-4be9-aece-1d6a736e9005_20191031_112953_725.jpg, 00:01:02, 14.66ft
Deformed, 10% changed

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Section Pictures - 10/31/2019 - Northeast South-West

City	Street	Date	Pipe Segment Reference	Nr.
Elyria, OH	**1400 Lowell St.**	**10/31/2019**	**Northeast South-West**	**6**

Northeast
South-West_e304673e-9e59-473b-b8bb-c309b0a34e4b_20191031_113052_767.jpg,
00:01:53, 27.06ft
Water Level, Sag in pipe, 10% of the vertical dimension, Start

Northeast South-West_2e4c4a35-28a4-4f6f-bd51-1c9a6e7f14ea_20191031_113112_308.jpg,
00:02:10, 33.35ft
Water Level, Sag in pipe, 10% of the vertical dimension, Finish

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Section Pictures - 10/31/2019 - Northeast South-West

City	Street	Date	Pipe Segment Reference	Nr.
Elyria, OH	**1400 Lowell St.**	**10/31/2019**	**Northeast South-West**	**6**

Northeast
South-West_422ca95e-543a-4013-95e4-56cdb3db73fe_20191031_113158_561.jpg,
00:02:49, 52.12ft
Deformed, 20% changed

Northeast South-West_bdfccd14-7ccc-4f71-950a-f52a4c11683f_20191031_113611_977.jpg,
00:04:59, 52.81ft
Water Level, Sag in pipe, 5% of the vertical dimension

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Section Pictures - 10/31/2019 - Northeast South-West

City	Street	Date	Pipe Segment Reference	Nr.
Elyria, OH	**1400 Lowell St.**	**10/31/2019**	**Northeast South-West**	**6**

Northeast South-West_aa356f1d-fcf7-4984-8772-1995aa87e02d_20191031_113643_578.jpg, 00:05:25, 65.62ft
Deformed, 10% changed

Northeast South-West_2db5c6e7-97ec-4ee7-af13-d6e21f47bca3_20191031_113749_102.jpg, 00:06:19, 85.39ft
Deformed, 25% changed

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Section Pictures - 10/31/2019 - Northeast South-West

City	Street	Date	Pipe Segment Reference	Nr.
Elyria, OH	**1400 Lowell St.**	**10/31/2019**	**Northeast South-West**	**6**

Northeast
South-West_dd7d2c25-056c-4399-8c91-92227aa3ac84_20191031_113817_524.jpg,
00:06:41, 91.20ft
Deformed, 10% changed

Northeast
South-West_6662647e-2b0b-47cf-8650-8081eee5573a_20191031_113920_905.jpg,
00:07:38, 106.55ft
Water Level, Sag in pipe, 5% of the vertical dimension, Start

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Section Pictures - 10/31/2019 - Northeast South-West

City	Street	Date	Pipe Segment Reference	Nr.
Elyria, OH	**1400 Lowell St.**	**10/31/2019**	**Northeast South-West**	**6**

Northeast
South-West_509edd4d-809f-4033-9c34-7d29da566b2a_20191031_113959_803.jpg,
00:08:12, 118.44ft
Water Level, Sag in pipe, 5% of the vertical dimension, Finish

Northeast
South-West_805729f6-6de5-4d77-813e-1ce6491aae7e_20191031_120054_791.jpg,
00:09:26, 121.59ft
General Observation

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Section Pictures - 10/31/2019 - Northeast South-West

City	Street	Date	Pipe Segment Reference	Nr.
Elyria, OH	**1400 Lowell St.**	**10/31/2019**	**Northeast South-West**	**6**

Northeast South-West_0d537fca-6a77-4f99-97fb-28a14a518e16_20191031_120305_701.jpg, 00:11:19, 168.33ft
Water Level, Sag in pipe, 10% of the vertical dimension

Northeast South-West_67315583-e9cb-4c1a-ba94-af5bcdb1adb9_20191031_120335_474.jpg, 00:11:41, 180.39ft
Deformed, 10% changed

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Section Pictures - 10/31/2019 - Northeast South-West

City	Street	Date	Pipe Segment Reference	Nr.
Elyria, OH	**1400 Lowell St.**	**10/31/2019**	**Northeast South-West**	**6**

Northeast South-West_b9c4ef06-2f18-43e8-8cd0-aba396c9e2c9_20191031_120419_104.jpg, 00:12:18, 194.99ft
Deformed, 10% changed

Northeast South-West_9ff89f61-c22a-42dd-bba2-445bafa6dd6a_20191031_120722_269.jpg, 00:15:13, 273.19ft
Deformed, 15% changed

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Section Pictures - 10/31/2019 - Northeast South-West

City	Street	Date	Pipe Segment Reference	Nr.
Elyria, OH	**1400 Lowell St.**	**10/31/2019**	**Northeast South-West**	**6**

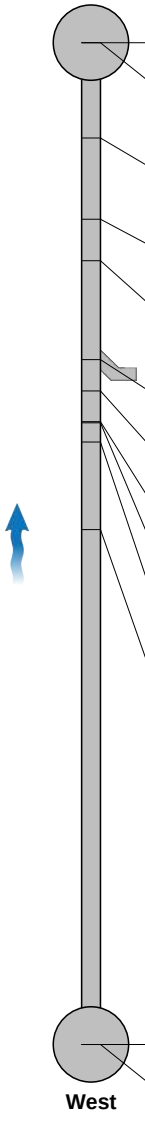
Northeast South-West_4175cfca-9995-46b8-acc2-f3be414d9d71_20191031_120946_832.jpg, 00:17:24, 341.26ft
Discharge Point

Blood Hound
750 Patricks Place, Brownsburg, IN 46112
Tel. (888) 858-9830
bhi@bhug.com

Inspection report

Date:	Work Order:	Weather:	Surveyed By:	Certificate Number:	Pipe Segment Ref.:
10/31/2019			**Eric Mandery**	**U-117-07006590**	**West-Southeast South**
Year laid:	Pre-cleaning:	Direction:	Pipe Joint Length:	Total Length:	Length Surveyed:
		Upstream		**783.6 '**	**783.6 '**

City:	**Elyria, OH**	Drainage Area:		Upstream MH:	**West**
Street:	**1400 Lowell St.**	Media Label:		Up Rim to Invert:	**0.0**
Location Code:		Flow Control:		Downstream MH:	**Southeast South**
Location Details:		Sheet Number:		Down Rim to Invert:	**0.0**
Pipe shape:	**Circular**	Sewer Use:		Total gallons used:	**0.0**
Pipe size:	**8 "**	Sewer Category:	**SEC**	Joints passed:	**0**
Pipe material:	**Polyethylene**	Purpose:		Joints failed:	**0**
Lining Method:		Owner:			
Additional Info:					



1:5915 Distance	Code	Observation	Counter	Photo	Grade
0.00	ADP	Discharge Point / Southeast South	00:00:00		
0.00	MWL	Water Level, 5% of the vertical dimension	00:00:07		
74.56	D	Deformed, 15% changed	00:02:47		S5
138.07	D	Deformed, 5% changed	00:05:16		S4
170.53	D	Deformed, 5% changed	00:06:40		S4
247.95	TF	Tap Factory Made at 9 o'clock, 8inch dim	00:10:19		
272.39	D	Deformed, 10% changed	00:12:32		S4
296.46	RFJ	Roots Fine Joint at 1 o'clock, within 8 inch	00:13:36		M1
297.25	RFJ	Roots Fine Joint at 1 o'clock, within 8 inch	00:13:56		M1
312.36	D	Deformed, 15% changed	00:15:07		S5
380.85	D	Deformed, 15% changed	00:18:29		S5
783.62	MSA	Survey Abandoned / Can not pass turn / deformed pipe.	00:38:32		
783.62		End of pipe			

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
5343	1200	27.0	2.0	29.0	4.5	1.0	3.6

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Section Pictures - 10/31/2019 - West-Southeast South

City	Street	Date	Pipe Segment Reference	Nr.
Elyria, OH	**1400 Lowell St.**	**10/31/2019**	**West-Southeast South**	**7**

West-Southeast South_eb881e6d-939d-44af-a383-2df5479a2676_20191031_135928_110.jpg, 00:00:00, 0.00ft
Discharge Point

West-Southeast South_32430ced-19bf-4dd5-9cd0-6c8bad2eebde_20191031_140408_990.jpg, 00:02:47, 74.56ft
Deformed, 15% changed

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Section Pictures - 10/31/2019 - West-Southeast South

City	Street	Date	Pipe Segment Reference	Nr.
Elyria, OH	**1400 Lowell St.**	**10/31/2019**	**West-Southeast South**	**7**

West-Southeast South_41aa186b-aec3-4d42-b9fb-3a5abe04f946_20191031_140653_230.jpg, 00:05:16, 138.07ft
Deformed, 5% changed

West-Southeast South_71c2953e-9455-4af4-8cbe-fc0991096e07_20191031_140830_860.jpg, 00:06:40, 170.53ft
Deformed, 5% changed

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Section Pictures - 10/31/2019 - West-Southeast South

City	Street	Date	Pipe Segment Reference	Nr.
Elyria, OH	**1400 Lowell St.**	**10/31/2019**	**West-Southeast South**	**7**

West-Southeast South_49aff70b-8ae0-48a3-94c9-8be63afd766d_20191031_141221_220.jpg, 00:10:19, 247.95ft
Tap Factory Made at 9 o'clock, 8inch dim

West-Southeast South_2d315e9f-a5bb-4dca-98aa-99c6c583b048_20191031_141551_960.jpg, 00:12:32, 272.39ft
Deformed, 10% changed

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Section Pictures - 10/31/2019 - West-Southeast South

City	Street	Date	Pipe Segment Reference	Nr.
Elyria, OH	**1400 Lowell St.**	**10/31/2019**	**West-Southeast South**	**7**

West-Southeast South_e4338f6d-811d-4af8-90f2-807dd0e63c27_20191031_141716_390.jpg, 00:13:36, 296.46ft
Roots Fine Joint at 1 o'clock, within 8 inch

West-Southeast South_f8e9557f-df8f-4bc6-9183-5d22718265db_20191031_141747_650.jpg, 00:13:56, 297.25ft
Roots Fine Joint at 1 o'clock, within 8 inch

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Section Pictures - 10/31/2019 - West-Southeast South

City	Street	Date	Pipe Segment Reference	Nr.
Elyria, OH	**1400 Lowell St.**	**10/31/2019**	**West-Southeast South**	**7**

West-Southeast South_73ab21b1-84d7-48a4-a55e-2ec7e4af2375_20191031_141911_940.jpg, 00:15:07, 312.36ft
Deformed, 15% changed

West-Southeast South_febf1650-48dd-463d-8493-c4e3fbf3bba6_20191031_142242_390.jpg, 00:18:29, 380.85ft
Deformed, 15% changed

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Section Pictures - 10/31/2019 - West-Southeast South

City	Street	Date	Pipe Segment Reference	Nr.
Elyria, OH	**1400 Lowell St.**	**10/31/2019**	**West-Southeast South**	**7**

West-Southeast South_5597f453-186e-4af6-8b83-b93b28778e1e_20191031_144431_440.jpg, 00:38:32, 783.62ft
Survey Abandoned

Blood Hound
750 Patricks Place, Brownsburg, IN 46112
Tel. (888) 858-9830
bhi@bhug.com

Inspection report

Date:	Work Order:	Weather:	Surveyed By:	Certificate Number:	Pipe Segment Ref.:
10/31/2019			**Eric Mandery**	**U-117-07006590**	**South-North Central**
Year laid:	Pre-cleaning:	Direction:	Pipe Joint Length:	Total Length:	Length Surveyed:
		Upstream		**15.7 '**	**15.7 '**

City:	**Elyria, OH**	Drainage Area:		Upstream MH:	**South**
Street:	**1400 Lowell St.**	Media Label:		Up Rim to Invert:	**0.0**
Location Code:		Flow Control:		Downstream MH:	**North Central**
Location Details:		Sheet Number:		Down Rim to Invert:	**0.0**
Pipe shape:	**Circular**	Sewer Use:		Total gallons used:	**0.0**
Pipe size:	**8 "**	Sewer Category:	**SEC**	Joints passed:	**0**
Pipe material:	**Polyethylene**	Purpose:		Joints failed:	**0**
Lining Method:		Owner:			
Additional Info:					

1:119 Distance	Code	Observation	Counter	Photo	Grade
0.00	ADP	Discharge Point / North Central after jetting.	00:00:00		
0.00	MWL	Water Level, 5% of the vertical dimension	00:00:07		
15.74	ATC	Tee Connection at 12 o'clock, 8"inch vertical, 8"inch horizontal / Blind Tee	00:00:50		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	0000	0.0	0.0	0.0	0.0	0.0	0.0

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Section Pictures - 10/31/2019 - South-North Central

City	Street	Date	Pipe Segment Reference	Nr.
Elyria, OH	**1400 Lowell St.**	**10/31/2019**	**South-North Central**	**8**

South-North Central_8dc7d76d-a76e-466f-a145-517f92d6a92d_20191031_153154_760.jpg, 00:00:00, 0.00ft
Discharge Point

South-North Central_06741066-205a-465b-8f09-2f74ef4eb135_20191031_153315_767.jpg, 00:00:50, 15.74ft
Tee Connection at 12 o'clock, 8"inch vertical, 8"inch horizontal

Blood Hound
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Tel. (888) 858-9830
bhi@bhug.com

Inspection report

Date:	Work Order:	Weather:	Surveyed By:	Certificate Number:	Pipe Segment Ref.:
10/31/2019			**Eric Mandery**	**U-117-07006590**	**South-Northwest South**
Year laid:	Pre-cleaning:	Direction:	Pipe Joint Length:	Total Length:	Length Surveyed:
		Upstream		**327.7 '**	**327.7 '**

City:	**Elyria, OH**	Drainage Area:		Upstream MH:	**South**
Street:	**1400 Lowell St.**	Media Label:		Up Rim to Invert:	**0.0**
Location Code:		Flow Control:		Downstream MH:	**Northwest South**
Location Details:		Sheet Number:		Down Rim to Invert:	**0.0**
Pipe shape:	**Circular**	Sewer Use:		Total gallons used:	**0.0**
Pipe size:	**8 "**	Sewer Category:	**SEC**	Joints passed:	**0**
Pipe material:	**Polyethylene**	Purpose:		Joints failed:	**0**
Lining Method:		Owner:			
Additional Info:					

1:2474	Distance	Code	Observation	Counter	Photo	Grade
Northwest South						
	0.00	ADP	Discharge Point / Northwest South	00:00:00		
	0.00	MWL	Water Level, 5% of the vertical dimension	00:00:07		
	327.74	AEP	End of Pipe / Reached Southwest 90	00:07:15		
South						

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	0000	0.0	0.0	0.0	0.0	0.0	0.0

Blood Hound
750 Patricks Place, Brownsburg, IN 46112
Tel. (888) 858-9830
bhi@bhug.com

Section Pictures - 10/31/2019 - South-Northwest South

City	Street	Date	Pipe Segment Reference	Nr.
Elyria, OH	**1400 Lowell St.**	**10/31/2019**	**South-Northwest South**	**9**

South-Northwest South_29a41f92-470a-49fc-84b0-a6887a716ff2_20191031_163045_128.jpg, 00:00:00, 0.00ft
Discharge Point

South-Northwest South_e19ea4a1-15b1-40a0-857b-e148e82df634_20191031_163821_498.jpg, 00:07:15, 327.74ft
End of Pipe

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Inspection report

Date:	Work Order:	Weather:	Surveyed By:	Certificate Number:	Pipe Segment Ref.:
10/31/2019			**Eric Mandery**	**U-117-07006590**	**West-Northwest North**
Year laid:	Pre-cleaning:	Direction:	Pipe Joint Length:	Total Length:	Length Surveyed:
		Upstream		**366.0 '**	**366.0 '**

City:	**Elyria, OH**	Drainage Area:		Upstream MH:	**West**
Street:	**1400 Lowell St.**	Media Label:		Up Rim to Invert:	**0.0**
Location Code:		Flow Control:		Downstream MH:	**Northwest North**
Location Details:		Sheet Number:		Down Rim to Invert:	**0.0**
Pipe shape:	**Circular**	Sewer Use:		Total gallons used:	**0.0**
Pipe size:	**8 "**	Sewer Category:	**SEC**	Joints passed:	**0**
Pipe material:	**Polyethylene**	Purpose:		Joints failed:	**0**
Lining Method:		Owner:			
Additional Info:					

1:2763 Distance	Code	Observation	Counter	Photo	Grade
Northwest North					
0.00	ADP	Discharge Point / Northwest North	00:00:00		
0.00	MWL	Water Level, 5% of the vertical dimension	00:00:07		
43.33	MWLS	Water Level, Sag in pipe, 5% of the vertical dimension	00:01:51		S2
113.43	D	Deformed, 5% changed	00:04:13		S4
168.61	MWLS	Water Level, Sag in pipe, 15% of the vertical dimension	00:05:24		S2
190.61	MWLS	Water Level, Sag in pipe, 15% of the vertical dimension	00:05:54		S2
215.54	MWLS	Water Level, Sag in pipe, 5% of the vertical dimension	00:06:31		S2
231.37	DSC	Deposits Settled Compacted, 30% of cross sectional area from 5 o'clock to 7 o'clock / Large rock.	00:07:49		M4
283.05	TF	Tap Factory Made at 9 o'clock, 8inch dim	00:19:25		
366.01	MSA	Survey Abandoned / Can not pass rock in pipe.	00:19:19		

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
4124	4100	12.0	4.0	16.0	2.4	4.0	2.7

Blood Hound
750 Patricks Place, Brownsburg, IN 46112
Tel. (888) 858-9830
bhi@bhug.com

Section Pictures - 10/31/2019 - West-Northwest North

City	Street	Date	Pipe Segment Reference	Nr.
Elyria, OH	**1400 Lowell St.**	**10/31/2019**	**West-Northwest North**	**10**

West-Northwest North_cb81c48d-c1ea-4d3c-8d46-3f402b0332e8_20191031_164420_799.jpg, 00:00:00, 0.00ft
Discharge Point

West-Northwest North_fb35bbfa-4ef4-4e11-8a5c-fd901d9f234b_20191031_164703_919.jpg, 00:01:51, 43.33ft
Water Level, Sag in pipe, 5% of the vertical dimension

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bhi@bhug.com

Section Pictures - 10/31/2019 - West-Northwest North

City	Street	Date	Pipe Segment Reference	Nr.
Elyria, OH	**1400 Lowell St.**	**10/31/2019**	**West-Northwest North**	**10**

West-Northwest North_a5e83abd-640c-48b3-85dc-1658b2f65cc1_20191031_164933_745.jpg, 00:04:13, 113.43ft
Deformed, 5% changed

West-Northwest North_f02b48c5-eb0e-464b-b8e1-710315b35063_20191031_165051_248.jpg, 00:05:24, 168.61ft
Water Level, Sag in pipe, 15% of the vertical dimension

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bhi@bhug.com

Section Pictures - 10/31/2019 - West-Northwest North

City	Street	Date	Pipe Segment Reference	Nr.
Elyria, OH	**1400 Lowell St.**	**10/31/2019**	**West-Northwest North**	**10**

West-Northwest North_ca734e12-2f34-4ed3-a41a-3430a3983c3d_20191031_165127_672.jpg, 00:05:54, 190.61ft
Water Level, Sag in pipe, 15% of the vertical dimension

West-Northwest North_c74a3a49-e418-4e00-b0e2-92986ead7913_20191031_165209_892.jpg, 00:06:31, 215.54ft
Water Level, Sag in pipe, 5% of the vertical dimension

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Section Pictures - 10/31/2019 - West-Northwest North

City	Street	Date	Pipe Segment Reference	Nr.
Elyria, OH	**1400 Lowell St.**	**10/31/2019**	**West-Northwest North**	**10**

West-Northwest North_957cc09e-f12b-4a4c-819d-0f488dac6699_20191031_165344_997.jpg, 00:07:49, 231.37ft
Deposits Settled Compacted, 30% of cross sectional area from 5 o'clock to 7 o'clock

West-Northwest North_975e1557-2be2-4e96-95cd-c2f3cdd89d43_20191031_170632_694.jpg, 00:19:25, 283.05ft
Tap Factory Made at 9 o'clock, 8inch dim

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bhi@bhug.com

Section Pictures - 10/31/2019 - West-Northwest North

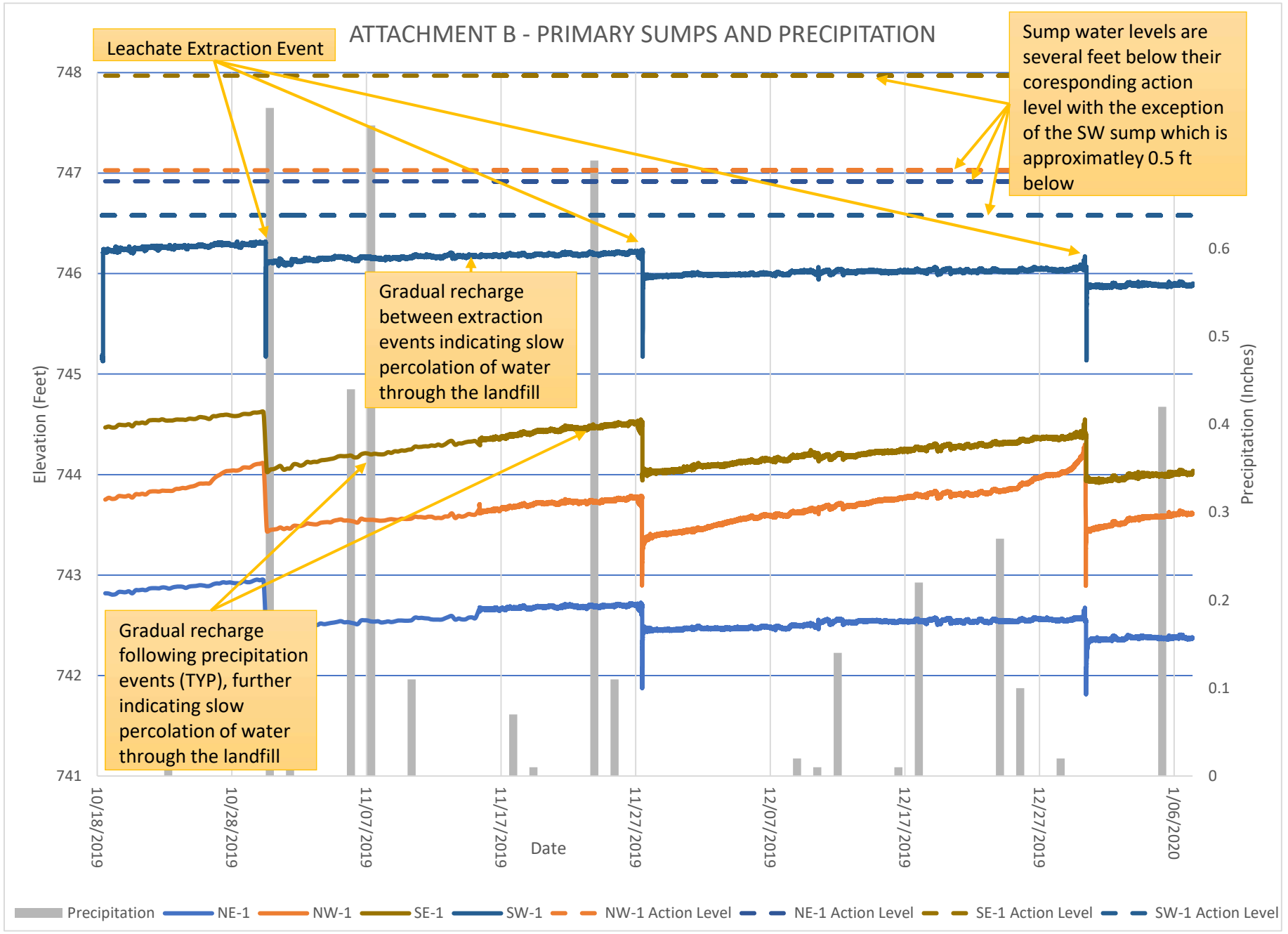
City	Street	Date	Pipe Segment Reference	Nr.
Elyria, OH	**1400 Lowell St.**	**10/31/2019**	**West-Northwest North**	**10**

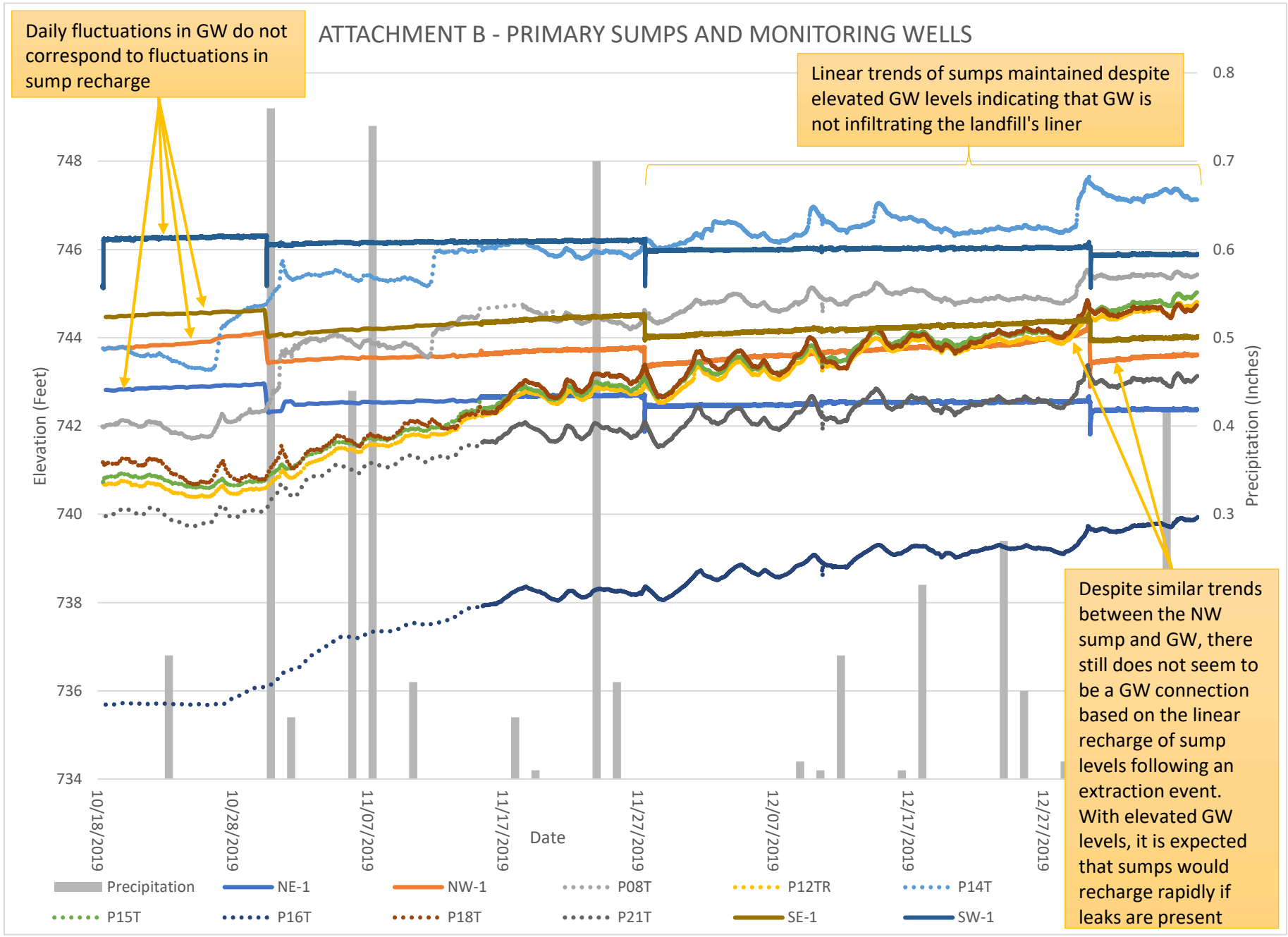
West-Northwest North_e7581d69-34c0-4206-804a-650cc7b137ea_20191031_170647_860.jpg, 00:19:25, 283.05ft
Tap Factory Made at 9 o'clock, 8inch dim

West-Northwest North_87471a83-3fa7-413f-9d93-bca947bb9266_20191031_170526_753.jpg, 00:19:19, 366.01ft
Survey Abandoned

ATTACHMENT B

Annotated Transducer Study Charts


ATTACHMENT B - PRIMARY SUMPS AND PRECIPITATION
Leachate Extraction Event
Sump water levels are several feet below their coresponding action level with the exception of the SW sump which is approximatley 0.5 ft below
Gradual recharge between extraction events indicating slow percolation of water through the landfill
Gradual recharge following precipitation events (TYP), further indicating slow percolation of water through the landfill
Elevation (Feet)
748
747
746
745
744
743
742
741
Precipitation (Inches)
0.6
0.5
0.4
0.3
0.2
0.1
0
10/18/2019
10/28/2019
11/07/2019
11/17/2019
11/27/2019
12/07/2019
12/17/2019
12/27/2019
1/06/2020
Date
Precipitation
NE-1
NW-1
SE-1
SW-1
NW-1 Action Level
NE-1 Action Level
SE-1 Action Level
SW-1 Action Level


ATTACHMENT B - PRIMARY SUMPS AND MONITORING WELLS
Daily fluctuations in GW do not correspond to fluctuations in sump recharge
Linear trends of sumps maintained despite elevated GW levels indicating that GW is not infiltrating the landfill's liner
Despite similar trends between the NW sump and GW, there still does not seem to be a GW connection based on the linear recharge of sump levels following an extraction event. With elevated GW levels, it is expected that sumps would recharge rapidly if leaks are present
Elevation (Feet)
Precipitation (Inches)
Date
748
746
744
742
740
738
736
734
0.8
0.7
0.6
0.5
0.4
0.3
10/18/2019
10/28/2019
11/07/2019
11/17/2019
11/27/2019
12/07/2019
12/17/2019
12/27/2019
Precipitation
NE-1
NW-1
P08T
P12TR
P14T
P15T
P16T
P18T
P21T
SE-1
SW-1

APPENDIX C

Tank Closure Memorandum

HALEY & ALDRICH, INC.
6500 Rockside Road
Suite 200
Cleveland, OH 44131
216.739.0555

MEMORANDUM

16 November 2017
File No. 129862-002

TO: Pam Barnett

FROM: Haley & Aldrich, Inc.
Ban Aragona
Lloyd Ross

SUBJECT: RCRA Generator Closure Documentation
Above Ground Storage Tanks RACER Trust Elyria
1400 Lowell St
Elyria, Ohio

The purpose of this memorandum is to document the generator closure activities completed at the RACER Trust Elyria Site (Site) located at 1400 Lowell Street, Elyria, Ohio. A RCRA Tank System was historically used to manage leachate at the Site. These tanks were installed and operated as short-term storage units (less than 90-days) for collected hazardous waste leachates from the adjacent former landfill, as shown in **Figure 1**.

Based on change in operations, the ASTs are no longer required to manage the leachate from the landfill. Therefore, the tanks and secondary containment were decontaminated to allow for generator closure and removal of the tank system from the Site. The decontamination of the tank system was completed in accordance with performance standards in Ohio Administrative Code (3745-66-11).

This tank system includes two ASTs with a 1,000-gallon capacity. Each tank is constructed of double-walled fiberglass reinforced plastic that is designed for the storage of liquid containing heavy metals contamination. The ASTs are equipped with a secondary containment system that includes a continuously bermed 12-inch, reinforced concrete pad underlain by a polyethylene liner.

Closure Activities

The closure activities included cleaning of tanks, associated piping and secondary containment and collection of samples from the collected solids and cleaning water.

Environmental Management Specialists (EMS) of Cleveland, Ohio performed the AST cleaning. The tanks and associated piping, including approximately 300 feet of influent piping, was jet cleaned and rinsed with high-pressure hot water. Similarly, the concrete of the secondary containment was rinsed,

scrubbed and high-pressure cleaned and rinsed with hot water. Solids and the cleaning and rinse water was containerized for disposal. The interior of the ASTs was triple rinsed with high pressure hot water. Rinsate liquid was removed and containerized for disposal.

Photographs of the closure activities are provided in **Appendix A**.

Sampling

Tank cleaning residuals generated during tank cleaning activities were sampled on May 16, 2017. The tank residuals sample, 0171-051617-1400, was analyzed for toxicity characteristic leaching procedure (TCLP) VOCs, TCLP SVOCs, TCLP Metals, TCLP Mercury total cyanide, and total sulfide in accordance with EPA SW-846 Methods 8260B, 8270C, 6010C, 7470A, 9012B and 9034, respectively. The final rinsate sample, 0171-051617-1330, was analyzed for total metals and total cyanide in accordance with EPA SW-846 Methods 7470A and 9012B, respectively. These data were used for disposal of the material.

On June 18, 2017, a clean rinse of the tank system was completed and a final rinse water and rinsate samples were collected to verify decontamination of the tank systems. Both samples, 0171-061917-1900 and 0171-061917-1915, were analyzed for total metals (ICP) and total mercury in accordance with EPA SW-846 Methods 6010C and 7470A respectively.

The tank residual sample was screened against hazardous waste regulatory levels and the final rinsate samples were screened against maximum contamination levels (MCLs) for drinking water quality. **Tables I, II and III** summarize the analytical data reported for these samples. Laboratory analytical reports are provided in **Appendix B**. Samples collected during the closure activities were either below applicable screening criteria or non-detect.

Based on the final rinsate sample results, the tanks system has been adequately decontaminated and can be decommissioned and disposed of accordingly.

Waste Handling

Approximately 318 gallons of rinsate from tank cleaning activities was collected and transported off Site by Vickery Transportation, Inc. and properly disposed at Vickery Environmental, Inc. located at 3956 State Route 412, Vickery, Ohio 43464. Waste manifests for the rinsate disposed off Site are provided in **Appendix C**. A generator waste profile was created by Chemical Waste Management, Inc. and is provided in **Appendix D**.

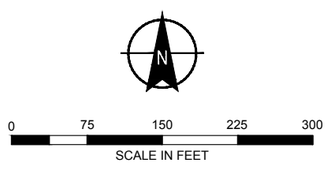
Attachments:
Figure I – AST Location Plan
Table I – Tank Sample Analytical Results
Table II – Rinsate Sample Analytical Results
Table III – Water and Rinsate Sample Analytical Results
Appendix A – Photographs
Appendix B – Analytical Reports
Appendix C – Waste Manifests
Appendix D – Waste Profile

FIGURES

LEGEND

NOTES

1.



HALEY ALDRICH

RACER TRUST ELYRIA
1400 LOWELL STREET
ELYRIA, OH 44035

AST LOCATION PLAN

SCALE: AS SHOWN
SEPTEMBER 2017

FIGURE 1

TABLES

TABLE I
SUMMARY OF ANALYTICAL RESULTS
RACER ELYRIA
ELYRIA, OH

Location	Hazardous Waste	Tanks
Sample Date	Regulatory	05/16/2017
Sample Name	Levels	0171-051617-1400
Inorganic Compounds (mg/kg)		
Cyanide	-	ND (0.1) F2F1
Sulfide	-	ND (8.7) F1
Inorganic Compounds (ug/L)		
Arsenic	5000	ND (75)
Barium	100000	**170 J**
Cadmium	1000	ND (20)
Chromium	5000	ND (50)
Lead	5000	ND (50)
Mercury	200	ND (0.2)
Selenium	1000	ND (100)
Silver	5000	ND (50)
Other		
Density (g/cm3)	-	**2.36**
Burn Rate (mm/sec)	-	ND (2.2)
Specific gravity (none)	-	**2.37**
pH (lab) (SU)	-	**8.5 HF**
Semi-Volatile Organic Compounds (ug/L)		
1,4-Dichlorobenzene	7500	ND (10)
2,4,5-Trichlorophenol	400000	ND (10)
2,4,6-Trichlorophenol	2000	ND (10)
2,4-Dinitrotoluene	130	ND (2)
2-Methylphenol (o-Cresol)	200000	ND (10)
3&4-Methylphenol	-	ND (10)
4-Methylphenol	200000	ND (10)
Hexachlorobenzene	130	ND (1)
Hexachlorobutadiene	500	ND (2)
Hexachloroethane	3000	ND (1) *
Nitrobenzene	2000	ND (1)
Pentachlorophenol	100000	ND (30)
Phenol	-	ND (10)
Pyridine	5000	ND (10)
Volatile Organic Compounds (ug/L)		
1,1-Dichloroethene	700	ND (10)
1,2-Dichloroethane	500	ND (10)
2-Butanone (Methyl Ethyl Ketone)	200000	ND (50)
Benzene	500	ND (10)
Carbon tetrachloride	500	ND (10)
Chlorobenzene	100000	ND (10)
Chloroform (Trichloromethane)	6000	ND (10)
Tetrachloroethene	700	ND (10)
Trichloroethene	500	ND (10)
Vinyl chloride	200	ND (10)

Notes:
1. ND (#): Not detected above reporting limit.
2. Results in **bold** are detected.
3. Lab qualifiers defined as follows:
   *: LCS or LCSD is outside acceptance limits.
   J: Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
   HF: Field parameter with a holding time of 15 minutes. Test performed by laboratory at client's request.
   F1: MS and/or MSD Recovery is outside acceptance limits.
   F2: MS/MSD RPD exceeds control limits
4. Results in red exceed Hazardous Waste Regulatory Levels.

TABLE II
SUMMARY OF ANALYTICAL RESULTS
RACER ELYRIA
ELYRIA, OH

	Location		Rinsate
	Sample Date		05/16/2017
	Sample Name	MCLs	0171-051617-1330
Inorganic Compounds (ug/L)			
Barium		2000	**37 J**
Calcium		-	**36000**
Chromium		100	**7.6 J**
Cyanide		200	**24**
Iron		-	**1300**
Magnesium		-	**9200**
Manganese		-	**40**
Nickel		-	ND (40)
Potassium		-	**16000**
Sodium		-	**14000**
Other (ug/L)			
Chloride		-	**27000 F1**
Sulfate		-	**56000 F1**

Notes:
1. ND (#): Not detected above reporting limit.
2. Results in **bold** are detected.
3. Lab qualifiers defined as follows:
   *: LCS or LCSD is outside acceptance limits.
   J: Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
   HF: Field parameter with a holding time of 15 minutes. Test performed by laboratory at client's request.
   F1: MS and/or MSD Recovery is outside acceptance limits.
   F2: MS/MSD RPD exceeds control limits
4. Results in red exceed MCLs.

TABLE III
SUMMARY OF ANALYTICAL RESULTS
RACER ELYRIA
ELYRIA, OH

Location		Source Water	Rinsate
Sample Date		6/19/2017	6/19/2017
Sample Name	MCLs	0171-061917-1900	0171-061917-1915
Inorganic Compounds (ug/L)			
Arsenic	10	ND (15)	ND (15)
Barium	2000	ND (200)	ND (200)
Cadmium	5.0	ND(4.0)	ND(4.0)
Chromium	100	ND (10)	ND (10)
Lead	15	ND(10)	ND(10)
Selenium	50	ND (20)	ND (20)
Silver	-	ND (10)	ND (10)
Other (ug/L)			
Mercury	2	ND (0.2)	ND (0.2)

Notes:
1. ND (#): Not detected above reporting limit.
2. Results in **bold** are detected.
3. Lab qualifiers defined as follows:
   *: LCS or LCSD is outside acceptance limits.
   J: Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
   HF: Field parameter with a holding time of 15 minutes. Test performed by laboratory at client's request.
   F1: MS and/or MSD Recovery is outside acceptance limits.
   F2: MS/MSD RPD exceeds control limits
4. Results in red exceed MCLs.

APPENDIX A

Photographs

Photo #1: AST shown inside building

Photo #2: AST Interior

Photo #3: Concrete pad of secondary containment system

Photo #4: EMS removes liquids from AST

Photo #5: EMS Power washing interior of AST

Photo #6: Vickery transporting rinsate off Site

Photo #7: Termination of electrical feed

Photo #8: Influent piping cut and removed

APPENDIX B

Laboratory Analytical Reports

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Canton
4101 Shuffel Street NW
North Canton, OH 44720
Tel: (330)497-9396

TestAmerica Job ID: 240-81262-1
Client Project/Site: Racer - Elyria, Ohio

For:
Haley & Aldrich, Inc.
3840 Packard Road
Suite 100
Ann Arbor, Michigan 48108-2280

Attn: Ban Aragona

Denise Pohl

Authorized for release by:
7/5/2017 3:37:17 PM

Denise Pohl, Project Manager II
(330)966-9789
denise.pohl@testamericainc.com

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Definitions/Glossary

Client: Haley & Aldrich, Inc.
Project/Site: Racer - Elyria, Ohio

TestAmerica Job ID: 240-81262-1

Qualifiers

Metals

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 240-81262-1

Laboratory: TestAmerica Canton

Narrative

CASE NARRATIVE

Client: Haley & Aldrich, Inc.

Project: Racer - Elyria, Ohio

Report Number: 240-81262-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica Canton attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header.

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

RECEIPT

The samples were received on 6/20/2017 9:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 21.8º C.

TOTAL METALS (ICP)

Samples 0171-061917-1900 (240-81262-1) and 0171-061917-1915 (240-81262-2) were analyzed for total metals (ICP) in accordance with EPA SW-846 Method 6010C. The samples were prepared on 06/22/2017 and analyzed on 06/23/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TOTAL MERCURY

Samples 0171-061917-1900 (240-81262-1) and 0171-061917-1915 (240-81262-2) were analyzed for total mercury in accordance with EPA SW-846 Methods 7470A. The samples were prepared and analyzed on 06/28/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Method Summary

Client: Haley & Aldrich, Inc.
Project/Site: Racer - Elyria, Ohio

TestAmerica Job ID: 240-81262-1

Method	Method Description	Protocol	Laboratory
6010C	Metals (ICP)	SW846	TAL EDI
7470A	Mercury (CVAA)	SW846	TAL EDI

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL EDI = TestAmerica Edison, 777 New Durham Road, Edison, NJ 08817, TEL (732)549-3900

Sample Summary

Client: Haley & Aldrich, Inc.
Project/Site: Racer - Elyria, Ohio

TestAmerica Job ID: 240-81262-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
240-81262-1	0171-061917-1900	Water	06/19/17 19:00	06/20/17 09:30
240-81262-2	0171-061917-1915	Water	06/19/17 19:15	06/20/17 09:30

Detection Summary

Client: Haley & Aldrich, Inc.
Project/Site: Racer - Elyria, Ohio

TestAmerica Job ID: 240-81262-1

Client Sample ID: 0171-061917-1900 **Lab Sample ID: 240-81262-1**

No Detections.

Client Sample ID: 0171-061917-1915 **Lab Sample ID: 240-81262-2**

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: 0171-061917-1900
Date Collected: 06/19/17 19:00
Date Received: 06/20/17 09:30

Lab Sample ID: 240-81262-1
Matrix: Water

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	10	U	10	1.8	ug/L		06/22/17 22:30	06/23/17 19:00	1
Arsenic	15	U	15	4.4	ug/L		06/22/17 22:30	06/23/17 19:00	1
Barium	200	U	200	8.6	ug/L		06/22/17 22:30	06/23/17 19:00	1
Cadmium	4.0	U	4.0	1.8	ug/L		06/22/17 22:30	06/23/17 19:00	1
Chromium	10	U	10	3.3	ug/L		06/22/17 22:30	06/23/17 19:00	1
Lead	10	U	10	4.1	ug/L		06/22/17 22:30	06/23/17 19:00	1
Selenium	20	U	20	4.4	ug/L		06/22/17 22:30	06/23/17 19:00	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.20	U	0.20	0.17	ug/L		06/28/17 12:55	06/28/17 15:05	1

Client: Haley & Aldrich, Inc.
Project/Site: Racer - Elyria, Ohio

TestAmerica Job ID: 240-81262-1

Client Sample ID: 0171-061917-1915
Date Collected: 06/19/17 19:15
Date Received: 06/20/17 09:30

Lab Sample ID: 240-81262-2
Matrix: Water

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	10	U	10	1.8	ug/L		06/22/17 22:30	06/23/17 19:04	1
Arsenic	15	U	15	4.4	ug/L		06/22/17 22:30	06/23/17 19:04	1
Barium	200	U	200	8.6	ug/L		06/22/17 22:30	06/23/17 19:04	1
Cadmium	4.0	U	4.0	1.8	ug/L		06/22/17 22:30	06/23/17 19:04	1
Chromium	10	U	10	3.3	ug/L		06/22/17 22:30	06/23/17 19:04	1
Lead	10	U	10	4.1	ug/L		06/22/17 22:30	06/23/17 19:04	1
Selenium	20	U	20	4.4	ug/L		06/22/17 22:30	06/23/17 19:04	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.20	U	0.20	0.17	ug/L		06/28/17 12:55	06/28/17 15:06	1

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 460-445287/1-A
Matrix: Water
Analysis Batch: 445450

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 445287

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	10	U	10	1.8	ug/L		06/22/17 22:30	06/23/17 17:03	1
Arsenic	15	U	15	4.4	ug/L		06/22/17 22:30	06/23/17 17:03	1
Barium	200	U	200	8.6	ug/L		06/22/17 22:30	06/23/17 17:03	1
Cadmium	4.0	U	4.0	1.8	ug/L		06/22/17 22:30	06/23/17 17:03	1
Chromium	10	U	10	3.3	ug/L		06/22/17 22:30	06/23/17 17:03	1
Lead	10	U	10	4.1	ug/L		06/22/17 22:30	06/23/17 17:03	1
Selenium	20	U	20	4.4	ug/L		06/22/17 22:30	06/23/17 17:03	1

Lab Sample ID: LCS 460-445287/2-A
Matrix: Water
Analysis Batch: 445450

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 445287

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Silver	50.0	46.9		ug/L		94	80 - 120
Arsenic	2000	1940		ug/L		97	80 - 120
Barium	2000	2050		ug/L		103	80 - 120
Cadmium	50.0	50.4		ug/L		101	80 - 120
Chromium	200	203		ug/L		101	80 - 120
Lead	500	518		ug/L		104	80 - 120
Selenium	2000	1950		ug/L		97	80 - 120

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 460-446399/1-A
Matrix: Water
Analysis Batch: 446460

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 446399

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.20	U	0.20	0.17	ug/L		06/28/17 12:55	06/28/17 14:38	1

Lab Sample ID: LCS 460-446399/2-A
Matrix: Water
Analysis Batch: 446460

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 446399

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	1.00	0.918		ug/L		92	80 - 120

QC Association Summary

Client: Haley & Aldrich, Inc.
Project/Site: Racer - Elyria, Ohio

TestAmerica Job ID: 240-81262-1

Metals

Prep Batch: 445287

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-81262-1	0171-061917-1900	Total/NA	Water	3010A	
240-81262-2	0171-061917-1915	Total/NA	Water	3010A	
MB 460-445287/1-A	Method Blank	Total/NA	Water	3010A	
LCS 460-445287/2-A	Lab Control Sample	Total/NA	Water	3010A	

Analysis Batch: 445450

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-81262-1	0171-061917-1900	Total/NA	Water	6010C	445287
240-81262-2	0171-061917-1915	Total/NA	Water	6010C	445287
MB 460-445287/1-A	Method Blank	Total/NA	Water	6010C	445287
LCS 460-445287/2-A	Lab Control Sample	Total/NA	Water	6010C	445287

Prep Batch: 446399

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-81262-1	0171-061917-1900	Total/NA	Water	7470A	
240-81262-2	0171-061917-1915	Total/NA	Water	7470A	
MB 460-446399/1-A	Method Blank	Total/NA	Water	7470A	
LCS 460-446399/2-A	Lab Control Sample	Total/NA	Water	7470A	

Analysis Batch: 446460

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-81262-1	0171-061917-1900	Total/NA	Water	7470A	446399
240-81262-2	0171-061917-1915	Total/NA	Water	7470A	446399
MB 460-446399/1-A	Method Blank	Total/NA	Water	7470A	446399
LCS 460-446399/2-A	Lab Control Sample	Total/NA	Water	7470A	446399

Lab Chronicle

Client: Haley & Aldrich, Inc.
Project/Site: Racer - Elyria, Ohio

TestAmerica Job ID: 240-81262-1

Client Sample ID: 0171-061917-1900

Lab Sample ID: 240-81262-1

Date Collected: 06/19/17 19:00

Matrix: Water

Date Received: 06/20/17 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			445287	06/22/17 22:30	GAE	TAL EDI
Total/NA	Analysis	6010C		1	445450	06/23/17 19:00	CDC	TAL EDI
Total/NA	Prep	7470A			446399	06/28/17 12:55	RBS	TAL EDI
Total/NA	Analysis	7470A		1	446460	06/28/17 15:05	RBS	TAL EDI

Client Sample ID: 0171-061917-1915

Lab Sample ID: 240-81262-2

Date Collected: 06/19/17 19:15

Matrix: Water

Date Received: 06/20/17 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			445287	06/22/17 22:30	GAE	TAL EDI
Total/NA	Analysis	6010C		1	445450	06/23/17 19:04	CDC	TAL EDI
Total/NA	Prep	7470A			446399	06/28/17 12:55	RBS	TAL EDI
Total/NA	Analysis	7470A		1	446460	06/28/17 15:06	RBS	TAL EDI

Laboratory References:

TAL EDI = TestAmerica Edison, 777 New Durham Road, Edison, NJ 08817, TEL (732)549-3900

Accreditation/Certification Summary

Client: Haley & Aldrich, Inc.
Project/Site: Racer - Elyria, Ohio

TestAmerica Job ID: 240-81262-1

Laboratory: TestAmerica Canton

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
California	State Program	9	2927	02-23-18
Connecticut	State Program	1	PH-0590	12-31-17
Florida	NELAP	4	E87225	06-30-18
Illinois	NELAP	5	200004	07-31-17 *
Kansas	NELAP	7	E-10336	01-31-18
Kentucky (UST)	State Program	4	58	02-23-18
Kentucky (WW)	State Program	4	98016	12-31-17
Minnesota	NELAP	5	039-999-348	12-31-17
Minnesota (Petrofund)	State Program	1	3506	07-31-17 *
Nevada	State Program	9	OH-000482008A	07-31-17 *
New Jersey	NELAP	2	OH001	06-30-18
New York	NELAP	2	10975	03-31-18
Ohio VAP	State Program	5	CL0024	09-14-17 *
Oregon	NELAP	10	4062	02-23-18
Pennsylvania	NELAP	3	68-00340	08-31-17 *
Texas	NELAP	6	T104704517-15-5	08-31-17 *
USDA	Federal		P330-16-00404	12-28-19
Virginia	NELAP	3	460175	09-14-17 *
Washington	State Program	10	C971	01-12-18
West Virginia DEP	State Program	3	210	12-31-17
Wisconsin	State Program	5	999518190	08-31-17 *

Laboratory: TestAmerica Edison

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Connecticut	State Program	1	PH-0200	09-30-18
DE Haz. Subst. Cleanup Act (HSCA)	State Program	3	N/A	12-31-17
New Jersey	NELAP	2	12028	06-30-18
New York	NELAP	2	11452	04-01-18
Pennsylvania	NELAP	3	68-00522	02-28-18
Rhode Island	State Program	1	LAO00132	12-30-17
USDA	Federal		NJCA-003-08	06-13-20

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

21.8|21.8

TestAmerica Edison
777 New Durham Road
Edison, NJ 08817
Phone (732) 549-3900 Fax (732) 549-3679

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: T. Correll	Lab PM: Pohl, Denise	Carrier Tracking No(s):	COC No: 460-85353-53395.1
Client Contact: Anthony Correll	Phone: 216-407-1168	E-Mail: denise.pohl@testamericainc.com		Page: Page 1 of 1
Company: Haley & Aldrich, Inc.				Job #:

Address: 6500 Rockside Road Suite 200	Due Date Requested: —
City: Cleveland	TAT Requested (days): Std
State, Zip: OH, 44131	
Phone: 734-454-4917(Tel) 734-454-1233(Fax)	PO #: 41753-005
Email: acorreli@haleyaldrich.com	WO #:
Project Name: Racer - Elyria, Ohio	Project #: 46020356
Site:	SSOW#:

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	RCRA Metals	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
0171-061917-1900	6/19/17	1900	G	W			X		Source Water
0171-061917-1915	↓	1915	G	W			X		Final Rinsate

240-81262 Chain of Custody

TJC 6/19/17

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify)	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
TJ Correll	6/19/17 @ 2030	H+A		6/20/17 930	TA
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

8/2/17

TestAmerica Canton Sample Receipt Form/Narrative **Login # :** _____
Canton Facility

Client Haley & Aldrich Site Name _____ Cooler unpacked by:

Cooler Received on 6/20/17 Opened on 6/20/17

FedEx: 1st Grd Exp UPS FAS Clipper Client Drop Off TestAmerica Courier Other _____

Receipt After-hours: Drop-off Date/Time _____ Storage Location _____

TestAmerica Cooler # _____ Foam Box ~~Client Cooler~~ Box Other _____

Packing material used: Bubble Wrap Foam Plastic Bag None Other _____

COOLANT: Wet Ice Blue Ice Dry Ice Water None

1. Cooler temperature upon receipt ☐ See Multiple Cooler Form

IR GUN# IR-8 (CF **-0.4** °C) Observed Cooler Temp._____°C Corrected Cooler Temp._____°C

IR GUN #36 (CF **+0**°C) Observed Cooler Temp 21.8 °C Corrected Cooler Temp. 21.8 °C

2. Were custody seals on the outside of the cooler(s)? If Yes Quantity 1	Yes	No
-Were custody seals on the outside of the cooler(s) signed & dated?	Yes	No NA
-Were custody seals on the bottle(s) or bottle kits (LLHg/MeHg)?	Yes	No
3. Shippers' packing slip attached to the cooler(s)?	Yes	No
4. Did custody papers accompany the sample(s)?	Yes	No
5. Were the custody papers relinquished & signed in the appropriate place?	Yes	No
6. Was/were the person(s) who collected the samples clearly identified on the COC?	Yes	No
7. Did all bottles arrive in good condition (Unbroken)?	Yes	No
8. Could all bottle labels be reconciled with the COC?	Yes	No
9. Were correct bottle(s) used for the test(s) indicated?	Yes	No
10. Sufficient quantity received to perform indicated analyses?	Yes	No
11. Are these work share samples?	Yes	No
If yes, Questions 11-15 have been checked at the originating laboratory.		
11. Were sample(s) at the correct pH upon receipt?	Yes	No NA pH Strip Lot# **HC697954**
12. Were VOAs on the COC?	Yes	No
13. Were air bubbles >6 mm in any VOA vials? ● ⬅ Larger than this.	Yes	No NA
14. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot #_____	Yes	No
15. Was a LL Hg or Me Hg trip blank present? _____	Yes	No

Contacted PM _____ Date _____ by _____ via Verbal Voice Mail Other

Concerning _____

16. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES Samples processed by:

17. SAMPLE CONDITION

Sample(s) _____ were received after the recommended holding time had expired.

Sample(s) _____ were received in a broken container.

Sample(s) _____ were received with bubble >6 mm in diameter. (Notify PM)

18. SAMPLE PRESERVATION

Sample(s) _____ were further preserved in the laboratory.

Time preserved: _____ Preservative(s) added/Lot number(s): _____

Ref: SOP NC-SC-0005, Sample Receiving
\\tacorp\corp\QA\QA_Facilities\Canton-QA\Document-Management\Work-Instruction\Word Version Work Instructions\WI-NC-099-052317 Cooler Receipt Form.doc djl

Login Container Summary Report

Temperature readings: _____

Client Sample ID	Lab ID	Container Type	Container pH	Preservative Added (mls)	Lot #
EB-AUG-20170607	240-80625-D-1	Plastic 500ml - with Nitric Acid	<2	_____	_____
EB-SPOON-20170607	240-80625-G-2	Plastic 500ml - with Nitric Acid	<2	_____	_____

TestAmerica Canton
4101 Shuffel Street NW
North Canton, OH 44720
Phone (330) 497-9396 Fax (330) 497-0772

0.5/0.5
1-3/1.3

Chain of Custody Record

MICHIGAN 190

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: D. Miller / T. Asher	Lab PM: Howell, Leslie	Carrier Tracking No(s):	COC No: 240-43577-18975.1
Client Contact: David Miller	Phone: 517-349-9499	E-Mail: leslie.howell@testamericainc.com		Page: Page 1 of 1
Company: Stantec Consulting Corp.				Job #:
Address: 2321 Club Meridian Drive Suite E	Due Date Requested:			
City: Okemos	TAT Requested (days): Standard			
State, Zip: MI, 48864				
Phone: (517) 349-9499	PO #: Purchase Order not required			
Email: david.miller@stantec.com	WO #:			
Project Name: Chevron BDG Company (Former Harshaw Chem	Project #: 24018459			
Site: 213202036	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6010B, 6020, 7470A	8260B - (MOD) TCL OLM03.1/4.2 Volatile Analyte L	8270C - (MOD) OLM03.1/4.2 Semivolatile Analyte L	9056A_28D - (MOD) Pick List	8082 - (MOD) PCB 7 Aroclors	6010B, 7470A, 8260B, 8270C	9040B - pH	6010A - Local Method	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D	A	N	N	N	N	N			
PZ-3	6/20/17	11:39	G	Water	N	N	X	X	X	X					7	
1A10-MW0016		13:08	G	Water	N	N	X	X	X	X					7	
1A10-MW0017		14:38	G	Water	N	N	X	X	X	X					7	
1A10-MW0018		16:20	G	Water	N	N	X	X	X	X					7	
1A10-MW0019		18:05	G	Water	N	N	X	X	X	X					7	
DUP-1		—	G	Water	N	N	X	X	X	X					6	
EB-1		15:20	G	Water	N	N	X	X	X	X					7	
TRIP Blank			G	Water	N	N		X							1	

240-81282 Chain of Custody

Possible Hazard Identification
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements: Ohio VAP Program

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment: Delivery

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
[signature]	6/21/17 10:15	Stantec	[signature]	6/21/17 1015	TAL
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

7/5/2017

TestAmerica Canton Sample Receipt Form/Narrative **Login # : 81282**
Canton Facility

Client SANTEC Site Name — Cooler unpacked by: RP

Cooler Received on 6-21-17 Opened on 6-21-17

FedEx: 1st Grd Exp UPS FAS Clipper Client Drop Off TestAmerica Courier Other

Receipt After-hours: Drop-off Date/Time Storage Location

TestAmerica Cooler # Foam Box Client Cooler Box Other

Packing material used: Bubble Wrap Foam Plastic Bag None Other

COOLANT: Wet Ice Blue Ice Dry Ice Water None

1. Cooler temperature upon receipt ☐ See Multiple Cooler Form
   IR GUN# IR-8 (CF **-0.4** °C) Observed Cooler Temp._____°C Corrected Cooler Temp._____°C
   IR GUN #36 (CF **+0**°C) Observed Cooler Temp._____°C Corrected Cooler Temp._____°C
2. Were custody seals on the outside of the cooler(s)? If Yes Quantity 1 Yes No
   -Were custody seals on the outside of the cooler(s) signed & dated? Yes No NA
   -Were custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Yes No
3. Shippers' packing slip attached to the cooler(s)? Yes No
4. Did custody papers accompany the sample(s)? Yes No
5. Were the custody papers relinquished & signed in the appropriate place? Yes No
6. Was/were the person(s) who collected the samples clearly identified on the COC? Yes No
7. Did all bottles arrive in good condition (Unbroken)? Yes No
8. Could all bottle labels be reconciled with the COC? Yes No 6-21-17 RP
9. Were correct bottle(s) used for the test(s) indicated? Yes No
10. Sufficient quantity received to perform indicated analyses? Yes No
11. Are these work share samples? Yes No
    If yes, Questions 11-15 have been checked at the originating laboratory.
11. Were sample(s) at the correct pH upon receipt? Yes No NA pH Strip Lot# **HC697954**
12. Were VOAs on the COC? Yes No
13. Were air bubbles >6 mm in any VOA vials? ● ⬅ Larger than this. Yes No NA
14. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot #_____ Yes No
15. Was a LL Hg or Me Hg trip blank present? _____ Yes No

Contacted PM _____ Date _____ by _____ via Verbal Voice Mail Other

Concerning _____

16. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES Samples processed by:

~~Did not Receive FB.~~ Found 6/21/17 BM

17. SAMPLE CONDITION

Sample(s) _____ were received after the recommended holding time had expired.
Sample(s) _____ were received in a broken container.
Sample(s) _____ were received with bubble >6 mm in diameter. (Notify PM)

18. SAMPLE PRESERVATION

Sample(s) _____ were further preserved in the laboratory.
Time preserved: _____ Preservative(s) added/Lot number(s): _____

TestAmerica Multiple Cooler Receipt Form/Narrative **Login # : 81282**
Canton Facility

Cooler #	IR Gun #	Observed Temp °C	Corrected Temp °C	Coolant
CLIENT	36	0.5	0.5	Ice
	1	1.3	1.3	1

Login Container Summary Report

Temperature readings: _____

Client Sample ID	Lab ID	Container Type	Container pH	Preservative Added (mls)	Lot #
PZ-3	240-81282-E-1	Plastic 500ml - with Nitric Acid	<2	_____	_____
1A10-MW0016	240-81282-E-2	Plastic 500ml - with Nitric Acid	<2	_____	_____
1A10-MW0017	240-81282-E-3	Plastic 500ml - with Nitric Acid	<2	_____	_____
1A10-MW0018	240-81282-E-4	Plastic 500ml - with Nitric Acid	<2	_____	_____
1A10-MW0019	240-81282-E-5	Plastic 500ml - with Nitric Acid	<2	_____	_____
DUP-1	240-81282-E-6	Plastic 500ml - with Nitric Acid	<2	_____	_____
EB-1	240-81282-E-7	Plastic 500ml - with Nitric Acid	<2	_____	_____

TestAmerica Canton
4101 Shuffel Street NW
North Canton, OH 44720
Phone (330) 497-9396 Fax (330) 497-0772

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

7/5/2017

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Pohl, Denise	Carrier Tracking No(s):	COC No: 240-72560.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: denise.pohl@testamericainc.com	State of Origin: Ohio	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note):		Job #: 240-81262-1
Address: 777 New Durham Road, ,	Due Date Requested: 6/30/2017			
City: Edison	TAT Requested (days):			
State, Zip: NJ, 08817				
Phone: 732-549-3900(Tel) 732-549-3679(Fax)	PO #:			
Email:	WO #:			
Project Name: Racer - Elyria, Ohio	Project #: 46020356			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6010C/3010A (MOD) RCRA 8 Analyte List	7470A/7470A_Prep Mercury	Total Number of containers	Special Instructions/Note:
			Preservation Code:							
0171-061917-1900 (240-81262-1)	6/19/17	19:00 Eastern		Water			X	X	1	
0171-061917-1915 (240-81262-2)	6/19/17	19:15 Eastern		Water			X	X	1	

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to TestAmerica Laboratories, Inc.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		6217 1730	240	via FedEx	6/22/17 1055	TAL CAN
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.: 10 05	Cooler Temperature(s) °C and Other Remarks: 3.8°C IR8

Login Sample Receipt Checklist

Client: Haley & Aldrich, Inc.

Job Number: 240-81262-1

Login Number: 81262
List Number: 2
Creator: Armbruster, Chris

List Source: TestAmerica Edison
List Creation: 06/22/17 01:22 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	3.8°C IR8
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Edison
777 New Durham Road
Edison, NJ 08817
Tel: (732)549-3900

TestAmerica Job ID: 460-133539-1
Client Project/Site: Racer - Elyria, Ohio

For:
Haley & Aldrich, Inc.
3840 Packard Road
Suite 100
Ann Arbor, Michigan 48108-2280

Attn: Ban Aragona

Denise Pohl

Authorized for release by:
6/1/2017 8:57:38 AM

Denise Pohl, Project Manager II
(330)966-9789
denise.pohl@testamericainc.com

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Definitions/Glossary

Client: Haley & Aldrich, Inc.
Project/Site: Racer - Elyria, Ohio

TestAmerica Job ID: 460-133539-1

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

GC/MS Semi VOA

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.
*	LCS or LCSD is outside acceptance limits.

HPLC/IC

Qualifier	Qualifier Description
F1	MS and/or MSD Recovery is outside acceptance limits.
U	Indicates the analyte was analyzed for but not detected.

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
U	Indicates the analyte was analyzed for but not detected.

General Chemistry

Qualifier	Qualifier Description
F1	MS and/or MSD Recovery is outside acceptance limits.
U	Indicates the analyte was analyzed for but not detected.
F2	MS/MSD RPD exceeds control limits
HF	Field parameter with a holding time of 15 minutes. Test performed by laboratory at client's request.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 460-133539-1

Laboratory: TestAmerica Edison

Narrative

CASE NARRATIVE

Client: Haley & Aldrich, Inc.

Project: Racer - Elyria, Ohio

Report Number: 460-133539-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

The D854 Specific Gravity analysis was performed at the TestAmerica Knoxville Laboratory.

TestAmerica Edison attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header.

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

RECEIPT

The samples were received on 5/17/2017 9:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.5º C.

TCLP VOLATILE ORGANIC COMPOUNDS (GCMS)

Sample 0171-051617-1400 (460-133539-2) was analyzed for TCLP volatile organic compounds (GCMS) in accordance with EPA SW-846 Methods 1311/8260B. The sample was leached on 05/18/2017 and analyzed on 05/25/2017.

Sample 0171-051617-1400 (460-133539-2)[10X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

Method(s) 8260B: The continuing calibration verification (CCV) associated with batch 439597 recovered above the upper control limit for Vinyl chloride. The samples associated with this CCV were non-detects for the affected analyte; therefore, the data have been reported.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TCLP SEMIVOLATILE ORGANIC COMPOUNDS (GCMS)

Job ID: 460-133539-1 (Continued)

Laboratory: TestAmerica Edison (Continued)

Sample 0171-051617-1400 (460-133539-2) was analyzed for TCLP semivolatile organic compounds (GCMS) in accordance with EPA SW-846 Methods 1311/8270C. The sample was leached on 05/18/2017, prepared on 05/19/2017 and analyzed on 05/26/2017.

Surrogates are added during the extraction process prior to dilution. When the sample is diluted, surrogate recoveries are diluted out and no corrective action is required.

Hexachloroethane failed the recovery criteria high for LCS 460-438125/2-A. Hexachloroethane failed the recovery criteria high for LCSD 460-438125/3-A. Refer to the QC report for details.

Method(s) 8270C: The laboratory control sample (LCS) and / or laboratory control sample duplicate (LCSD) for preparation batch 460-438125 and analytical batch 460-438659 recovered outside control limits for the following analyte: Hexachloroethane. This analyte was biased high in the LCS/LCSD and was not detected in the associated samples; therefore, the data have been reported.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TCLP METALS (ICP)

Sample 0171-051617-1400 (460-133539-2) was analyzed for TCLP metals (ICP) in accordance with EPA SW-846 Methods 1311/6010C. The sample was leached on 05/18/2017, prepared on 05/19/2017 and analyzed on 05/20/2017 and 05/23/2017.

Lead was detected in method blank LB 460-438149/1-B at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged. Refer to the QC report for details.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TOTAL METALS (ICP)

Sample 0171-051617-1330 (460-133539-1) was analyzed for total metals (ICP) in accordance with EPA SW-846 Method 6010C. The sample was prepared and analyzed on 05/31/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TCLP MERCURY

Sample 0171-051617-1400 (460-133539-2) was analyzed for TCLP mercury in accordance with EPA SW-846 Methods 1311/7470A. The sample was leached on 05/18/2017, and prepared and analyzed on 05/23/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

FLASHPOINT

Sample 0171-051617-1400 (460-133539-2) was analyzed for flashpoint in accordance with EPA SW-846 Method 1030. The sample was analyzed on 05/30/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TOTAL CYANIDE

Sample 0171-051617-1400 (460-133539-2) was analyzed for total cyanide in accordance with EPA SW-846 Method 9012B. The sample was prepared and analyzed on 05/30/2017.

Cyanide, Total failed the recovery criteria low for the MS of sample 0171-051617-1400MS (460-133539-2) in batch 460-440110. Cyanide, Total failed the recovery criteria low for the MSD of sample 0171-051617-1400MSD (460-133539-2) in batch 460-440110. Cyanide, Total exceeded the RPD limit.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TOTAL CYANIDE

Sample 0171-051617-1330 (460-133539-1) was analyzed for total cyanide in accordance with EPA SW-846 Method 9012B. The sample

Job ID: 460-133539-1 (Continued)

Laboratory: TestAmerica Edison (Continued)

was prepared and analyzed on 05/30/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TOTAL SULFIDE
Sample 0171-051617-1400 (460-133539-2) was analyzed for total sulfide in accordance with EPA SW-846 Method 9034. The sample was prepared and analyzed on 05/21/2017.

Sulfide failed the recovery criteria low for the MS/MSD of sample 0171-051617-1400MS/MSD (460-133539-2) in batch 460-438817.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

PH
Sample 0171-051617-1400 (460-133539-2) was analyzed for pH in accordance with EPA SW-846 Method 9045D. The sample was analyzed on 05/30/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ANIONS, ION CHROMATOGRAPHY
Sample 0171-051617-1330 (460-133539-1) was analyzed for Anions, Ion Chromatography in accordance with SW-846 Method 9056A_OrgFM. The sample was analyzed on 05/28/2017.

Chloride and Sulfate failed the recovery criteria high for the MS/MSD of sample 0171-051617-1330MS/MSD (460-133539-1) in batch 460-439827.

Sample 0171-051617-1330 (460-133539-1)[10X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

Method(s) 9056A: The following samples were diluted to bring the concentration of target analytes within the calibration range: 0171-051617-1330 (460-133539-1), (460-133539-A-1 DU), (460-133539-A-1 MS) and (460-133539-A-1 MSD) at 10.0, 10.0, 10.0 and 10.0. Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

SPECIFIC GRAVITY
Sample 0171-051617-1400 (460-133539-2) was analyzed for specific gravity in accordance with ASTM Method D854. The sample was analyzed on 05/20/2017.

Density: The density (or specific gravity) of the samples was determined using SOP number KNOX-WC-0015, based on ASTM Methods D1475 (replaced D1963) and D854. A Hubbard-Carmick type pycnometer is tared on a four-place analytical balance. The pycnometer filled with water is weighed to calibrate the volume at the desired temperature. The pycnometer filled with sample is weighed to determine the weight of the sample at the calibrated volume. The standard temperature for this procedure is 25ºC. The density and specific gravity of the material are calculated using the following equations:

d(SAMP) = [C(T) - A] / V(T)

Where:
d(SAMP) = Density of the liquid sample at temperature T, g/cm3
C(T) = Weight of pycnometer filled with sample at temperature T, g
A = Weight of pycnometer, g
V(T) = Volume of pycnometer at temperature T, cm3

d(SAMP) = [C(T) - A] / [V(T) - [(D(T) - C(T)) / dH2O(T)]]

Where:

Job ID: 460-133539-1 (Continued)

Laboratory: TestAmerica Edison (Continued)

d(SAMP) = Density of the solid sample at temperature T, g/cm3
D(T) = Weight of pycnometer filled with water and an aliquot of the sample at temperature T, g
C(T) = Weight of pycnometer partially filled with an aliquot of the sample at temperature T, g
A = Weight of pycnometer, g
dH2O(T) = Density of pure water at temperature T, g/cm3
V(T) = Volume of pycnometer at temperature T, cm3

S(T) = d(SAMP) / dH2O(T)

Where:
S(T) = Specific gravity of the sample at temperature T, unitless
d(SAMP) = Density of the sample at temperature T, g/cm3
dH2O(T) = Density of pure water at temperature T, g/cm3
T = Temperature of analysis

Conversion factors:
1 lb/gal = 0.1198 g/cm3
1 Kg/cu. m = 0.001 g/cm3

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: Haley & Aldrich, Inc.
Project/Site: Racer - Elyria, Ohio

TestAmerica Job ID: 460-133539-1

Client Sample ID: 0171-051617-1330 — Lab Sample ID: 460-133539-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride - DL	27	F1	1.2	0.31	mg/L	10		9056A	Total/NA
Sulfate - DL	56	F1	6.0	1.3	mg/L	10		9056A	Total/NA
Barium	37	J	200	8.6	ug/L	1		6010C	Total/NA
Calcium	36000		5000	350	ug/L	1		6010C	Total/NA
Chromium	7.6	J	10	3.3	ug/L	1		6010C	Total/NA
Iron	1300		150	92	ug/L	1		6010C	Total/NA
Magnesium	9200		5000	310	ug/L	1		6010C	Total/NA
Manganese	40		15	3.1	ug/L	1		6010C	Total/NA
Potassium	16000		5000	170	ug/L	1		6010C	Total/NA
Sodium	14000		5000	410	ug/L	1		6010C	Total/NA
Cyanide, Total	0.024		0.010	0.0020	mg/L	1		9012B	Total/NA

Client Sample ID: 0171-051617-1400 — Lab Sample ID: 460-133539-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Barium	170	J	1000	43	ug/L	5		6010C	TCLP
pH	8.5	HF			SU	1		9045D	Total/NA
Corrosivity	8.5	HF			SU	1		9045D	Total/NA
Density	2.36		0.0100	0.0100	g/cm3	1		D854	Total/NA
Specific Gravity	2.37		0.0100	0.0100	NONE	1		D854	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: 0171-051617-1330

Lab Sample ID: 460-133539-1

Date Collected: 05/16/17 13:30

Matrix: Water

Date Received: 05/17/17 09:30

Method: 9056A - Anions, Ion Chromatography - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**27**	**F1**	1.2	0.31	mg/L			05/28/17 00:23	10
Sulfate	**56**	**F1**	6.0	1.3	mg/L			05/28/17 00:23	10

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Barium	**37**	**J**	200	8.6	ug/L		05/31/17 08:26	05/31/17 14:00	1
Calcium	**36000**		5000	350	ug/L		05/31/17 08:26	05/31/17 14:00	1
Chromium	**7.6**	**J**	10	3.3	ug/L		05/31/17 08:26	05/31/17 14:00	1
Iron	**1300**		150	92	ug/L		05/31/17 08:26	05/31/17 14:00	1
Magnesium	**9200**		5000	310	ug/L		05/31/17 08:26	05/31/17 14:00	1
Manganese	**40**		15	3.1	ug/L		05/31/17 08:26	05/31/17 14:00	1
Nickel	40	U	40	9.0	ug/L		05/31/17 08:26	05/31/17 14:00	1
Potassium	**16000**		5000	170	ug/L		05/31/17 08:26	05/31/17 14:00	1
Sodium	**14000**		5000	410	ug/L		05/31/17 08:26	05/31/17 14:00	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	**0.024**		0.010	0.0020	mg/L		05/30/17 07:00	05/30/17 12:32	1

Client Sample ID: 0171-051617-1400

Lab Sample ID: 460-133539-2

Date Collected: 05/16/17 14:00

Matrix: Solid

Date Received: 05/17/17 09:30

Method: 8260B - TCLP Volatiles - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	0.010	U	0.010	0.0019	mg/L			05/25/17 07:31	10
2-Butanone	0.050	U	0.050	0.022	mg/L			05/25/17 07:31	10
Carbon tetrachloride	0.010	U	0.010	0.0033	mg/L			05/25/17 07:31	10
Chlorobenzene	0.010	U	0.010	0.0024	mg/L			05/25/17 07:31	10
Chloroform	0.010	U	0.010	0.0022	mg/L			05/25/17 07:31	10
1,2-Dichloroethane	0.010	U	0.010	0.0025	mg/L			05/25/17 07:31	10
1,1-Dichloroethene	0.010	U	0.010	0.0034	mg/L			05/25/17 07:31	10
Tetrachloroethene	0.010	U	0.010	0.0036	mg/L			05/25/17 07:31	10
Trichloroethene	0.010	U	0.010	0.0022	mg/L			05/25/17 07:31	10
Vinyl chloride	0.010	U	0.010	0.0020	mg/L			05/25/17 07:31	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Bromofluorobenzene	*93*		*77 - 124*		*05/25/17 07:31*	*10*
Dibromofluoromethane (Surr)	*107*		*72 - 131*		*05/25/17 07:31*	*10*
1,2-Dichloroethane-d4 (Surr)	*117*		*74 - 132*		*05/25/17 07:31*	*10*
Toluene-d8 (Surr)	*96*		*80 - 120*		*05/25/17 07:31*	*10*

Method: 8270C - TCLP Semivolatiles - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
3 & 4 Methylphenol	0.010	U	0.010	0.00088	mg/L		05/19/17 10:34	05/26/17 13:28	1
Phenol	0.010	U	0.010	0.00041	mg/L		05/19/17 10:34	05/26/17 13:28	1
Pyridine	0.010	U	0.010	0.00094	mg/L		05/19/17 10:34	05/26/17 13:28	1
1,4-Dichlorobenzene	0.010	U	0.010	0.00066	mg/L		05/19/17 10:34	05/26/17 13:28	1
2-Methylphenol	0.010	U	0.010	0.0013	mg/L		05/19/17 10:34	05/26/17 13:28	1
Hexachloroethane	0.0010	U *	0.0010	0.000090	mg/L		05/19/17 10:34	05/26/17 13:28	1

Client Sample ID: 0171-051617-1400
Date Collected: 05/16/17 14:00
Date Received: 05/17/17 09:30

Lab Sample ID: 460-133539-2
Matrix: Solid

Method: 8270C - TCLP Semivolatiles - TCLP (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4-Methylphenol	0.010	U	0.010	0.00087	mg/L		05/19/17 10:34	05/26/17 13:28	1
Nitrobenzene	0.0010	U	0.0010	0.00049	mg/L		05/19/17 10:34	05/26/17 13:28	1
Hexachlorobutadiene	0.0020	U	0.0020	0.00076	mg/L		05/19/17 10:34	05/26/17 13:28	1
2,4,6-Trichlorophenol	0.010	U	0.010	0.00053	mg/L		05/19/17 10:34	05/26/17 13:28	1
2,4,5-Trichlorophenol	0.010	U	0.010	0.00049	mg/L		05/19/17 10:34	05/26/17 13:28	1
2,4-Dinitrotoluene	0.0020	U	0.0020	0.0010	mg/L		05/19/17 10:34	05/26/17 13:28	1
Hexachlorobenzene	0.0010	U	0.0010	0.00047	mg/L		05/19/17 10:34	05/26/17 13:28	1
Pentachlorophenol	0.030	U	0.030	0.0022	mg/L		05/19/17 10:34	05/26/17 13:28	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*100*		*51 - 108*	*05/19/17 10:34*	*05/26/17 13:28*	*1*
Phenol-d5	*23*		*14 - 39*	*05/19/17 10:34*	*05/26/17 13:28*	*1*
Terphenyl-d14	*90*		*40 - 148*	*05/19/17 10:34*	*05/26/17 13:28*	*1*
2,4,6-Tribromophenol	*96*		*26 - 139*	*05/19/17 10:34*	*05/26/17 13:28*	*1*
2-Fluorophenol	*38*		*25 - 58*	*05/19/17 10:34*	*05/26/17 13:28*	*1*
2-Fluorobiphenyl	*98*		*45 - 107*	*05/19/17 10:34*	*05/26/17 13:28*	*1*

Method: 6010C - TCLP Metals (ICP) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	50	U	50	9.0	ug/L		05/19/17 22:40	05/20/17 21:15	5
Arsenic	75	U	75	22	ug/L		05/19/17 22:40	05/20/17 21:15	5
Barium	**170**	**J**	1000	43	ug/L		05/19/17 22:40	05/20/17 21:15	5
Cadmium	20	U	20	9.2	ug/L		05/19/17 22:40	05/20/17 21:15	5
Chromium	50	U	50	17	ug/L		05/19/17 22:40	05/23/17 11:06	5
Lead	50	U	50	20	ug/L		05/19/17 22:40	05/20/17 21:15	5
Selenium	100	U	100	22	ug/L		05/19/17 22:40	05/20/17 21:15	5

Method: 7470A - TCLP Mercury - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.20	U	0.20	0.17	ug/L		05/23/17 11:34	05/23/17 15:57	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Burn Rate	2.20	U	2.20	2.20	mm/sec			05/30/17 15:46	1
Cyanide, Total	0.10	U F2 F1	0.10	0.027	mg/Kg		05/30/17 07:00	05/30/17 12:12	1
Sulfide	8.7	U F1	8.7	3.4	mg/Kg		05/21/17 11:00	05/21/17 16:00	1
pH	**8.5**	**HF**			SU			05/30/17 13:51	1
Corrosivity	**8.5**	**HF**			SU			05/30/17 13:51	1

Method: D854 - Specific Gravity

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Density	**2.36**		0.0100	0.0100	g/cm3			05/20/17 00:00	1
Specific Gravity	**2.37**		0.0100	0.0100	NONE			05/20/17 00:00	1

Surrogate Summary

Client: Haley & Aldrich, Inc.
Project/Site: Racer - Elyria, Ohio

TestAmerica Job ID: 460-133539-1

Method: 8260B - TCLP Volatiles

Matrix: Solid — **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		BFB	DBFM	12DCE	TOL
Lab Sample ID	Client Sample ID	(77-124)	(72-131)	(74-132)	(80-120)
LCS 460-439167/3	Lab Control Sample	97	102	112	100
LCS 460-439597/4	Lab Control Sample	96	94	103	95
LCSD 460-439167/4	Lab Control Sample Dup	96	99	107	97
LCSD 460-439597/5	Lab Control Sample Dup	97	94	100	98
MB 460-439167/6	Method Blank	92	102	109	95
MB 460-439597/8	Method Blank	91	93	104	98

Surrogate Legend

BFB = Bromofluorobenzene
DBFM = Dibromofluoromethane (Surr)
12DCE = 1,2-Dichloroethane-d4 (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260B - TCLP Volatiles

Matrix: Solid — **Prep Type: TCLP**

		Percent Surrogate Recovery (Acceptance Limits)			
		BFB	DBFM	12DCE	TOL
Lab Sample ID	Client Sample ID	(77-124)	(72-131)	(74-132)	(80-120)
460-133539-2	0171-051617-1400	93	107	117	96
LB 460-437906/1-A	Method Blank	93	99	107	98

Surrogate Legend

BFB = Bromofluorobenzene
DBFM = Dibromofluoromethane (Surr)
12DCE = 1,2-Dichloroethane-d4 (Surr)
TOL = Toluene-d8 (Surr)

Method: 8270C - TCLP Semivolatiles

Matrix: Solid — **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		NBZ	PHL	TPH	TBP	2FP	FBP
Lab Sample ID	Client Sample ID	(51-108)	(14-39)	(40-148)	(26-139)	(25-58)	(45-107)
LCS 460-438125/2-A	Lab Control Sample	92	25	94	118	43	97
LCSD 460-438125/3-A	Lab Control Sample Dup	84	29	105	111	46	89
MB 460-438125/1-A	Method Blank	96	26	89	113	42	92

Surrogate Legend

NBZ = Nitrobenzene-d5
PHL = Phenol-d5
TPH = Terphenyl-d14
TBP = 2,4,6-Tribromophenol
2FP = 2-Fluorophenol
FBP = 2-Fluorobiphenyl

Surrogate Summary

Client: Haley & Aldrich, Inc.
Project/Site: Racer - Elyria, Ohio

TestAmerica Job ID: 460-133539-1

Method: 8270C - TCLP Semivolatiles

Matrix: Solid **Prep Type: TCLP**

		Percent Surrogate Recovery (Acceptance Limits)							
		NBZ	PHL	TPH	TBP	2FP	FBP		
Lab Sample ID	Client Sample ID	(51-108)	(14-39)	(40-148)	(26-139)	(25-58)	(45-107)		
460-133539-2	0171-051617-1400	100	23	90	96	38	98		
LB 460-437940/1-B	Method Blank	101	29	98	109	48	98		

Surrogate Legend

NBZ = Nitrobenzene-d5
PHL = Phenol-d5
TPH = Terphenyl-d14
TBP = 2,4,6-Tribromophenol
2FP = 2-Fluorophenol
FBP = 2-Fluorobiphenyl

Method: 8260B - TCLP Volatiles

Lab Sample ID: MB 460-439167/6
Matrix: Solid
Analysis Batch: 439167

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	0.0010	U	0.0010	0.00019	mg/L			05/24/17 22:45	1
2-Butanone	0.0050	U	0.0050	0.0022	mg/L			05/24/17 22:45	1
Carbon tetrachloride	0.0010	U	0.0010	0.00033	mg/L			05/24/17 22:45	1
Chlorobenzene	0.0010	U	0.0010	0.00024	mg/L			05/24/17 22:45	1
Chloroform	0.0010	U	0.0010	0.00022	mg/L			05/24/17 22:45	1
1,2-Dichloroethane	0.0010	U	0.0010	0.00025	mg/L			05/24/17 22:45	1
1,1-Dichloroethene	0.0010	U	0.0010	0.00034	mg/L			05/24/17 22:45	1
Tetrachloroethene	0.0010	U	0.0010	0.00036	mg/L			05/24/17 22:45	1
Trichloroethene	0.0010	U	0.0010	0.00022	mg/L			05/24/17 22:45	1
Vinyl chloride	0.0010	U	0.0010	0.00020	mg/L			05/24/17 22:45	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Bromofluorobenzene	*92*		*77 - 124*		*05/24/17 22:45*	*1*
Dibromofluoromethane (Surr)	*102*		*72 - 131*		*05/24/17 22:45*	*1*
1,2-Dichloroethane-d4 (Surr)	*109*		*74 - 132*		*05/24/17 22:45*	*1*
Toluene-d8 (Surr)	*95*		*80 - 120*		*05/24/17 22:45*	*1*

Lab Sample ID: LCS 460-439167/3
Matrix: Solid
Analysis Batch: 439167

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	0.0200	0.0230		mg/L		115	77 - 121
2-Butanone	0.100	0.0955		mg/L		95	64 - 120
Carbon tetrachloride	0.0200	0.0219		mg/L		110	70 - 132
Chlorobenzene	0.0200	0.0201		mg/L		100	80 - 120
Chloroform	0.0200	0.0228		mg/L		114	80 - 120
1,2-Dichloroethane	0.0200	0.0224		mg/L		112	76 - 121
1,1-Dichloroethene	0.0200	0.0228		mg/L		114	74 - 123
Tetrachloroethene	0.0200	0.0209		mg/L		104	78 - 122
Trichloroethene	0.0200	0.0191		mg/L		96	77 - 120
Vinyl chloride	0.0200	0.0225		mg/L		112	62 - 138

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Bromofluorobenzene	*97*		*77 - 124*
Dibromofluoromethane (Surr)	*102*		*72 - 131*
1,2-Dichloroethane-d4 (Surr)	*112*		*74 - 132*
Toluene-d8 (Surr)	*100*		*80 - 120*

Lab Sample ID: LCSD 460-439167/4
Matrix: Solid
Analysis Batch: 439167

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzene	0.0200	0.0215		mg/L		108	77 - 121	7	30
2-Butanone	0.100	0.101		mg/L		101	64 - 120	5	30
Carbon tetrachloride	0.0200	0.0218		mg/L		109	70 - 132	1	30

Method: 8260B - TCLP Volatiles (Continued)

Lab Sample ID: LCSD 460-439167/4
Matrix: Solid
Analysis Batch: 439167

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chlorobenzene			0.0200	0.0197		mg/L		98	80 - 120	2	30
Chloroform			0.0200	0.0220		mg/L		110	80 - 120	3	30
1,2-Dichloroethane			0.0200	0.0224		mg/L		112	76 - 121	0	30
1,1-Dichloroethene			0.0200	0.0215		mg/L		107	74 - 123	6	30
Tetrachloroethene			0.0200	0.0194		mg/L		97	78 - 122	7	30
Trichloroethene			0.0200	0.0186		mg/L		93	77 - 120	3	30
Vinyl chloride			0.0200	0.0202		mg/L		101	62 - 138	11	30

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Bromofluorobenzene	*96*		*77 - 124*
Dibromofluoromethane (Surr)	*99*		*72 - 131*
1,2-Dichloroethane-d4 (Surr)	*107*		*74 - 132*
Toluene-d8 (Surr)	*97*		*80 - 120*

Lab Sample ID: MB 460-439597/8
Matrix: Solid
Analysis Batch: 439597

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	0.0010	U	0.0010	0.00019	mg/L			05/19/17 10:47	1
2-Butanone	0.0050	U	0.0050	0.0022	mg/L			05/19/17 10:47	1
Carbon tetrachloride	0.0010	U	0.0010	0.00033	mg/L			05/19/17 10:47	1
Chlorobenzene	0.0010	U	0.0010	0.00024	mg/L			05/19/17 10:47	1
Chloroform	0.0010	U	0.0010	0.00022	mg/L			05/19/17 10:47	1
1,2-Dichloroethane	0.0010	U	0.0010	0.00025	mg/L			05/19/17 10:47	1
1,1-Dichloroethene	0.0010	U	0.0010	0.00034	mg/L			05/19/17 10:47	1
Tetrachloroethene	0.0010	U	0.0010	0.00036	mg/L			05/19/17 10:47	1
Trichloroethene	0.0010	U	0.0010	0.00022	mg/L			05/19/17 10:47	1
Vinyl chloride	0.0010	U	0.0010	0.00020	mg/L			05/19/17 10:47	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Bromofluorobenzene	*91*		*77 - 124*		*05/19/17 10:47*	*1*
Dibromofluoromethane (Surr)	*93*		*72 - 131*		*05/19/17 10:47*	*1*
1,2-Dichloroethane-d4 (Surr)	*104*		*74 - 132*		*05/19/17 10:47*	*1*
Toluene-d8 (Surr)	*98*		*80 - 120*		*05/19/17 10:47*	*1*

Lab Sample ID: LCS 460-439597/4
Matrix: Solid
Analysis Batch: 439597

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene			0.0200	0.0210		mg/L		105	77 - 121
2-Butanone			0.100	0.0807		mg/L		81	64 - 120
Carbon tetrachloride			0.0200	0.0215		mg/L		108	70 - 132
Chlorobenzene			0.0200	0.0200		mg/L		100	80 - 120
Chloroform			0.0200	0.0211		mg/L		106	80 - 120
1,2-Dichloroethane			0.0200	0.0218		mg/L		109	76 - 121
1,1-Dichloroethene			0.0200	0.0205		mg/L		103	74 - 123

Method: 8260B - TCLP Volatiles (Continued)

Lab Sample ID: LCS 460-439597/4
Matrix: Solid
Analysis Batch: 439597

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Tetrachloroethene			0.0200	0.0192		mg/L		96	78 - 122		
Trichloroethene			0.0200	0.0174		mg/L		87	77 - 120		
Vinyl chloride			0.0200	0.0241		mg/L		120	62 - 138		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Bromofluorobenzene	*96*		*77 - 124*
Dibromofluoromethane (Surr)	*94*		*72 - 131*
1,2-Dichloroethane-d4 (Surr)	*103*		*74 - 132*
Toluene-d8 (Surr)	*95*		*80 - 120*

Lab Sample ID: LCSD 460-439597/5
Matrix: Solid
Analysis Batch: 439597

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzene			0.0200	0.0215		mg/L		108	77 - 121	2	30
2-Butanone			0.100	0.0834		mg/L		83	64 - 120	3	30
Carbon tetrachloride			0.0200	0.0206		mg/L		103	70 - 132	5	30
Chlorobenzene			0.0200	0.0197		mg/L		99	80 - 120	2	30
Chloroform			0.0200	0.0207		mg/L		103	80 - 120	2	30
1,2-Dichloroethane			0.0200	0.0212		mg/L		106	76 - 121	2	30
1,1-Dichloroethene			0.0200	0.0198		mg/L		99	74 - 123	4	30
Tetrachloroethene			0.0200	0.0201		mg/L		101	78 - 122	5	30
Trichloroethene			0.0200	0.0182		mg/L		91	77 - 120	4	30
Vinyl chloride			0.0200	0.0252		mg/L		126	62 - 138	5	30

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Bromofluorobenzene	*97*		*77 - 124*
Dibromofluoromethane (Surr)	*94*		*72 - 131*
1,2-Dichloroethane-d4 (Surr)	*100*		*74 - 132*
Toluene-d8 (Surr)	*98*		*80 - 120*

Lab Sample ID: LB 460-437906/1-A
Matrix: Solid
Analysis Batch: 439597

Client Sample ID: Method Blank
Prep Type: TCLP

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	0.010	U	0.010	0.0019	mg/L			05/19/17 11:40	10
2-Butanone	0.050	U	0.050	0.022	mg/L			05/19/17 11:40	10
Carbon tetrachloride	0.010	U	0.010	0.0033	mg/L			05/19/17 11:40	10
Chlorobenzene	0.010	U	0.010	0.0024	mg/L			05/19/17 11:40	10
Chloroform	0.010	U	0.010	0.0022	mg/L			05/19/17 11:40	10
1,2-Dichloroethane	0.010	U	0.010	0.0025	mg/L			05/19/17 11:40	10
1,1-Dichloroethene	0.010	U	0.010	0.0034	mg/L			05/19/17 11:40	10
Tetrachloroethene	0.010	U	0.010	0.0036	mg/L			05/19/17 11:40	10
Trichloroethene	0.010	U	0.010	0.0022	mg/L			05/19/17 11:40	10
Vinyl chloride	0.010	U	0.010	0.0020	mg/L			05/19/17 11:40	10

Method: 8260B - TCLP Volatiles (Continued)

Lab Sample ID: LB 460-437906/1-A
Matrix: Solid
Analysis Batch: 439597

Client Sample ID: Method Blank
Prep Type: TCLP

Surrogate	LB %Recovery	LB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Bromofluorobenzene	*93*		*77 - 124*		*05/19/17 11:40*	*10*
Dibromofluoromethane (Surr)	*99*		*72 - 131*		*05/19/17 11:40*	*10*
1,2-Dichloroethane-d4 (Surr)	*107*		*74 - 132*		*05/19/17 11:40*	*10*
Toluene-d8 (Surr)	*98*		*80 - 120*		*05/19/17 11:40*	*10*

Method: 8270C - TCLP Semivolatiles

Lab Sample ID: MB 460-438125/1-A
Matrix: Solid
Analysis Batch: 438659

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 438125

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
3 & 4 Methylphenol	0.010	U	0.010	0.00088	mg/L		05/19/17 10:34	05/23/17 10:33	1
Phenol	0.010	U	0.010	0.00041	mg/L		05/19/17 10:34	05/23/17 10:33	1
Pyridine	0.010	U	0.010	0.00094	mg/L		05/19/17 10:34	05/23/17 10:33	1
1,4-Dichlorobenzene	0.010	U	0.010	0.00066	mg/L		05/19/17 10:34	05/23/17 10:33	1
2-Methylphenol	0.010	U	0.010	0.0013	mg/L		05/19/17 10:34	05/23/17 10:33	1
Hexachloroethane	0.0010	U	0.0010	0.000090	mg/L		05/19/17 10:34	05/23/17 10:33	1
4-Methylphenol	0.010	U	0.010	0.00087	mg/L		05/19/17 10:34	05/23/17 10:33	1
Nitrobenzene	0.0010	U	0.0010	0.00049	mg/L		05/19/17 10:34	05/23/17 10:33	1
Hexachlorobutadiene	0.0020	U	0.0020	0.00076	mg/L		05/19/17 10:34	05/23/17 10:33	1
2,4,6-Trichlorophenol	0.010	U	0.010	0.00053	mg/L		05/19/17 10:34	05/23/17 10:33	1
2,4,5-Trichlorophenol	0.010	U	0.010	0.00049	mg/L		05/19/17 10:34	05/23/17 10:33	1
2,4-Dinitrotoluene	0.0020	U	0.0020	0.0010	mg/L		05/19/17 10:34	05/23/17 10:33	1
Hexachlorobenzene	0.0010	U	0.0010	0.00047	mg/L		05/19/17 10:34	05/23/17 10:33	1
Pentachlorophenol	0.030	U	0.030	0.0022	mg/L		05/19/17 10:34	05/23/17 10:33	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Nitrobenzene-d5	*96*		*51 - 108*	*05/19/17 10:34*	*05/23/17 10:33*	*1*
Phenol-d5	*26*		*14 - 39*	*05/19/17 10:34*	*05/23/17 10:33*	*1*
Terphenyl-d14	*89*		*40 - 148*	*05/19/17 10:34*	*05/23/17 10:33*	*1*
2,4,6-Tribromophenol	*113*		*26 - 139*	*05/19/17 10:34*	*05/23/17 10:33*	*1*
2-Fluorophenol	*42*		*25 - 58*	*05/19/17 10:34*	*05/23/17 10:33*	*1*
2-Fluorobiphenyl	*92*		*45 - 107*	*05/19/17 10:34*	*05/23/17 10:33*	*1*

Lab Sample ID: LCS 460-438125/2-A
Matrix: Solid
Analysis Batch: 438659

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 438125

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Phenol	0.0800	0.0266		mg/L		33	16 - 43
Pyridine	0.160	0.0787		mg/L		49	16 - 70
1,4-Dichlorobenzene	0.0800	0.0730		mg/L		91	42 - 94
2-Methylphenol	0.0800	0.0470		mg/L		59	43 - 80
Hexachloroethane	0.0800	0.0760	*	mg/L		95	39 - 92
4-Methylphenol	0.0800	0.0430		mg/L		54	34 - 78
Nitrobenzene	0.0800	0.0707		mg/L		88	56 - 106

Method: 8270C - TCLP Semivolatiles (Continued)

Lab Sample ID: LCS 460-438125/2-A
Matrix: Solid
Analysis Batch: 438659

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 438125

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Hexachlorobutadiene	0.0800	0.0770		mg/L		96	34 - 99
2,4,6-Trichlorophenol	0.0800	0.0770		mg/L		96	62 - 120
2,4,5-Trichlorophenol	0.0800	0.0753		mg/L		94	59 - 117
2,4-Dinitrotoluene	0.0800	0.0985		mg/L		123	70 - 123
Hexachlorobenzene	0.0800	0.0817		mg/L		102	63 - 125
Pentachlorophenol	0.160	0.150		mg/L		94	54 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Nitrobenzene-d5	*92*		*51 - 108*
Phenol-d5	*25*		*14 - 39*
Terphenyl-d14	*94*		*40 - 148*
2,4,6-Tribromophenol	*118*		*26 - 139*
2-Fluorophenol	*43*		*25 - 58*
2-Fluorobiphenyl	*97*		*45 - 107*

Lab Sample ID: LCSD 460-438125/3-A
Matrix: Solid
Analysis Batch: 438659

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 438125

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Phenol	0.0800	0.0290		mg/L		36	16 - 43	9	30
Pyridine	0.160	0.0814		mg/L		51	16 - 70	3	30
1,4-Dichlorobenzene	0.0800	0.0722		mg/L		90	42 - 94	1	30
2-Methylphenol	0.0800	0.0498		mg/L		62	43 - 80	6	30
Hexachloroethane	0.0800	0.0778	*	mg/L		97	39 - 92	2	30
4-Methylphenol	0.0800	0.0485		mg/L		61	34 - 78	12	30
Nitrobenzene	0.0800	0.0630		mg/L		79	56 - 106	12	30
Hexachlorobutadiene	0.0800	0.0718		mg/L		90	34 - 99	7	30
2,4,6-Trichlorophenol	0.0800	0.0713		mg/L		89	62 - 120	8	30
2,4,5-Trichlorophenol	0.0800	0.0730		mg/L		91	59 - 117	3	30
2,4-Dinitrotoluene	0.0800	0.0899		mg/L		112	70 - 123	9	30
Hexachlorobenzene	0.0800	0.0809		mg/L		101	63 - 125	1	30
Pentachlorophenol	0.160	0.151		mg/L		94	54 - 120	1	30

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Nitrobenzene-d5	*84*		*51 - 108*
Phenol-d5	*29*		*14 - 39*
Terphenyl-d14	*105*		*40 - 148*
2,4,6-Tribromophenol	*111*		*26 - 139*
2-Fluorophenol	*46*		*25 - 58*
2-Fluorobiphenyl	*89*		*45 - 107*

Lab Sample ID: LB 460-437940/1-B
Matrix: Solid
Analysis Batch: 438659

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 438125

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
3 & 4 Methylphenol	0.010	U	0.010	0.00088	mg/L		05/19/17 10:34	05/23/17 11:39	1

Method: 8270C - TCLP Semivolatiles (Continued)

Lab Sample ID: LB 460-437940/1-B
Matrix: Solid
Analysis Batch: 438659

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 438125

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phenol	0.010	U	0.010	0.00041	mg/L		05/19/17 10:34	05/23/17 11:39	1
Pyridine	0.010	U	0.010	0.00094	mg/L		05/19/17 10:34	05/23/17 11:39	1
1,4-Dichlorobenzene	0.010	U	0.010	0.00066	mg/L		05/19/17 10:34	05/23/17 11:39	1
2-Methylphenol	0.010	U	0.010	0.0013	mg/L		05/19/17 10:34	05/23/17 11:39	1
Hexachloroethane	0.0010	U	0.0010	0.000090	mg/L		05/19/17 10:34	05/23/17 11:39	1
4-Methylphenol	0.010	U	0.010	0.00087	mg/L		05/19/17 10:34	05/23/17 11:39	1
Nitrobenzene	0.0010	U	0.0010	0.00049	mg/L		05/19/17 10:34	05/23/17 11:39	1
Hexachlorobutadiene	0.0020	U	0.0020	0.00076	mg/L		05/19/17 10:34	05/23/17 11:39	1
2,4,6-Trichlorophenol	0.010	U	0.010	0.00053	mg/L		05/19/17 10:34	05/23/17 11:39	1
2,4,5-Trichlorophenol	0.010	U	0.010	0.00049	mg/L		05/19/17 10:34	05/23/17 11:39	1
2,4-Dinitrotoluene	0.0020	U	0.0020	0.0010	mg/L		05/19/17 10:34	05/23/17 11:39	1
Hexachlorobenzene	0.0010	U	0.0010	0.00047	mg/L		05/19/17 10:34	05/23/17 11:39	1
Pentachlorophenol	0.030	U	0.030	0.0022	mg/L		05/19/17 10:34	05/23/17 11:39	1

Surrogate	*LB %Recovery*	*LB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5	*101*		*51 - 108*	*05/19/17 10:34*	*05/23/17 11:39*	*1*
Phenol-d5	*29*		*14 - 39*	*05/19/17 10:34*	*05/23/17 11:39*	*1*
Terphenyl-d14	*98*		*40 - 148*	*05/19/17 10:34*	*05/23/17 11:39*	*1*
2,4,6-Tribromophenol	*109*		*26 - 139*	*05/19/17 10:34*	*05/23/17 11:39*	*1*
2-Fluorophenol	*48*		*25 - 58*	*05/19/17 10:34*	*05/23/17 11:39*	*1*
2-Fluorobiphenyl	*98*		*45 - 107*	*05/19/17 10:34*	*05/23/17 11:39*	*1*

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 460-439827/3
Matrix: Water
Analysis Batch: 439827

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	0.12	U	0.12	0.031	mg/L			05/27/17 13:01	1
Sulfate	0.60	U	0.60	0.13	mg/L			05/27/17 13:01	1

Lab Sample ID: LCS 460-439827/5
Matrix: Water
Analysis Batch: 439827

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	1.50	1.48		mg/L		98	90 - 110
Sulfate	7.50	6.92		mg/L		92	90 - 110

Lab Sample ID: LCSD 460-439827/6
Matrix: Water
Analysis Batch: 439827

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	1.50	1.40		mg/L		94	90 - 110	5	15
Sulfate	7.50	6.77		mg/L		90	90 - 110	2	15

Method: 9056A - Anions, Ion Chromatography - DL

Lab Sample ID: 460-133539-1 MS
Matrix: Water
Analysis Batch: 439827

Client Sample ID: 0171-051617-1330
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride - DL	27	F1	15.0	45.6	F1	mg/L		122	90 - 110
Sulfate - DL	56	F1	75.0	141	F1	mg/L		113	90 - 110

Lab Sample ID: 460-133539-1 MSD
Matrix: Water
Analysis Batch: 439827

Client Sample ID: 0171-051617-1330
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride - DL	27	F1	15.0	45.8	F1	mg/L		123	90 - 110	0	15
Sulfate - DL	56	F1	75.0	145	F1	mg/L		118	90 - 110	2	15

Lab Sample ID: 460-133539-1 DU
Matrix: Water
Analysis Batch: 439827

Client Sample ID: 0171-051617-1330
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Chloride - DL	27	F1	26.3		mg/L		4	15
Sulfate - DL	56	F1	55.7		mg/L		1	15

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 460-440312/1-A
Matrix: Water
Analysis Batch: 440371

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 440312

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	5000	U	5000	350	ug/L		05/31/17 08:26	05/31/17 13:32	1
Barium	200	U	200	8.6	ug/L		05/31/17 08:26	05/31/17 13:32	1
Iron	150	U	150	92	ug/L		05/31/17 08:26	05/31/17 13:32	1
Chromium	10	U	10	3.3	ug/L		05/31/17 08:26	05/31/17 13:32	1
Magnesium	5000	U	5000	310	ug/L		05/31/17 08:26	05/31/17 13:32	1
Manganese	15	U	15	3.1	ug/L		05/31/17 08:26	05/31/17 13:32	1
Nickel	40	U	40	9.0	ug/L		05/31/17 08:26	05/31/17 13:32	1
Potassium	5000	U	5000	170	ug/L		05/31/17 08:26	05/31/17 13:32	1
Sodium	5000	U	5000	410	ug/L		05/31/17 08:26	05/31/17 13:32	1

Lab Sample ID: LCS 460-440312/2-A
Matrix: Water
Analysis Batch: 440371

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 440312

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Calcium	20000	20000		ug/L		100	80 - 120
Barium	2000	2080		ug/L		104	80 - 120
Iron	1000	1020		ug/L		102	80 - 120
Chromium	200	206		ug/L		103	80 - 120
Magnesium	20000	19900		ug/L		100	80 - 120
Manganese	500	522		ug/L		104	80 - 120
Nickel	500	529		ug/L		106	80 - 120
Potassium	20000	18900		ug/L		95	80 - 120

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: LCS 460-440312/2-A
Matrix: Water
Analysis Batch: 440371

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 440312

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sodium	20000	19400		ug/L		97	80 - 120

Method: 6010C - TCLP Metals (ICP)

Lab Sample ID: MB 460-438275/1-A
Matrix: Solid
Analysis Batch: 438310

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 438275

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	10	U	10	1.8	ug/L		05/19/17 22:40	05/20/17 20:07	1
Arsenic	15	U	15	4.4	ug/L		05/19/17 22:40	05/20/17 20:07	1
Barium	200	U	200	8.6	ug/L		05/19/17 22:40	05/20/17 20:07	1
Cadmium	4.0	U	4.0	1.8	ug/L		05/19/17 22:40	05/20/17 20:07	1
Lead	10	U	10	4.1	ug/L		05/19/17 22:40	05/20/17 20:07	1
Selenium	20	U	20	4.4	ug/L		05/19/17 22:40	05/20/17 20:07	1

Lab Sample ID: MB 460-438275/1-A
Matrix: Solid
Analysis Batch: 438449

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 438275

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	10	U	10	3.3	ug/L		05/19/17 22:40	05/21/17 14:48	1

Lab Sample ID: LCS 460-438275/2-A ^2
Matrix: Solid
Analysis Batch: 438310

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 438275

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Silver	500	434		ug/L		87	80 - 120
Arsenic	5000	4710		ug/L		94	80 - 120
Barium	10000	10000		ug/L		100	80 - 120
Cadmium	1000	1030		ug/L		103	80 - 120
Lead	5000	5310		ug/L		106	80 - 120
Selenium	1000	922		ug/L		92	80 - 120

Lab Sample ID: LCS 460-438275/2-A ^2
Matrix: Solid
Analysis Batch: 438449

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 438275

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chromium	5000	5940		ug/L		119	80 - 120

Lab Sample ID: LB 460-437940/1-E ^5
Matrix: Solid
Analysis Batch: 438310

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 438275

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	50	U	50	9.0	ug/L		05/19/17 22:40	05/20/17 21:28	5
Arsenic	75	U	75	22	ug/L		05/19/17 22:40	05/20/17 21:28	5

Method: 6010C - TCLP Metals (ICP) (Continued)

Lab Sample ID: LB 460-437940/1-E ^5
Matrix: Solid
Analysis Batch: 438310

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 438275

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Barium	1000	U	1000	43	ug/L		05/19/17 22:40	05/20/17 21:28	5
Cadmium	20	U	20	9.2	ug/L		05/19/17 22:40	05/20/17 21:28	5
Lead	50	U	50	20	ug/L		05/19/17 22:40	05/20/17 21:28	5
Selenium	100	U	100	22	ug/L		05/19/17 22:40	05/20/17 21:28	5

Lab Sample ID: LB 460-437940/1-E ^5
Matrix: Solid
Analysis Batch: 438449

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 438275

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	50	U	50	17	ug/L		05/19/17 22:40	05/21/17 15:52	5

Lab Sample ID: LB 460-438149/1-B ^5
Matrix: Solid
Analysis Batch: 438310

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 438275

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	50	U	50	9.0	ug/L		05/19/17 22:40	05/20/17 21:32	5
Arsenic	75	U	75	22	ug/L		05/19/17 22:40	05/20/17 21:32	5
Barium	1000	U	1000	43	ug/L		05/19/17 22:40	05/20/17 21:32	5
Cadmium	20	U	20	9.2	ug/L		05/19/17 22:40	05/20/17 21:32	5
Lead	27.3	J	50	20	ug/L		05/19/17 22:40	05/20/17 21:32	5
Selenium	100	U	100	22	ug/L		05/19/17 22:40	05/20/17 21:32	5

Lab Sample ID: LB 460-438149/1-B ^5
Matrix: Solid
Analysis Batch: 438449

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 438275

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	50	U	50	17	ug/L		05/19/17 22:40	05/21/17 15:56	5

Method: 7470A - TCLP Mercury

Lab Sample ID: MB 460-438549/1-A
Matrix: Solid
Analysis Batch: 438632

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 438549

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.20	U	0.20	0.17	ug/L		05/22/17 10:59	05/22/17 13:56	1

Lab Sample ID: LCS 460-438549/2-A
Matrix: Solid
Analysis Batch: 438632

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 438549

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	5.00	4.76		ug/L		95	80 - 120

Method: 7470A - TCLP Mercury (Continued)

Lab Sample ID: MB 460-438789/1-A
Matrix: Solid
Analysis Batch: 438858

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 438789

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.20	U	0.20	0.17	ug/L		05/23/17 11:34	05/23/17 15:07	1

Lab Sample ID: LCS 460-438789/2-A
Matrix: Solid
Analysis Batch: 438858

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 438789

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	5.00	5.04		ug/L		101	80 - 120

Lab Sample ID: LB 460-437940/1-F
Matrix: Solid
Analysis Batch: 438632

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 438549

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.20	U	0.20	0.17	ug/L		05/22/17 10:59	05/22/17 14:50	1

Lab Sample ID: LB 460-438172/1-E
Matrix: Solid
Analysis Batch: 438632

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 438549

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.20	U	0.20	0.17	ug/L		05/22/17 10:59	05/22/17 14:52	1

Method: 9012B - Cyanide, Total andor Amenable

Lab Sample ID: MB 460-440062/1-A
Matrix: Solid
Analysis Batch: 440110

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 440062

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	0.10	U	0.10	0.027	mg/Kg		05/30/17 07:00	05/30/17 12:08	1

Lab Sample ID: HLCS 460-440062/3-A
Matrix: Solid
Analysis Batch: 440110

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 440062

Analyte	Spike Added	HLCS Result	HLCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cyanide, Total	2.00	1.98		mg/Kg		99	90 - 110

Lab Sample ID: LCSSRM 460-440062/4-A ^40
Matrix: Solid
Analysis Batch: 440110

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 440062

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Cyanide, Total	159	92.4		mg/Kg		58.1	41.1 - 142.8

Method: 9012B - Cyanide, Total andor Amenable (Continued)

Lab Sample ID: LLCS 460-440062/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 440110 — **Prep Batch: 440062**

Analyte	Spike Added	LLCS Result	LLCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cyanide, Total	1.00	1.05		mg/Kg		105	90 - 110

Lab Sample ID: 460-133539-2 MS — **Client Sample ID: 0171-051617-1400**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 440110 — **Prep Batch: 440062**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Cyanide, Total	0.10	U F2 F1	2.00	0.268	F1	mg/Kg		13	47 - 118

Lab Sample ID: 460-133539-2 MSD — **Client Sample ID: 0171-051617-1400**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 440110 — **Prep Batch: 440062**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cyanide, Total	0.10	U F2 F1	2.00	0.0373	J F1 F2	mg/Kg		2	47 - 118	151	35

Lab Sample ID: MB 460-440072/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 440110 — **Prep Batch: 440072**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	0.010	U	0.010	0.0020	mg/L		05/30/17 07:00	05/30/17 12:26	1

Lab Sample ID: HLCS 460-440072/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 440110 — **Prep Batch: 440072**

Analyte	Spike Added	HLCS Result	HLCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cyanide, Total	0.200	0.207		mg/L		104	90 - 110

Lab Sample ID: LLCS 460-440072/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 440110 — **Prep Batch: 440072**

Analyte	Spike Added	LLCS Result	LLCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cyanide, Total	0.100	0.103		mg/L		103	90 - 110

Lab Sample ID: 460-133539-1 MS — **Client Sample ID: 0171-051617-1330**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 440110 — **Prep Batch: 440072**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Cyanide, Total	0.024		0.200	0.242		mg/L		109	90 - 110

Lab Sample ID: 460-133539-1 MSD — **Client Sample ID: 0171-051617-1330**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 440110 — **Prep Batch: 440072**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cyanide, Total	0.024		0.200	0.233		mg/L		105	90 - 110	4	10

Method: 9034 - Sulfide, Acid Soluble and Insoluble (Titrimetric)

Lab Sample ID: MB 460-438815/1-A
Matrix: Solid
Analysis Batch: 438817

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 438815

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfide	8.7	U	8.7	3.4	mg/Kg		05/21/17 11:00	05/21/17 16:00	1

Lab Sample ID: LCS 460-438815/3-A
Matrix: Solid
Analysis Batch: 438817

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 438815

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfide	75.2	55.6		mg/Kg		74	70 - 130

Lab Sample ID: 460-133539-2 MS
Matrix: Solid
Analysis Batch: 438817

Client Sample ID: 0171-051617-1400
Prep Type: Total/NA
Prep Batch: 438815

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfide	8.7	U F1	55.6	35.4	F1	mg/Kg		64	70 - 130

Lab Sample ID: 460-133539-2 MSD
Matrix: Solid
Analysis Batch: 438817

Client Sample ID: 0171-051617-1400
Prep Type: Total/NA
Prep Batch: 438815

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Sulfide	8.7	U F1	55.6	32.4	F1	mg/Kg		58	70 - 130	9	15

Method: 9045D - Corrosivity as pH

Lab Sample ID: MB 460-440139/2
Matrix: Solid
Analysis Batch: 440139

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	5.9				SU			05/30/17 13:47	1
Corrosivity	5.9				SU			05/30/17 13:47	1

Lab Sample ID: LCSSRM 460-440139/3
Matrix: Solid
Analysis Batch: 440139

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.50	7.5		SU		99.7	97.3 - 102.7
Corrosivity	7.50	7.5		SU		99.7	97.3 - 102.7

Method: D854 - Specific Gravity

Lab Sample ID: LCS 140-11445/3
Matrix: Solid
Analysis Batch: 11445

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Density			0.997	0.9971		g/cm3		100	99 - 101		

Lab Sample ID: 460-133539-2 DU
Matrix: Solid
Analysis Batch: 11445

Client Sample ID: 0171-051617-1400
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Density	2.36			2.397		g/cm3				1	10

Lab Sample ID: LCS 140-11481/3
Matrix: Solid
Analysis Batch: 11481

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Specific Gravity			1.00	1.000		NONE		100	99 - 101		

Lab Sample ID: 460-133539-2 DU
Matrix: Solid
Analysis Batch: 11481

Client Sample ID: 0171-051617-1400
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Specific Gravity	2.37			2.404		NONE				1	10

GC/MS VOA

Leach Batch: 437906

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
460-133539-2	0171-051617-1400	TCLP	Solid	1311	
LB 460-437906/1-A	Method Blank	TCLP	Solid	1311	

Analysis Batch: 439167

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
460-133539-2	0171-051617-1400	TCLP	Solid	8260B	437906
MB 460-439167/6	Method Blank	Total/NA	Solid	8260B	
LCS 460-439167/3	Lab Control Sample	Total/NA	Solid	8260B	
LCSD 460-439167/4	Lab Control Sample Dup	Total/NA	Solid	8260B	

Analysis Batch: 439597

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LB 460-437906/1-A	Method Blank	TCLP	Solid	8260B	437906
MB 460-439597/8	Method Blank	Total/NA	Solid	8260B	
LCS 460-439597/4	Lab Control Sample	Total/NA	Solid	8260B	
LCSD 460-439597/5	Lab Control Sample Dup	Total/NA	Solid	8260B	

GC/MS Semi VOA

Leach Batch: 437940

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
460-133539-2	0171-051617-1400	TCLP	Solid	1311	
LB 460-437940/1-B	Method Blank	TCLP	Solid	1311	

Prep Batch: 438125

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
460-133539-2	0171-051617-1400	TCLP	Solid	3510C	437940
LB 460-437940/1-B	Method Blank	TCLP	Solid	3510C	437940
MB 460-438125/1-A	Method Blank	Total/NA	Solid	3510C	
LCS 460-438125/2-A	Lab Control Sample	Total/NA	Solid	3510C	
LCSD 460-438125/3-A	Lab Control Sample Dup	Total/NA	Solid	3510C	

Analysis Batch: 438659

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LB 460-437940/1-B	Method Blank	TCLP	Solid	8270C	438125
MB 460-438125/1-A	Method Blank	Total/NA	Solid	8270C	438125
LCS 460-438125/2-A	Lab Control Sample	Total/NA	Solid	8270C	438125
LCSD 460-438125/3-A	Lab Control Sample Dup	Total/NA	Solid	8270C	438125

Analysis Batch: 439465

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
460-133539-2	0171-051617-1400	TCLP	Solid	8270C	438125

HPLC/IC

Analysis Batch: 439827

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
460-133539-1 - DL	0171-051617-1330	Total/NA	Water	9056A	
MB 460-439827/3	Method Blank	Total/NA	Water	9056A	
LCS 460-439827/5	Lab Control Sample	Total/NA	Water	9056A	

HPLC/IC (Continued)

Analysis Batch: 439827 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCSD 460-439827/6	Lab Control Sample Dup	Total/NA	Water	9056A	
460-133539-1 MS - DL	0171-051617-1330	Total/NA	Water	9056A	
460-133539-1 MSD - DL	0171-051617-1330	Total/NA	Water	9056A	
460-133539-1 DU - DL	0171-051617-1330	Total/NA	Water	9056A	

Metals

Leach Batch: 437940

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
460-133539-2	0171-051617-1400	TCLP	Solid	1311	
LB 460-437940/1-E ^5	Method Blank	TCLP	Solid	1311	
LB 460-437940/1-F	Method Blank	TCLP	Solid	1311	

Leach Batch: 438149

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LB 460-438149/1-B ^5	Method Blank	TCLP	Solid	1311	

Leach Batch: 438172

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LB 460-438172/1-E	Method Blank	TCLP	Solid	1311	

Prep Batch: 438275

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
460-133539-2	0171-051617-1400	TCLP	Solid	3010A	437940
LB 460-437940/1-E ^5	Method Blank	TCLP	Solid	3010A	437940
LB 460-438149/1-B ^5	Method Blank	TCLP	Solid	3010A	438149
MB 460-438275/1-A	Method Blank	Total/NA	Solid	3010A	
LCS 460-438275/2-A ^2	Lab Control Sample	Total/NA	Solid	3010A	

Analysis Batch: 438310

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
460-133539-2	0171-051617-1400	TCLP	Solid	6010C	438275
LB 460-437940/1-E ^5	Method Blank	TCLP	Solid	6010C	438275
LB 460-438149/1-B ^5	Method Blank	TCLP	Solid	6010C	438275
MB 460-438275/1-A	Method Blank	Total/NA	Solid	6010C	438275
LCS 460-438275/2-A ^2	Lab Control Sample	Total/NA	Solid	6010C	438275

Analysis Batch: 438449

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LB 460-437940/1-E ^5	Method Blank	TCLP	Solid	6010C	438275
LB 460-438149/1-B ^5	Method Blank	TCLP	Solid	6010C	438275
MB 460-438275/1-A	Method Blank	Total/NA	Solid	6010C	438275
LCS 460-438275/2-A ^2	Lab Control Sample	Total/NA	Solid	6010C	438275

Prep Batch: 438549

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LB 460-437940/1-F	Method Blank	TCLP	Solid	7470A	437940
LB 460-438172/1-E	Method Blank	TCLP	Solid	7470A	438172
MB 460-438549/1-A	Method Blank	Total/NA	Solid	7470A	
LCS 460-438549/2-A	Lab Control Sample	Total/NA	Solid	7470A	

Metals (Continued)

Analysis Batch: 438632

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LB 460-437940/1-F	Method Blank	TCLP	Solid	7470A	438549
LB 460-438172/1-E	Method Blank	TCLP	Solid	7470A	438549
MB 460-438549/1-A	Method Blank	Total/NA	Solid	7470A	438549
LCS 460-438549/2-A	Lab Control Sample	Total/NA	Solid	7470A	438549

Prep Batch: 438789

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
460-133539-2	0171-051617-1400	TCLP	Solid	7470A	437940
MB 460-438789/1-A	Method Blank	Total/NA	Solid	7470A	
LCS 460-438789/2-A	Lab Control Sample	Total/NA	Solid	7470A	

Analysis Batch: 438790

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
460-133539-2	0171-051617-1400	TCLP	Solid	6010C	438275

Analysis Batch: 438858

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
460-133539-2	0171-051617-1400	TCLP	Solid	7470A	438789
MB 460-438789/1-A	Method Blank	Total/NA	Solid	7470A	438789
LCS 460-438789/2-A	Lab Control Sample	Total/NA	Solid	7470A	438789

Prep Batch: 440312

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
460-133539-1	0171-051617-1330	Total/NA	Water	3010A	
MB 460-440312/1-A	Method Blank	Total/NA	Water	3010A	
LCS 460-440312/2-A	Lab Control Sample	Total/NA	Water	3010A	

Analysis Batch: 440371

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
460-133539-1	0171-051617-1330	Total/NA	Water	6010C	440312
MB 460-440312/1-A	Method Blank	Total/NA	Water	6010C	440312
LCS 460-440312/2-A	Lab Control Sample	Total/NA	Water	6010C	440312

General Chemistry

Prep Batch: 438815

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
460-133539-2	0171-051617-1400	Total/NA	Solid	9030B	
MB 460-438815/1-A	Method Blank	Total/NA	Solid	9030B	
LCS 460-438815/3-A	Lab Control Sample	Total/NA	Solid	9030B	
460-133539-2 MS	0171-051617-1400	Total/NA	Solid	9030B	
460-133539-2 MSD	0171-051617-1400	Total/NA	Solid	9030B	

Analysis Batch: 438817

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
460-133539-2	0171-051617-1400	Total/NA	Solid	9034	438815
MB 460-438815/1-A	Method Blank	Total/NA	Solid	9034	438815
LCS 460-438815/3-A	Lab Control Sample	Total/NA	Solid	9034	438815
460-133539-2 MS	0171-051617-1400	Total/NA	Solid	9034	438815
460-133539-2 MSD	0171-051617-1400	Total/NA	Solid	9034	438815

General Chemistry (Continued)

Prep Batch: 440062

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
460-133539-2	0171-051617-1400	Total/NA	Solid	9012B	
MB 460-440062/1-A	Method Blank	Total/NA	Solid	9012B	
HLCS 460-440062/3-A	Lab Control Sample	Total/NA	Solid	9012B	
LCSSRM 460-440062/4-A ^4	Lab Control Sample	Total/NA	Solid	9012B	
LLCS 460-440062/2-A	Lab Control Sample	Total/NA	Solid	9012B	
460-133539-2 MS	0171-051617-1400	Total/NA	Solid	9012B	
460-133539-2 MSD	0171-051617-1400	Total/NA	Solid	9012B	

Prep Batch: 440072

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
460-133539-1	0171-051617-1330	Total/NA	Water	9012B	
MB 460-440072/1-A	Method Blank	Total/NA	Water	9012B	
HLCS 460-440072/3-A	Lab Control Sample	Total/NA	Water	9012B	
LLCS 460-440072/2-A	Lab Control Sample	Total/NA	Water	9012B	
460-133539-1 MS	0171-051617-1330	Total/NA	Water	9012B	
460-133539-1 MSD	0171-051617-1330	Total/NA	Water	9012B	

Analysis Batch: 440110

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
460-133539-1	0171-051617-1330	Total/NA	Water	9012B	440072
460-133539-2	0171-051617-1400	Total/NA	Solid	9012B	440062
MB 460-440062/1-A	Method Blank	Total/NA	Solid	9012B	440062
MB 460-440072/1-A	Method Blank	Total/NA	Water	9012B	440072
HLCS 460-440062/3-A	Lab Control Sample	Total/NA	Solid	9012B	440062
HLCS 460-440072/3-A	Lab Control Sample	Total/NA	Water	9012B	440072
LCSSRM 460-440062/4-A ^4	Lab Control Sample	Total/NA	Solid	9012B	440062
LLCS 460-440062/2-A	Lab Control Sample	Total/NA	Solid	9012B	440062
LLCS 460-440072/2-A	Lab Control Sample	Total/NA	Water	9012B	440072
460-133539-1 MS	0171-051617-1330	Total/NA	Water	9012B	440072
460-133539-1 MSD	0171-051617-1330	Total/NA	Water	9012B	440072
460-133539-2 MS	0171-051617-1400	Total/NA	Solid	9012B	440062
460-133539-2 MSD	0171-051617-1400	Total/NA	Solid	9012B	440062

Analysis Batch: 440132

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
460-133539-2	0171-051617-1400	Total/NA	Solid	1030	

Analysis Batch: 440139

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
460-133539-2	0171-051617-1400	Total/NA	Solid	9045D	
MB 460-440139/2	Method Blank	Total/NA	Solid	9045D	
LCSSRM 460-440139/3	Lab Control Sample	Total/NA	Solid	9045D	

Geotechnical

Analysis Batch: 11445

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
460-133539-2	0171-051617-1400	Total/NA	Solid	D854	
LCS 140-11445/3	Lab Control Sample	Total/NA	Solid	D854	
460-133539-2 DU	0171-051617-1400	Total/NA	Solid	D854	

Geotechnical (Continued)

Analysis Batch: 11481

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
460-133539-2	0171-051617-1400	Total/NA	Solid	D854	
LCS 140-11481/3	Lab Control Sample	Total/NA	Solid	D854	
460-133539-2 DU	0171-051617-1400	Total/NA	Solid	D854	

Lab Chronicle

Client: Haley & Aldrich, Inc.
Project/Site: Racer - Elyria, Ohio

TestAmerica Job ID: 460-133539-1

Client Sample ID: 0171-051617-1330

Lab Sample ID: 460-133539-1

Date Collected: 05/16/17 13:30

Matrix: Water

Date Received: 05/17/17 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A	DL	10	439827	05/28/17 00:23	HXM	TAL EDI
Total/NA	Prep	3010A			440312	05/31/17 08:26	QZY	TAL EDI
Total/NA	Analysis	6010C		1	440371	05/31/17 14:00	CDC	TAL EDI
Total/NA	Prep	9012B			440072	05/30/17 07:00	IAA	TAL EDI
Total/NA	Analysis	9012B		1	440110	05/30/17 12:32	HTV	TAL EDI

Client Sample ID: 0171-051617-1400

Lab Sample ID: 460-133539-2

Date Collected: 05/16/17 14:00

Matrix: Solid

Date Received: 05/17/17 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
TCLP	Leach	1311			437906	05/18/17 13:27	JNP	TAL EDI
TCLP	Analysis	8260B		10	439167	05/25/17 07:31	EMM	TAL EDI
TCLP	Leach	1311			437940	05/18/17 17:10	YXG	TAL EDI
TCLP	Prep	3510C			438125	05/19/17 10:34	GRB	TAL EDI
TCLP	Analysis	8270C		1	439465	05/26/17 13:28	CBB	TAL EDI
TCLP	Leach	1311			437940	05/18/17 17:10	YXG	TAL EDI
TCLP	Prep	3010A			438275	05/19/17 22:40	GAE	TAL EDI
TCLP	Analysis	6010C		5	438310	05/20/17 21:15	CDC	TAL EDI
TCLP	Leach	1311			437940	05/18/17 17:10	YXG	TAL EDI
TCLP	Prep	3010A			438275	05/19/17 22:40	GAE	TAL EDI
TCLP	Analysis	6010C		5	438790	05/23/17 11:06	CDC	TAL EDI
TCLP	Leach	1311			437940	05/18/17 17:10	YXG	TAL EDI
TCLP	Prep	7470A			438789	05/23/17 11:34	RBS	TAL EDI
TCLP	Analysis	7470A		1	438858	05/23/17 15:57	RBS	TAL EDI
Total/NA	Analysis	1030		1	440132	05/30/17 15:46	YAH	TAL EDI
Total/NA	Prep	9012B			440062	05/30/17 07:00	IAA	TAL EDI
Total/NA	Analysis	9012B		1	440110	05/30/17 12:12	HTV	TAL EDI
Total/NA	Prep	9030B			438815	05/21/17 11:00	HTV	TAL EDI
Total/NA	Analysis	9034		1	438817	05/21/17 16:00	HTV	TAL EDI
Total/NA	Analysis	9045D		1	440139	05/30/17 13:51	YAH	TAL EDI
Total/NA	Analysis	D854		1	11445	05/20/17 00:00	MDR	TAL KNX
Total/NA	Analysis	D854		1	11481	05/20/17 00:00	MDR	TAL KNX

Laboratory References:

TAL EDI = TestAmerica Edison, 777 New Durham Road, Edison, NJ 08817, TEL (732)549-3900

TAL KNX = TestAmerica Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

Accreditation/Certification Summary

Client: Haley & Aldrich, Inc.
Project/Site: Racer - Elyria, Ohio

TestAmerica Job ID: 460-133539-1

Laboratory: TestAmerica Edison

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Connecticut	State Program	1	PH-0200	09-30-18
DE Haz. Subst. Cleanup Act (HSCA)	State Program	3	N/A	12-31-17
New Jersey	NELAP	2	12028	06-30-17
New York	NELAP	2	11452	04-01-18
Pennsylvania	NELAP	3	68-00522	02-28-18
Rhode Island	State Program	1	LAO00132	12-30-17
USDA	Federal		NJCA-003-08	04-04-17 *

Laboratory: TestAmerica Knoxville

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
	AFCEE		N/A	
Arkansas DEQ	State Program	6	88-0688	06-16-17
California	State Program	9	2423	06-30-18
Colorado	State Program	8	TN00009	02-28-18
Connecticut	State Program	1	PH-0223	09-30-17
Florida	NELAP	4	E87177	06-30-17
Georgia	State Program	4	906	04-13-20
Hawaii	State Program	9	N/A	04-13-18
Kansas	NELAP	7	E-10349	10-31-17
Kentucky (DW)	State Program	4	90101	12-31-17
L-A-B	DoD ELAP		L2311	02-13-19
Louisiana	NELAP	6	83979	06-30-17
Louisiana (DW)	NELAP	6	LA160005	12-31-17
Maryland	State Program	3	277	03-31-18
Michigan	State Program	5	9933	04-13-17 *
Nevada	State Program	9	TN00009	07-31-17
New Jersey	NELAP	2	TN001	06-30-17
New York	NELAP	2	10781	03-31-18
North Carolina (DW)	State Program	4	21705	07-31-17
North Carolina (WW/SW)	State Program	4	64	12-31-17
Ohio VAP	State Program	5	CL0059	11-22-18
Oklahoma	State Program	6	9415	08-31-17
Pennsylvania	NELAP	3	68-00576	12-31-17
Tennessee	State Program	4	2014	04-13-20
Texas	NELAP	6	T104704380-16-9	08-31-17
USDA	Federal		P330-13-00262	08-20-19
Utah	NELAP	8	TN00009	07-31-17
Virginia	NELAP	3	460176	09-14-17
Washington	State Program	10	C593	01-19-18
West Virginia (DW)	State Program	3	9955C	12-31-17
West Virginia DEP	State Program	3	345	04-30-18
Wisconsin	State Program	5	998044300	08-31-17

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: Haley & Aldrich, Inc.
Project/Site: Racer - Elyria, Ohio

TestAmerica Job ID: 460-133539-1

Method	Method Description	Protocol	Laboratory
8260B	TCLP Volatiles	SW846	TAL EDI
8270C	TCLP Semivolatiles	SW846	TAL EDI
9056A	Anions, Ion Chromatography	SW846	TAL EDI
6010C	Metals (ICP)	SW846	TAL EDI
6010C	TCLP Metals (ICP)	SW846	TAL EDI
7470A	TCLP Mercury	SW846	TAL EDI
1030	Ignitability, Solids	SW846	TAL EDI
9012B	Cyanide, Total andor Amenable	SW846	TAL EDI
9034	Sulfide, Acid Soluble and Insoluble (Titrimetric)	SW846	TAL EDI
9045D	Corrosivity as pH	SW846	TAL EDI
D854	Specific Gravity	ASTM	TAL KNX

Protocol References:

ASTM = ASTM International

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL EDI = TestAmerica Edison, 777 New Durham Road, Edison, NJ 08817, TEL (732)549-3900

TAL KNX = TestAmerica Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

Sample Summary

Client: Haley & Aldrich, Inc.
Project/Site: Racer - Elyria, Ohio

TestAmerica Job ID: 460-133539-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
460-133539-1	0171-051617-1330	Water	05/16/17 13:30	05/17/17 09:30
460-133539-2	0171-051617-1400	Solid	05/16/17 14:00	05/17/17 09:30

TestAmerica Canton
4101 Shuffel Street, N. W.
North Canton, OH 44720
Phone: 330.497.9396 Fax: 330.497.0772

2,8/C2.5

Chain of Custody Record

162271

TestAmerica THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact		Project Manager: B. Aragona	Site Contact: T. Correll	Date: 5/16/17	COC No:
Company Name: Haley & Aldrich		Tel/Fax: 734-887-8410	Lab Contact: D. Pohl	Carrier: Fed Ex	1 of 1 COCs
Address: 6500 Rockside Rd Suite 220		Analysis Turnaround Time			Sampler:
City/State/Zip: Independence, OH 44131		☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 216-706-1300		TAT if different from Below ____			Walk-in Client:
Fax:		☐ 2 weeks			Lab Sampling:
Project Name: RACER		☐ 1 week			
Site: Elyria		☐ 2 days			Job / SDG No.:
P O # 179862-002		☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	TCLP VOCs	TCLP SVOCs	TCLP metals	Corrosivity	Reactivity	Cn, Sulfide	Spec. Grav., FP	total metals	Sample Specific Notes:
0171-0516171330	5/16/17	1330	G	AG		N	N								X	Final Rinseate
0171-051617-1400	↓	1400	G	SO		N	N	X	X	X	X	X	X	X	~~X~~	Solids Tanks

5/16/17

460-133539 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☐ Disposal by Lab ☐ Archive for ____ Months

Special Instructions/QC Requirements & Comments: Sample 0171-051617-1400 (No Total metals) 1.5°C IR8 [initials] 5/18/17

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.: NO CS	Cooler Temp. (°C): Obs'd: ____ Corr'd: ____	Therm ID No.:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
[signature]	H+A Fed Ex	5/16/17 2000	[signature]	TA	5-17-17 930
[signature]	TAC	5/17/17 1600	[signature] via FedEx	[initials]	5/18/17 0915
			Received in Laboratory by:		

TestAmerica Canton Sample Receipt Form/Narrative **Login # : 460-133539**
Canton Facility

Client H+A Site Name _____ Cooler unpacked by:

Cooler Received on 5.17.17 Opened on 5.17.17

FedEx: 1st Grd Exp UPS FAS Clipper Client Drop Off TestAmerica Courier Other _____

Receipt After-hours: Drop-off Date/Time _____ Storage Location _____

TestAmerica Cooler # _____ Foam Box Client Cooler Box Other _____

Packing material used: Bubble Wrap Foam Plastic Bag None Other _____

COOLANT: Wet Ice Blue Ice Dry Ice Water None

1. Cooler temperature upon receipt ☐ See Multiple Cooler Form
   IR GUN# IR-8 (CF **-0.3** °C) Observed Cooler Temp. 2.8 °C Corrected Cooler Temp. 2.5 °C
   IR GUN #36 (CF **+0.8**°C) Observed Cooler Temp. _____ °C Corrected Cooler Temp. _____ °C
2. Were custody seals on the outside of the cooler(s)? If Yes Quantity 2 Yes No
   -Were custody seals on the outside of the cooler(s) signed & dated? Yes No NA
   -Were custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Yes No
3. Shippers' packing slip attached to the cooler(s)? Yes No
4. Did custody papers accompany the sample(s)? Yes No
5. Were the custody papers relinquished & signed in the appropriate place? Yes No
6. Was/were the person(s) who collected the samples clearly identified on the COC? Yes No
7. Did all bottles arrive in good condition (Unbroken)? Yes No
8. Could all bottle labels be reconciled with the COC? Yes No
9. Were correct bottle(s) used for the test(s) indicated? Yes No
10. Sufficient quantity received to perform indicated analyses? Yes No
11. Are these work share samples? Yes No
    If yes, Questions 11-15 have been checked at the originating laboratory.
11. Were sample(s) at the correct pH upon receipt? Yes No NA pH Strip Lot# **HC697954**
12. Were VOAs on the COC? Yes No
13. Were air bubbles >6 mm in any VOA vials? ● ⬅ Larger than this. Yes No NA
14. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot #_____ Yes No
15. Was a LL Hg or Me Hg trip blank present? _____ Yes No

Contacted PM _____ Date _____ by _____ via Verbal Voice Mail Other

Concerning _____

16. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES Samples processed by:

17. SAMPLE CONDITION

Sample(s) _____ were received after the recommended holding time had expired.
Sample(s) _____ were received in a broken container.
Sample(s) _____ were received with bubble >6 mm in diameter. (Notify PM)

18. SAMPLE PRESERVATION

Sample(s) _____ were further preserved in the laboratory.
Time preserved: _____ Preservative(s) added/Lot number(s): _____

Ref: SOP NC-SC-0005, Sample Receiving
\\tacorp\corp\QA\QA_Facilities\Canton-QA\Document-Management\Work-Instruction\Word Version Work Instructions\WI-NC-099-042717 Cooler Receipt Form.doc djl

TestAmerica Edison
Receipt Temperature and pH Log

Job Number: 460-133539

Number of Coolers: 1 IR Gun # 8

Cooler Temperatures

	RAW	CORRECTED		RAW	CORRECTED		RAW	CORRECTED
Cooler #1:	1.5 °C	1.5 °C	Cooler #4:	°C	°C	Cooler #7:	°C	°C
Cooler #2:	°C	°C	Cooler #5:	°C	°C	Cooler #8:	°C	°C
Cooler #3:	°C	°C	Cooler #6:	°C	°C	Cooler #9:	°C	°C

TALS Sample Number	Ammonia (pH<2)	COD (pH<2)	Nitrate Nitrite (pH<2)	Metals* (pH<2)	Hardness (pH<2)	Pest (pH 5-9)	EPH or QAM (pH<2)	Phenols (pH<2)	Sulfide (pH>9)	TKN (pH<2)	TOC (pH<2)	Total Cyanide (pH>12)	Total Phos (pH<2)	Other	Other

If pH adjustments are required record the information below:

Sample No(s). adjusted: _____

Preservative Name/Conc.: _____ Volume of Preservative used (ml): _____

Lot # of Preservative(s): _____ Expiration Date: _____

The appropriate Project Manager and Department Manager should be notified about the samples which were pH adjusted.

** Samples for Metal analysis which are out of compliance must be acidified at least 24 hours prior to analysis.*

Initials: CA Date: 5/18/17

TestAmerica Canton
4101 Shuffel Street, N. H.
North Canton, OH 44720
Phone: 330.497.9396 Fax: 330.497.0772

2.8/C2.5

Chain of Custody Record

162271

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Manager: B. Aragona	Site Contact: T. Correll	Date: 5/16/17	COC No:
Company Name: Haley & Aldrich	Tel/Fax: 734-887-8490	Lab Contact: D. Pohl	Carrier: Fed Ex	1 of 1 COCs
Address: 6500 Rockside Rd Suite 220	Analysis Turnaround Time			Sampler:
City/State/Zip: Independence, OH 44131	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 216-706-1300	TAT if different from Below _____			Walk-in Client:
Fax:	☐ 2 weeks ☐ 1 week ☐ 2 days ☐ 1 day			Lab Sampling:
Project Name: RACER				Job / SDG No.:
Site: Elyria				
PO # 179862-002				

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	TCLP VOCs	TCLP SVOCs	TCLP metals	Corrosivity	Reactivity	Cn, Sulfide	Sep. Gravity	total Metals 6010	Sample Specific Notes:
0171-051617-1330	5/16/17	1330	G	AG		N	N								X	Final Rinseate
0171-051617-1400	↓	1400	G	SO		N	N	X	X	X	X	X	X	X	~~X~~	Solids, Tanks

460-133539 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☐ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments: Sample 0171-051617-1400 (No Total Metals)

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: _____ Corr'd: _____ | Therm ID No.: _____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
T. Correll	H&A Fed Ex	5/16/17 2000		TA	5.17.17 930
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

TestAmerica Canton Sample Receipt Form/Narrative **Login # : 440-133539**
Canton Facility

Client H+A Site Name _____ Cooler unpacked by:

Cooler Received on 5.17.17 Opened on 5.17.17

FedEx: 1st Grd Exp UPS FAS Clipper Client Drop Off TestAmerica Courier Other _____

Receipt After-hours: Drop-off Date/Time _____ Storage Location _____

TestAmerica Cooler # _____ Foam Box Client Cooler Box Other _____

Packing material used: Bubble Wrap Foam Plastic Bag None Other _____

COOLANT: Wet Ice Blue Ice Dry Ice Water None

1. Cooler temperature upon receipt ☐ See Multiple Cooler Form
   IR GUN# IR-8 (CF **-0.3** °C) Observed Cooler Temp. 2.9 °C Corrected Cooler Temp. 2.5 °C
   IR GUN #36 (CF **+0.8**°C) Observed Cooler Temp. _____ °C Corrected Cooler Temp. _____ °C
2. Were custody seals on the outside of the cooler(s)? If Yes Quantity 2 Yes No
   -Were custody seals on the outside of the cooler(s) signed & dated? Yes No NA
   -Were custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Yes No
3. Shippers' packing slip attached to the cooler(s)? Yes No
4. Did custody papers accompany the sample(s)? Yes No
5. Were the custody papers relinquished & signed in the appropriate place? Yes No
6. Was/were the person(s) who collected the samples clearly identified on the COC? Yes No
7. Did all bottles arrive in good condition (Unbroken)? Yes No
8. Could all bottle labels be reconciled with the COC? Yes No
9. Were correct bottle(s) used for the test(s) indicated? Yes No
10. Sufficient quantity received to perform indicated analyses? Yes No
11. Are these work share samples? Yes No
    If yes, Questions 11-15 have been checked at the originating laboratory.
11. Were sample(s) at the correct pH upon receipt? Yes No NA pH Strip Lot# **HC697954**
12. Were VOAs on the COC? Yes No
13. Were air bubbles >6 mm in any VOA vials? ● ⬅ Larger than this. Yes No NA
14. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot #_____ Yes No
15. Was a LL Hg or Me Hg trip blank present? _____ Yes No

Contacted PM _____ Date _____ by _____ via Verbal Voice Mail Other

Concerning _____

16. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES Samples processed by:

17. SAMPLE CONDITION

Sample(s) _____ were received after the recommended holding time had expired.
Sample(s) _____ were received in a broken container.
Sample(s) _____ were received with bubble >6 mm in diameter. (Notify PM)

18. SAMPLE PRESERVATION

Sample(s) _____ were further preserved in the laboratory.
Time preserved: _____ Preservative(s) added/Lot number(s): _____

Ref: SOP NC-SC-0005, Sample Receiving
\\tacorp\corp\QA\QA_Facilities\Canton-QA\Document-Management\Work-Instruction\Word Version Work Instructions\WI-NC-099-042717 Cooler Receipt Form.doc djl

TestAmerica Edison
777 New Durham Road
Edison, NJ 08817
Phone (732) 549-3900 Fax (732) 549-3679

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Pohl, Denise	Carrier Tracking No(s):	COC No: 460-48434.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: denise.pohl@testamericainc.com	State of Origin: Ohio	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note):		Job #: 460-133539-1
Address: 5815 Middlebrook Pike, ,	Due Date Requested: 5/30/2017			
City: Knoxville	TAT Requested (days):			
State, Zip: TN, 37921				
Phone: 865-291-3000(Tel) 865-584-4315(Fax)	PO #:			
Email:	WO #:			
Project Name: Racer - Elyria, Ohio	Project #: 46020356			
Site:	SSOW#:			

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA
M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)
Other:

Analysis Requested

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	D854/ Specific Gravity	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
0171-051617-1400 (460-133539-2)	5/16/17	14:00 Eastern		Solid			X	1	

NO CUSTODY SEALS
RECEIVED AT AT 0.1 / CT 0.1°C
AKD 5-18-17
1 COOLER FEDX# 725972864951

460-133539 Chain of Custody

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to TestAmerica Laboratories, Inc.

Possible Hazard Identification Unconfirmed	*Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)* ☐ Return To Client ☐ Disposal By Lab ☐ Archive For ____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
[signature]	5-17-17 1400	240	[signature]	5-18-17 09:20	TA KNOX
[signature]					

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Loc: 460
133539

TESTAMERICA KNOXVILLE SAMPLE RECEIPT/CONDITION UPON RECEIPT ANOMALY CHECKLIST

Log In Number:

Review Items	Yes	No	NA	If No, what was the problem?
1. Are the shipping containers intact?	/			☐ **Containers, Broken**
2. Were ambient air containers received intact?			/	☐ Checked in lab
3. The coolers/containers custody seal if present, is it intact?			/	☐ Yes ☐ NA
4. Is the cooler temperature within limits? (> freezing temp. of water to 6 °C, VOST: 10°C) Thermometer ID :_____ Correction factor: _____			/	☐ **Cooler Out of Temp, Client Contacted, Proceed/Cancel** ☐ **Cooler Out of Temp, Same Day Receipt**
5. Were all of the sample containers received intact?	/			☐ **Containers, Broken**
6. Were samples received in appropriate containers?	/			☐ **Containers, Improper; Client Contacted; Proceed/Cancel**
7. Do sample container labels match COC? (IDs, Dates, Times)	/			☐ **COC & Samples Do Not Match** ☐ **COC Incorrect/Incomplete** ☐ **COC Not Received**
8. Were all of the samples listed on the COC received?	/			☐ **Sample Received, Not on COC** ☐ **Sample on COC, Not Received**
9. Is the date/time of sample collection noted?	/			☐ **COC; No Date/Time; Client Contacted**
10. Was the sampler identified on the COC?			/	☐ **Sampler Not Listed on COC**
11. Is the client and project name/# identified?	/			☐ **COC Incorrect/Incomplete**
12. Are tests/parameters listed for each sample?	/			☐ **COC No tests on COC**
13. Is the matrix of the samples noted?	/			☐ **COC Incorrect/Incomplete**
14. Was COC relinquished? (Signed/Dated/Timed)	/			☐ **COC Incorrect/Incomplete**
15. Were samples received within holding time?	/			☐ **Holding Time - Receipt**
16. Were samples received with correct chemical preservative (excluding Encore)?			/	☐ **pH Adjusted, pH Included (See box 16A)** ☐ **Incorrect Preservative**
17. Were VOA samples received without headspace?			/	☐ **Headspace (VOA only)**
18. Did you check for residual chlorine, if necessary? (e.g. 1613B, 1668) Chlorine test strip lot number:_____			/	☐ **Residual Chlorine**
19. For 1613B water samples is pH<9?			/	☐ If no, lab will adjust
20. For rad samples was sample activity info. Provided?			/	☐ Project missing info

Comments/Actions Taken

Labeling Verified by: **Date:**

pH test strip lot number:

	Box 16A: pH Preservation	Box 18A: Residual Chlorine
Preservative:		
Lot Number:		
Exp Date:		
Analyst:		
Date:		
Time:		

Project #: _____ PM Instructions: _____

Sample Receiving Associate: _____ Date: 5/18/17

QA026R30.doc, 080916

APPENDIX C

Waste Manifests

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

CWMI

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: OHD004201091
2. Page 1 of: 1
3. Emergency Response Phone: (937) 620-8524
4. Manifest Tracking Number: 008689352 FLE

5. Generator's Name and Mailing Address:
RACER TRUST
1400 LOWELL ST
ELYRIA OH 44035

Generator's Site Address (if different than mailing address)

Generator's Phone: (419) 499-1339

6. Transporter 1 Company Name: VICKERY TRANSPORTATION, INC. — U.S. EPA ID Number: OHR000103762

7. Transporter 2 Company Name: — U.S. EPA ID Number:

8. Designated Facility Name and Site Address:
VICKERY ENVIRONMENTAL, INC.
3956 STATE ROUTE 412
VICKERY OH 43464

U.S. EPA ID Number: OHD020273819

Facility's Phone: (419) 547-7791

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. RQ, NA3082, WASTE HAZARDOUS WASTE, LIQUID, N.O.S., 9,III,(F006)	001	TT	143	G	F006
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
WASTE PROFILE #OH894433 EMERGENCY RESPONSE CONTACT.
ERG #171
TRIP #: 3 TAG #: 1A

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Todd Cowell | Signature: [signature] | Month Day Year: 05 26 17

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: | Signature: | Month Day Year: 5 26 17
Transporter 2 Printed/Typed Name: | Signature: | Month Day Year:

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator) — U.S. EPA ID Number:
Facility's Phone:
18c. Signature of Alternate Facility (or Generator) — Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. H134 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: | Signature: | Month Day Year:

GENERATOR | INT'L | TRANSPORTER | DESIGNATED FACILITY

CWMI

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
OHD004201091	1	(937) 620-8524	008689352 FLE

GENERATOR

5. Generator's Name and Mailing Address
RACER TRUST
1400 LOWELL ST
ELYRIA OH 44035
Generator's Phone: (419) 499-1339

Generator's Site Address (if different than mailing address)

6. Transporter 1 Company Name: VICKERY TRANSPORTATION, INC. — U.S. EPA ID Number: OHR000103762

7. Transporter 2 Company Name — U.S. EPA ID Number

8. Designated Facility Name and Site Address
VICKERY ENVIRONMENTAL, INC.
3956 STATE ROUTE 412
VICKERY OH 43464
Facility's Phone: (419) 547-7791
U.S. EPA ID Number: OHD020273819

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. RQ, NA3082, WASTE HAZARDOUS WASTE, LIQUID, N.O.S., 9,III,(F006)	001	TT	175	G	F006
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
WASTE PROFILE #OHB94433 EMERGENCY RESPONSE CONTACT: _____
ERG #171
TRIP #: 327975 TAG #: 1860444

15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Tony Correll — Signature: on behalf of RACER Trust and properties — Month 05 Day 16 Year 17

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Buel Nesbitt — Signature: Buel Nesbitt III — Month 05 Day 16 Year 17
Transporter 2 Printed/Typed Name — Signature — Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☒ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Greater than 10% Spillage discrepancy 143 Actual Gals Adj by Tony Correll 5/16/17
Manifest Reference Number:

18b. Alternate Facility (or Generator) — U.S. EPA ID Number
Facility's Phone:

18c. Signature of Alternate Facility (or Generator) — Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.
H134			

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: MARILYN BINSACK — Signature: Marilyn Binsack — Month 05 Day 16 Year 17

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

APPENDIX D

Waste Profile

Date Printed: 05/11/17 Chemical Waste Management, Inc. Profile #

GENERATOR'S WASTE PROFILE SHEET VIC OH894759

(_) Check here if this is a Recertification LOCATION OF ORIGINAL Vickery Environmental, Inc.

A/B WASTE GENERATOR AND CUSTOMER INFORMATION

1. Generator Name: RACER TRUST
Generator USEPA ID: OHD004201091

2. Generator Address: 1400 LOWELL ST
ELYRIA OH 44035

Billing Address: (_) Same
HALEY & ALDRICH INC
70 BLANCHARD RD, SUITE 204
BURLINGTON MA 01803

3. Technical Contact/Phone: PAMELA BARNETT 973/751-8635

4. Alternate Contact/Phone: BAN ARAGONA (HALEY & ALDRICH) 617/886-7400

Billing Contact/Phone: BAN ARAGONA 617/886-7400

C. WASTE STREAM INFORMATION

1a Process Generating Waste: LEACHATE COLLECTION TANKS BEING STEAM CLEANED
1b Waste Name: (F006) LEACHATE TANK CLEANOUT SOLUTION
1c Color : VARIES
1d Strong Odor:(_);describe:
1e Physical State @ 70F: Solid(_) Liquid(X) Both(_) Gas(_) 1f Single Layer (X) Multilayer (_)
1g Free liq. range: 99 to 100% Gravity: 1.000 to 1.300 Viscosity: LOW BTU/lb: _____ to _____
1h pH: Range 5.0 to 10.0 or Not applicable (_)
1i Liquid Flash Point: < 73F (_) 73-99F (_) 100-139F (_) 140-199F (_) >= 200F (X) N.A. (_) Closed Cup (X) Open Cup (_)

2a Is this a USEPA hazardous waste (40 CFR Part 261)? Yes (X) No (_)
2a Identify ALL USEPA listed and characteristic waste code numbers (D,F,K,P,U): F006
State Waste Codes:
2b Do underlying hazardous constituents (UHCs) apply (40CFR268.48)?(N)
2d Is the waste predominantly debris subject to the Alternate Debris Standards(40 CFR268.45)? (N)
2e Is the waste predominantly soil subject to the Alternate Soil Treatment Standards(40 CFR268.49)? (N)
2f Does the waste contain asbestos? (N) If yes, is waste Friable(_) Non-Friable(_) or Both(_)
2g Waste contains benzene in concentrations _ _____ ppm. NESHAP?(N)
2h Is waste remediation from a major source of Haz Air Pollutants (Site Remediation NESHAP, 40CFR 63 subpart GGGGG)?(N)
If yes, does the waste contain <500 ppmw VOHAPs at the point of determination?(_)
2i Waste contains PCBs (< >) _ _____ ppm, regulated by 40 CFR 761?(N)
Are PCBs regulated under SIRS Mega Rule (40 CFR 761,61(a)?(_)

2j CHEMICAL COMPOSITION: List ALL constituents (incl. halogenated organics) present in any concentration and forward analysis

Constituents	Range		Unit Description	
WATER	97.9 to	100	%	
METAL HYDROXIDES	0 to	0.1	%	
COMMENTS	to			
(METAL HYDROXIDE SLUDGE)	to			
LEAD	0 to	1.3	MG/L	
SODIUM CARBONATE	0 to	0.5	%	See attach2
TOTAL COMPOSITION (MUST EQUAL OR EXCEED 100%):		102.100000		

2k Is the waste: Pyrophoric (_) Water-Reactive (_) Shock Sensitive (_) Oxidizer (_) Carcinogen (_) Infectious (_)
Other _____
2l Is waste Group 1 wastewater or residual under Hazardous Organic NESHAP?(N)
2m Does the waste contain radioactive material? (N) Regulated by NRC?(_) Is radioactive waste NORM?(_)
2n Is the waste a CERCLA (40 CFR 300, Appendx B) or state mandated cleanup?(N)

3a This is a Wastewater.
3e Physical Appearance: LOW VISCOSITY, LIQUID
3f If waste subject to the land ban & meets treatment standards, check here: (_) & supply analytical results where applicable.
3g Tracking Number: _____

D. DOT Information and Shipping Volume

D1 Anticipated Annual Volume: 18000 Units: GALLONS Shipping Frequency: MONTH
D2 PACKAGING: Bulk Solid (_) Bulk Liquid (X) Drum (_) Type/Size: TANK Other SHIPS 1,500 GALLONS PER MONTH

GENERATOR'S CERTIFICATION

I hereby certify that all information submitted in this and all attached documents contains true and accurate descriptions of this waste. Any sample submitted is representative as defined in 40 CFR 261 - Appendix I or by using an equivalent method. All relevant information regarding known or suspected hazards in the possession of the generator has been disclosed. I authorize CWM to obtain a sample from any waste shipment for purposes of recertification.

Signature Name and Title Date

Date Printed 05/11/17

Profile #
VIC OH894759

ATTACHMENT 2

CHEMICAL COMPOSITION: Additional constituents NOT included on page 1 of the Waste Profile

Constituents	Range	Unit Description
SODIUM GLUCONATE	0 to 0.5	%
NON-TRI CHEMICALS	0 to 1	%
ETHOXYLATED ALCOHOL	to	

APPENDIX D

Boring Logs

SOIL BORING LOGS

Boring Number	Interval (ft)	Description
P-1	0-3	Gray brown silty clay
	3-10	Light brown silty sand and gravel
	10-12	Weathered redish brown sandstone
	12-19	Very hard find grained greenish gray sandstone, very thin shale interbeds
	19-29	Gray shale
P-2	0-8	Brown silty clay trace sand
	8-11	Gray silty clay trace sand
	11-13.5	Gray shale sandy interbeds
	13.5-22	Sandstone, medium fine gravel, thin shale interbeds
	22-23	Gray shale, some silt
P-3	0-9	Gray brown silty clay trace sand
	9-12	Weathered shale, gray
	12-14	Gray shale
	14-19	Fine grained sandstone, light gray with shale streaks
	19-23	Gray silty shale
P-4	0-4	Silty clay - fill?
	14-13	Brown to gray brown silty clay trace sand
	13-25	Very hard greenish gray sandstone
	27-28	Red shale

Confidential under FOIA
John Messinger
Arcadis
Jun 17, 2009 17:46

SOIL BORING LOGS

Boring Number	Interval (ft)	Description
P-5	0-3	Brown silty clay, trace sand
	8-23	Weathered light gray sandstone
	23-29	Light gray sandstone, medium fine grain
P-6	0-10	Brown silty clay, trace sand
	10-15	Weathered light gray sandstone
	15-18.5	Weathered red shale

Confidential under FOIA
John Messinger
Arcadis
Jun 17, 2009 17:46

FILE NO.

CDM

PIEZOMETER INSTALLATION SHEET

PROJECT NAME Fisher Body (GM) FIELD ENG/GEO Ross Overby DATE 5/14/81
PROJECT NO. 1211 CHECKED BY Ross Overby DATE 5/14/81
BORING NO. P-1 COORDINATES
PIEZOMETER NO. P-1 DATE OF INSTALLATION 5/14/81

BOREHOLE DRILLING

DRILLING METHOD Auger/Rotary
DRILLING FLUID(S) USED:
FLUID Water FROM TO
FLUID FROM TO

TYPE OF BIT Roller/ Tricone
CASING SIZE(S) USED: None
SIZE FROM TO
SIZE FROM TO

PIEZOMETER DESCRIPTION

TYPE PVC
DIAMETER OF PERFORATED SECTION 2" ID
PERFORATION TYPE:
SLOTS [X] HOLES [ ] SCREEN [ ]
AVERAGE SIZE OF PERFORATIONS
TOTAL PERFORATED AREA

RISER PIPE MATERIAL PVC
RISER PIPE DIAMETERS 2" ID
O.D. I.D.
LENGTH OF PIPE SECTIONS
JOINING METHOD GLUE ASTM 2564

PROTECTION SYSTEM

RISER PROTECTIVE PIPE LENGTH 3'
PROTECTIVE PIPE O.D.

OTHER PROTECTION

ITEM	DISTANCE ABOVE/BELOW GROUND SURFACE (Ft)		ELEVATION (Ft)	
TOP OF RISER PIPE	1.1		105.9 (749.8)	
GROUND SURFACE	0.0			
BOTTOM OF PROTECTIVE PIPE				
BOREHOLE FILL MATERIALS				
GROUT/SLURRY	TOP 0	BOTTOM 13	TOP 104.8	BOTTOM 91.8
BENTONITE	TOP 0	BOTTOM 13	TOP 104.8	BOTTOM 91.8
SAND	TOP 13	BOTTOM 14	TOP 91.8	BOTTOM 90.8
GRAVEL	TOP 14	BOTTOM 20	TOP 90.8	BOTTOM 84.8
PERFORATED SECTION	TOP 15	BOTTOM 20	TOP 89.8	BOTTOM 84.8
PIEZOMETER TIP	20		84.8	
BOTTOM OF BOREHOLE				
GWL AFTER INSTALLATION	10.5		95.4	

WAS THE HOLE FLUSHED BEFORE INSTALLATION? YES [X] NO [ ]
WAS THE PIEZOMETER FLUSHED AFTER INSTALLATION? YES [X] NO [ ]
WAS A SENSITIVITY TEST PERFORMED ON THE PIEZOMETER? YES [ ] NO [X]

REMARKS

FILE NO. _____

CDM

PIEZOMETER INSTALLATION SHEET

PROJECT NAME Fisher Body (GM) FIELD ENG/GEO Ross Overby DATE 5/15/81
PROJECT NO. 1211 CHECKED BY Ross Overby DATE 5/15/81
BORING NO. P-2 COORDINATES _____
PIEZOMETER NO. P-2 DATE OF INSTALLATION 5/15/81

BOREHOLE DRILLING

DRILLING METHOD Rotary/Auger
DRILLING FLUID(S) USED: Water
FLUID _____ FROM _____ TO _____
FLUID _____ FROM _____ TO _____

TYPE OF BIT Roller/Tricone
CASING SIZE(S) USED:
SIZE _____ FROM _____ TO _____
SIZE _____ FROM _____ TO _____

PIEZOMETER DESCRIPTION

TYPE PVC
DIAMETER OF PERFORATED SECTION 2" ID
PERFORATION TYPE:
SLOTS ☒ HOLES ☐ SCREEN ☐
AVERAGE SIZE OF PERFORATIONS _____
TOTAL PERFORATED AREA _____

RISER PIPE MATERIAL PVC
RISER PIPE DIAMETERS 2" ID
O.D. _____ I.D. _____
LENGTH OF PIPE SECTIONS _____
JOINING METHOD Glue ASTM 2564

PROTECTION SYSTEM

RISER PROTECTIVE PIPE LENGTH 3'
PROTECTIVE PIPE O.D. _____

OTHER PROTECTION _____

ITEM	DISTANCE ABOVE/BELOW GROUND SURFACE (ft)		ELEVATION (ft)	
TOP OF RISER PIPE	1.8		105.0 (748.90)	
GROUND SURFACE	0.0			
BOTTOM OF PROTECTIVE PIPE				
BOREHOLE FILL MATERIALS				
GROUT/SLURRY	TOP 0	BOTTOM 14	TOP 103.2	BOTTOM 89.2
BENTONITE	TOP 0	BOTTOM 14	TOP 103.2	BOTTOM 89.2
SAND	TOP 14	BOTTOM 15	TOP 89.2	BOTTOM 88.2
GRAVEL	TOP 15	BOTTOM 22	TOP 88.2	BOTTOM 81.2
PERFORATED SECTION	TOP 17	BOTTOM 22	TOP 86.2	BOTTOM 81.2
PIEZOMETER TIP	22		81.2	
BOTTOM OF BOREHOLE				
GWL AFTER INSTALLATION	4.0		101.0	

WAS THE HOLE FLUSHED BEFORE INSTALLATION? YES ☒ NO ☐
WAS THE PIEZOMETER FLUSHED AFTER INSTALLATION? YES ☐ NO ☐
WAS A SENSITIVITY TEST PERFORMED ON THE PIEZOMETER? YES ☐ NO ☒

REMARKS _____

FILE NO. _____

CDM.

PIEZOMETER INSTALLATION SHEET

PROJECT NAME Fisher Body (GM) FIELD ENG/GEO Ross Overby DATE 5/18/81
PROJECT NO. 1211 CHECKED BY Ross Overby DATE 5/18/81
BORING NO. P-3 COORDINATES _____
PIEZOMETER NO. P-3 DATE OF INSTALLATION 5/18/81

BOREHOLE DRILLING

DRILLING METHOD Auger/Rotary
DRILLING FLUID(S) USED. Water
FLUID _____ FROM _____ TO _____
FLUID _____ FROM _____ TO _____

TYPE OF BIT Roller/Tricone
CASING SIZE(S) USED:
SIZE _____ FROM _____ TO _____
SIZE _____ FROM _____ TO _____

PIEZOMETER DESCRIPTION

TYPE PVC
DIAMETER OF PERFORATED SECTION 2" ID
PERFORATION TYPE:
SLOTS ☒ HOLES ☐ SCREEN ☐
AVERAGE SIZE OF PERFORATIONS _____
TOTAL PERFORATED AREA _____

RISER PIPE MATERIAL PVC
RISER PIPE DIAMETERS 2" ID
O.D. _____ I.D. _____
LENGTH OF PIPE SECTIONS _____
JOINING METHOD Glue ASTM 2564

PROTECTION SYSTEM

RISER PROTECTIVE PIPE LENGTH 3'
PROTECTIVE PIPE O.D. _____

OTHER PROTECTION _____

ITEM	DISTANCE ABOVE/BELOW GROUND SURFACE (ft)		ELEVATION (ft)	
TOP OF RISER PIPE	2.0		105.4 (749.30)	
GROUND SURFACE	0.0			
BOTTOM OF PROTECTIVE PIPE				
BOREHOLE FILL MATERIALS				
GROUT/SLURRY	TOP 0	BOTTOM 12	TOP 103.4	BOTTOM 91.4
BENTONITE	TOP 0	BOTTOM 12	TOP 103.4	BOTTOM 91.4
SAND	TOP 12	BOTTOM 14	TOP 91.4	BOTTOM 89.4
GRAVEL	TOP 14	BOTTOM 18	TOP 89.4	BOTTOM 85.4
PERFORATED SECTION	TOP 13	BOTTOM 18	TOP 90.4	BOTTOM 85.4
PIEZOMETER TIP	18		85.4	
BOTTOM OF BOREHOLE				
GWL AFTER INSTALLATION	5.0		100.4	

WAS THE HOLE FLUSHED BEFORE INSTALLATION? YES ☒ NO ☐
WAS THE PIEZOMETER FLUSHED AFTER INSTALLATION? YES ☒ NO ☐
WAS A SENSITIVITY TEST PERFORMED ON THE PIEZOMETER? YES ☐ NO ☒

REMARKS _____

FILE NO. _____

CDM

PIEZOMETER INSTALLATION SHEET Abandond

PROJECT NAME Fisher Body (GM) FIELD ENG/GEO Ross Overby DATE 5/19/81
PROJECT NO. 1211 CHECKED BY Ross Overby DATE 5/19/21
BORING NO. P-4 COORDINATES _____
PIEZOMETER NO. P-4 DATE OF INSTALLATION 5/19/81

BOREHOLE DRILLING

DRILLING METHOD Auger/Rotary
DRILLING FLUID(S) USED. Water
FLUID _____ FROM _____ TO _____
FLUID _____ FROM _____ TO _____

TYPE OF BIT Roller/Tricone
CASING SIZE(S) USED:
SIZE _____ FROM _____ TO _____
SIZE _____ FROM _____ TO _____

PIEZOMETER DESCRIPTION

TYPE PVC
DIAMETER OF PERFORATED SECTION 2" ID
PEREORATION TYPE:
SLOTS ☒ HOLES ☐ SCREEN ☐
AVERAGE SIZE OF PERFORATIONS _____
TOTAL PERFORATED AREA _____

RISER PIPE MATERIAL PVC
RISER PIPE DIAMETERS 2" ID
O.D. _____ I.D. _____
LENGTH OF PIPE SECTIONS _____
JOINING METHOD Glue ASTM 2564

PROTECTION SYSTEM

RISER PROTECTIVE PIPE LENGTH 3'
PROTECTIVE PIPE O.D. _____

OTHER PROTECTION _____

ITEM	DISTANCE ABOVE/BELOW GROUND SURFACE (ft)		ELEVATION (ft)	
TOP OF RISER PIPE	1.3		110.3 (754.2)	
GROUND SURFACE	0.0			
BOTTOM OF PROTECTIVE PIPE				
BOREHOLE FILL MATERIALS				
GROUT/SLURRY	TOP 0	BOTTOM 18	TOP 109.0	BOTTOM 91.0
BENTONITE	TOP 0	BOTTOM 18	TOP 109.0	BOTTOM 91.0
SAND	TOP 18	BOTTOM 19	TOP 91.0	BOTTOM 90.0
GRAVEL	TOP 19	BOTTOM 26	TOP 90.0	BOTTOM 83.0
PERFORATED SECTION	TOP 21	BOTTOM 26	TOP 88.0	BOTTOM 83.0
PIEZOMETER TIP	26		83.0	
BOTTOM OF BOREHOLE				
GWL AFTER INSTALLATION	7.0		103.3	

WAS THE HOLE FLUSHED BEFORE INSTALLATION? YES ☒ NO ☐
WAS THE PIEZOMETER FLUSHED AFTER INSTALLATION? YES ☒ NO ☐
WAS A SENSITIVITY TEST PERFORMED ON THE PIEZOMETER? YES ☐ NO ☒

REMARKS _____

FILE NO. _____

CDM

PIEZOMETER INSTALLATION SHEET

PROJECT NAME Fisher Body (GM) FIELD ENG/GEO Ross Overby DATE 7-28-81
PROJECT NO. 1211 CHECKED BY Ross Overby DATE 7-28-81
BORING NO. P-5 COORDINATES _____
PIEZOMETER NO. P-5 DATE OF INSTALLATION 7-28-81

BOREHOLE DRILLING

DRILLING METHOD Auger/Rotary TYPE OF BIT Roller/Tricone
DRILLING FLUID(S) USED. CASING SIZE(S) USED:
FLUID Water FROM _____ TO _____ SIZE _____ FROM _____ TO _____
FLUID _____ FROM _____ TO _____ SIZE _____ FROM _____ TO _____

PIEZOMETER DESCRIPTION

TYPE PVC RISER PIPE MATERIAL PVC
DIAMETER OF PERFORATED SECTION 4" OD RISER PIPE DIAMETERS 4" OD
PERFORATION TYPE: O.D. _____ I.D. _____
SLOTS ☒ HOLES ☐ SCREEN ☐ LENGTH OF PIPE SECTIONS _____
AVERAGE SIZE OF PERFORATIONS _____ JOINING METHOD GLUE ASTM 2564
TOTAL PERFORATED AREA _____

PROTECTION SYSTEM

RISER PROTECTIVE PIPE LENGTH 3' OTHER PROTECTION _____
PROTECTIVE PIPE O.D. _____

ITEM	DISTANCE ABOVE/BELOW GROUND SURFACE (ft)		ELEVATION ( )	
TOP OF RISER PIPE	1.4		108.3 (752.2)	
GROUND SURFACE	0.0			
BOTTOM OF PROTECTIVE PIPE				
BOREHOLE FILL MATERIALS				
GROUT/SLURRY	TOP -0	BOTTOM 18	TOP 106.9	BOTTOM 90.3
BENTONITE	TOP 18	BOTTOM 21	TOP 90.3	BOTTOM 87.3
SAND	TOP 21	BOTTOM 23	TOP 87.3	BOTTOM 85.3
GRAVEL	TOP 23	BOTTOM 29	TOP 85.3	BOTTOM 79.3
PERFORATED SECTION	TOP 24	BOTTOM 29	TOP 84.3	BOTTOM 79.3
PIEZOMETER TIP	29'		79.3	
BOTTOM OF BOREHOLE				
GWL AFTER INSTALLATION	9.2'		99.1	

WAS THE HOLE FLUSHED BEFORE INSTALLATION? YES ☒ NO ☐
WAS THE PIEZOMETER FLUSHED AFTER INSTALLATION? YES ☒ NO ☐
WAS A SENSITIVITY TEST PERFORMED ON THE PIEZOMETER? YES ☐ NO ☒

REMARKS _____

FILE NO. _____

CDM

PIEZOMETER INSTALLATION SHEET

PROJECT NAME Fisher Body (GM) FIELD ENG/GEO. Ross Overby DATE 7-29-81
PROJECT NO. 1211 CHECKED BY Ross Overby DATE 7-29-81
BORING NO. P-6 COORDINATES _____
PIEZOMETER NO. P-6 DATE OF INSTALLATION 7-29-81

BOREHOLE DRILLING

DRILLING METHOD Auger TYPE OF BIT Auger
DRILLING FLUID(S) USED:
FLUID _____ FROM _____ TO _____
FLUID _____ FROM _____ TO _____
CASING SIZE(S) USED:
SIZE _____ FROM _____ TO _____
SIZE _____ FROM _____ TO _____

PIEZOMETER DESCRIPTION

TYPE PVC RISER PIPE MATERIAL PVC
DIAMETER OF PERFORATED SECTION 4" OD RISER PIPE DIAMETERS 4" OD
PERFORATION TYPE: O.D. _____ I.D. _____
SLOTS [X] HOLES [ ] SCREEN [ ] LENGTH OF PIPE SECTIONS _____
AVERAGE SIZE OF PERFORATIONS _____ JOINING METHOD GLUE ASTM 2564
TOTAL PERFORATED AREA _____

PROTECTION SYSTEM

RISER PROTECTIVE PIPE LENGTH 3' OTHER PROTECTION _____
PROTECTIVE PIPE O.D. _____

ITEM	DISTANCE ABOVE/BELOW GROUND SURFACE (ft)		ELEVATION (ft)	
TOP OF RISER PIPE	1.5		109.9 (753.8)	
GROUND SURFACE	0.0			
BOTTOM OF PROTECTIVE PIPE				
BOREHOLE FILL MATERIALS				
GROUT/SLURRY	TOP 0	BOTTOM 7	TOP 109.9	BOTTOM 102.9
BENTONITE	TOP 7	BOTTOM 8	TOP 102.9	BOTTOM 101.9
SAND	TOP 8	BOTTOM 10	TOP 101.9	BOTTOM 99.9
GRAVEL	TOP 10	BOTTOM 15	TOP 99.9	BOTTOM 94.9
PERFORATED SECTION	TOP 10	BOTTOM 15	TOP 99.9	BOTTOM 94.9
PIEZOMETER TIP	15		94.9	
BOTTOM OF BOREHOLE				
GWL AFTER INSTALLATION	9.0		100.9	

WAS THE HOLE FLUSHED BEFORE INSTALLATION? YES [ ] NO [X]
WAS THE PIEZOMETER FLUSHED AFTER INSTALLATION? YES [ ] NO [X]
WAS A SENSITIVITY TEST PERFORMED ON THE PIEZOMETER? YES [ ] NO [X]

REMARKS _____

WESTON

GEOLOGIC DRILL LOG		PROJECT NAME AND LOCATION: GMC FISHER GUIDE, Elyria, OH.				PAGE NO. 1 of 1	HOLE NO. P-1T
START 10/26/88	FINISH 10/26/88	DRILLER BOWSER	DRILL METHOD HSA	BOREHOLE DIAMETER 6"	WELL DIAMETER 2"	TOTAL DEPTH 12.50'	
LOGGER G. KINSALL		TOP of CASING ELEV.	GROUND ELEVATION	DEPTH/ELEVATION GROUNDWATER - DATE MEASURED '/'			

SAMPLE NO.	SAMPLE TYPE	RECOVERY "	SAMPLE BLOWS*	ELEV	DEPTH	GRAPHIC LOG	WELL CONSTRUCTION	CLASS-IFICATION SAMPLE INTERVAL	DESCRIPTION	NOTES
1	SS	18	6 6 7		5				Mottled, orange, light to dark brown, gray, stiff to hard, CLAY, some silt, some root hairs, moist	
2	SS	14	7 10 15						Mottled, orange, light brown, gray, hard, SILTY CLAY, trace medium to coarse sand, moist	
3	SS	12	11 16 38		10				Medium brown, stiff, CLAY, some silt, some weathered fine sandstone, moist	
4	SS		28 40 100/4"						Light brown, fine sandstone, moist	
									End of boring @ 12.5 feet	

*ASTM D1586
SS = SPLIT SPOON
D = DENNISON
ST = SHELBY TUBE
C = CORE
CT = CUTTINGS
CS = CONTINUOUS SAMPLER
OT = OTHER

Confidential under FOIA
John Messinger
Arcadis
Jun 17, 2009 17:46

WESTON

GEOLOGIC DRILL LOG		PROJECT NAME AND LOCATION GMC FISHER GUIDE, Elyria, OH.				PAGE NO. 1 of 1	HOLE NO. P-2T
START 10/26/88	FINISH 10/26/88	DRILLER BOWSER	DRILL METHOD HSA	BOREHOLE DIAMETER 6"	WELL DIAMETER 2"	TOTAL DEPTH 13.50'	
LOGGER G. KINSALL		TOP of CASING ELEV.	GROUND ELEVATION	DEPTH/ELEVATION GROUNDWATER - DATE MEASURED ' /			

SAMPLE NO.	SAMPLE TYPE	RECOVERY "	SAMPLE BLOWS*	ELEV	DEPTH	GRAPHIC LOG	WELL CONSTRUCTION	CLASS-IFICATION	SAMPLE INTERVAL	DESCRIPTION	NOTES
1	SS	6	4 5 6		5					Light brown, soft, plastic SILTY CLAY, trace fine sand, root hairs, moist to wet.	
2	SS	18	8 12 22							Mottled, orange, light brown, gray, stiff to hard, slightly plastic, CLAY, some silt, trace fine to medium pebbles, moist.	
3	SS		11 12 18		10					Gray, stiff, non-plastic, SILTY CLAY, a little coarse sand, moist.	
4	SS		18 29 39							A/A with small zones of sandstone and weathered sandstone, moist.	
										End of boring @ 13.5 feet	

*ASTM D1586
SS = SPLIT SPOON ST = SHELBY TUBE
D = DENNISON C = CORE CS = CONTINUOUS SAMPLER
CT = CUTTINGS OT = OTHER

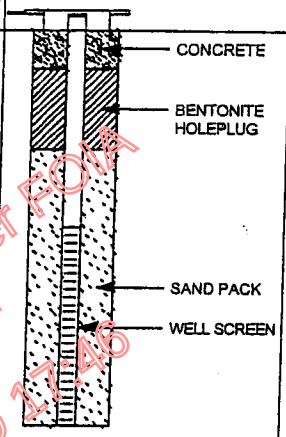
STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: REALM LANDFILL
PROJECT NUMBER: 12616-31
CLIENT: REALM
LOCATION: ELYRIA, OH

HOLE DESIGNATION: P-3T
DATE COMPLETED: May 23, 2002
DRILLING METHOD: HSA
FIELD PERSONNEL: D. NEWTON

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS
0	CL-CLAY, silty, low plasticity, stiff, brown with orange and gray mottling, dry	
4	CL-CLAY, firm, low plasticity, light brown with orange and gray streaking, dry, gravel fragments mixed	4.00
8	CL-CLAY, stiff, compact, brown, dry, gravel fragments mixed with whitish, gray sandstone at 8' BGS	8.00
10	- Bedrock at 9.0ft BGS END OF BOREHOLE @ 10.0ft BGS	10.00

MONITOR INSTALLATION



WELL DETAILS
Screened interval: 5.00 to 10.00ft BGS
Length: 5ft
Diameter: 2in
Slot Size: #10
Sand Pack: 3.00 to 10.00ft BGS
Material: SILICA SAND

SAMPLE NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
1			12	0
2			10	0
3			12	0
4			11	0
5			69	0

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 12616.GPJ CRA_CORP.GDT 8/22/02

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: REALM LANDFILL
PROJECT NUMBER: 12616-31
CLIENT: REALM
LOCATION: ELYRIA, OH

HOLE DESIGNATION: P-3R
DATE COMPLETED: June 3, 2002
DRILLING METHOD: HSA
FIELD PERSONNEL: B. WILLIAMS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS
	TOPSOIL, sands, fien to medium, with vegetation	0.30
	CL-SILTY CLAY, trace fien sands, trace rootlets, trace subangular gravel, fine, compact, low plasticity, gray/brown mottling, dry to moist	
	- slight increase in fine subangular gravel content at 5.0ft BGS	
	- increase in density, dry to moist at 5.5ft BGS	
	- decrease in gray mottling, dry at 7.0ft BGS	
	- becoming darker gray, dry at 7.8ft BGS	
	SM-SILTY SANDS, medium grained, compact, gray, moist	8.75
	SANDSTONE, weathered	9.00
	END OF BOREHOLE @ 19.0ft BGS	19.00

MONITOR INSTALLATION: CONCRETE; BENTONITE CHIPS; SAND PACK; WELL SCREEN

WELL DETAILS
Screened interval:
14.00 to 19.00ft BGS
Length: 5ft
Diameter: 2in
Slot Size: #10
Sand Pack
12.00 to 19.00ft BGS
Material: SILICA SAND

SAMPLE NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
1			5	0.0
2			7	0.0
3			11	0.0
4			32	0.0
5			>100	0.0

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 12616.GPJ CRA_CORP.GDT 8/22/02

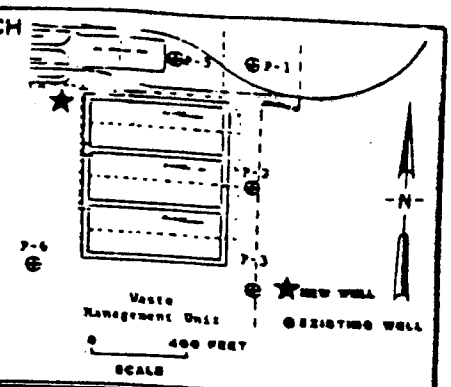
WESTON

DRILLING LOG

WELL NUMBER: W-4R
LOCATION: Near NW corner of impoundment. Wooded area
SURFACE ELEVATION: _____
DRILLING COMPANY: Bowser Morner
DRILLER: Rick Gerald
LOG BY: G. Kinsall

OWNER: GMC Fisher Guide
ADDRESS: Elyria, Ohio
TOTAL DEPTH _____
WATER LEVEL: 7'
DRILLING METHOD: HSA/Rotary
DATE DRILLED: 8/26/87
HELPER: Dave Wright

SKETCH



NOTES: Bedford Shale plugged so screen can be set in Berea Sandstone.

DEPTH (FEET)	GRAPHIC LOG	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE BLOWS	DESCRIPTION / SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)
0		1	STP	4 8 11 15	top 4" hummus top soil (PT)
					4"-2 ft. Very stiff, brown to orange brown, SITLY CLAY, dry, trace of medium grain sand (CL)
		2		7 7 9 9	2-4 ft. Very stiff, light brown - brown, SILTY CLAY intermixed with CLAY at 2.5 ft., very wet, (MH/CH)
		3		6 9 11 15	4-6 ft. Very stiff, light brown - brown, SILTY CLAY intermixed with CLAY at 2.5 ft., very wet (MH/CH)
		4		4 8 10 15	6-8 ft. Very stiff, brown grading to medium gray, CLAY, wet, trace of orgainc material and green-gray shale fiags
		5		7 11 29 55	8-10 Hard, brownish gray-grades to gray, CLAY, mosit (CH)
10					At 9 ft contact of greenish-gray, soft, dry shale or siltstone (Orangeville)
					Berea Sandstone at 14 ft.
15					Top of Bedford Shale at 24 ft.

Well W-4R

Well Construction Summary

Location or Coords: _____ Elevation: Ground Level _____

Top of Casing _____

Project GMC - Fisher Guide
Phase 2 Groundwater Quality Assessment

Location Elyria, Ohio

Personnel Greg Kinsall

Drilling Summary:

Total Depth 21'

Borehole Diameter 8" to 14'
4" to 21'

Driller Rick Gerald
Asst. Dave Wright

Rig Mobile 13-61

Bit(s) HSA, 3 7/8 rollar bit

Drilling Fluid Water

Surface Casing 4" Drive Casing

Well Design:

Basis: Geologic Log X Geophysical Log _____

Casing String(s): C = Casing S = Screen

21'	-	16'	S		
16'	-	+2	C_1		
-3	-	+2	C_2		

Casing: C1 #304 Sch 5 stainless Steel
2" diameter

C2 6" Protective Steel Casing

Screen: S1 #304 Sch 5 Stainless Steel
0.010" slot

S2 _____

Centralizers _____

Filter Material #4 coarse sand washed and graded 22' - 15'

Cement Portland type I 2 bags cement to 151b. bentonite

Other Bentonite slurry

Construction Time Log:

Task	Start Date	Start Time	Finish Date	Finish Time
Drilling:	1987			
HSA	8/26	0800	8/26	0915
Rotary Wash	8/27	0805	8/27	0930
Geophys Logging:				
Casing:				
C_1	8/27	1120	8/27	1125
C_2	8/27	1345	8/27	1355
Filter Placement:	8/27	1130	8/27	1135
Cementing:	8/27	1330	8/27	1340
Development:				
Other:				
Bentonite Pellets	8/27	1145	8/27	1155

Well Development:

First atempt to develop on 8/30/87
Well goes dry and is ledt to recharge

Comments:

Drilled into bedford shale at 24'. 2' bentonite plug is place to seal it off. 1' of sand is placed over that to set well in at 21'. Very slow recharger. Water is extreamly turbid.

Project: Site – Fisher Guide
Phase 2 Groundwater Quality Assessment
Location: Elyria, Ohio
Personnel: Greg Kinsall

Well: W-5S

Well Construction Summary

Location or Coords: ______

Elevation: Ground Level ______

Top of Casing ______

Drilling Summary:

Total Depth: 20'

Borehole Diameter: 8" to 11'
4" to 20'

Driller: Rick Gerald
Asst. Dave Wright

Rig: Mobile 13-61

Bit(s): HSA and 3 7/8" roller bit

Drilling Fluid: Water

Surface Casing: 4" Drive Casing

Construction Time Log:

Task	Start Date	Start Time	Finish Date	Finish Time
Drilling:	1987		1987	
HSA	8/28	0840	8/28	0920
Rotary Wash	8/28	0930	8/28	1025
Geophys. Logging:				
Casing:				
C_1	8/28	1030	8/28	1035
C_2	8/28	1425	8/28	1430
Filter Placement:	8/28	1040	8/28	1045
Cementing:	8/28	1410	8/28	1420
Development:				
Other:				
Bentonite Pellets	8/28	1045	8/28	1055

Well Design:

Basis: Geologic Log X Geophysical Log ______

Casing String(s): C = Casing S = Screen

From	To	String
20'	15'	S
15'	+2	C_1
-3	+2	C_2

Casing: C1 #304 Sch 5 Stainless Steel
2" diameter

C2 6" Protective Steel Casing

Screen: S1 #304 Sch 5 Stainless Steel
0.010" slot

S2 ______

Centralizers ______

Filter Material: #4 Coarse sand washed and graded 20' to 13'

Cement: Portland Type I
2 bags cement to 15lb. bentonite

Other: Bentonite Pellets 13' to 10'

Well Development:

Well developed 8/30/87
5 volumes removed. Ph, cond. and temp checked after 1 vol., 3 vol., and 5 vol. stable each time

Comments:

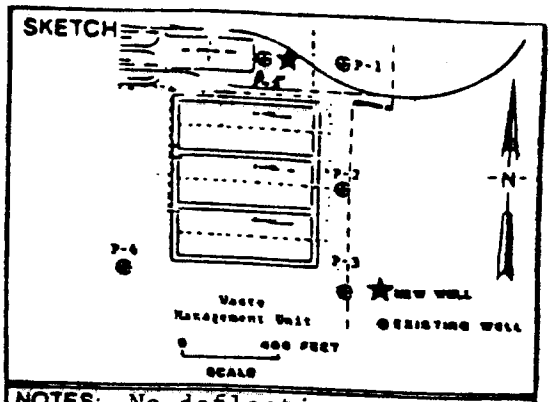
Well is fairly good recharger.

WESTON

DRILLING LOG

WELL NUMBER: W-5S
LOCATION: About 15' East of W-5
OWNER: GMC Fisher Guide
ADDRESS: Elyria, OH
TOTAL DEPTH: 20'
SURFACE ELEVATION: _____
WATER LEVEL: 8.5'
DRILLING COMPANY: Bowser MOrner
DRILLING METHOD: HSA/Rotary
DATE DRILLED: 8/28/87
DRILLER: Rick Gerald
HELPER: Dave Wright
LOG BY: Greg Kinsall

SKETCH



NOTES: No deflection on Hnu TOX and VOC taken at 10-11' intervals

DEPTH (FEET)	GRAPHIC LOG	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE BLOWS/6"	DESCRIPTION / SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)
0		1	SPT	push 2 2	0-2ft Soft, light brown, CLAY, dry to slightly moist, look as if material is disturbed (CL)
		2		2 2 2 2	2-4ft Soft, mottled black-green-red, CLAY, dry to moist, traces of cardboard and brick. (Still disturbed) (CL/OL)
		3		2 2 2 2	4-6ft. Soft, black, CLAY, moist. (OL)
		4		3 5 8 9	6-8ft. Stiff, mottled gray and black, CLAY, moist (CL/OL)
		5		6 10 15 20	8-10ft Very stiff, light brown, CLAY, wet, trace of sand grains, (CH)
10		6		15 38	10-11ft Very stiff to hard, light brown grading to gray, CLAY with weathered sandstone, wet (CH)
					Berea Sandstone topped at 11ft.
15					

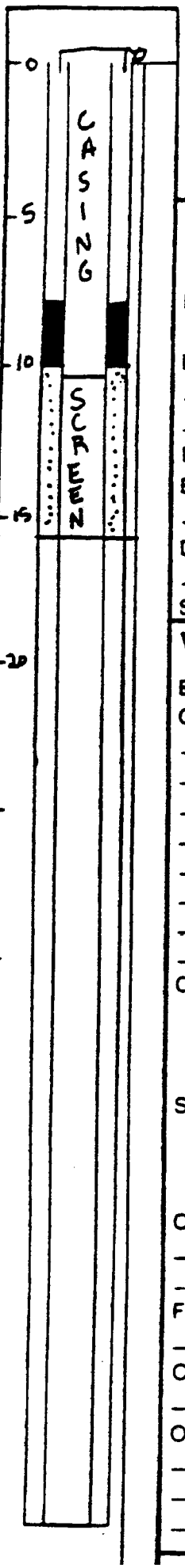
Well P6 Mw 7

Well Construction Summary

Location or Coords West of P6

Elevation Ground Level 754.35

Top of Casing 756.84



Location Elyria, Ohio
Personnel E.M.U.
Project GM

Drilling Summary:

Total Depth 16.5'
Borehole Diameter 4.25" ID
Driller Herron
Rig GME 75
Bit(s) H.S.A. 4.25" ID
Drilling Fluid Water (washed out hole)
Surface Casing Steel Protective/locked

Well Design:

Basis: Geologic Log X Geophysical Log ___

Casing String(s): C = Casing S = Screen

16	-	11	S		-
11	-	0	C		-
0	-	2	S.U.		-
	-				-
	-				-
	-				-
	-				-
	-				-

Casing C1 PVC 2"

C2

Screen: S1 PVC 2"
.010 inch slot

S2

Centralizers

Filter Material Medium sand (16 - 10')

Cement Cement/Bentonite
(8 - 0')

Other Bentonite pelle
(10 - 8')

Construction Time Log:

Task	Start Date	Start Time	Finish Date	Finish Time
Drilling X	1987 2/13	3p	1987 2/13	5p
Geophys. Logging				
Casing	2/14	9a	2/14	11:3(
Filter Placement	2/14	9a	2/14	11:3(
Cementing	2/14	9a	2/14	11:3(
Development:	2/19		2/19	
Other	2/20		2/20	

Well Development:

Well Development went slowly - pumped dry and would let well recover repeated procedure Removed 15 gallons totally, still silty

Comments:

2 bags sand
1 bucket pellets
grout 8'

WESTON

DRILLING LOG

MW 7 ~~P8~~

WELL NUMBER P8

LOCATION West of P6

OWNER GM

ADDRESS Lowell St
Elyria, Ohio

TOTAL DEPTH 18.5

SURFACE ELEVATION

WATER LEVEL:

DRILLING COMPANY Herron Testing

DRILLING METHOD HSA 4.25" ID

DATE DRILLED 2/13/87

DRILLER

HELPER:

LOG BY: E.M.U.

SKETCH MAP

NOTES.
Water in augers at 15'4" – 2-14-87

DEPTH (FEET)	GRAPHIC LOG	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE BLOWS	DESCRIPTION/SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)
0		01	ss	1 2 2	SOFT, Dark brown to black silty clay, organic rich, veg. roots (clay)
		02	ss	12 5 8	STIFF, Yellowish brown, sandy silty clay, trace fine sand, some silt, trace gravel chips
5		03	ss	9 14 22	HARD
		04	ss	9 14 25	HARD, Gray clayey silt, some gravel size chips
10		05	ss	32 33 14	DENSE (14 blows - bent spoon) SS05 - top 7", white to gray fine sand, hit cobble - top of Berea Sandstone. - Lower 7", reddish to mauve silt (rods wet)
		05	ss	22 23 25	DENSE, Appears to be interbedded sandstones and shales
15		07	ss	19 22 27	HARD, Reddish to mauve, silt, contains shale chips, Bedford shale
20		08	ss	18 27 28	

6'

10'

15'

WESTON

GEOLOGIC DRILL LOG	PROJECT NAME AND LOCATION	PAGE NO.	HOLE NO.
	GMC FISHER GUIDE, Elyria, OH.	1 of 1	P-7T

START	FINISH	DRILLER	DRILL METHOD	BOREHOLE DIAMETER	WELL DIAMETER	TOTAL DEPTH
10/25/88	10/25/88	BOWSER	HSA	6"	2"	17.50'

LOGGER	TOP of CASING ELEV.	GROUND ELEVATION	DEPTH/ELEVATION GROUNDWATER - DATE MEASURED
G. KINSALL			'/'

SAMPLE NO.	SAMPLE TYPE	RECOVERY "	SAMPLE BLOWS*	ELEV	DEPTH	GRAPHIC LOG	WELL CONSTRUCTION	CLASS-IFICATION SAMPLE INTERVAL	DESCRIPTION	NOTES
1	SS	10	11 13 16		5				Light to medium brown, hard, non-plastic CLAYEY SILT, trace coarse sand to fine gravel, moist	
2	SS	10	10 19 29						A/A Gray, firm to hard, CLAYEY SILT, trace of coarse gravel, moist	
3	SS	8	8 27 29		10				A/A	
4	SS	8	17 37 28						Gray, fine, SILTY SAND, some pieces of sandstone, dry to moist A/A with some large (1-1.5") pieces of fine, gray sandstone, moist.	
5	SS	8	11 17 23		15				Dark brown to dark reddish brown, hard, CLAYEY SILT, starting to get shale texture, moist	
6	SS	12	11 24 44						Dark reddish brown, fissile SHALE, moist to damp	
									End of boring @ 17.5 feet	

*ASTM D1586
SS = SPLIT SPOON ST = SHELBY TUBE
D = DENNISON C = CORE CS = CONTINUOUS SAMPLER
CT = CUTTINGS OT = OTHER

WESTON

GEOLOGIC DRILL LOG	PROJECT NAME AND LOCATION	PAGE NO.	HOLE NO.
	GMC FISHER GUIDE, Elyria, OH.	1 of 1	P-8T

START	FINISH	DRILLER	DRILL METHOD	BOREHOLE DIAMETER	WELL DIAMETER	TOTAL DEPTH
10/26/88	10/26/88	BOWSER	HSA	6"	2"	10.00'

LOGGER	TOP of CASING ELEV.	GROUND ELEVATION	DEPTH/ELEVATION GROUNDWATER - DATE MEASURED
G. KINSALL			'/'

SAMPLE NO.	SAMPLE TYPE	RECOVERY "	SAMPLE BLOWS*	ELEV	DEPTH	GRAPHIC LOG	WELL CONSTRUCTION	CLASS-IFICATION	SAMPLE INTERVAL	DESCRIPTION	NOTES
1	SS	10	3 4 5		5					Gray, slightly sticky, non-plastic CLAYEY SILT, trace of root hairs and organic material, wet.	
2	SS	8	4 6 11							Mottled light brown, orange, gray, hard, slightly plastic SILTY CLAY, a little fine sand, trace angular pebbles, moist.	
3	SS	1	100/3		10					Light brown, fine SANDSTONE, wet.	
										End of boring @ 10.0 feet	

*ASTM D1586
SS = SPLIT SPOON ST = SHELBY TUBE
D = DENNISON C = CORE CS = CONTINUOUS SAMPLER
CT = CUTTINGS OT = OTHER

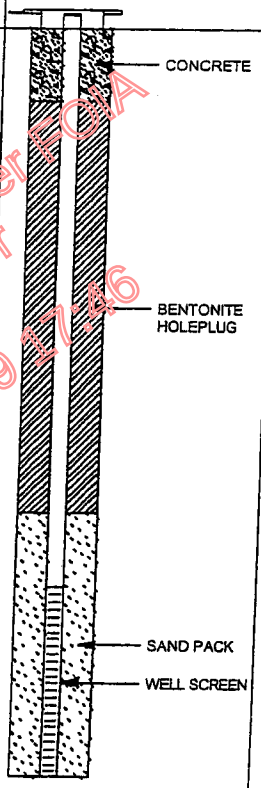
STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: REALM LANDFILL
PROJECT NUMBER: 12616-31
CLIENT: REALM
LOCATION: ELYRIA, OH

HOLE DESIGNATION: P-8R
DATE COMPLETED: May 29, 2002
DRILLING METHOD: HSA
FIELD PERSONNEL: D. NEWTON

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS
	SILTY CLAY, dark brown, moist, roots	
2	CL-SILTY CLAY, soft, dark brown, moist, sticky	2.00
4	CL-SILTY CLAY, medium plasticity, friable, light brown, orange and gray mottling, slightly moist	4.00
6	CL-CLAY, firm, light brown, orange mottling, sticky, dry - 4" sand lense, damp at 6.5ft BGS	6.00
8	CL-CLAY, silty, very soft, friable, light brown, damp - weathered gray sandstone, damp at 9.0ft BGS	8.00
10	CL-CLAY, mixed with gray weathered sandstone, competent, light brown, wet	10.00
12		
14		
16		
18		
20	END OF BOREHOLE @ 20.0ft BGS	20.00
22		
24		
26		
28		
30		
32		
34		

MONITOR INSTALLATION



WELL DETAILS
Screened interval:
15.00 to 20.00ft BGS
Length: 5ft
Diameter: 2in
Slot Size: .010
Sand Pack:
13.00 to 20.00ft BGS
Material: SILICA SAND

SAMPLE NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
1			7	0
2			5	0
3			8	0
4			11	0
5			46	0
6				0

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 12616.GPJ CRA_CORP.GDT 9/17/02

Well W-9

Well Construction Summary

Location or Coords: _____ Elevation: Ground Level _____

Top of Casing _____

Location Elyria, Ohio
Personnel Skip Ricketts - RFW

Project Phase 2 Groundwater Quality Assessment

Drilling Summary:

Total Depth 21'
Borehole Diameter 8" to 8.5', 4" to 15'
Driller Rich Gerald
Asst. Dave Wright
Rig 13-61 Mobile
Bit(s) 4 1/4 HSA, 3 7/8" roller bit Mill tooth
Drilling Fluid Water
Surface Casing 4" Drive Casing

Well Design:

Basis: Geologic Log ___ Geophysical Log ___

Casing String(s): C = Casing S = Screen

21'	-	16'	S		-
16'	-	+2	C_1		-
-3	-	+2	C_2		-
	-				-
	-				-
	-				-
	-				-
	-				-

Casing: C_1 #304 Sch 5 2" diameter Stainless Steel riser
C_2 6" diameter Protective Steel Casing

Screen: S_1 #304 Sch 5 2" diameter Stainless Steel.
S_2 0.010" slot

Centralizers _____

Filter Material #4 Quartz Sand - Coarse washed and graded 21'-13'

Cement Portland Type I Cement 2 bags cement with 15lb. Bentonite

Other Bentonite Pellets 13'-10'

Construction Time Log:

Task	Start Date	Start Time	Finish Date	Finish Time
Drilling:	1987		1987	
HSA	9/1	0850	9/1	0915
Rotary Wash	9/1	0915	9/1	1115
Geophys. Logging:				
Casing:				
C_1	9/1	1117	9/1	1120
C_2	9/1	1155	9/1	1200
Filter Placement:	9/1	1120	9/1	1125
Cementing:	9/1	1135	9/1	1150
Development:	9/2	1245	9/2	1315
Other:				
Bentonite Pellets	9/1	1125	9/1	1127

Well Development:

5 Volumes equals approximatly 10.6 gallons. Removed 11.1 gallons Water was initially clear becomming strongly turbid - reddish brown at 3 gallons removed. Continued development yielded mildly turbid light gray water at 8 gallons removed.

Comments:

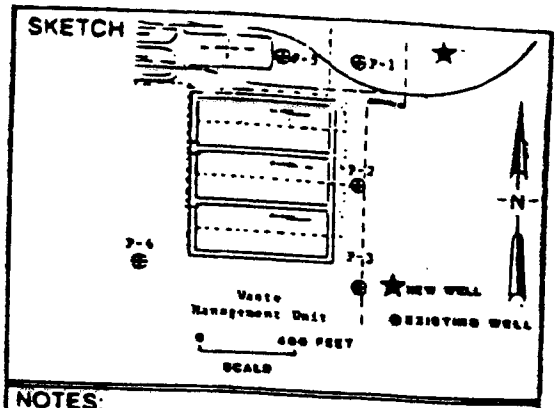
Drill HSA to 8.5' at Berea Sandstone
WOB-500 PSI
Ran out of drill water at 19' - 10:40 hrs. Resume drilling at 11:05hr

WESTON

DRILLING LOG

WELL NUMBER: W-9
LOCATION: East of P-1
OWNER: GMC Fisher Guide
ADDRESS: Elyria, OH
TOTAL DEPTH 21 ft.
SURFACE ELEVATION:
WATER LEVEL:
DRILLING COMPANY: Bowser Morner
DRILLING METHOD: HSA
DATE DRILLED: 9/1/87
DRILLER: Rick Gerald
HELPER: Dave Wright
LOG BY: Ricketts

SKETCH



NOTES:
No deflection on Hnu

DEPTH (FEET)	GRAPHIC LOG	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE BLOWS	DESCRIPTION / SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)
0		1	SPT	3 6 9 11	0-2ft. Slightly stiff, dark brown - medium gray with orange brown mottling, organic CLAY grading to CLAY, plastic, moist, abndt. root hairs (CH/CH)
		2		8 12 12 12	2-4ft. As above, however: stiff, less moist
		3		3 6 9 13	4-6ft. Slighty stiff, orange brown mottled with gray, CLAY plastic, moist, abndt. root hairs, traces of gravel-pebbles (CH)
		4		14 21 25 43	6-8ft. Very stiff, orange brown SILTY CLAY, slightly moist, trace of pebbles (CL). Shale at 7.5ft. fissile, brittle, gray-black cleavage faces oxidised.
10		5	cut-ting		8.5ft. Sandstone, tan, occ. brown bands, fine grain, friable moist, moderately hard
		6			Drill break at 12ft. 8.5-12ft. Sandstone, tan grading to light gray, fine-med. grain, fining down to gray shaly sand Shale in sanstone probably accounts for drill break
5					12-18ft. Sandstone, light gray, very fine grain, occ. thin shale interbeds
					Berea Sandstone to 21ft. Top of bedford shale at 21ft. Black, fissile mod hard

Well W-10

Well Construction Summary

Location or Coords: _____ Elevation: Ground Level _____

Top of Casing _____

Location Elyria, Ohio
Personnel Skip Ricketts - RFW

Phase 2 Groundwater Quality Assessment

Drilling Summary:

Total Depth 15'
Borehole Diameter 8" to 7 1/2'
4" to 15'
Driller Rick Gerald
Asst. Dave Wright
Rig Mobile 13-61
Bit(s) HSA, 3 7/8" roller bit
Drilling Fluid Water
Surface Casing 4" Drive Casing

Well Design:

Basis: Geologic Log X Geophysical Log _____
Casing String(s): C = Casing S = Screen

15	-	10	S		
10	-	+2	C_1		
-3	-	+2	C_2		

Casing: C_1 #304 Sch. 5 Stainless Steel 2" diameter
C_2 6" Protectibe Steel Casing

Screen: S1 #304 Sch 5 Stainless Steel 0.010" slot
S2 _____

Centralizers _____

Filter Material #4 coarse sand washed and graded 15 - 8'
Cement Portland Type 1 Cement 2 bags cement with 15lb. bentonite
Other Bentonite Pellets 8 - 6 1/2'

Construction Time Log:

Task	Start Date	Start Time	Finish Date	Finish Time
Drilling:	1987			
HSA	9/1	1545	9/1	1610
Rotary Wash	9/1	1645	9/1	1715
Geophys. Logging:				
Casing:				
C_1	9/1	1715	9/1	1725
C_2				
Filter Placement:	9/1	1725	9/1	1730
Cementing:	9/1	1745	9/1	1815
Development:	9/2	1400	9/2	1420
Other:				
Bentonite Pellets	9/1	1730	9/1	1733

Well Development:

5 volumes equals approximately 9 gallons Well dry after removing 3.5 gallons Well water was stronly turbid and red-brown colored.

Comments:

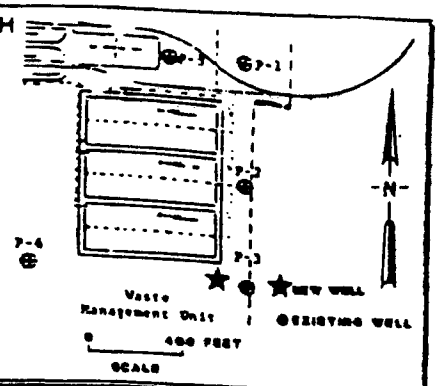
HSA drilling to 7 1/2'
Rotary wash drilling - 7 1/2 to 15'
Extremely hard drilling 7 1/2' -8½'

WESTON

DRILLING LOG

WELL NUMBER: W-10 OWNER: GMC Fisher Guide
LOCATION: Wooded area South of P-3 ADDRESS: Elyria, OH
TOTAL DEPTH 15'
SURFACE ELEVATION: WATER LEVEL:
DRILLING COMPANY: Bowser Morner DRILLING METHOD: HSA/Rotary DATE DRILLED: 9/1/87
DRILLER: Rick Gerald HELPER: Daves Wright
LOG BY: Ricketts

SKETCH



NOTES:
No readings on Hnu.

DEPTH (FEET)	GRAPHIC LOG	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE BLOWS	DESCRIPTION / SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)
0		1	SPT	3 8 10 11	0-2' Firm to hard, medium gray-brown CLAY with orange mottling, abundant root hair, moist-slightly moist (OH/CH)
		2		9 13 18 21	2-4' hard, orange brown mottled with gray, CLAY, non-plastic, occ. sm shale frags and pebbles, moist to dry (CH)
		3		6 9 18 41	4-6' Hard, mottled orange brown-gray CLAY, nonplastic, abndt. shale frags and root hairs, moist to dry (CH/CL)
		4		21 40 60/3	6-7.5' No Recovery 7.0' top of Berea sandstone
10					
15					

WESTON

GEOLOGIC DRILL LOG	PROJECT NAME AND LOCATION	PAGE NO.	HOLE NO.
	GMC FISHER GUIDE, Elyria, OH.	1 of 1	P-11

START	FINISH	DRILLER	DRILL METHOD	BOREHOLE DIAMETER	WELL DIAMETER	TOTAL DEPTH
10/27/88	10/27/88	BOWSER	HSA	6"	2"	13.00'

LOGGER	TOP of CASING ELEV.	GROUND ELEVATION	DEPTH/ELEVATION GROUNDWATER - DATE MEASURED
G. KINSALL			'/'

SAMPLE NO.	SAMPLE TYPE	RECOVERY "	SAMPLE BLOWS*	ELEV	DEPTH	GRAPHIC LOG	WELL CONSTRUCTION	CLASS-IFICATION	SAMPLE INTERVAL	DESCRIPTION	NOTES
1	SS	24	4 6 9		5					Mottled orange, light brown and gray, stiff to hard, slightly plastic CLAY, some silt, trace fine to medium pebbles, moist.	
2	SS	24	10 19 29							A/A	
3	SS	6	100/6		10					Light orangish brown, fine grained, weathered SANDSTONE, moist.	
										End of boring @ 13.0 feet	

*ASTM D1586
SS = SPLIT SPOON ST = SHELBY TUBE
D = DENNISON C = CORE CS = CONTINUOUS SAMPLER
CT = CUTTINGS OT = OTHER

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(DL-01)
Page 1 of 1

PROJECT NAME: ELYRIA HYDRO INV.
PROJECT NUMBER: 12616-02
CLIENT: REALM
LOCATION: ELYRIA, OHIO

HOLE DESIGNATION: P-12
DATE COMPLETED: FEBRUARY 3, 2000
DRILLING METHOD: HSA/ TRICONE ROLLER
CRA SUPERVISOR: D. NEWTON

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft.	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
0	TOPSOIL, trace roots		CONCRETE	1SS		4	0.0
2.5	SC-SAND, silty, light brown clay with orange mottling, trace roots, some black organic streaking, dry			2SS		7	0.0
	CL-SILTY CLAY, low plasticity, firm, light brown with some orange mottling, dry to moist						
5.0	- some black shale pieces mixed, moist to wet		BENTONITE SLURRY	3SS		8	0.0
7.5			2"Ø PVC CASING	4SS		15	0.0
	CL-CLAY, coarse shale cobbles mixed, hard, dark brown, dry, gray shale layer at 9.3' to 9.5', then dark brown clay with trace gray shale fines		8"Ø BOREHOLE	5SS		22	0.0
10.0	CL-SILTY CLAY, plastic, light brown, moist			6SS		47	0.0
	CL-CLAY, with black shale pieces, trace gray shale fines mixed, dark brown, dry		BENTONITE CHIPS				
12.5	- shale layer at 11.5' bgs, dark brownish-gray with red mottling						
15.0	SHALE, dry, gray - weathered shale						
17.5	- orange, reddish shale		2"Ø PVC SCREEN				
20.0	- gray, weathered shale - rustic orange, reddish shaled mixed with brownish, red shale		SANDPACK				
22.5	- brown shale						
25.0	END OF HOLE @ 24.5ft BGS						
27.5							
30.0							
32.5							

SCREEN DETAILS
Screened interval:
15.0 to 20.0ft BGS
Length: 10.0ft
Diameter: 2"
Slot Size: #10
Material: PVC
Sand Pack:
13.0 to 23.5ft BGS
Material: Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(OL-02)

PROJECT NAME: ELYRIA HYDRO INV.
PROJECT NUMBER: 12616-02
CLIENT: REALM
LOCATION: ELYRIA, OHIO

HOLE DESIGNATION: P-12T
DATE COMPLETED: FEBRUARY 3, 2000
DRILLING METHOD: 4¼" HSA
CRA SUPERVISOR: D. NEWTON

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft.	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
0	TOPSOIL, roots, grass		CONCRETE	1SS		14	0.0
	SC-SILTY SAND, clay sand mixture, trace roots, non-plastic, light brown, dry		BENTONITE				
2.5	CL-CLAY, some silty sand, fine, brown with some gray mottling, moist		2"Ø PVC CASING	2SS		7	0.0
	- some silty, trace sand, light brown, wet		8"Ø BOREHOLE	3SS		11	0.0
5.0	- some coarse black shale pieces, pieces of gray, fine sandstone, smooth, hard, light brown with reddish, brown mottling, dry		2"Ø PVC SCREEN	4SS		22	0.0
7.5			SANDPACK				
	CL-CLAY, trace pebbles, shale chips, hard, brownish gray, rock formation at 9.1, dry to moist			5SS		58	0.0
10.0	END OF HOLE @ 9.1ft BGS						
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

SCREEN DETAILS
Screened interval:
4.1 to 9.1ft BGS
Length: 5.0ft
Diameter: 2"
Slot Size: #10
Material: PVC
Sand Pack:
3.1 to 9.1ft BGS
Material: Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(DL-12)
Page 1 of 1

PROJECT NAME: HYDROGEOLOGIC INVESTIGATION
PROJECT NUMBER: 12618-02
CLIENT: REALM
LOCATION: ELYRIA, OHIO

HOLE DESIGNATION: P-13
DATE COMPLETED: MARCH 9, 2000
DRILLING METHOD: 4¼" HSA/AIR ROTARY
CRA SUPERVISOR: D. NEWTON

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft.	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	CH-CLAY, topsoil, plastic, brown, damp		CONCRETE	1SS		38	0.0
2.5	CL-SILTY CLAY, some shale cobbles and friable sandstone cobbles, brown, dry - very stiff, light brown with orange-gray mottling, dry		BENTONITE CHIPS	2SS		9	0.0
5.0	- moist		2"Ø PVC CASING	3SS		21	0.0
7.5			8"Ø BOREHOLE	4SS		25	0.0
10.0	SANDSTONE, coarse shale and sandstne gravels, friable, tan/gray, wet - competent sandstone			5SS		--	0.0
12.5	(collect core sample from air rotary at 9-17ft BGS)						
15.0			2"Ø PVC SCREEN SANDPACK				
17.5	END OF HOLE @ 17.0ft BGS						
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

SCREEN DETAILS
Screened interval:
12 to 17ft BGS
Length: 5.0ft
Diameter: 2"
Slot Size: #10
Material: PVC
Sand Pack:
10 to 17ft BGS
Material: Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(DL-13)
Page 1 of 1

PROJECT NAME: HYDROGEOLOGIC INVESTIGATION
PROJECT NUMBER: 12616-02
CLIENT: REALM
LOCATION: ELYRIA, OHIO

HOLE DESIGNATION: P-13T
DATE COMPLETED: MARCH 9, 2000
DRILLING METHOD: 4¼" HSA
CRA SUPERVISOR: D. NEWTON

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft.	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
0	CH-CLAY, topsoil, dark brown, moist		CONCRETE	1SS		33	0.0
2.5	- light brown sandstone, friable cobbles, dry		BENTONITE CHIPS	2SS		19	0.0
	- brown, wet		2"Ø PVC CASING	3SS		18	0.0
5.0	SANDSTONE, friable, tan, dry		8"Ø BOREHOLE	4SS		22	0.0
	CL-CLAY, some small sandstone fine gravels, very stiff, dark brown with gray mottling, dry		2"Ø PVC SCREEN	5SS		--	0.0
7.5			SANDPACK				
	BEDROCK, competent						
8.17	END OF HOLE @ 8.17ft BGS						
10.0			SCREEN DETAILS Screened interval: 2.5 to 8ft BGS Length: 5.0ft Diameter: 2" Slot Size: #10 Material: PVC Sand Pack: 2.5 to 8.17ft BGS Material: Sand				
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

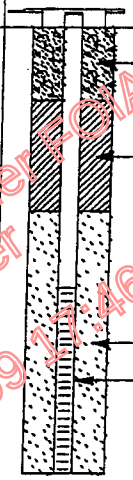
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: REALM LANDFILL
PROJECT NUMBER: 12616-31
CLIENT: REALM
LOCATION: ELYRIA, OH

HOLE DESIGNATION: P-14T
DATE COMPLETED: May 24, 2002
DRILLING METHOD: HSA
FIELD PERSONNEL: D. NEWTON

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS
	CL-CLAY, silty, compact, stiff, medium plasticity, friable, dark brown, dry, gravel fragments	
2	CL-CLAY, silty, firm, medium plasticity, gray clay with brown and orange streaking, gravel fragments, dry	2.00
4	CL-CLAY, medium plasticity, sticky, light brown with orange and gray mottling, slightly moist	4.00
6	CL-CLAY, silty, medium plasticity, brown, stick, gravel fragments, smooth, wet	6.00
8	CL-CLAY, silty, high plasticity, wet, sandstone (weathered), gray sandstone layer at 9.5'	8.00
10	- gray clay at 9.8ft BGS	
12	- wet, brown, silty clay mixed with gray weathered shale, sandy, hard, compact at 11.5ft BGS	12.00
	END OF BOREHOLE @ 12.0ft BGS	
14		
16		
18		
20		
22		
24		
26		
28		
30		
32		
34		



WELL DETAILS
Screened interval:
7.00 to 12.00ft BGS
Length: 5ft
Diameter: 2in
Slot Size: #10
Sand Pack:
5.00 to 12.00ft BGS
Material: SILICA SAND

SAMPLE NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
1			15	0
2			14	0
3			3	0
4			20	0
5			44	0
6			33	0

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 12616.GPJ CRA_CORP.GDT 8/22/02

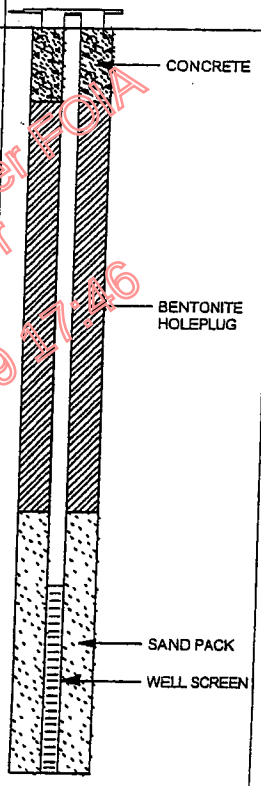
STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: REALM LANDFILL
PROJECT NUMBER: 12616-31
CLIENT: REALM
LOCATION: ELYRIA, OH

HOLE DESIGNATION: P-14
DATE COMPLETED: June 5, 2002
DRILLING METHOD: HSA
FIELD PERSONNEL: D. NEWTON

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS
0	TOPSOIL	0.30
	CL-CLAY, poorly graded sands, light brown, moist to dry	
2	- becoming dark-brown, rootlets, silty, dry at 0.8ft BGS	
	- becoming gray with orange mottling, some broken gravel fragments, medium plasticity, silty clay, dry at 2.0ft BGS	
4	- decrease in sands at 4.0ft BGS	
6	- light brown silty clay, dry, increase in gravel pieces, dry to moist at 6.0ft BGS	
	- increase in fine grained sands, moist to wet at 7.5ft BGS	
8	- becoming hard, light brown, dry, friable at 8.5ft BGS	
10	- light brown weathered sandstone at 9.8ft BGS	
12		
	- shale layer, moist at 13.0ft BGS	13.20
14	SANDSTONE, grey, wet	
16		
18		
20	END OF BOREHOLE @ 20.0ft BGS	20.00
22		
24		
26		
28		
30		
32		
34		

MONITOR INSTALLATION



WELL DETAILS
Screened interval:
15.00 to 20.00ft BGS
Length: 5ft
Diameter: 2in
Slot Size: #10
Sand Pack:
13.00 to 20.00ft BGS
Material: SILICA SAND

SAMPLE NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
1			12	0
2			17	0
3			3	0
4			12	0
5			35	0

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 12616.GPJ CRA_CORP.GDT 8/22/02

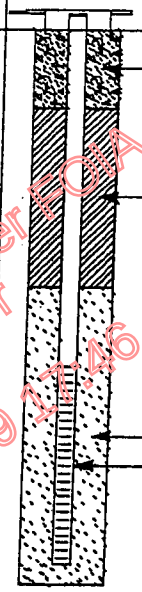
STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: REALM LANDFILL
PROJECT NUMBER: 12616-31
CLIENT: REALM
LOCATION: ELYRIA, OH

HOLE DESIGNATION: P-15T
DATE COMPLETED: May 23, 2002
DRILLING METHOD: HSA
FIELD PERSONNEL: D. NEWTON

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS
	TOPSOIL	0.30
	CL-CLAY, silty, medium plasticity, trace roots, some gravel fragments, firm, brown, orange mottling, dry	
	- grayish silty clay, moist at 3.0ft BGS	
	- brown clay at 3.5ft BGS	
	- damp at 4.0ft BGS	
	- light brown sand lense, wet at 7.0ft BGS	
	- brown sandstone, weathered fragments at 8.0ft BGS	
	- becoming firm, brown clay, dense, dry, some sand and gravel, poorly graded, mixed sand lense, wet, fine at 8.4ft BGS	
	- becoming compact, low plasicity, dry at 10.0ft BGS	
	CL-CLAY, some graded sands, firm, silty	12.00
	- weathered gray broken sandstone, hard, gray, moist, competant bedrock at 13.0ft BGS	
	END OF BOREHOLE @ 14.0ft BGS	14.00

MONITOR INSTALLATION



WELL DETAILS
Screened interval:
8.50 to 13.50ft BGS
Length: 5ft
Diameter: 2in
Slot Size: #10
Sand Pack:
6.50 to 14.00ft BGS
Material: SILICA SAND

SAMPLE NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
1			9	0
2			17	0
3			8	0
4			16	0
5			53	0
6			25	0
7			32	0

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 12616.GPJ CRA_CORP.GDT 10/8/02

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

PROJECT NAME: REALM LANDFILL
PROJECT NUMBER: 12616-31
CLIENT: REALM
LOCATION: ELYRIA, OH

HOLE DESIGNATION: P-15
DATE COMPLETED: May 30, 2002
DRILLING METHOD: HSA
FIELD PERSONNEL: D. NEWTON

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS
0	SW-SAND (FILL), well graded, trace vegetation, fine to coarse sands, dark brown, moist	0.30
	SP-FILL, poorly graded medium sands, black, moist	0.40
2	CL-SILTY CLAY, trace medium sands, trace subrounded gravel, very low plasticity, compact, orange/brown mottling throughout, moist	
4	- becoming gray at 2.2ft BGS - decrease in silts, increase in fine sands at 3.0ft BGS	
6	- becoming olive gray at 3.5ft BGS - some well graded gravels, fine, subangular to rounded brown/gray mottling, brown, moist at 5.2ft BGS	
8	- decrease in gravels and sands, moist at 6.3ft BGS - orange/brown mottling, moist at 6.8ft BGS - some well graded gravels, fine, subangular to subrounded at 7.0ft BGS - becoming brown, increase in density, dense, dry at 7.4ft BGS	8.00
10		
12	CL-SILTY CLAY (NATIVE), trace subangular fine gravel, compact, low plasticity, brittle, competent, gray, dry	12.00
14	Sandstone/shale, weathered, streaked, gray, saturated	
16		
18		
20		
22	END OF BOREHOLE @ 22.0ft BGS	22.00
24		
26		
28		
30		
32		
34		

MONITOR INSTALLATION

- CONCRETE
- BENTONITE HOLEPLUG
- SAND PACK
- WELL SCREEN

WELL DETAILS
Screened interval:
17.00 to 22.00ft BGS
Length: 5ft
Diameter: 2in
Slot Size: #10
Sand Pack:
15.00 to 22.00ft BGS
Material: SILICA SAND

SAMPLE NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
1			9	0.0
2			24	0.0
3			8	0.0
4			14	0.0
5			55	0.0
6			12	0.0
7				0.0

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 12616.GPJ CRA_CORP.GDT 8/22/02

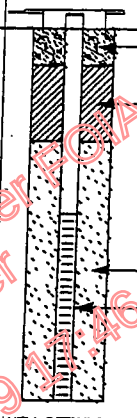
STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: REALM LANDFILL
PROJECT NUMBER: 12616-31
CLIENT: REALM
LOCATION: ELYRIA, OH

HOLE DESIGNATION: P-16T
DATE COMPLETED: May 24, 2002
DRILLING METHOD: HSA
FIELD PERSONNEL: D. NEWTON

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS
0	TOPSOIL, trace vegetation, well graded, fill sands, moist	0.40
2	CL-CLAY, silty, stiff, medium plasticity, brown, orange mottling throughout, dry	
4	- some gravel fragments mixed, compact clay at 4.5ft BGS	
6	- slightly moist, becoming friable, some well graded sands at 6.0ft BGS	
8	- gray sandstone, weathered, broken fragments, moist at 7.0ft BGS	
10	- competent gray sandstone, wet at 9.5ft BGS	10.00
12	END OF BOREHOLE @ 10.0ft BGS	

MONITOR INSTALLATION



WELL DETAILS
Screened interval:
5.00 to 10.00ft BGS
Length: 5ft
Diameter: 2in
Slot Size: #10
Sand Pack:
3.00 to 10.00ft BGS
Material: SILICA SAND

SAMPLE NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
1			9	0
2			10	0
3			18	0
4			44	0
5			>60	0

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 12616.GPJ CRA_CORP.GDT 8/22/02

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: REALM LANDFILL
PROJECT NUMBER: 12616-31
CLIENT: REALM
LOCATION: ELYRIA, OH

HOLE DESIGNATION: P-16
DATE COMPLETED: June 5, 2002
DRILLING METHOD: HSA
FIELD PERSONNEL: D. NEWTON

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS
	TOPSOIL, some sandy fill, trace vegetation, moist	0.30
	CL-CLAY, silty, medium plasticity, stiff, brown, orange mottling, dry	
	- becoming more firm, some brown angular gravel fragments at 4.8ft BGS	
	- becoming moist, friable, more sandy, gray mottling at 6.0ft BGS	
	- weathered gray sandstone, broken fragments, poorly graded fine sands mixed, moist at 7.5ft BGS	
	SANDSTONE, competent, gray, wet	9.20
	- Bedrock fracture. Sandstone bedrock pieces mixed between coarse flakes to fine beds to large chunks from the fracture, at 14.5ft BGS	
	END OF BOREHOLE @ 18.0ft BGS	18.00

MONITOR INSTALLATION: CONCRETE; BENTONITE HOLEPLUG; SAND PACK; WELL SCREEN

WELL DETAILS
Screened interval:
13.00 to 18.00ft BGS
Length: 5ft
Diameter: 2in
Slot Size: #10
Sand Pack
11.00 to 18.00ft BGS
Material: SILICA SAND

SAMPLE NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
1			10	0
2			11	0
3			16	0
4			37	0
5			53	0

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 12616.GPJ CRA_CORP.GDT 8/22/02

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Bedrock Investigation
PROJECT NUMBER: 012616-60
CLIENT: REALM
LOCATION: Realm Landfill, Elyria, Ohio

HOLE DESIGNATION: P-17
DATE COMPLETED: 26 June 2003
DRILLING METHOD: 6¼" HSA/NX Coring/4 7/8" Reaming
FIELD PERSONNEL: Brad Trytten

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft AMSL	Borehole	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE	SAMPLE PID
	GROUND SURFACE	752.16						
0	CL - CLAY (Till), silty, trace sand, firm, fine to coarse sand, moderate plasticity, poorly graded, medium brown, damp		Concrete	1		58	7	0.0
2	SC/CH - SAND and CLAY (Till), silty, trace fine gravel, firm to stiff, fine to coarse sand, high plasticity, slight dilatency, poorly graded, medium brown, wet	750.66		2		67	10	0.0
4			8 1/4 inch Ø Borehole	3		92	8	0.0
6	SM - SAND (Till), silty, clayey, trace fine gravel, firm, fine to coarse sand, non-plastic, slight dilatency, poorly graded, dark brown, wet	746.66	6 inch Ø PVC Casing					
	ML - SILT (Till), clayey, with sand, trace fine gravel, stiff to very stiff, fine to coarse sand, moderate plasticity, slight dilatency, poorly graded, dark brown, wet	745.66	2 inch Ø PVC Riser	4		75	10	0.0
8	- becomes gray brown, very stiff, damp		Bentonite Gravel	5		92	22	0.0
10								
12	Bedrock - Sandstone (Berea Formation),medium gray, silty, very fine sandstone, laminated to thin bedded, moderately cemented, low angle cross-bedded/laminated, dark gray to black mica flakes on laminations, numerous near-horizontal fractures (primarily mechanical), approximately 1/2 to 1 gpm water entering corehole, poor recovery	740.66	Bentonite Gravel	6		58	26	0.0
14	END OF OVERBURDEN HOLE @ 12.0ft BGS							
16								
18								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 12616 - ELYRIA.GPJ CRA_CORP.GDT 2/3/04

STRATIGRAPHIC AND INSTRUMENTATION LOG (BEDROCK)

PROJECT NAME: Bedrock Investigation
PROJECT NUMBER: 012616-60
CLIENT: REALM
LOCATION: Realm Landfill, Elyria, Ohio

HOLE DESIGNATION: P-17
DATE COMPLETED: 26 June 2003
DRILLING METHOD: 6¼" HSA/NX Coring/4 7/8" Reaming
FIELD PERSONNEL: Brad Trytten

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft AMSL
12	Bedrock - Sandstone (Berea Formation),medium gray, silty, very fine sandstone, laminated to thin bedded, moderately cemented, low angle cross-bedded/laminated, dark gray to black mica flakes on laminations, numerous near-horizontal fractures (primarily mechanical), approximately 1/2 to 1 gpm water entering corehole, poor recovery	740.66
14	Poor core recovery, fractures (primarily mechanical), spaced 1 to 1 1/2", numerous drilling and air compressor problems	737.16
16	Hole reamed out to 4 7/8" diameter to 16'2 ft BGS	
	Poor core recovery	735.99
18	Poor core recovery	733.91
20		
	Hole reamed out to 4 7/8" diameter	731.16
22	END OF BOREHOLE @ 22.7ft BGS	729.49
24	Bedrock material difficult to core. Temporary 6-inch diameter PVC casing installed, could not remove. RQD = 0 due to poor core recovery	
26		
28		

Borehole: Bentonite Gravel; 4 7/8 inch Ø Reamed Hole; Sand Pack; 2 inch Ø PVC Screen

RUN NUMBER	CORE RECOVERY %	RQD %
1	58	0
2	36	0
3	28	0
4	18	0

WELL DETAILS
Screened interval:
735.16 to 730.16ft AMSL
17.00 to 22.00ft BGS
Length: 5ft
Diameter: 2in
Slot Size: 10
Material: PVC
Seal:
750.16 to 737.16ft AMSL
2.00 to 15.00ft BGS
Material: Bentonite Gravel
Sand Pack:
737.16 to 729.49ft AMSL
15.00 to 22.67ft BGS
Material: #5, #7 Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

BEDROCK LOG 12616 - ELYRIA.GPJ CRA_CORP.GDT 2/3/04

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Bedrock Investigation
PROJECT NUMBER: 012616-60
CLIENT: REALM
LOCATION: Realm Landfill, Elyria, Ohio

HOLE DESIGNATION: P-18
DATE COMPLETED: 30 June 2003
DRILLING METHOD: 6¼" HSA/NX Coring/4 7/8" Reaming
FIELD PERSONNEL: Brad Trytten

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft AMSL	Monitoring Well	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE	SAMPLE PID
	GROUND SURFACE	748.47						
0	CH - CLAY (Till), silty, with sand, firm to stiff, fine to coarse sand, moderate plasticity, poorly graded, medium brown to medium orange brown, moist, occasional pebble		Concrete	1		75	12	0.0
2	- sandstone cobble			2		58	13	0.0
4			8 1/4 inch Ø Borehole	3		67	9	0.0
6	- 12" of gray, silty till, wet - becomes dark brown, mottled with gray		2 inch Ø PVC Riser	4		75	24	0.0
8			6 inch Ø PVC Casing	5		75	33	0.0
10	- becomes dark gray, moist to wet, occasional sandstone fragments, coarse gravel to cobble size		Bentonite Gravel	6		33	50/4"	0.0
12	Sandstone Boulder (misidentified as bedrock) - Hole reamed out to 12.3 ft, collapsed to 11.67 ft	736.97	Bentonite Gravel					
14	CL - CLAY, silty, trace sand, trace gravel, hard, fine to coarse sand, fine gravel, low plasticity, poorly graded, dark brown, moist to wet, occasional thin sandy zones	734.97	4 7/8 inch Ø Reamed Hole	7		83	79	0.0
16				8		83	68	0.0
17	END OF OVERBURDEN HOLE @ 17.0ft BGS							
18								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 12616 - ELYRIA.GPJ CRA_CORP.GDT 2/3/04

STRATIGRAPHIC AND INSTRUMENTATION LOG (BEDROCK)

PROJECT NAME: Bedrock Investigation
PROJECT NUMBER: 012616-60
CLIENT: REALM
LOCATION: Realm Landfill, Elyria, Ohio

HOLE DESIGNATION: P-18
DATE COMPLETED: 30 June 2003
DRILLING METHOD: 6¼" HSA/NX Coring/4 7/8" Reaming
FIELD PERSONNEL: Brad Trytten

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft AMSL	Monitoring Well	RUN NUMBER	CORE RECOVERY %	RQD %
		731.47				
18	BEDROCK, shale, dark gray-green, highly weathered to clay, laminated, with fragments of less weathered shale - Collected Split Spoon from 17.5' to 18.5', (100% Recovery, N>85) - becomes dark red-brown, gradational color change - 10" shale fragements recovered by coring from 18.5 to 24 ft BGS, few fragments dark gray-green, most dark red-brown					
20				1	10"	
22						
24	- alternating thin layers of gray-green and red-brown shale, collected with Split Spoon Sampler from 24' to 24.5' (67% Recovery, N>100) - borehole reamed out, dry red-brown shale cuttings in air return		Sand Pack			
26	- red-brown shale fragments recovered by coring, hole reamed out, Split Spoon Sampler Driven from 25.5' to 26' (2" Recovery, N>100) - core 25.5 to 28 ft BGS, recover 10 inches of red-brown weathered shale fragments, to 1.5 inch long axis		2 inch Ø PVC Screen	2	10"	
28	END OF BOREHOLE @ 28.3ft BGS	720.14				
30						
32						
34						

WELL DETAILS
Screened interval:
725.30 to 720.14ft AMSL
23.17 to 28.33ft BGS
Length: 5.16ft
Diameter: 2in
Slot Size: 10
Material: PVC
Seal:
746.47 to 727.47ft AMSL
2.00 to 21.00ft BGS
Material: Bentonite Gravel
Sand Pack:
727.47 to 720.14ft AMSL
21.00 to 28.33ft BGS
Material: #5, #7 Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

BEDROCK LOG 12616 - ELYRIA.GPJ CRA_CORP.GDT 2/3/04

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Bedrock Investigation
PROJECT NUMBER: 012616-60
CLIENT: REALM
LOCATION: Realm Landfill, Elyria, Ohio

HOLE DESIGNATION: P-19
DATE COMPLETED: 27 June 2003
DRILLING METHOD: 6¼" HSA/NX Coring/4 7/8" Reaming
FIELD PERSONNEL: Brad Trytten

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft AMSL	Monitoring Well	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE	SAMPLE PID
	GROUND SURFACE	747.59						
0	CH - CLAY (Till), silty, with sand, firm to very stiff, fine to coarse sand, moderate plasticity, poorly graded, orange brown, mottled gray, moist, occasional pebbles - near-vertical fracture, mottled gray, rootlets		Concrete	1		92	7	0.0
2				2		75	1	0.0
4			6 inch ∅ PVC Casing 8 1/4 inch ∅ Borehole	3		96	18	0.0
6	- near-vertical fracture, mottled gray, becomes trace fine gravel		2 inch ∅ PVC Riser Bentonite Gravel	4		100	31	0.0
8		739.09		5		0	>50	0.0
10	BEDROCK - Sandstone (Berea Formation), silty, very fine to fine sand, orange-brown, thin bedded, some fragments light gray - Hole reamed out to 10 ft BGS END OF OVERBURDEN HOLE @ 10.0ft BGS		Bentonite Gravel					
12								
14								
16								
18								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 12616 - ELYRIA.GPJ CRA_CORP.GDT 2/3/04

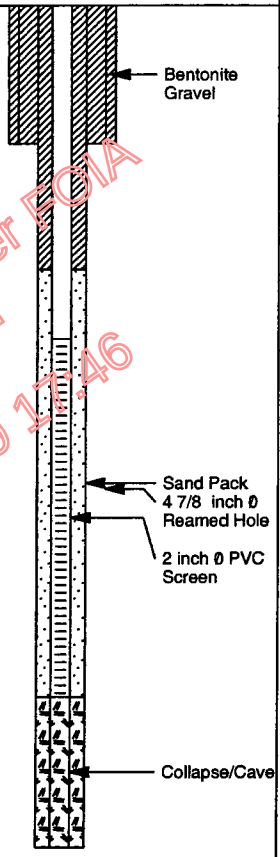
STRATIGRAPHIC AND INSTRUMENTATION LOG (BEDROCK)

PROJECT NAME: Bedrock Investigation
PROJECT NUMBER: 012616-60
CLIENT: REALM
LOCATION: Realm Landfill, Elyria, Ohio

HOLE DESIGNATION: P-19
DATE COMPLETED: 27 June 2003
DRILLING METHOD: 6¼" HSA/NX Coring/4 7/8" Reaming
FIELD PERSONNEL: Brad Trytten

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft AMSL
	BEDROCK - Sandstone (Berea Formation), silty, very fine to fine sand, orange-brown, thin bedded, some fragments light gray	739.09
10	- Hole reamed out to 10 ft BGS	
	- becomes silty, very fine sand, medium gray no core recover from 10.5' to 15', drove very hard boulder into bedrock	
12		
14	sample collected with split Spoon Sampler from 14' to 15.5' (89% Recovery, N=134), dark gray shale, highly weathered to clay, with shale fragments, dark gray	733.59
	light gray, silty, very fine sandstone, moderately cemented	733.42
	dark gray weathered shale	733.09
	light gray, silty, very fine sandstone	732.92
	dark gray weathered shale	732.67
16	sample collected with Split Spoon Sampler from 16' to 17.5' (89% Recovery, N>140), interbedded highly weathered shale, dark gray with siltstone, medium gray-brown, and silty very fine sandstone, light gray, borehole reamed out to 17.5'	732.26
	light gray-green, silty very fine sandstone, colected with Split Spoon Sampler (17% Recovery, N>100), hole reamed out to 18' 3"	730.09
18	- Hole reamed out, collapsed to 18'	729.09
20	END OF BOREHOLE @ 20.2ft BGS	727.42
22		
24		
26		

Monitoring Well



WELL DETAILS
Screened interval:
734.76 to 729.59ft AMSL
12.83 to 18.00ft BGS
Length: 5.17ft
Diameter: 2in
Slot Size: 10
Material: PVC
Seal:
745.59 to 735.76ft AMSL
2.00 to 11.83ft BGS
Material: Bentonite Gravel
Sand Pack:
735.76 to 729.59ft AMSL
11.83 to 18.00ft BGS
Material: #5, #7 Sand

RUN NUMBER	CORE RECOVERY %	RQD %
1	3%	0

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

BEDROCK LOG 12616 - ELYRIA.GPJ CRA_CORP.GDT 2/3/04

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Bedrock Investigation
PROJECT NUMBER: 012616-60
CLIENT: REALM
LOCATION: Realm Landfill, Elyria, Ohio

HOLE DESIGNATION: P-20
DATE COMPLETED: 1 July 2003
DRILLING METHOD: 6¼" HSA/NX Coring/4 7/8" Reaming
FIELD PERSONNEL: Brad Trytten

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft AMSL	Monitoring Well	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE	SAMPLE PID
	GROUND SURFACE	745.98						
	Topsoil	745.81						
	SP - SAND, trace silt, loose, fine to coarse sand, poorly graded, medium gray brown, wet	745.48						
	CH - CLAY (Till), silty, with sand, firm to stiff, moderate plasticity, poorly graded, orange brown, mottled dark gray, moist, occasional pebble		Concrete	1		58	16	0.0
2				2		67	15	0.0
4	- becomes olive brown - 3" layer of CH - Clay, soft, dark gray green, wet		6 inch Ø PVC Casing 8 1/4 inch Ø Borehole	3		67	12	0.0
6			Bentonite Gravel 2 inch Ø PVC Riser	4		67	16	0.0
	BEDROCK - Sandstone, very fine to fine sand, light orange to gray	738.98						
8	- Hole reamed out to 9'							
10	- becomes medium gray-green sandstone, fine to coarse grained, well cemented, unfractured, cross-bedded, occasional dark gray streaks, (possibly plant material), occasional pyrite nodules 1 to 4mm END OF OVERBURDEN HOLE @ 9.0ft BGS							
12								
14								
16								
18								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 12616 - ELYRIA.GPJ CRA_CORP.GDT 2/3/04

STRATIGRAPHIC AND INSTRUMENTATION LOG (BEDROCK)

PROJECT NAME: Bedrock Investigation
PROJECT NUMBER: 012616-60
CLIENT: REALM
LOCATION: Realm Landfill, Elyria, Ohio

HOLE DESIGNATION: P-20
DATE COMPLETED: 1 July 2003
DRILLING METHOD: 6¼" HSA/NX Coring/4 7/8" Reaming
FIELD PERSONNEL: Brad Trytten

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft AMSL	Monitoring Well	RUN NUMBER	CORE RECOVERY %	RQD %
10	- becomes medium gray-green sandstone, fine to coarse grained, well cemented, unfractured, cross-bedded, occasional dark gray streaks, (possibly plant material), occasional pyrite nodules 1 to 4mm - probable fracture, orientation unknown Shale, red-brown, laminated, weathered to clay, trace silt, damp to moist, with fragments of less weathered shale	735.98	Bentonite Gravel	1	20	0
12						
14	- Collected Split Spoon Sample from 14' to 15' (100% Recovery, N>110)		Sand Pack 4 7/8 inch Ø Reamed Hole 2 inch Ø PVC Screen			
16						
18	- Collected Split Spoon Sample from 16.5' to 17.5' (100% Recovery, N>105)	727.81				
20	END OF BOREHOLE @ 18.5ft BGS					
22						
24						
26						

WELL DETAILS
Screened interval:
732.98 to 727.81ft AMSL
13.00 to 18.17ft BGS
Length: 5.17ft
Diameter: 2in
Slot Size: 10
Material: PVC
Seal:
743.98 to 734.90ft AMSL
2.00 to 11.08ft BGS
Sand Pack:
734.90 to 727.81ft AMSL
11.08 to 18.17ft BGS
Material: #5, #7 Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

BEDROCK LOG 12616 - ELYRIA.GPJ CRA_CORP.GDT 2/3/04

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Bedrock Investigation
PROJECT NUMBER: 012616-60
CLIENT: REALM
LOCATION: Realm Landfill, Elyria, Ohio

HOLE DESIGNATION: P-21
DATE COMPLETED: 2 July 2003
DRILLING METHOD: 6¼" HSA/NX Coring/4 7/8" Reaming
FIELD PERSONNEL: Brad Trytten

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft AMSL
	GROUND SURFACE	748.40
0	CLAY (FILL), silty, with sand, trace gravel, hard, fine to coarse sand, fine gravel, moderate plasticity, poorly graded, medium brown, to medium gray-brown, damp, crumbly	
2	- Sandstone cobble	
4	CH - CLAY (TILL), silty, with sand, trace gravel, very stiff to hard, fine to coarse sand, fine gravel, moderate plasticity, poorly graded, orange brown, mottled gray, moist	744.40
6		
8	- becomes medium gray, wet	
	- Sandstone cobble	
10	SM - SAND (Till), silty, clayey, with gravel, hard, very fine to fine sand, fine to coarse gravel, slight plasticity, slight dilatency, poorly graded, dark gray, wet	738.40
12	BEDROCK - weathered sandstone, very fine to fine sand, clayey, (auger flight samples), dark gray, wet	736.40
14	END OF OVERBURDEN HOLE @ 14.0ft BGS	
16		
18		

Monitoring Well: Concrete; 8 1/4 inch Ø Borehole; 2 inch Ø PVC Riser; 6 inch Ø PVC Casing; Bentonite Gravel; Bentonite Gravel

SAMPLE NUMBER	INTERVAL	REC (%)	'N' VALUE	PID
1		95	31	0.0
2		16	56	0.0
3		95	32	0.0
4		100	22	0.0
5		90	37	0.0
6		100	66	0.0
7		0	>50	NA

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 12616 - ELYRIA.GPJ CRA_CORP.GDT 2/3/04

STRATIGRAPHIC AND INSTRUMENTATION LOG (BEDROCK)

PROJECT NAME: Bedrock Investigation
PROJECT NUMBER: 012616-60
CLIENT: REALM
LOCATION: Realm Landfill, Elyria, Ohio

HOLE DESIGNATION: P-21
DATE COMPLETED: 2 July 2003
DRILLING METHOD: 6¼" HSA/NX Coring/4 7/8" Reaming
FIELD PERSONNEL: Brad Trytten

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft AMSL	Monitoring Well	RUN NUMBER	CORE RECOVERY %	RQD %
14	BEDROCK - weathered sandstone, very fine to fine sand, clayey, (auger flight samples), dark gray, wet	736.40	4 7/8 inch ∅ Reamed Hole			
16	- sandstone, medium gray-green, very fine to fine sand, silty, massive to laminated, cross-bedded where laminated, occasional black specks and streaks, mechanical fractures 1 1/" - 2" spacing			1	39	0
18	BEDROCK - Shale, green, weathered to clay with less weathered shale fragments, laminated, dry to damp, collected with Split Spoon Sampler from 18' to 20' (83% Recovery, N=85)	730.40	Sand Pack 2 inch ∅ PVC Screen			
20	- red-brown, near vertical fracture - Collected Split Spoon Sample from 20' to 21' (50% Recovery, N>50)					
22	END OF BOREHOLE @ 22.0ft BGS	726.40				
24						
26						
28						
30						

WELL DETAILS
Screened interval:
732.40 to 727.23ft AMSL
16.00 to 21.17ft BGS
Length: 5.17ft
Diameter: 2in
Slot Size: 10
Material: PVC
Seal:
746.40 to 733.90ft AMSL
2.00 to 14.50ft BGS
Material: Bentonite Gravel
Sand Pack:
733.90 to 726.40ft AMSL
14.50 to 22.00ft BGS
Material: #5, #7 Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

BEDROCK LOG 12616 - ELYRIA.GPJ CRA_CORP.GDT 2/3/04

APPENDIX E

Field Sampling/Logging Forms

>>> Select a Laboratory <<<

#N/A
#N/A
#N/A
#N/A

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc.

Client Contact	**Project Manager:**	**Site Contact:**	**Date:**	COC No:
Your Company Name here	**Tel/Fax:**	**Lab Contact:**	**Carrier:**	_____ of _____ COCs
Address	**Analysis Turnaround Time**			Sampler:
City/State/Zip	☐ CALENDAR DAYS ☐ WORKING DAYS			**For Lab Use Only:**
(xxx) xxx-xxxx Phone	TAT if different from Below _____			Walk-in Client:
(xxx) xxx-xxxx FAX	☐ 2 weeks			Lab Sampling:
Project Name:	☐ 1 week			
Site:	☐ 2 days			Job / SDG No.:
P O #	☐ 1 day			

Sample Identification	**Sample Date**	**Sample Time**	**Sample Type (C=Comp, G=Grab)**	**Matrix**	**# of Cont.**	**Filtered Sample (Y / N)**	**Perform MS / MSD (Y / N)**																Sample Specific Notes:

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☐ Disposal by Lab ☐ Archive for_____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd:_____ Corr'd:_____ Therm ID No.:_____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

HALEY & ALDRICH

DAILY FIELD REPORT

Page of

Project		**Report No.**	
Location		**Date**	
Client		**Page**	of
Contractor		**File No.**	
Weather		**Temperature**	

Field Representative(s)	**Time on site**	**Report/Travel/Other**	**Total hours**

Distribution:

Haley & Aldrich, Inc.

HALEY & ALDRICH

GROUNDWATER MONITORING REPORT

OW/PZ NUMBER

Page of

PROJECT ______ H&A FILE NO. ______
LOCATION ______ PROJECT MGR. ______
CLIENT ______ FIELD REP. ______
CONTRACTOR ______ DATE ______
ELEVATION OF REFERENCE POINT ______ REFERENCE POINT: Ground Surface ☐ PVC ☐ Other ☐

Date	Time	Elapsed Time (days)	Depth of Water from Reference Point	Elevation of Water	Remarks	Read By

HALEY & ALDRICH

LOW-FLOW SAMPLING FIELD FORM

Monitoring Well I.D.:	Date:	Time Started:	File Number:
Weather Conditions:		Time Ended:	Field Personnel:

Initial Readings

Measured Well Bottom (TOR-ft)	Riser Pipe Diameter (in.)
Measured Water Level (TOR-ft)	PID background (ppm)
Notes:	PID headspace (ppm)

Well Condition

Well Riser Type (place an X in one box)		Stainless Steel		Carbon Steel		PVC

Casing Condition:	OK		Repair Required:
Cap Condition:	OK		Repair Required:
Paint Condition:	OK		Repair Required:
Lock Condition:	OK		Repair Required:
Inner Casing Condition:	OK		Repair Required:
Surface Seal Condition:	OK		Repair Required:
Other:	OK		Repair Required:

Purge Information

Purging Method:		Peristaltic Pump		Bladder Pump		Grundfos Pump		Other:

Purge Start Time:	
Water Level Prior to Purging (TOR ft.)	Water Level After Purging (TOR ft.)
Amount Purged:	Flow Rate (mL per minute):
Comments:	

Time Elapsed (min)	Temperature (deg C)	pH	Conductivity (mS/cm)	Turbidity (NTUs)	Dissolved Oxygen (mg/L)	Redox (ORP)	Water Level (TOR ft)	Comments

Sampling Information

Date:	Time Sampled:	Field Personnel:

Measured Water Level (TOR ft):										
Sampling Method: (place X in box)		Stainless Steel Bailer		Peristaltic Pump		Grundfos Pump		Teflon Bailer
		Polyethylene Bailer		Bladder Pump		Other:		

Analysis:	
Sample ID:	
Odor:	Appearance:
QA/QC Samples Taken:	
Comments:	

Sampler (Print)	Sampler (signature):	Date:

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LOW-FLOW GROUNDWATER SAMPLING RECORD

Page of

PROJECT		**H&A FILE NO.**	
LOCATION		**PROJECT MGR.**	
CLIENT		**FIELD REP**	
CONTRACTOR		**DATE**	

GROUNDWATER SAMPLING INFORMATION

Well ID		
Depth Of Well (ft.) per Log		
Reference Mark		
Depth to Water from Reference Mark (ft.)		
Time		
Depth to Product (ft.)		
Field Measured Depth Of Well (ft.)		
Inside Diameter (in.)		
Standing Water Depth (ft.)		
Volume Of Water In Well (gallons/liters)		
Purging Device		
Volume of Bailer/Pump Capacity		
Cleaning Procedure		
Bails Removed/ Volume Removed		
Time Purging Started		
Time Purging Stopped		
Instrument Used to Monitor Field Parameters		
Sampling Device		
Cleaning Procedure		
Color		
Odor		

TIME SAMPLES TAKEN	VOA		
	ABN		
	Metals		

PARAMETERS	Time													
	Temp, C													
	Conductivity (umhos/cm)													
	Dissolved Oxygen (mg/L)													
	pH													
	ORP													
	Drawdown Ft													
	Volume purged/Gals													
	Turbidity (NTU)													

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

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EQUIPMENT CALIBRATION LOG

Project Name: _____
Location: _____
Model Name: _____
Model Number: _____

Employee Signature: _____
Employee Name: _____
Cal. Standards: _____
Serial Number: _____

Date	Time	GW Monitoring Standard						Calibration/Check Results						PID Standard	Calibration/ Check Result	Calibration?	Check?
		pH	Temp.	Cond.	ORP	DO	Turb.	pH	Temp.	Cond.	ORP	DO	Turb.				

Other Comments: _____