

GROUNDWATER MONITORING PLAN REVERE SMELTING & REFINING CORPORATION MIDDLETOWN, NEW YORK, EPA ID NO. NYD030485288

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1 INTRODUCTION

Revere Smelting & Refining Corporation (Revere) operates a secondary lead smelter facility located at 65 Ballard Road in the Town of Wallkill, Orange County, New York. Revere conducts operations at the facility including the storage, treatment, and management of hazardous wastes as defined by New York State Department of Environmental Conservation (NYSDEC) rules and regulations. NYSDEC issued permit # 3-3352-00145/00001-0 to Revere for operation of a hazardous waste management facility.

Historical environmental investigations have identified impacts to environmental media (soil, sediment, and groundwater) as a result of operations at the site. Lead and arsenic are the primary contaminants of concern. The NYSDEC and Revere signed an Order of Consent (#C3-5288-11--98) in March 1999 that required Revere to update, modify, and develop a groundwater monitoring plan (GWMP) for the facility. Since 1999, the GWMP has been modified on several occasions with the approval of the NYSDEC. The November 2016 version of the GWMP superseded all previous versions and was produced to account for changes at the facility resulting from new construction and the implementation of various remediation projects. Revision No. 1 to the GWMP incorporates additional piezometers that were installed in September 2018 in accordance with the August 2017 addendum (WSP 2017) to the Groundwater Extraction System Monitoring and Contingent Expansion Work Plan for Operable Unit 4 dated September 24, 2014, and revised November 9, 2016 (WSP 2016).

Revere entered into a Consent Order (Order; Index # 3-20100528-80) with the NYSDEC on February 1, 2011 to investigate impacts within each of the following OUs, which were defined to prioritize corrective action and remediation activities on the site (Sheet 1):

- OU1 all environmental media, other than groundwater (OU2), on property currently owned by Eco-Bat to the east of Ballard Road in the Town of Wallkill, Orange County, New York (Tax Parcels 41-1-70.21, 41-1-70.22, 41-1-70.23, 41-1-71.22, 41-1-73.1, 41-1-73.22, 41-1-74.82, and 41-1-76), except for the Facility (OU4), and all environmental media, other than groundwater, not owned by Eco-Bat in the Town of Wallkill, Orange County, New York within Tax Parcels 60-1-120 and 41-1-72.2.
- OU2 all onsite groundwater.
- OU3 all offsite media impacted by Revere's activities, except environmental media other than groundwater on property not owned by Eco-Bat that is included in OU1.
- OU4 the Facility.

Revere is in varying stages of the Remedial Investigation/Feasibility Study (RI/FS) and Remedial Design/Remedial Action (RD/RA) process for OU1, OU2, and OU3 and the RCRA Facility Investigation/Corrective Measures Study (RFI/CMS) process for OU4.

A Corrective Measures Study (CMS) for OU4 was prepared by ENTACT LLC (ENTACT), on behalf of Revere, and submitted to the NYSDEC on February 7, 2014¹ (ENTACT 2014). The purpose of the CMS was to develop and evaluate corrective measures alternatives that address risks to human health and the environment from exposures to impacted soils and source materials within OU4. Due to the current and expected future operations of the facility, Revere has determined that the implementation of final corrective measures is not practical or feasible and that a phased approach is warranted:

- Phase 1 Interim Corrective Measures (ICMs) that will be implemented to address risks based on current land use and
 are consistent with the continued operations of the facility.
- Phase 2 Final Corrective Measures that are implemented upon cessation of operations at the facility.

The final corrective measure alternatives are discussed in detail in the February 7, 2014, CMS. Each of the four alternatives involve the use of existing OU4 surface cover (i.e. asphalt surface, concrete surface, building foundation, vegetated soil covers, gravel) and completion of the barrier wall system around the facility as the ICM to address risks based on current land use. On February 19, 2015, WSP submitted the Interim Corrective Measure Completion Report – Phase III Barrier Wall Installation and Phase I and II Barrier Wall Extensions - Operable Unit 4 (WSP 2015a), which presents the complete barrier

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¹ The February 7, 2014 CMS was Revision 2.0.

wall system that encircles OU4. Sheet 1 shows the barrier wall system location and the location of groundwater extraction wells installed inside the barrier wall that provide hydraulic groundwater containment.

In September 2015, an OU1 Phase III Containment Cell Groundwater Monitoring Work Plan (WSP 2015b) was prepared and submitted to the NYSDEC. This work plan included details regarding the installation of four proposed well pairs located around the containment cell to monitoring groundwater conditions upgradient and downgradient of the cell in accordance with 6 NYCRR Part 360-2.11. The NYSDEC approved the work plan with modifications, including an additional well pair, in a letter dated October 23, 2015 (NYSDEC 2015). Wells were installed at three of the proposed locations (MW-28, MW-29, and MW-30) in 2015, while the remaining well pairs (MW-31 and MW-32) were installed in September 2016. In addition, monitoring well pair MW-23S/D and well MW-26, which were abandoned during construction activities associated with the Wet Electrostatic Precipitator (WESP), and an additional well (MW-33S) in the former Eastern Fill Area (EFA) were installed in September 2016.

The monitoring program specified in the Groundwater Extraction System Monitoring and Contingent Expansion Work Plan includes quarterly collection of water level data from monitoring wells and piezometers located on either side of the hydraulic containment system. Piezometer pairs were previously installed on the upgradient and downgradient sides of the Phase I and II barrier walls, but were not yet completed along the Phase III alignment due to construction of the WESP building. In addition, piezometer PZ-14 was abandoned in April 2014 as part of the Phase IIB Remedial Design/Remedial Action (RD/RA) and required replacement. The construction of the WESP building was completed in 2017, and the new and replacement piezometers were installed in September 2018.

During the May 2016 quarterly groundwater sampling event, it was discovered that monitoring well MW-25S was damaged. In a letter dated September 8, 2017, the NYSDEC approved removal of this monitoring well from the GWMP. This modification is reflected in Table 1.

Any additional wells damaged or destroyed by construction or other actions in the future shall be replaced (if warranted) in consultation with the NYSDEC and will also be incorporated into this GWMP.

2 GROUNDWATER MONITORING PLAN

Revere collects groundwater quality samples from monitoring wells installed in the unconsolidated and bedrock aquifer system at the Revere facility. With the additional wells installed in 2015 and 2016 and excluding monitoring well MW-25S, Revere currently has 34 active groundwater monitoring wells (21 overburden wells and 13 bedrock wells) located within the boundaries of OU1 and OU4 (Sheet 1). In addition, one barrier wall piezometer (PZ-13) is included in the groundwater sampling program. Monitoring well and piezometer construction details for all of the wells installed at the site are included in Table 1², while available boring logs and construction diagrams are included in Appendix A.

Revere performs "property line compliance" monitoring with respect to the unconsolidated and bedrock aquifer system. Property line compliance means that the unconsolidated and bedrock aquifer monitoring wells are or will be situated in the vicinity of Reveres' downgradient southern property boundary. Based upon historical groundwater elevation data collected from existing monitoring wells, groundwater flow in the unconsolidated aquifer is toward the south–southeast. Groundwater flow in the bedrock aquifer also appears to flow toward the south–southeast.

2.1 UNCONSOLIDATED AQUIFER

Revere collects groundwater quality samples from 21 monitoring wells and one piezometer installed in the unconsolidated material aquifer. The shallow monitoring wells and piezometers that are currently part of the facility's GWMP are shown on Table 1. The unconsolidated aquifer monitoring well locations are presented in Sheet 1. These monitoring wells are installed in and around the facility to monitor the unconsolidated aquifer. MW-18S is located upgradient of the Middletown facility and represents background groundwater quality. The existing unconsolidated monitoring wells are sufficient to monitor groundwater quality and to determine groundwater flow direction upgradient and downgradient of the Middletown facility.

Monitoring wells MW-31S and MW-32S were installed in September 2016 and added to the GWMP to complete the groundwater monitoring network in the unconsolidated aquifer upgradient and downgradient of the containment cell. The locations of these wells are also shown on Sheet 1. All of the containment cell wells are located within 50 feet of the cell, well MW-28S is located approximately 600 feet upgradient of MW-29S, and the downgradient wells are located approximately 200 feet on center.

2.1.1 SHALLOW MONITORING WELL INSTALLATION

The existing shallow monitoring wells at the site have been installed by various drilling contractors and consultants over the past three decades. WSP understands that the majority of the wells were installed using hollow-stem auger methods. While WSP does not have detailed well construction information for all of the shallow monitoring wells, the following section describes a typical hollow-stem auger installation methodology for shallow monitoring wells at the site. With the exception of the wells that were installed in September 2016 using rotosonic techniques, the shallow wells installed under WSP's oversight were constructed following this methodology.

The shallow borings would have been advanced through the overburden using either a truck-mounted or track-mounted drill rig equipped with minimum 4.25-inch inside-diameter (ID) hollow-stem augers. Continuous split-barrel or macro-core soil samples would have typically been collected until the final termination depth of the well. On retrieval, the soil would have been logged and classified according to the Unified Soil Classification System (refer to the available boring logs in Appendix A). The September 2016 wells were installed using a track-mounted drill rig equipped with a 4-inch core barrel and logged as described above.

The wells were typically constructed with 2-inch diameter Schedule 40 polyvinyl chloride (PVC) casing fitted with 0.010-inch slotted PVC screen. Screen lengths for each shallow monitoring well are included on Table 1. Once the casings were installed, a quartz sand filter pack (typically U.S. Silica #1, or equivalent) would have been placed in the annular space

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² Well names were revised in January 2016 with an S, I, or D to indicate overburden, intermediate, or bedrock wells.

between the casing and the surrounding formation. The sand would have been installed to a level approximately 1-foot above the top of the screened interval and topped with approximately 3-feet of bentonite to form a seal. Once the seal had set, a bentonite-cement grout would have been installed to fill the remaining annular space. The wellheads were completed with either flush-mounted protective covers or above-grade stick-ups set in a concrete pad. The inner casings of the wells were fitted with watertight lockable caps.

All downhole drilling equipment and the split spoon samplers would have been decontaminated following NYSDEC-approved procedures. Soil cuttings generated during well installation would have been placed in appropriate containers and transported to an onsite temporary storage area for characterization before final disposal.

Future shallow groundwater monitoring wells will be installed in a similar manner, with the exception that other drilling methods, such as rotosonic techniques, may be implemented on a case by case basis with the approval of the NYSDEC.

2.2 BEDROCK AQUIFER

Bedrock monitoring wells located at the facility are also listed on Table 1. Monitoring well MW-29I (intermediate) was installed at the proposed location for monitoring well MW-29D; however, during construction this well could not be completed to the design depth and was installed to 12 feet bgs. Because this well is double-cased and screened within the weathered shale siltstone and not the overburden, this well is considered to be a bedrock monitoring well. Available groundwater elevation data for the bedrock wells indicate groundwater flow direction in the bedrock aquifer toward the south-southeast. Bedrock monitoring well MW-18D was installed upgradient of the Middletown facility to determine background water quality. The bedrock monitoring wells have allowed for evaluation of groundwater quality and groundwater migration in the bedrock aquifer.

Wells MW-31D and MW-32D were installed in September 2016 and added to the GWMP to complete the monitoring well network in the bedrock aquifer upgradient and downgradient of the containment cell. The locations of these wells are also shown on Sheet 1. All of the containment cell wells are located within 50 feet of the cell, well MW-28D is located approximately 600 feet upgradient of MW-29D, and the downgradient wells are located approximately 200 feet on center.

2.2.1 BEDROCK MONITORING WELL INSTALLATION

The existing bedrock monitoring wells were installed as double cased wells with an outer metal casing having a minimum six-inch (inner) diameter. The outer conductor casing was installed to seal off groundwater in the unconsolidated aquifer and the weathered, fractured bedrock horizon.

The initial soil boring for each existing well was advanced through the unconsolidated material using minimum 10.25-inch (inner) diameter hollow stem augers and split spoon samplers or rotosonic techniques. The hollow stem augers or core barrels were advanced into the top of the weather bedrock horizon to refusal. Bedrock coring techniques were used to advance the bore hole approximately five feet through the weathered bedrock until competent bedrock was encountered. After competent bedrock was encountered, the bedrock portion of the borehole was reamed with a minimum of 6.25-inch diameter roller bit. The reamed borehole was cleaned of drill cuttings. The conductor casing was set into the bedrock socket and grouted in place using a cement bentonite grout. Once the conductor casing was positioned, the grout was allowed to cure for a minimum of 24 hours before the borehole was advanced into the underlying bedrock. Casing centralizers were placed on the conductor casings when the conductor casings exceed 80 feet in total length to properly align the conductor case in the borehole. Centralizers were placed approximately every 15 to 20 feet of casing length.

The bedrock monitoring wells were installed using a two-inch Schedule 40 polyvinyl chloride (PVC) riser casing and 0.010-inch slotted well screen installed through the conductor casing. Ten feet of two-inch (inner) diameter well screen was placed in the bottom of the bore hole. The annular space between the well screen and the boring wall was fitted with filter pack material consisting of clean quartz and compatible with the screen slot size. The filter pack was extended to one foot from the top of the well screen. A one-foot thick fine sand layer was placed above the filter pack material. A bentonite pellet seal, a minimum of two-feet in thickness was placed above the fine sand layer. Depending on the depth at which the bedrock aquifer was encountered, the bentonite pellet seal was extended in the bottom of the conductor casing to eliminate cross communication between the unconsolidated material / weather bedrock horizon and the bedrock aquifer. The remaining

annular space was filled with a cement bentonite grout to within three feet of the original grade. The cement bentonite grout was pumped into the borehole starting at the top of the bentonite seal and proceeding upward using a tremie pipe.

The bedrock monitoring wells were completed above grade by installing a metal sono-tube protective surface casing to prevent well head damage due to frost heaving. The sono-tube was cemented into place and fitted with a lock cap. The PVC monitoring wells were fitted with a bottom and top end cap. One exception is for well MW-21D, which was completed as a flush mount well. Casing centralizers were placed on the monitoring wells casings as necessary, and any well that had a termination depth of greater than 30 feet. The first centralizer was placed approximately two feet above the top of the well screen and every 15 feet thereafter.

All downhole drilling equipment and the split spoon samplers were decontaminated following NYSDEC-approved procedures.

Soil and bedrock cuttings generated during bedrock well installation were placed in appropriate containers and transported to an onsite temporary storage area for characterization before final disposal.

Future bedrock groundwater monitoring wells will be installed in a similar manner, with the exception that other drilling methods, such as rotosonic techniques, may be implemented on a case by case basis with the approval of the NYSDEC.

2.3 BARRIER WALL PIEZOMETERS

Piezometer clusters were installed upgradient and downgradient of the barrier wall for measuring groundwater levels in the unconsolidated aquifer. The groundwater elevation data collected from the piezometers is used to evaluate the effectiveness of the barrier wall in retarding groundwater migration through the barrier structure.

Revere installed piezometer clusters (PZ-1 through PZ-25³) for measuring groundwater levels in the unconsolidated aquifer. PZ-14 was removed as part of on-going remediation efforts being completed at the facility; replacement piezometer PZ-14R was installed in September 2018 as shown on Sheet 1. The piezometer clusters are positioned on an approximate 300-foot spacing along the completed eastern sections of the barrier wall.

2.3.1 PIEZOMETER INSTALLATION

Soil borings for piezometer installation were advanced through the unconsolidated materials using either minimum 2.25-inch (inner) diameter hollow stem augers (PZ-1 through PZ-18⁴) or rotosonic techniques (PZ-14R and PZ-19 through PZ-25). Split spoon or 5-foot interval continuous core samples were retrieved from the borings and logged by an onsite hydrogeologist.

The piezometers were constructed of two-inch (inner) diameter schedule 40 PVC riser casing and well screen. The PVC well screen consists of 2-inch 0.010-inch machine slots. On reaching the bedrock surface, bentonite pellets were placed in the bottom two-foot sections of the boring and topped with six-inches of sand material. The well screen was placed into the boring from the top of the sand material to the depth at which the unconsolidated groundwater table was encountered.

The annular space between the well screen and the boring wall was fitted with filter pack material consisting of clean quartz and compatible with the screen slot size. The filter pack was extended to one foot from the top of the well screen top. A minimum two-foot thick bentonite pellet seal was placed above the filter pack material. The remaining annular space was filled with a cement bentonite grout within three feet of the original grade. Above grade protective metal casing sono-tube structures were installed on each piezometer, with the exception of piezometers PZ-5 and PZ-21 through PZ-25, which were

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³ Piezometer PZ-26 was also installed in September 2018. As described in the October 30, 2018, Completion Report for the August 2017 Addendum to the Groundwater Extraction System Monitoring and Contingent Expansion Work Plan for Operable Unit 4 (WSP 2018), piezometer PZ-26 will be abandoned with the approval of the NYSDEC and is therefore not included in this GWMP.

⁴ Piezometers PZ-15 though PZ-18 were installed in 2011 to determine depth to water for the design of the containment cell. These piezometers have since been removed.

installed in flush mount protective casings to prevent damage by vehicular traffic. Additionally, as the result of a grade change, access to piezometer PZ-7 is now through a protective manhole cover. The sono-tubes were fitted with locking caps.

Piezometers installed to a depth greater than 30 feet were fitted with casing centralizers to properly align the PVC casing and well screen to the borehole. Each piezometer was fitted with a bottom and top end cap. Piezometers installed in the facility operational areas were completed with appropriately sized, flushed mount curb boxes so that the piezometers will not restrict facility traffic.

All downhole drilling equipment and the split-spoon samplers were decontaminated following NYSDEC-approved procedures.

Soil and bedrock cuttings generated during piezometer installation were placed in appropriate containers and transported to an onsite temporary storage area for characterization prior to proper disposal.

Future piezometers will be installed in a similar manner, with the exception that other drilling methods, such as rotosonic techniques, may be implemented on a case by case basis with the approval of the NYSDEC.

2.4 MONITORING WELL AND PIEZOMETER DEVELOPMENT

The monitoring wells and piezometers were developed using submersible pumps, bailers, and mechanical surging equipment to remove formation fines from the filter pack. The installed monitoring wells and piezometers were developed until the discharged groundwater was free of sediment or suspend matter and in-situ parameters for pH, temperature, and specific conductance have stabilized. Based on historical well development activities performed at the Middletown facility, approximately 5-10 well volumes or a minimum of one-hour of mechanical development were required to complete the development of each monitoring well or piezometer.

Development and purge water generated during development, purging or sampling activities was collected in containers and transported to containment areas that drain to the onsite water treatment facility for treatment.

2.5 SURVEYING

Monitoring wells and piezometers were surveyed for horizontal location and vertical elevation by a registered licensed New York surveyor. Horizontal measurements were calculated to the nearest 0.1 foot. Vertical elevations were calculated to the nearest 0.01 foot and reported in feet above mean sea level (MSL). Orientation for the monitoring well and piezometer locations are on New York State Plane Coordinate System, east zone (Horizontal NAD-83; Vertical NAVD-88). The monitoring well and piezometer locations have been plotted on Sheet 1 for reference.

Vertical elevations on the north side top of the PVC casing, north top side of the metal protective casing or curb box, and the local ground surface were determined at each monitoring well and piezometer. Vertical elevations are reported relative to MSL. The top of the PVC casing elevation is used to determine groundwater elevations in the unconsolidated and bedrock aquifers.

2.6 SAMPLING AND FIELD MEASUREMENTS

To the extent allowed by existing physical conditions at the Middletown facility, the groundwater sampling protocols adhere to the specific methods present in this GWMP document. If alternative sampling procedures are implemented in response to facility specific constraints, each procedure will be selected on the basis of meeting data objectives. Such alternatives will be fully documented and reported to the proper regulatory agencies.

2.6.1 GROUNDWATER ELEVATION MEASUREMENTS

Total monitoring well/piezometer depth and the depth to groundwater is measured in each monitoring well/piezometer before evacuation, purging, or sampling activities are performed. An electronic water level indicator is used to measure the depth to

groundwater and total depth of each monitoring well/piezometer. The total depth and depth to groundwater measurements are used to determine the direction of potential groundwater flow and how water levels change with time and to calculate the necessary purge volumes for sampling. Groundwater elevation data are recorded for all of the piezometers to determine the effectiveness of the barrier wall structure. Water levels are measured from a marked measuring point established on the inner well casing. The water level probe and tape shall be decontaminated between measurements. Groundwater elevation monitoring activities are performed on a quarterly basis for piezometers and monitoring wells that are part of this GWMP.

2.6.2 GROUNDWATER SAMPLING PROCEDURES

Groundwater monitoring wells that are designated for sampling will be purged with the aid of a peristaltic-type pump and new or dedicated, disposable tubing as recommended in EPA's RCRA Groundwater Monitoring Draft Technical Guidance document (November 1992). Using a pump for purging monitoring wells and for collection of groundwater quality samples is an acceptable purging method according to EPA's Region II QAM. The NYSDEC approved the use of a peristaltic pump to purge groundwater monitoring wells in August 1994. Monitoring wells may also be purged and sampled using a new polyethylene bailer.

Groundwater sampling activities will be initiated after each well is properly developed and purged. Because drilling and well construction activities disturb the natural groundwater system for a new well, a minimum of 10 days will be allowed for the groundwater system to return to chemical and physical equilibrium before initial groundwater quality samples are collected from any new well for laboratory analysis. All equipment used during groundwater quality sampling activities will be decontaminated and thoroughly rinsed before use.

If any specific monitoring well cannot be purged using a peristaltic pump, then that monitoring well will be purged using a new polyethylene or PVC bailer and new sampling rope. Peristaltic pumps, in general, cannot recover groundwater from monitoring wells if the depth to groundwater is greater than 25 feet. Based upon historical groundwater drawdowns observed on wells MW-13D, MW-14D, MW-15D, MW-18D, PZ-13 and MW-27D, these bedrock monitoring wells require purging and sampling activities to be completed with a polyethylene or PVC bailer.

After measuring the depth to water, the depth to the bottom of the well shall be measured. The volume of water in the casing shall then be calculated, followed by the calculation of the minimum purge volume. The depths and calculations shall be recorded on a sample log for each well.

A minimum of three well volumes will be evacuated from each monitoring well before collection of the groundwater quality samples to ensure water from the formation has displaced the standing water in the well casing. In-situ indicator parameters of pH, temperature, oxidation/reduction potential and specific conductance will be recorded in a field book after each well volume. Turbidity and hardness values will be recorded from the final purge volume. All field measurements (purge volume, times, water level measurements and field parameters, etc.) will be recorded in the field notebook. If any groundwater monitoring well is of a low yielding nature or is purged to dryness before the removal of three well volumes, that monitoring well will be purged to near dryness once and then allowed to recover sufficiently before groundwater quality samples are collected. All wells will be sampled within 3 hours after the completion of the evacuation process as recommended in the EPA's 1992 draft guidance document. Two wells, MW-9S and PZ 13 are sampled after an overnight recovery. If any monitoring well is purged to dryness during the groundwater sampling process, that monitoring well will be allowed to recover before the sampling process is continued.

Portable pumps and vehicles shall be placed down-wind of the well to be sampled (specifically when sampling volatile organic compounds [VOCs]). Gasoline for portable pumps shall not be stored near empty sample containers, nor near the coolers with filled sample containers.

2.6.3 SAMPLING AND ANALYTICAL PARAMETERS

Nitrile gloves shall be worn whenever sampling or handling samples. To prevent cross-contamination by sample handling, new gloves shall be used at each well. Gloves shall be replaced with new gloves whenever contact is made with the ground or other surface that could be contaminated.

Samples shall be collected in clean, pre-preserved containers, where applicable. All groundwater quality samples will be collected in sampling containers supplied by the analytical laboratory. Containers shall be acquired already cleaned in

accordance with EPA contract laboratory protocols. Total metals will be collected in a laboratory supplied pre-preserved sample container. Containers should be labeled and provide the following information:

- Well Number or Sample ID
- Sample Matrix
- Facility Name
- Sample Collector's Name or Initials
- Date and Time of Sample Collection
- Analysis to be performed
- Preservative

Sampling shall be performed in a prescribed sequence. Duplicate samples shall be taken in the same manner and identified with a unique identification that does not indicate the nature of the sample. Equipment blank samples shall be taken in a manner that duplicates well sampling as much as practical. Samples shall be immediately placed in a pre-cooled cooler.

QUARTERLY SITE-WIDE MONITORING PROGRAM

Groundwater quality samples will be collected from the existing wells and analyzed for total lead, antimony, arsenic, cadmium, and chromium, sulfate, alkalinity and pH to evaluate both site-wide groundwater quality and specifically groundwater quality upgradient and downgradient of the containment cell. Total metals and inorganic groundwater quality samples will be collected from the monitoring wells using new or dedicated tubing and a peristaltic pump, or a bailer, after the purging process.

Groundwater quality samples collected from any monitoring well as part of the GWMP will be analyzed for the constituents listed in Table 2 on a quarterly basis. It should be noted that the elimination of dissolved lead from the groundwater monitoring program was approved by the NYSDEC in July 2003, and, as such, analysis for this parameter is no longer required.

Field blanks and/or trip blanks shall be collected and handled in as near to the same manner as groundwater samples. Duplicate samples shall be taken and handled exactly the same as other groundwater samples.

ANNUAL CONTAINMENT CELL MONITORING PROGRAM

Groundwater quality samples will be collected from the containment cell monitoring wells on a quarterly basis as described above. In addition, groundwater samples will be collected on an annual basis from the containment cell wells (MW-28S/D, MW-29S/D, MW-30S/D, MW-31S/D, and MW-32S/D) for analysis of the parameters shown in Table 3, which are listed in 6 NYCRR Part 360-2.11 as "routine" and "baseline" parameters.

The initial sampling event after the wells have been installed and developed will include all of the parameters listed in Table 3. The analysis of the annual program parameters will be rotated quarterly, such that the annual program is conducted during a different quarter each calendar year.

Groundwater quality samples collected from any monitoring well for VOC analysis will be collected using a new or dedicated Teflon or Polyethylene bailer before collection of any other samples. VOA vials shall be filled completely with no remaining headspace and no bubbles. Care should be taken to avoid over-filling vials and bottles to prevent spillage of preservatives.

Field blanks and/or trip blanks shall be collected and handled in as near to the same manner as groundwater samples. Duplicate samples shall be taken and handled exactly the same as other groundwater samples. All containment cell groundwater samples collected as part of either baseline or expanded sampling will be validated in accordance with the procedures outlined in 6 NYCRR Part 360-2.11(d).

CONTINGENCY MONITORING PROGRAM

Site-Wide Monitoring Wells

The quarterly reports will include an evaluation of the data for all monitoring wells and recommend changes to the program as appropriate. For monitoring wells not associated with the containment cell, if a significant increase over historical water

quality data is detected for one or more of the quarterly parameters, a contingent modification to the quarterly program will be developed and implemented in coordination with the NYSDEC.

Containment Cell Monitoring Wells

In accordance with 6 NYCRR Part 360-2.11(c), if a significant increase over existing water quality is detected for one or more of the parameters in the quarterly (Table 2) or annual (Table 3) program for the containment cell monitoring wells, the NYSDEC will be notified within 14 days. A significant increase over the existing water quality is defined as an exceedence of the existing groundwater quality by three standard deviations, or an exceedence of water quality standards for that parameter as defined in 6 NYCRR Part 703 for a class GA groundwater. If the exceedence was detected during quarterly sampling, samples collected from the containment cell monitoring wells during the next quarterly sampling event will be analyzed for all of the annual parameters listed in Table 3. If the exceedence was detected in an annual parameter, the data will be evaluated to determine an offsite source or explanation for the exceedence due to error in sampling, analysis, or natural variation, and a report will be submitted to the NYSDEC.

In accordance with 6 NYCRR Part 360-2.11(c), if a significant increase over existing water quality has been detected for one or more of the annual parameters listed above in the containment cell monitoring wells, and it cannot successfully be demonstrated to be due to an offsite source or an error in sampling, analysis, or natural variation in groundwater quality, a contingent groundwater monitoring program will be developed and implemented in coordination with the NYSDEC. Table 4 includes potential expanded parameters that may be included in the contingent program.

2.6.4 INSTRUMENT CALIBRATION PROCEDURES AND FREQUENCY

All field instruments, including electro-conductivity meters, pH meters, dissolved oxygen meters and turbidity meters, shall be calibrated in accordance with the manufacturer's specifications before each daily use. All calibration fluids shall be kept in clearly marked containers with the fluid expiration dates on each container. Documentation that the meters were appropriately calibrated shall be recorded on a field log. Information to be recorded includes instrument type, model number, date and time.

2.6.5 ANALYTICAL PROCEDURES

Analyses shall be performed for the parameters and by the methods shown in Tables 2 and 3. Analytical procedures shall be specified and analyses conducted in accordance with the laboratory's quality assurance manual.

2.6.6 SAMPLING EQUIPMENT DECONTAMINATION PROCEDURES

Measuring tapes, probes, sensors, field indicator parameter meters, purging and sampling devices shall be decontaminated with de-ionized water. Any equipment or device that will be placed in the well casing or could come into contact with groundwater to be sampled shall not be placed on the ground. All equipment and devices shall be placed on clean surfaces only. Any equipment or device that is to be placed in the well casing or could come into contact with groundwater to be sampled shall be decontaminated between sampling at different well locations and shall be rinsed with de-ionized water prior to placing the equipment or device in the well casing.

2.6.7 INTERNAL QUALITY CONTROL CHECKS

Quality control of sampling and sample handling is maintained by a systematic collection and analysis of "blank" and duplicate samples. Quality control samples include:

Trip blanks that are placed in coolers by the supplying laboratory and analyzed for VOCs to assess the containers and the impacts on samples caused by the transport of the samples. These blank samples are made by the laboratory using reagent grade de-ionized water and the usual preservative. The caps are to remain sealed until removed in the laboratory. One trip blank per VOC sampling event shall be prepared and analyzed.

- Equipment blanks are checks of the decontamination procedure's effectiveness made after decontamination by pouring distilled water over, or passing the distilled water through, equipment and collecting it in sample bottles for analysis.
 One equipment blank per sampling event is collected and analyzed.
- Duplicate samples are made in the field by duplicating a sample or sample suite, as much as practical, as near to the same time as practical, using the same sampling techniques, preservatives, containers and container source to eliminate as many variables as possible. The samples shall be identified in a manner that the duplicate sample appears to be simply another sample from a different well, not labeled or coded unusually, and not analyzed in a different manner. Duplicate samples will be collected and analyzed at the rate of 1 per 20 primary samples per sampling event.

2.6.8 SAMPLE CHAIN-OF-CUSTODY

Chain-of-custody documents shall be maintained in a manner such that samples are in the custody and control of a known person at all times. The chain-of-custody procedures will allow the tracing of possession and handling of each sample from the time of field collection through laboratory analysis. The quality control procedure shall include completed purge and sample (field) logs, completed sample labels for each sample, completed chain-of-custody forms and transport of a properly sealed cooler. Transport of a properly sealed cooler by a common carrier does not require acknowledgement of the contents by the common carrier. The chain-of-custody form shall include provisions to record the sample identification, analyses required, personnel handling and receiving of the samples, and dates and times.

2.6.9 PREVENTATIVE MAINTENANCE

As part of the routine before sampling each well, a well inspection shall be conducted. The well inspection shall include observations concerning general appearance (free of debris, access is maintained), labeling/markings (well number and measurement point clearly marked), traffic protection, concrete pad, lock, cap and surroundings. A review of records will be conducted to assess evidence of silt build-up in the well or screen clogging. Any deficiencies shall be noted in the permanent inspection log (field log) and maintenance scheduled in a timely manner.

3 DELIVERABLES/REPORTING

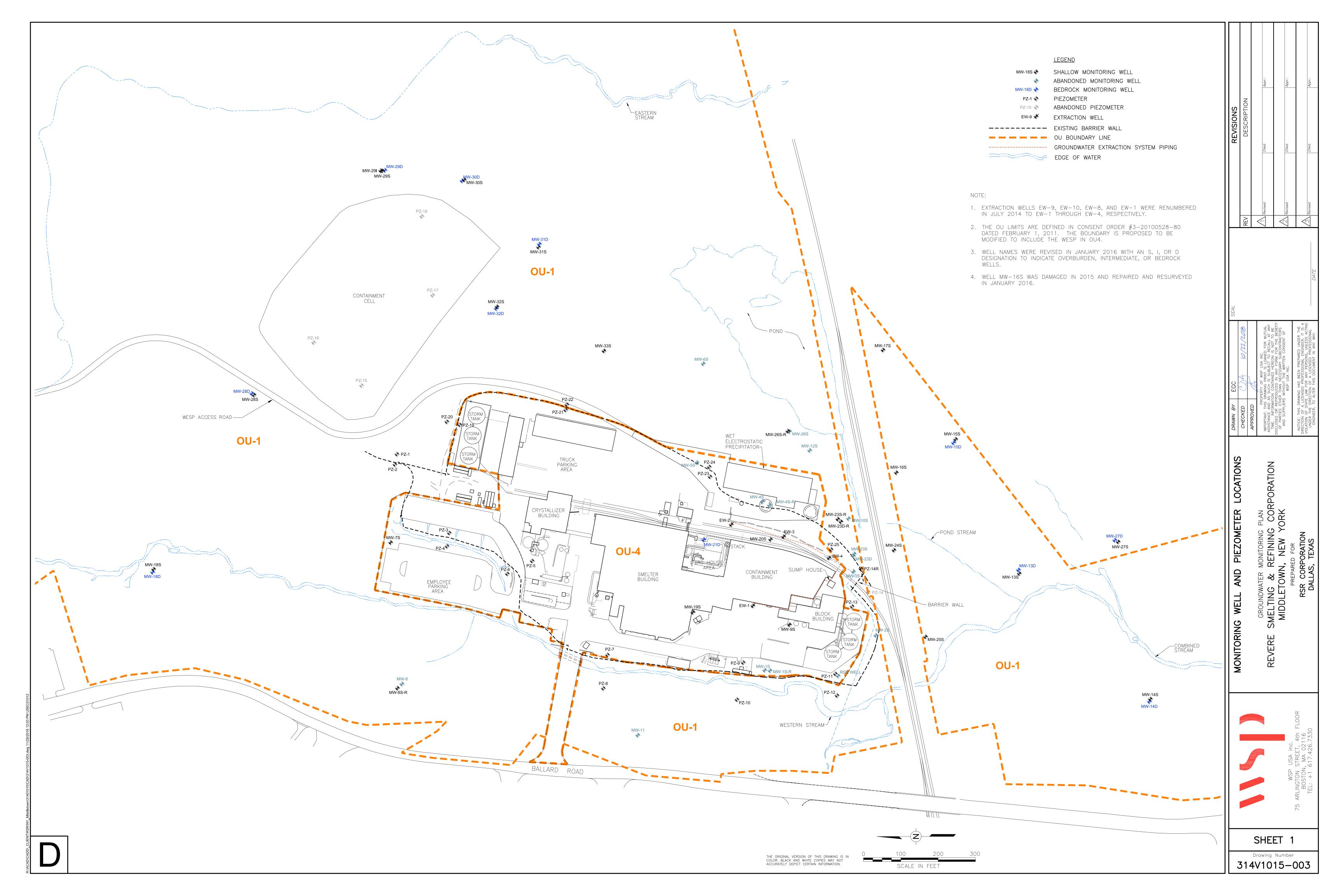
Groundwater quality samples collected under this GWMP will be collected on a quarterly or annual basis. Groundwater sampling activity reports are prepared and submitted to the NYSDEC quarterly as well as to the Town of Wallkill. The quarterly reports include a description of the field sampling activities, a discussion of the laboratory results, and evaluation of the piezometer data. The reports will be modified to include the containment cell monitoring data. The reports shall also include laboratory analytical summary sheets, including quality control summaries, chain-of-custody forms and groundwater purging and sample (field) logs for each well sampled. The quarterly sampling reports are submitted to the NYSDEC and Town of Wallkill approximately 60 days after completion of the groundwater sampling activities. Additionally, the data is submitted electronically to the NYSDEC as part of their Electronic Data Deliverable (EDD) program.

Any changes to the list of wells to be sampled during the subsequent sampling event, including additional monitoring wells or the analytical parameters, will be documented in the quarterly groundwater monitoring reports.

4 REFERENCES

- NYSDEC. 2015. Letter from Mr. William B. Bennett III, P.E. to Mr. Gerry Manley of RSR Corporation regarding OU-1 Phase III Containment Cell Groundwater Monitoring Work Plan, Revere Smelting & Refining Site, Site No. 3-36-053, Operable Unit 1 (OU-1), Town of Wallkill, Orange County. October 23.
- WSP. 2015a. Interim Corrective Measure Completion Report Phase III Barrier Wall Installation and Phase I and II Barrier Wall Extensions – Operable Unit 4, Revere Smelting & Refining Corporation, Middletown, New York. February 19.
- WSP. 2015b. Letter from Mr. James Sobieraj to Mr. William B. Bennett III, P.E. of the New York State Department of Environmental Conservation regarding the OU1 Phase III Containment Cell Groundwater Monitoring Work Plan, Order on Consent and Administration Settlement Index #3-20100528-80, Revere Smelting & Refining Facility, Middletown, New York (Site #3-36-053). September 4.
- WSP. 2015c. Letter from Mr. James Sobieraj to Mr. William B. Bennett III, P.E. of the New York State Department of Environmental Conservation regarding Response to Proposed Modifications, OU1 Phase III Containment Cell Groundwater Monitoring Work Plan, Order on Consent and Administration Settlement Index #3 20100528-80, Revere Smelting & Refining Facility, Middletown, New York (Site #3-36-053). November 6.
- WSP. 2016. Groundwater Extraction System Monitoring and Contingent Expansion Work Plan for Operable Unit 4.
 Revere Smelting & Refining Corporation, Middletown, New York. September 24, 2014; Revised November 9.
- WSP. 2017. Letter from Mr. James Sobieraj and Ms. Christine Albertin to Mr. William B. Bennett III, P.E. of the New York State Department of Environmental Conservation regarding Addendum to the Groundwater Extraction System Monitoring and Contingent Expansion Work Plan for Operable Unit 4. Revere Smelting & Refining Corporation, Middletown, New York (Site #3-36-053). August 25.
- WSP. 2018. Letter from Mr. James Sobieraj and Ms. Christine Albertin to Mr. William B. Bennett III, P.E. of the New York State Department of Environmental Conservation regarding Completion Report for the Addendum to the Groundwater Extraction System Monitoring and Contingent Expansion Work Plan for Operable Unit 4. Revere Smelting & Refining Corporation, Middletown, New York (Site #3-36-053). October 30.

SHEET



TABLES

Table 1

Monitoring Well and Piezometer Construction Details
Revere Smelting & Refining Corporation
Middletown, New York

				Ground	Top of Casing	Depth to Top	Depth to Bottom	Total	Top of Screen	Bottom of Screen	Bottom		
	Former	Installation	Well	Elevation	Elevation	of Screen	of Screen	Depth	Elevation	Elevation	Elevation	Diameter	Slot Size
Well ID (b)	Well ID	Date	Status	(feet amsl)	(feet amsl)	(feet)	(feet)	(feet)	(feet amsl)	(feet amsl)	(feet amsl)	(inches)	(inches)
Overburden Wells		_ = 5.55		(10000	(coordinate)	(100)	(3334)	(1000)	(10000000000000000000000000000000000000	(cood and a	(1000	((,
RSR Well (GW-1)	RSR Well (GW-1)	08/10/82	Abandoned	516	519.65	5.1	15.1	17	510.9	500.9	499	4	NA
MW-1S	MW-1	07/29/91	Abandoned	518.9	520.24	8	13	13	510.9	505.9	NA	NA	NA
MW-1S-R	MW-1A	12/22/93	Abandoned	518.8	520.29	19	24	24	499.8	494.8	NA	2	0.01
MW-2S	MW-2	07/30/91	Abandoned	510.9	513.42	22	27	27	488.9	483.9	NA	2	0.01
MW-3S	MW-3	07/26/91	Abandoned	507.1	509.47	17.5	22.5	22.5	489.6	484.6	NA	2	0.01
MW-4S	MW-4	07/25/91	Abandoned	511.4	512.8	13.5	18.5	18.5	497.9	492.9	NA	2	0.01
MW-4S-R	MW-4A	12/21/93	Abandoned	511.7	513.02	23	33	33	488.7	478.7	NA	2	0.01
MW-5S	MW-5	07/22/91	Abandoned	513	514.72	15	20	20	498	493	NA	2	0.01
MW-6S	MW-6A	07/29/91	Abandoned	506.8	509.14	11	16	16	495.8	490.8	NA	2	0.01
MW-7S	MW-7	07/11/91	Active	524.8	526.63	5	15	15	519.8	509.8	NA	2	0.01
MW-8S	MW-8	07/29/91	Abandoned	523.8	525.49	3	8	8	520.8	515.8	NA	2	0.01
MW-8S-R	MW-8R	June 1999	Active	524.06	526.21	NA	NA	NA	NA	NA	NA	NA	NA
MW-9S	MW-9	12/13/93	Active	518.7	519.35	5	10	10	513.7	508.7	NA	2	0.01
MW-10S	MW-10	12/10/93	Abandoned	497.6	499.98	3	8	8	494.6	489.6	NA	2	0.01
MW-11S	MW-11	12/15/93	Abandoned	531.4	533.48	7.1	9.4	9.4	524.3	522	NA	2	0.01
MW-12S	MW-12	12/10/93	Abandoned	500.2	502.09	4	9	9	496.2	491.2	NA	2	0.01
MW-13S	MW-13(A)	07/28/94	Active	480.99	483.32	13	18	18	467.99	462.99	NA	2	0.01
MW-14S	MW-14	12/14/93	Active	481.2	483.38	22	27	27	459.2	454.2	NA	2	0.01
MW-15S	MW-15(A)	06/10/97	Active	484.17	486.47	6	11	11	478.17	473.17	NA	2	0.01
MW-16S (c)	MW-16	06/04/97	Active	492.53	494.62	5.41	15.41	16	487.12	477.12	NA	2	0.01
MW-17S	MW-17(A)	06/06/97	Active	488.87	491.46	3.5	13.5	13.5	485.37	475.37	NA	NA	NA
MW-18S	MW-18	06/13/97	Active	530.92	533.28	5	10	10	525.92	520.92	NA	2	0.01
MW-19S	MW-19	06/14/01	Active	521.99	523.96	5	15	15	516.99	506.99	NA	2	NA
MW-20S	MW-20	06/14/01	Active	512.32	511.94	19	29	29	493.32	483.32	NA	2	NA
MW-23S	MW-23S	11/07/01	Abandoned	496.68	498.5	2	12	12	494.68	484.68	NA	2	NA
MW-23S-R	NA	09/01/16	Active	497.76	500.23	6	16	16	491.76	481.76	481.76	2	0.01
MW-24S	MW-24	11/08/01	Active	485.86	488.09	2	12	12	483.86	473.86	NA	2	NA
MW-25S (d)	MW-25	11/08/01	Damaged	491.65	494.16	2	12	12	489.65	479.65	NA	2	NA
MW-26S	MW-26	11/08/01	Abandoned	501.74	503.99	7.6	14.6	14.6	494.14	487.14	NA	2	NA
MW-26S-R	NA	09/01/16	Active	502.62	505.46	5.5	15.5	15.5	497.12	487.12	487.12	2	0.01
MW-27S	MW-27A	04/09/09	Active	480.19	482.18	10	20	20	470.19	460.19	460.19	2	0.01
MW-28S	MW-28S	12/15/15	Active	532.84	535.50	2.5	12.5	12.5	530.34	520.34	520.34	2	0.01
MW-29S	MW-29S	12/17/15	Active	521.78	524.25	4.5	5.5	5.5	517.28	516.28	516.28	2	0.01
MW-30S	MW-30S	12/18/15	Active	523.32	525.02	4.5	12.5	12.5	518.82	510.82	510.82	2	0.01
MW-31S	MW-31S	09/06/16	Active	515.73	518.37	5	13	13	510.73	502.73	502.73	2	0.01
MW-32S	MW-32S	09/06/16	Active	530.07	532.73	4.5	14.5	14.5	525.57	515.57	515.57	2	0.01
MW-33S	NA	09/01/16	Active	514.80	517.57	4.5	7.5	7.5	510.30	507.30	507.30	2	0.01

Table 1

Monitoring Well and Piezometer Construction Details
Revere Smelting & Refining Corporation
Middletown, New York

				Ground	Top of Casing	Depth to Top	Depth to Bottom	Total	Top of Screen	Bottom of Screen	Bottom		
	Former	Installation	Well	Elevation	Elevation	of Screen	of Screen	Depth	Elevation	Elevation	Elevation	Diameter	Slot Size
Well ID (b)	Well ID	Date	Status	(feet amsl)	(feet amsl)	(feet)	(feet)	(feet)	(feet amsl)	(feet amsl)	(feet amsl)	(inches)	(inches)
Bedrock Wells MW-13D	MW-13B	06/12/97	Active	482.21	483.32	32.5	37.5	32.5	449.71	444.71	NA	2	0.01
MW-14D	MW-14B	July 1999	Active	482.8	484.92	32.5 NA	NA	NA	NA	NA	NA NA	NA	NA
MW-15D	MW-15B	July 1999	Active	484.01	486.32	NA NA	NA NA	NA	NA NA	NA NA	NA NA	NA NA	NA NA
MW-18D	MW-18B	July 1999	Active	531.42	533.39	NA NA	NA NA	NA	NA NA	NA NA	NA NA	NA	NA NA
MW-21D	MW-21B	06/15/01	Active	515.81	515.48	9	19	19	506.81	496.81	NA NA	2	NA
MW-23D	MW-23(D)	Nov 2001	Abandoned	496.72	498.06	22	26.8	26.8	474.72	469.9	NA	2	NA
MW-23D-R	NA	08/31/16	Active	497.02	499.72	30	35	35	467.02	462.02	462.02	2	0.01
MW-27D	MW-27B	04/09/09	Active	480.71	482.34	27	35	35	453.71	445.71	445.71	2	0.01
MW-28D	MW-28D	12/29/15	Active	532.63	534.40	18.5	23.5	23.5	514.13	509.13	509.13	2	0.01
MW-29I	MW-29I	12/17/15	Active	521.55	523.61	8.0	12.0	12.0	513.5	509.15	509.13	2	0.01
MW-29D	MW-29D	12/30/15	Active	521.68	522.61	18.5	23.5	23.5	503.18	498.18	498.18	2	0.01
MW-30D	MW-30D	12/29/15	Active	522.83	523.78	18.5	23.5	23.5	504.33	499.33	499.33	2	0.01
MW-31D	MW-31D	09/06/16	Active	514.82	517.77	19	24	24	495.82	490.82	490.82	2	0.01
MW-32D	MW-32D	09/01/16	Active	530.21	532.97	22	27	27	508.21	503.21	503.21	2	0.01
Piezometers	IVIVV-32D	03/01/10	Active	330.Z1	30Z.37		<u> Li</u>		300.21	300.21	300.Z1		0.01
PZ-1	PZ-1	08/23/99	Active	529	531.13	7.2	10.2	10.2	521.8	518.8	518.8	2	0.01
PZ-2	PZ-2	08/24/99	Active	527.69	529.75	7.2	14.2	14.2	520.49	513.49	513.49	2	0.01
PZ-3	PZ-3	08/24/99	Active	523.82	525.72	6	14	14	517.82	509.82	509.82	2	0.01
PZ-4	PZ-4	08/24/99	Active	522.92	524.74	6	14	14	516.92	508.92	508.92	2	0.01
PZ-5	PZ-5	08/30/99	Active	523.06	522.64	6	14	14	517.06	509.06	509.06	2	0.01
PZ-6	PZ-6	08/25/99	Active	522.74	524.39	6	15	15	516.74	507.74	507.74	2	0.01
PZ-7	PZ-7	08/25/99	Active	519.8	521.38	6	10	10	513.8	509.8	509.8	2	0.01
PZ-8	PZ-8	08/25/99	Active	528.86	527.62	7.4	13.4	13.4	521.46	515.46	515.46	2	0.01
PZ-9	PZ-9	08/31/99	Active	519.76	521.52	6.2	15.2	15.2	513.56	504.56	504.56	2	0.01
PZ-10	PZ-10	08/25/99	Active	517.68	519.54	6.1	13.1	13.1	511.58	504.58	504.58	2	0.01
PZ-11	PZ-11	08/31/99	Active	516.84	519.18	6	14	14	510.84	502.84	502.84	2	0.01
PZ-12	PZ-12	08/30/99	Active	512.72	514.80	6	14	14	506.72	498.72	498.72	2	0.01
PZ-13	PZ-13	09/01/99	Active	513.19	514.86	17	27	30	496.19	486.19	483.19	2	0.01
PZ-14	PZ-14	09/02/99	Abandoned	506.85	508.77	16	24	24	490.85	482.85	482.85	2	0.01
PZ-14R	NA	08/16/18	Active	505.79	509.14	14	24	26	491.79	481.7899	479.7899	2	0.01
PZ-15 (e)	PZ-15	09/19/11	Removed	534.3	536.307	3	8	10	531.30	526.3	524.3	2	0.01
PZ-16 (e)	PZ-16	09/19/11	Removed	531.62	533.62	8	13	13	523.62	518.62	518.62	2	0.01
PZ-17 (e)	PZ-17	09/19/11	Removed	531.74	534.245	8	13	13	523.74	518.74	518.74	2	0.01
PZ-18 (e)	PZ-18	09/19/11	Removed	526.48	528.479	8	13	13	518.48	513.48	513.48	2	0.01
PZ-19	NA	08/15/18	Active	529.55	532.19	5	10	11	524.55	519.55	518.55	2	0.01
PZ-20	NA	08/14/18	Active	530.09	533.06	5.5	10.5	11.5	524.59	519.59	518.59	2	0.01
PZ-21	NA	08/15/18	Active	518.73	518.39	3	6	6	515.73	512.73	512.73	2	0.01
PZ-22	NA	08/15/18	Active	517.63	517.09	3	6	6	514.63	511.63	511.63	2	0.01
PZ-23	NA	08/15/18	Active	512.38	511.96	10	20	21	502.38	492.38	491.38	2	0.01
PZ-24	NA	08/15/18	Active	511.49	511.20	14	24	28	497.49	487.49	483.49	2	0.01
PZ-25	NA	08/16/18	Active	508.85	508.47	14	24	24	494.85	484.85	484.85	2	0.01

Table 1

Monitoring Well and Piezometer Construction Details Revere Smelting & Refining Corporation Middletown, New York

	Former	Installation	Well	Ground Elevation	Top of Casing Elevation	Depth to Top of Screen	Depth to Bottom of Screen	Total Depth	Top of Screen Elevation	Bottom of Screen Elevation	Bottom Elevation	Diameter	Slot Size
Well ID (b)	Well ID	Date	Status	(feet amsl)	(feet amsl)	(feet)	(feet)	(feet)	(feet amsl)	(feet amsl)	(feet amsl)	(inches)	(inches)
Extraction Wells													
EW-1	EW-9	07/28/07	Active	518.63	517.71	10	20	20	508.63	498.63	498.63	4	0.04
EW-2	EW-10	07/30/07	Active	513.65	512.80	9	19	19	504.65	494.65	494.65	4	0.04
EW-3	EW-8	07/29/07	Active	511.12	510.27	8	23	23	503.12	488.12	488.12	4	0.04
EW-4	EW-1	07/27/07	Active	509.41	508.29	9.8	19.8	19.8	499.61	489.61	489.61	4	0.04

- a) NA = Not available. Boring logs not provided or incomplete.
- b) Well names were revised in January 2016 with an S, I, or D to indicate overburden, intermediate, or bedrock wells.
- c) Well MW-16S was damaged during the Phase IIB RD/RA, and repaired and resurveyed in January 2016.
- d) Monitoring well MW-25S was damaged and approved for removal from the GWMP by the NYSDEC in a letter dated September 8, 2017.
- e) Piezometers PZ-15 though PZ-18 were installed to determine depth to water for the design of the containment cell. These piezometers have since been removed.

Table 2

Quarterly Groundwater Monitoring Program Revere Smelting & Refining Corporation Middletown, New York

		Unfilte	red Metals	(in ug/l)		Miscellane	ous Inorg	ganics		
Parameters	Total	Total	Total	Total	Total	Alkalinity	Sulfate	рН		
Monitoring	Lead	Antimony	Cadmium	Chromium	Arsenic	(mg/l)	(mg/l)	9040B and		
Well ID	6010C	6010C	6010C	6010C	6010C	SM2320 B-1997	300	9045D		
Unconsolidated Wells										
MW-7S	Χ	Х	Х	Х	Х	Х	Х	X		
MW-8S-R	Χ	Χ	X	X	Х	Х	Х	X		
MW-9S	Χ	Х	Х	X	Х	X	Х	Х		
MW-13S	Χ	Х	Х	Х	Х	Χ	Х	Х		
MW-14S	Χ	Х	Х	Х	Х	Х	Х	Х		
MW-15S	Χ	Х	Х	Х	Х	Х	Х	X		
MW-16S	Χ	X	X	X	Х	Χ	Х	X		
MW-17S	Χ	X	Х	X	Χ	Χ	Х	X		
MW-18S	Χ	Х	Х	Х	Х	Χ	Χ	X		
MW-19S	Χ	Х	Х	Х	Х	Х	Х	Х		
MW-20S	Χ	Х	Х	Х	Х	Χ	Х	X		
MW-23S-R	Χ	Х	X	Х	Χ	Χ	Χ	X		
MW-24S	Χ	X	X	X	Χ	Χ	Х	X		
MW-26S-R	Χ	X	X	X	Χ	Χ	Χ	Х		
MW-27S	Χ	X	X	Х	Χ	Χ	Х	X		
MW-28S	Χ	X	X	Х	Χ	Χ	Х	X		
MW-29S	Χ	X	X	X	Χ	Χ	Χ	X		
MW-30S	Χ	X	X	Χ	Χ	Χ	Х	X		
MW-31S	Χ	X	X	Χ	Χ	Χ	Х	Х		
MW-32S	Χ	X	X	Х	Χ	Χ	Χ	X		
MW-33S	Χ	X	X	X	Χ	X	Х	X		
Bedrock Wel	ls									
MW-13D	Χ	X	X	Χ	Χ	Χ	Χ	X		
MW-14D	Χ	Χ	Χ	X	Х	Х	Х	Х		
MW-15D	Χ	Χ	Χ	X	Х	X	Х	Х		
MW-18D	Χ	Χ	Χ	X	Х	X	Х	X		
MW-21D	Χ	X	Х	X	Х	X	Х	X		
MW-23D-R	Χ	Χ	Χ	Χ	Χ	X	Χ	Х		
MW-27D	Χ	Χ	Χ	Χ	Х	X	Х	X		
MW-28D	Χ	Х	Χ	X	Х	X	Х	X		
MW-29D	Χ	Χ	Χ	X	Χ	X	Χ	X		
MW-30D	Χ	Χ	Χ	Χ	Х	X	Х	X		
MW-31D	Χ	Χ	Χ	X	Χ	X	Х	Х		
MW-32D	Χ	Χ	Χ	X	Χ	Χ	X	X		
Barrier Wall										
PZ-13	Χ	X	X	X	Χ	X	Χ	X		

Table 3

Annual Containment Cell Groundwater Monitoring Program Revere Smelting & Refining Corporation Middletown, New York

Parameters	Analytical Method				
Field Measurements	<u>.</u>				
Static Water Level	-				
Specific Conductance	-				
Temperature	-				
Floaters or Sinkers	-				
pH	-				
Oxidation/Reduction Potential (Eh)	-				
Turbidity (NTU)	-				
Laboratory Analysis					
General Chemistry Parameters:					
Total Kjeldahl Nitrogen (mg/l)	351.2				
Ammonia (mg/l)	350.1				
Nitrate (mg/l)	300.0				
Chemical Oxygen Demand (mg/l)	410.4				
Biochemical Oxygen Demand (mg/l)	SM5210 B-2001				
Total Organic Carbon (mg/l)	9060A				
Total Dissolved Solids (mg/l)	SM2540 C-1997				
Sulfate (mg/l)	300.0				
Alkalinity, Total as CaCO3 (mg/l)	SM2320 B-1997				
Phenols (mg/l)	9066				
Chloride (mg/l)	300.0				
Bromide (mg/l)	300.0				
Total Hardness as CaCO3 (mg/L)	SM2340 C-1997				
Inorganic Parameters (mg/l):	•				
Aluminum	6010C				
Barium	6010C				
Beryllium	6010C				
Boron	6010C				
Calcium	6010C				
Chromium (Hexavalent)	7196A				
Cobalt	6010C				
Copper	6010C				
Cyanide	9012B				
Iron	6010C				
Magnesium	6010C				
Manganese	6010C				
Mercury	7470A				
Nickel	6010C				
Potassium	6010C				
Selenium	6010C				
Silver	6010C				
Sodium	6010C				
Thallium	6010C				
Vanadium	6010C				
Zinc	6010C				
Volatile Organic Compounds (µg/l) (a)	8260C				

a) Analysis will include all of the VOCs listed under the baseline parameters in the Water Quality Analysis Tables under 6 NYCRR Part 360-2.11.

Table 4

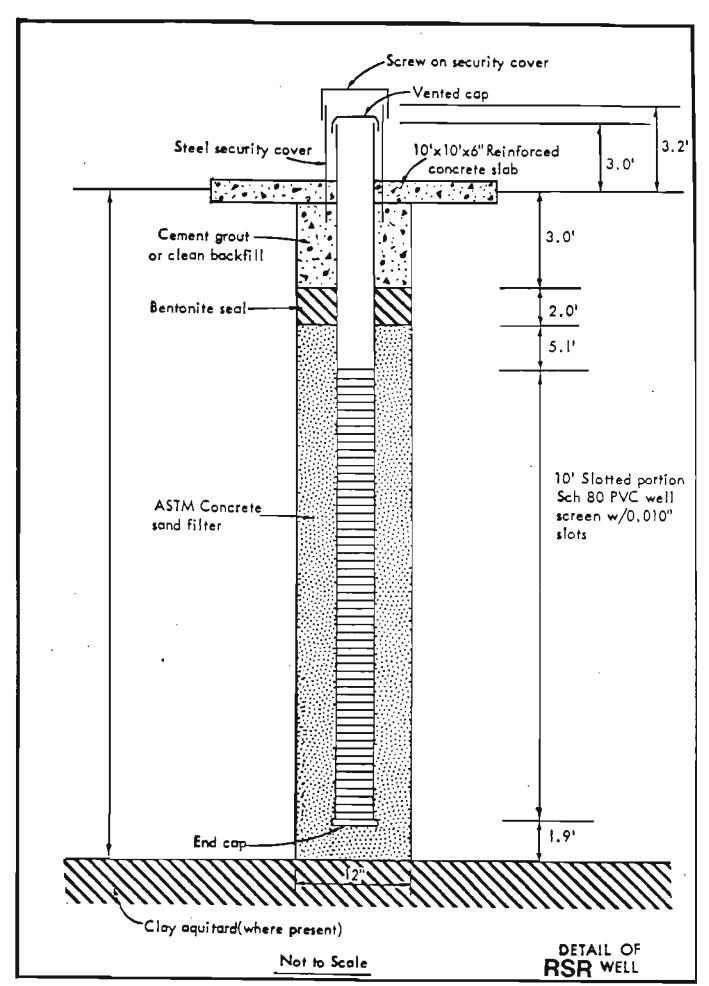
Containment Cell Contingent Groundwater Monitoring Program Revere Smelting & Refining Corporation Middletown, New York

Potential Parameters	Analytical Method
Laboratory Analysis	
General Chemistry Parameters:	
Sulfide	9034
Inorganic Parameters (mg/l):	
Tin	6010C
Semi-Volatile Organic Compounds (µg/l) (a)	8270D
Pesticides (µg/l) (a)	8081B
Polychlorinated Biphenyl Compounds (µg/l) (a)	8082A
Herbicides (µg/l) (a)	8151A

a) Analysis will include all of the SVOCs, pesticides, PCBs, or herbicides listed under the expanded parameters in the Water Quality Analysis Tables under 6 NYCRR Part 360-2.11.

APPENDIX

A MONITORING WELL
AND PIEZOMETER
BORING LOGS AND
WELL CONSTRUCTION
DIAGRAMS



LOG OF BORING NO. GW-I

RSR CORPORATION - PROJECT 82-21 MIDDLETOWN, NEW YORK

TYPE B	ORING: Wash	LOCATION					ings, l	Plate			
DEPTH. FT. SYMBOL	SOIL DESCRIPTION	BLOWS PER FT.	% PASSING NO. 200 SIEVE	LIQUID	PLASTIC	MOISTURE CONTENT, %	SHEA IN T	ONS	STRENGTH NS/SQ FT.		UNIT DRY WT
	Brownish-gray sandy clay, w/occasional light tan clay and numerous angular rock fragments						11.				
	-boulder from 8.0-8.5' -boulder from 9.5-10.0'						· · ·				
15-	-boulder from 13.0-14.01 (Till)										
-20- -25- -30-	Note: 4" monitor well installed in this boring location										\ <u>```\`\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\</u>
СОМ	PLETION DEPTH: 15.0' DATE: 8/10/82	DEPTH	TO					aved		91	-

SITE NAME: Revere Smelting & Refining Corporation LOCATION: Wallkill, New York DATE: July 29, 1991 Steel Casing Set in Cement with Locking Cap 1.9' Cap with air vent **Ground Surface** Cement Pad · 2.0 " Schedule 40 **PVC** Riser Cement/Bentonite Grout 4.0' 2.0 ' Thick 6.0' Bentonite Seal 8.0' DEPTH BELOW Gravel Pack GROUND SURFACE Screen 5.0' Length, 0.010" Slot Size, -Schedule 40 PVC - <u>13.0</u>° Bottom End Cap -End of Boring -- <u>13.0'</u> 8 1/4" AS-BUILT DIAGRAM FOR WELL <u>MW-1</u> (MW-1S as of 01/16) ENVIRONMENTAL STRATEGIES CORP. Four Penn Center West, Suite 315

Pittsburgh, Pennsylvania 15276

412-787-5100

PROJECT: Revere Smelting & Refining Corporation

Wallkill, New York

PA641-02

Environmental Strategies Corporation Four Penn Center West, Suite 315 Pittsburgh, PA 15276 Boring No.: MW-1 (MW-1S as of 01/16)

Date Drilled: July 26, 1991

Drilling Co.: Environmental Drilling, Inc.

Driller: Greg Pijak

ESC Geologist: E. Michael Riggins

Boring Location: West of battery storage area

Ground Elevation:

TOC Elevation:

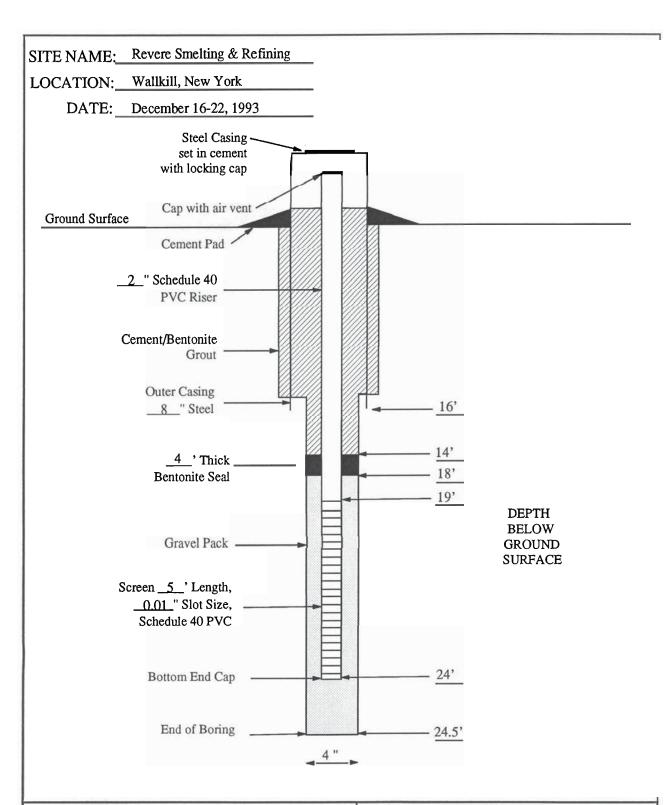
Boring	Sampler

Method: H.S.A. Method: Split-spoon Hole Diameter: 8.25" Length Ft.: 2.0 Inside Diameter: 4.25" Hammer lbs.: 140 Total Depth: 13.0' Fall ins.: 30

Depth (ft)	PID (ppm)	Percent Rec.	Sample Depth (ft)	Blows/6"	Sample Description
0.0-0.4	•	90	MW1-1 0.0-1.5	10/21/23/21	TOPSOIL-SILT-dark brown, some clay & angular rock fragments
0.4-2.0					SILT-yellowish brown to brown, little clay, trace rock fragments, FILL
2.0-4.0		60	MW1-2 2.0-4.0	15/16/17/22	SILT-grayish brown, little sand & clay, some rock fragments, calcite crystal, plastic, wood, & plastic sheeting material, FILL, damp
1.0-4.5		60	MW1-3 4.0-5.0	42/33/47/45	SILT-same as above to 4.5°
.5-6.0					SILT-greenish gray, some clay, trace angular rock fragments, native soil (?)
5.0-7.0		40	MW1-4 6.0-7.0	15/50 over 4"	CLAY-grayish brown, orange mottles, little sand & silt, trace rock fragments, rock fragment in spoon tip
3.0-9.0		80	MW 1-5 8.0-9.0	7/25/22/ 13	CLAY-same as above to 9.0'

9.0-10.0		SILT & SAND-bluish gray, little rock fragments, trace clay, saturated
10.0-12.0	16/12/12/12	SAND & GRAVEL & ROCK FRAGMENTS- dark bluish gray, trace silt & clay, saturated
12.0-13.0		SAND & GRAVEL & ROCK FRAGMENTS- same as above, augers advanced to 13.0'

NOTE: Groundwater encountered at 9.0'.





ENVIRONMENTAL STRATEGIES CORPORATION Four Penn Center West • Suite 315

Pittsburgh, Pennsylvania 15276

(412) 787-5100

AS-BUILT DIAGRAM FOR WELL MW-1A (MW-1S-R as of 01/16)

BORING LOG

Environmental Strategies
Corporation
Four Penn Center West, Ste. 315

Pittsburgh, Pennsylvania 15276

ESC Geologist __E. Michael Riggins

PROJECT

Revere Smelting & Refining

Wallkill, New York

PA1217-02

Boring No. MW-1A (MW-1S-R as of 01/16) Sheet 1 of 1

Date Drilled <u>12/16-22/93</u>

Drilling Co. Empire Soil and Investigations
Driller Scott Bray

Boring Location South of MW-1
Ground Elevation NA
TOC Elevation NA

Boring
Method Hollow Stem Augers
Hole Diameter 18"-8"-4"
Inside Diameter 12.25"-4.25"
Total Depth 24.5 feet

Type PVC

Diameter 2 inch
Screen Length 5 feet
Screen Slot Size 0.01 inch

 Method
 Sampler

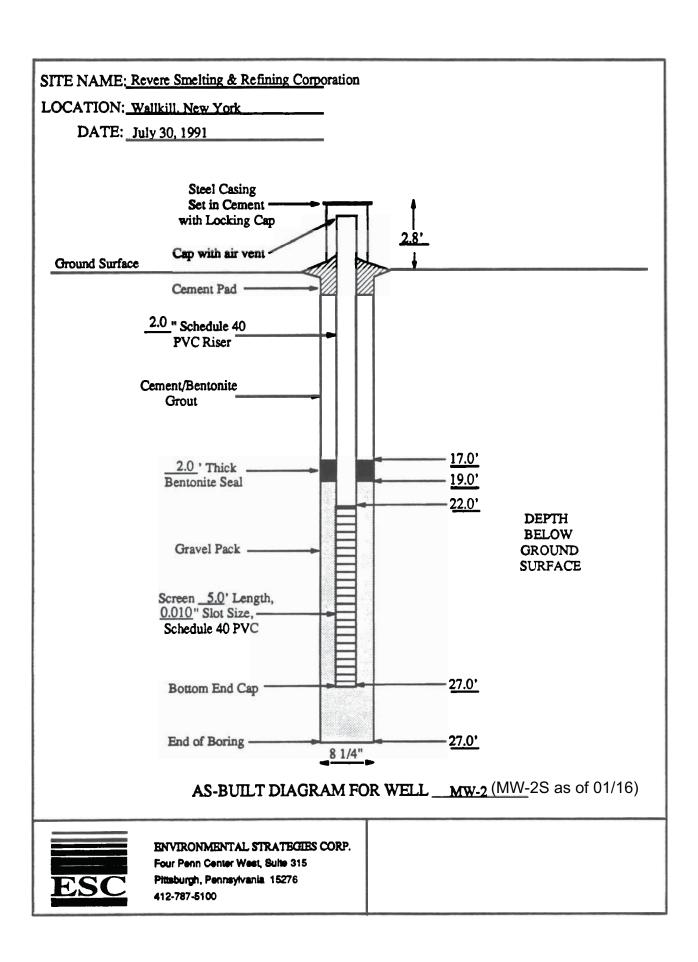
 Split-spoon

 Length
 (ft)
 2-foot

 Hammer
 (lb)
 140

 Fall
 (in)
 30

Depth (ft)	P.I.D. (ppm)	Percent Recovery	Sample Depth (ft)	Blows/6"	Sample Number	Sample Description
0	NA	30	0-2	10-11-10-9	MW1A-1	SILT FILL, some clay and roots,
ł .0						trace anthropogenic material, dark
						brown, moist.
2	NA	40	2-3.5	21-23-	MW1A-2	SILT FILL, trace clay and rock
r 1				100/6"		fragments, some calcite fragments,
: 4						yellowish brown, moist; large
						gravel and anthropogenic material
r						below 3 feet.
4	NA	100	4-6	12-21-30-30	MW1A-3	Note: Color change to greenish
					MW1A-4	brown from 4 to 4.5 feet.
7				/		
4.5						Note: color change to yellowish
	NA	50	6-8	21-50-65-33	MW1A-5	brown, trace bluish gray clay and
	NA	45	8-9.5	10-13-13-7	MW1A-6	rock fragments, orange mottling.
10	NA	40	10-12	6-7-8-10		SILT FILL and shale fragments,
						bluish gray, little fine grain
	NA	60	12-14	7-15-23-18		sand, saturated; dark greenish
						gray and moist below 12 feet.
	I TO ALCOHOLD THE T					
15.5	NA	50	14-16	10-23-30-19		SILT, trace fine sand, clay, and
	NA	40	16-18	20-27-65-60		rock fragments, yellowish brown,
						dry, native soil; set
						8 inch steel casing at 16 feet.
18	NA	50	18-20	23-28-32-67		SILT TILL with shale fragments,
4						bluish gray, moist.
20	NA	30	20-24.5	Cored	RUN 1	SHALE, dark gray, horizontal
						fracturing at 30° angles, wet,
						competent.
						7



PROJECT: Revere Smelting & Refining Corporation

Wallkill, New York

PA641-02

Environmental Strategies Corporation

Four Penn Center West, Suite 315

Pittsburgh, PA 15276

Drilling Co.:

Environmental Drilling, Inc.

Driller: Greg Pijak

ESC Geologist: E. Michael Riggins

Boring No.: MW-2 (MW-2S as of 01/16)

Date Drilled: July 30, 1991

Boring Location: South of facility

Sampler

Ground Elevation:
TOC Elevation:

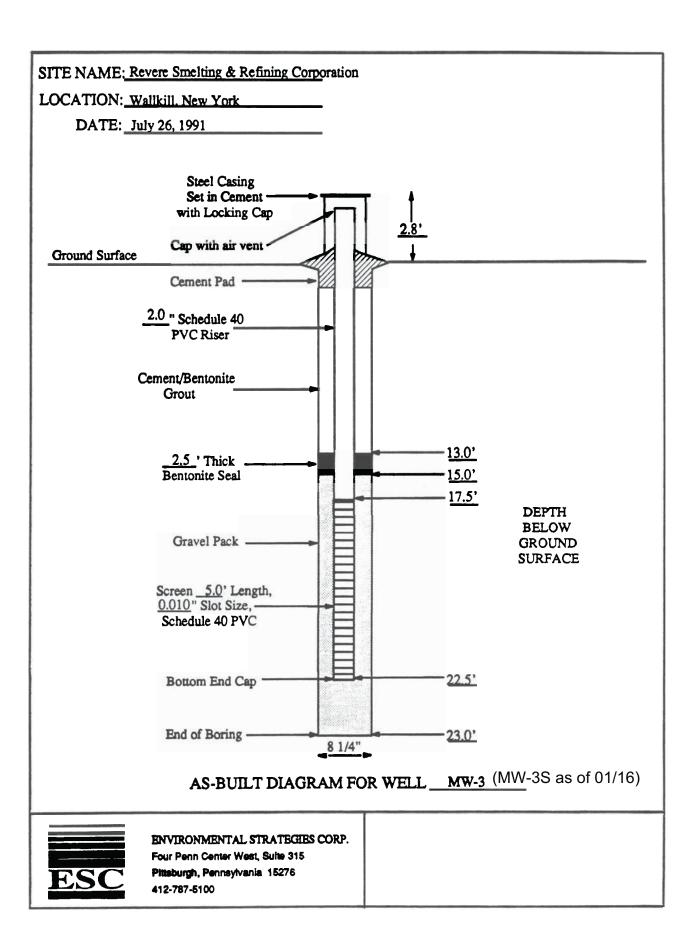
Boring

H.S.A. Method: Method: Split-spoon 8.25" Length Ft.: 2.0 Hole Diameter: Inside Diameter: 4.25" Hammer Ibs.: 140 Fall ins.: 30 Total Depth: 27.0'

PID Percent Sample Depth Rec. Depth (ft) Blows/6" Sample Description (ft) (ppm) 25 MW2-1 9/26/42/43 SILT FILL-medium brown, little clay & 0.0-2.0 0 0.0-0.5 angular & rounded rock fragments 2.0-2.5 50 over 5" No recovery-calcite crystal in spoon tip, augered to 4.0' 4.0-5.0 300 90 MW2-2 14/50/ SILT FILL-same as above to 5.0' 4.0-5.5 50 over 5" SAND-yellowish brown, fine grained, 5.0-5.5 trace silt & rock fragments 6.0-6.5 320 MW2-3 11/50 over 4" SAND-same as above to 6.5' 6.0-7.0 SILT FILL-grayish brown, little clay, 6.5-7.0 trace sand & rock fragments MW2-4 5/14/8/9 SILT FILL-same as above to 9.0' 8.0-9.0 30 50 8.0-9.0

9.0-10.0	3				SILT FILL-dark gray to bluish gray, some clay, little rock fragments, trace sand, poorly sorted, damp
10.0-10.5	3	7 0	MW2-5 10.0-12.0 MW2-6 10.0-12.0 (dup)	8/9/4/7	SILT-black, organic material, woody material, roots, some clay, trace rock fragments, native soils
10.5-11.2					CLAY-dark gray, some silt, trace rock fragments, organic & root material
11.2-12.0					SILT-yellowish brown, little clay, trace fine sand & rock fragments, TILL
12.0-13.0	3	90	MW2-7 12.0-13.0	9/2 0/32/42	SILT TILL-yellowish brown, little clay & fine sand, trace rock fragments
13.0-14.0					SILT TILL-yellowish brown, dark orange mottles, little clay & rock fragments
14.0-14.6	3	90	MW2-8 14.0-14.6	29/50 over 2"	SILT TILL-same as above to 14.3', weathered shale fragment in spoon tip
16.0-17.3	4	100	MW2-9 16.0-17.0	48/50/ 50 over 4"	SILT TILL-dark yellowish brown, little clay & rounded rock fragments, poorly sorted
18.0-18.5		5		72	SILT TILL-same as above, very poor recovery
20.0-21.2		30	MW2-10 20.0-21.2	16/19/ 50 over 3"	SILT TILL-yellowish brown, little clay & rock fragments, trace sand, poorly sorted, damp, boulder at 21.0'
22.0-23.2		90	MW2-11 22,0-23.0	27/30/ 50 over 3"	SILT TILL-same as above, sandstone fragments, saturated at 23.0'
23.2-27.0					SILT TILL- same as above, augered to 27.0'

NOTE: Groundwater encountered at 23.0'.



PROJECT: Revere Smelting & Refining Corporation

Wallkill, New York

PA641-02

Environmental Strategies Corporation Four Penn Center West, Suite 315 Pittsburgh, PA 15276 Boring No.: MW-3 (MW-3S as of 01/16)

Date Drilled: July 24 & 25, 1991

Drilling Co.:

Environmental Drilling, Inc.

Driller:

Greg Pijak

ESC Geologist:

E. Michael Riggins

Boring Location: Southeast of facility

Sampler

Ground Elevation:

TOC Elevation:

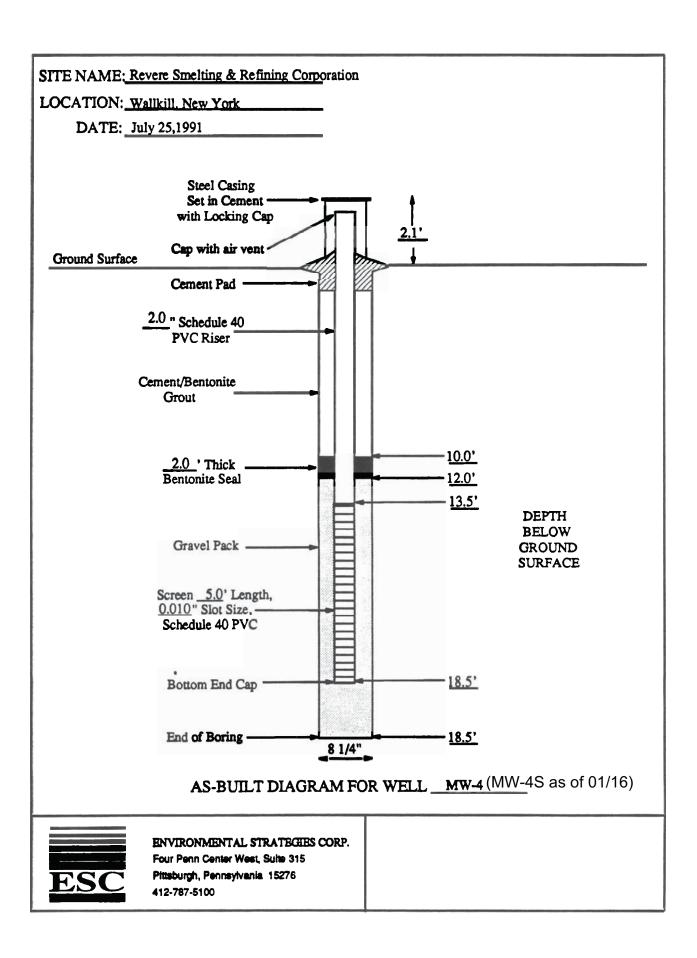
Boring

Method: H.S.A. Method: Split-spoon Hole Diameter: 8.25" Length Ft.: 2.0 Inside Diameter: 4.25" Hammer Ibs.: 140 Total Depth: 22.0' Fall ins.: 30

Depth (ft)	PID (ppm)	Percent Rec.	Sample Depth (ft)	Blows/6"	Sample Description
0.0-1.0	0	65	MW3-1 0.0-0.5	3/12/30/ 50 over 5"	SAND-brown, fine grained, trace silt & clay, organics & roots, FILL
1.0-2.0	0				SILT FILL-grayish brown, little clay & rock fragments, trace fine sand, trace lead, slag, concrete, & plastic material
2.0-4.0	0	50	MW3-2 2.0-2.5	5/14/8/21	SILT FILL-yellowish brown, little clay & rock fragments, poorly sorted
4.0-6.0	0	75 *	MW3-3 4.0-4.5	17/10/12/44	SILT TILL-yellowish brown, little clay & rock fragments, rootlets & organics, damp at 4.0', native soils
5.0-8.0	0	100	MW3-4 6.0-6.5	33/50/33/34	SILT TILL-same as above, rock fragments smaller in size
8.0-10.0	0	100	MW3-5 8.0-8.5	5 0/21/35/22	SILT TILL-same as above
10.0-10.5	0	80	MW3-6 10.0-10.5	50 over 5"	SILT TILL-grayish brown, little clay, trace rock fragments, poorly sorted, dry

15.0-16.9 20 51/100 over 5" SILT TILL-same as above, gravel sized fraction has increased	12.0-12.7	40	5/50 over 3"	SILI IIII-same as above
	15.0-16.9	20	51/100 over 5"	

NQTE: Groundwater encountered at 7.0',



PROJECT: Revere Smelting & Refining Corporation

Wallkill, New York

PA641-02

Environmental Strategies Corporation

Four Penn Center West, Suite 315

Pittsburgh, PA 15276

Boring No.: MW-4 (MW-4S as of 01/16)

Date Drilled: July 24, 1991

Drilling Co.: Environmental Drilling, Inc.

Driller: Greg Pijak

ESC Geologist: E. Michael Riggins

Boring Location: East of facility

Ground Elevation:
TOC Elevation:

Boring	Boring Sampler		

Method:	H.S.A.	Method:	Split-spoon
Hole Diameter:	8.25"	Length Ft.:	2.0
Inside Diameter:	4.25"	Hammer Ibs.:	140
Total Depth:	20.0'	Fall ins.:	30

Depth (ft)	PID (ppm)	Percent Rec.	Sample Depth (ft)	Blows/6"	Sample Description
0.0-0.5	0	90	MW4-1 0.0-0.5	1/8/27/24	SAND-fine grained, root zone, trace silt & rock fragments, FILL
0.5-2.0					SILT FILL-some clay, little rock fragments, plastic & lead material
2.0-4.0	3-4	100	MW4-2 2.0-2.5	17/48/18/41	SILT FILL-same as above, concrete fragment in spoon tip
4.0-6.0	. 6-8	90	MW4-3 4.0-6.0 MW4-4 4.0-6.0 (dup)	40/38/27/ 50 over 4"	SILT FILL-same as above, lead, wood & concrete material
6.0-7.0	0	80		50/50 over 4"	FILL-wood & slag material in spoon tip, no sample collected
8.0-10.0		5		29/8/14/13	FILL-wood material in spoon tip, no recovery, pushing woody material downward through the FILL
10.0-12.0				2/16/29/30	FILL-same as above, no recovery

12.0-14.0	0	5	MW4-5 12.0-14.0	4/25/9/34	FILL-slag material, no recovery
14.0-16.0	0	5		25/14/5/7	FILL-SLAG & GRAVEL-dark gray to black, saturated
16.0-16.5	0	90	MW4-6 16.0-17.0	6/3/5/8	SLAG & GRAVEL-same as above to 16.5°
16.5-17.3					SILT-dark gray, little clay, trace fragments, root structures, saturated
17.3-18.0					SILT-yellowish gray to brown, little clay, trace rock fragments, mottled
18.0-20.0	0	90		8/14/18/ 50 over 5"	SILT TILL-light yellowish brown, little clay, trace angular rock fragments, tight formation

NOTE: Groundwater encountered at 16.0'.

SITE NAME: Revere Smelting & Refining LOCATION: Wallkill, New York DATE: December 14-21, 1993 Steel Casing set in cement with locking cap Cap with air vent **Ground Surface** Cement Pad _2_" Schedule 40 **PVC** Riser Cement/Bentonite Grout Outer Casing 8_" Steel 16.5 _____, Thick Bentonite Seal 23' **DEPTH BELOW** Gravel Pack **GROUND SURFACE** Screen _10' Length, _0.01_" Slot Size, Schedule 40 PVC Bottom End Cap End of Boring 35.2 4"



ENVIRONMENTAL STRATEGIES CORPORATION
Four Penn Center West • Suite 315
Pittsburgh, Pennsylvania 15276
(412) 787-5100

AS-BUILT DIAGRAM FOR WELL MW-4A (MW-4S-R as of 01/16)

Environmental Strategies
Corporation
Four Penn Center West, Ste. 315
Pittsburgh, Pennsylvania 15276

PROJECT Revere Smelting & Refining Wallkill, New York PA1217-02

MW-4A (MW-4S-R as of 01/16) sheet 1 of 2

Date Drilled _12/08/93

Drilling Co. Empire Soil and Investigations Boring Location South of MW4

Driller Scott Bray/Craig Conner Ground Elevation NA

ESC Geologist E. Michael Riggins TOC Elevation NA

Method Hollow Stem Augers
Hole Diameter 18"-8"-4"
Inside Diameter 13.25"-4.25"
Total Depth 35.2 feet

Type PVC
Diameter 2 inch
Screen Length 10 foot
Screen Slot Size 0.01 inch

 Method
 Split-spoon

 Length
 (ft)
 2-foot

 Hammer
 (lb)
 140

 Fall
 (in)
 30

Depth (ft)	P.I.D. (ppm)		Sample Depth (ft)	Blows/6"	Sample Number	Sample Description
0	NA	75	0-2	3-12-15-27	MW4A-1	SILT, little sand, trace
						rock fragments, and roots, brown,
						moist.
0.5						SILT FILL, little sand and clay,
						trace rock fragments anthropogenic
						materials, yellowish brown, moist.
2	NA	80	2-4	12-12-17-13	MW4A-2	SILT FILL, trace sand,
2	NA	80	2-4	12-12-17-13	MW4A-Z	
					-	anthropogenic material, wood,
						brownish gray.
5	NA	60	4-6	6-10-17-	MW4A-3	Note: Large gravel to cobble
				70/4"		size rocks at 5 feet.
6	NA	30	6-8	21-11-9-20	MW4A-4	SILT FILL, some gravel, trace
						rock fragments, dark gray to
						black.
8	NA	-	8-10	8-10-7-8	MW4A-5	GRAVELLY SILT FILL, trace sand,
	NA	30	10-12	6-4-6-4	MW4A-6	medium to large size gravel, some
	NA	0	12-14	11-8-21-19		wood, slag, and rock fragments,
						dark gray, dry; saturated at 14 to
	-		Lu Y			15 feet.
15	NA	30	14-16	3-6-3-3		SILT, trace clay and rock
15	NA.	30	14-10	3-0-3-3		fragments, greenish gray,
		10				dry, slightly plastic, virgin soil
17	NA	50	16-18	1-6-9-13	MW4A-7	GRAVELLY SAND, little silt,
	The state of	5				yellowish brown, moist,
						set 8 inch steel casing to
						16.5 feet on 12/14/93.
18	NA	40	18-20	4-10-4-5	MW4A-8	CLAY, some silt, trace rock
						fragments, reddish brown, plastic,

Environmental Strategies Corporation

Four Penn Center West, Ste. 315 Pittsburgh, Pennsylvania 15276

PROJECT

Revere Smelting & Refining
Wallkill, New York
PA1217-02

Boring No. <u>MW-4A</u>
(MW-4S-R as of 01/16)
Sheet <u>2</u> of <u>2</u>

Date Drilled 12/21/93

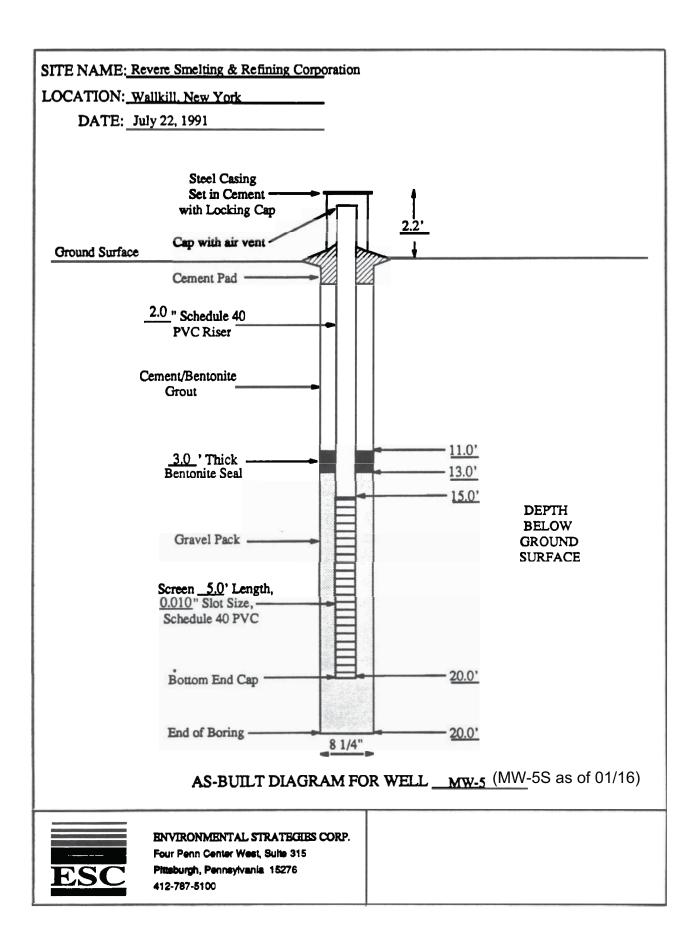
Drilling Co. Empire Soil and Investigations
Driller Scott Bray/Craig Conner Ground Elevation NA

ESC Geologist E. Michael Riggins TOC Elevation NA

Method Hollow Stem Augers
Hole Diameter 18"-8"-4"
Inside Diameter 12.25"-4.25"
Total Depth 35.2 feet

Type PVC
Diameter 2 inch
Screen Length 10 foot
Screen Slot Size 0.01 inch

Depth (ft)	P.I.D. (ppm)		Sample Depth (ft)	Blows/6"	Sample Number	Sample Description
18	NA		18-20			CLAY, dry.
20	NA	30	20-22	9-6-9-14		Note: Some rounded gravel, trace
	-					calcite in tip of sampler, stiff.
22	NA	30	22-24	11-15-15-17	MW4A-8	SILT, some clay, little shale
						fragments, trace fine sand, brown,
	-					hard, dry.
24	NA	40	24-26	27-36-22-28	MW4A-9	SILT TILL with rock fragments,
						little clay, moist, rock
	NA	70	26-28	21-30-33-60		fragments increase with depth,
	NA	50	28-29	23-100/5"		brown, moist.
29	NA	0	29	100/0"		SHALE, competent, horizontal
	NA		31-35.2		RUN 1	fractures, dark gray, RQD=0.
	-					-
	<u> </u>					-
	-					
	-				-	



PROJECT:

Revere Smelting & Refining Corporation

Wallkill, New York

PA641-02

Environmental Strategies Corporation

Four Penn Center West, Suite 315

Pittsburgh, PA 15276

Boring No.: MW-5 (MW-5S as of 01/16)

Date Drilled: July 22, 1991

Drilling Co.:

Environmental Drilling, Inc.

Driller:

Greg Pijak

ESC Geologist:

E. Michael Riggins

Boring Location: East of facility

Ground Elevation:

TOC Elevation:

Boring

Method: H.S.A.
Hole Diameter: 8.25"
Inside Diameter: 4.25"
Total Depth: 20.0'

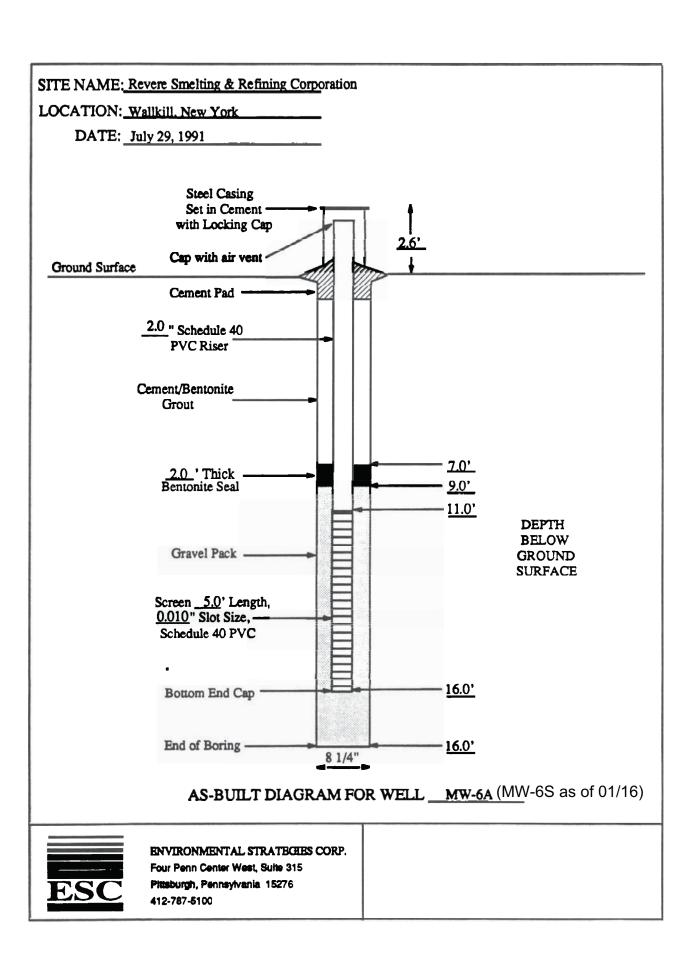
Sampler

Method:	Split-spoon
Length Ft.:	2.0
Hammer lbs.:	140
Fall ins.:	30

Depth (ft)	PID (ppm)	Percent Rec.	Sample Depth (ft)	Blows/6"	Sample Description
0.0-2.0	0	20	MW5-1 0.0-0.5	5/7/6/7	TOPSOIL-SILT-medium to dark brown, little clay, trace rock fragments, FILL
2.0-4.0	0	50	MW5-2 2.0-3.0	50 over 3" 12/16/26	SILT FILL-medium gray, some clay, trace rock & plastic fragments
4.0-4.5	0	80	MW5-3 4.0-4.5	27/42/45/3 0	SILT FILL-same as above to 4.5'
4.5-6.0					SILT-medium brown to reddish brown, some orange staining, some clay, trace shale & rock fragments, poorly sorted, native soils or TILL (?)
6.0-8.0	0	90	MW5-4 6.0-6.5	20/27/40/43	SILT-same as above, TILL (?)
8.0-10.0	50 at 8.8'	80	MW5-5 8.0-8.5	33/34/34/38	SILT-same as above, increasing shale fragments, micaceous siltstone fragment in spoon tip

10.0-12.0	30	70	MW5-6 10.0-10.5	19/18/16/16	SILT-same as above, changing color to dark brown
12.0-14.0	0	80	MW5-7 12.0-12.5	33/18/18/29	SILT-same as above, dark brown color, two nails in split-spoon tip
14.0-16.0	0	80	MW5-8 14.0-14.5	8/41/19/25	SILT-same as above, damp at 15,0°
16.0-17.3	0	85	MW5-9 16.0-16.5	60/67/ 50 over 3"	SILT-same as above, shale fragment in spoon tip, saturated at 16.0'
18.0-20.0	0	80		14/33/31/42	Weathered shale fragment to 18.3', SILT TILL-same as above, dry

NOTE: Groundwater encountered at 16.0°



PROJECT: Revere Smelting & Refining Corporation

Wallkill, New York

PA641-02

Environmental Strategies Corporation Four Penn Center West, Suite 315

Pittsburgh, PA 15276

Drilling Co.: Environmental Drilling, Inc.

Driller: Greg Pijak

ESC Geologist: E. Michael Riggins

Boring No.: MW-6A (MW-6S as of 01/16)

Date Drilled: July 29, 1991

Boring Location: East of facility

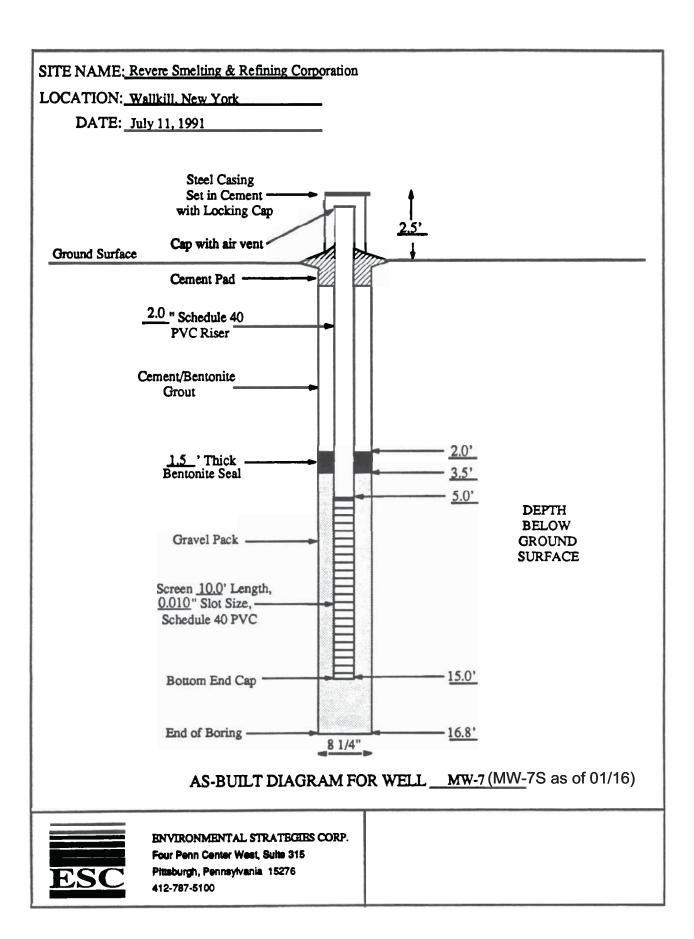
Ground Elevation:
TOC Elevation:

Boring Sampler

H.S.A. Method: Method: Split-spoon 8.25" Hole Diameter: Length Ft.: 2.0 Inside Diameter: 4.25" Hammer lbs.: 140 Total Depth: 16.0' Fall ins.: 30

Percent PID Depth Sample Depth (ft) Sample Description (ft) (ppm) Rec. Blows/6" 0.0-2.0 0 60 MW6A-1 10/20/22/20 SILT FILL-light brown, little clay & 0.0-1.0 rock fragments, trace sand & slag 2.0-3.5 0 100 MW6A-2 9/12/25/28 CLAY-bluish to greenish gray, little silt, trace rock fragments, black 2.0-3.0 organic (peat) material SILT-yellowish brown, little clay, 3.5-4.0 trace sand & rock fragments, poorly sorted, TILL SILT TILL-same as above to 5.5' 4.0-5.5 0 80 MW6A-3 26/26/30/40 4.0-5.0 SILT TILL-medium brown, little clay, 5.5-6.0 trace sand & rock fragments 50 over 5" 6.0-6.5 SANDSTONE FRAGMENT in spoon tip 25/50 over 5" 8.0-9.0 0 No recovery-pushing cobble 50 over 3" 10.0-10.2 5 Dark gray SILTSTONE fragment in spoon tip

12.0-12.1	10	50 over 1*	SAND & GRAVEL-poor recovery, split- spoon wet, saturated material
12.1-16.0			Material augered, saturated
NOTE: Groundwar	ter encountered at 12.0',		



PROJECT: Revere Smelting & Refining Corporation

Wallkill, New York

PA641-02

Environmental Strategies Corporation Four Penn Center West, Suite 315

Pittsburgh, PA 15276

Boring No.: MW-7 (MW-7S as of 01/16)

Date Drilled: July 10, 1991

Drilling Co.: Environmental Drilling, Inc.

Driller: Greg Pijak

ESC Geologist: E. Michael Riggins

Boring Location: North of facility

Ground Elevation: TOC Elevation:

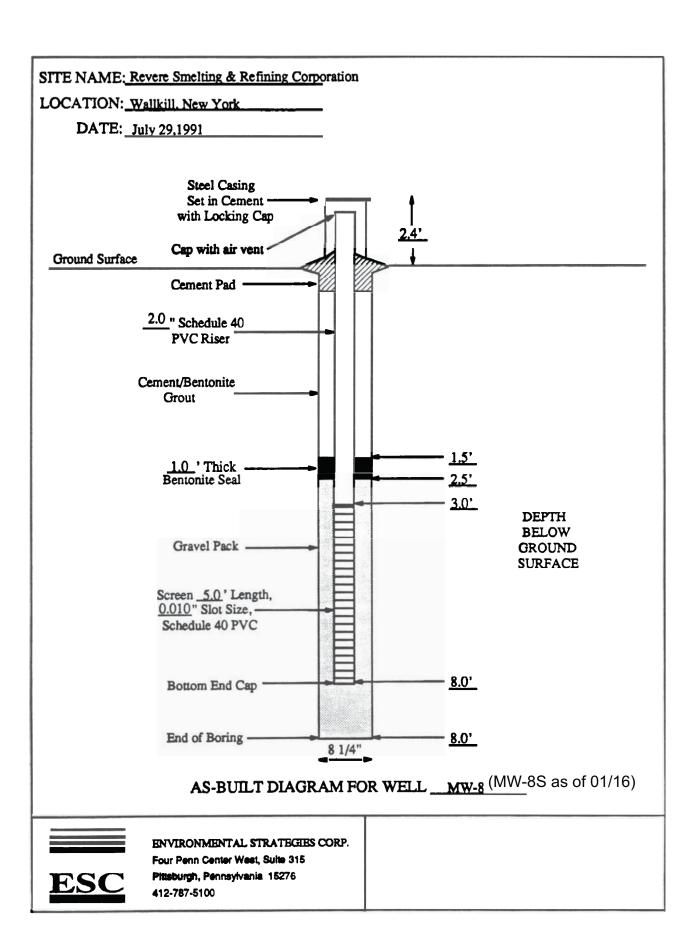
Boring Sampler

Method: H.S.A. Method: Split-spoon Hole Diameter: 8.25" Length Ft.: 2.0 Inside Diameter: 4.25" Hammer lbs.: 140 Fall ins.: 30 Total Depth: 16.9

Depth (ft)	PID (ppm)	Percent Rec.	Sample Depth (ft)	Blows/6"	Sample Description
0.0-1.5	0	50	MW7-1 0.0-0.5	4/8/5	TOPSOIL-SILT-medium grayish brown, organic material, trace sand & clay, yellowish brown mottles, wet
1.5-2.5	0	85	MW7-2 2.0-2.5	5/8/12/23	CLAY-yellowish brown, some silt, root structures, mottled
2.5-3.5					SILT-bluish gray, some clay, little sand, trace rock fragments, yellowish brown mottles in upper 0.5'
3.5-5.5	0	85	MW7-3 4.0-4.5	20/23/28/40	SILT TILL-medium grayish brown, some clay, little sand & rock fragments, trace rounded gravel
5.5-7.5	0	60	MW7-4 6.0-6.5	23/17/18/24	SILT TILL-dark bluish gray, trace clay & rock fragments, saturated at 7.0'
8.0-10.0	0	70	MW7-5 8.0-8.5	6/35/23/25	SILT TILL-dark bluish gray, little sand & rock fragments, saturated
10.0-12.0		40		5/13/17/16	SILT TILL-same as above, gravel sized rock fragments

12.0-12.7	40	5/50 over 3"	SILT TILL-same as above
15.0-16.9	20	51/100 over 5"	SILT TILL-same as above, gravel sized fraction has increased

NOTE: Groundwater encountered at 7.0'.



PROJECT:

Revere Smelting & Refining Corporation

Wallkill, New York

PA641-02

Environmental Strategies Corporation Four Penn Center West, Suite 315

Pittsburgh, PA 15276

Boring No.: MW-8 (MW-8S as of 01/16)

Date Drilled: July 29, 1991

Drilling Co.:

Environmental Drilling, Inc.

Driller:

Greg Pijak

ESC Geologist:

E. Michael Riggins

Boring Location: North of facility

Ground Elevation:

TOC Elevation:

-	•	
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Method: H.S.A.
Hole Diameter: 8.25"
Inside Diameter: 4.25"
Total Depth: 8.0'

Sampler

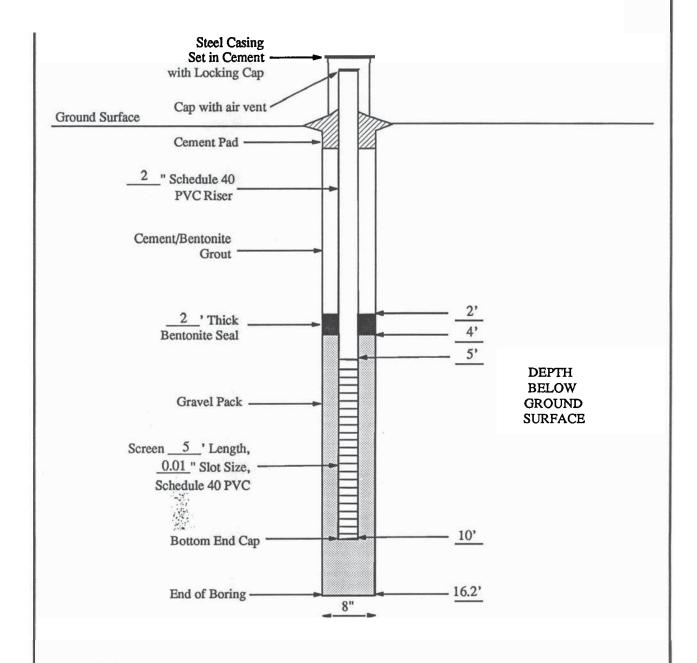
Method: Split-spoon
Length Ft.: 2.0
Hammer lbs.: 140
Fall ins.: 30

Depth (ft)	PID (ppm)	Percent Rec.	Sample Depth (ft)	Blows/6"	Sample Description
0.0-0.5	0	50	MW8-1 0.0-0.5	2/6/8/14	TOPSOIL-SILT-dark brown, little sand, trace clay, root zone
0.5-2.0					SILT-yellowish brown, some fine sand, trace clay & rock fragments, mottled
2.0-4.0	0	100	MW8-2 2.0-3.0	13/14/11/12	SILT-yellowish brown, little fine grained, gray sand, little clay, trace rock fragments, saturated at 3.5'
4.0-5.0	0	80	MW8-3 4.0-5.0	10/14/18/16	SAND-yellowish brown, some silt, trace rock fragments, grading into gray SAND
5.0-6.0					SAND-dark gray to gray, fine to medium grained, little rock fragments, trace silt, saturated
5.0-7.5	0	100		20/19/15/15	SAND-same as above to 7.5'
7.5-8.0					SAND & GRAVEL & ROCK FRAGMENTS saturated material

NOTE: Groundwater encountered at 3.5'

SITE NAME: Revere Smelting & Refining
LOCATION: Wallkill, New York

DATE: December 20, 1993





ENVIRONMENTAL STRATEGIES CORPORATION
Four Penn Center West • Suite 315
Pittsburgh, Pennsylvania 15276
(412) 787-5100

AS-BUILT DIAGRAM FOR WELL MW-9 (MW-9S as of 01/16)

Environmental Strategies Corporation

Four Penn Center West, Ste. 315 Pittsburgh, Pennsylvania 15276

PROJECT

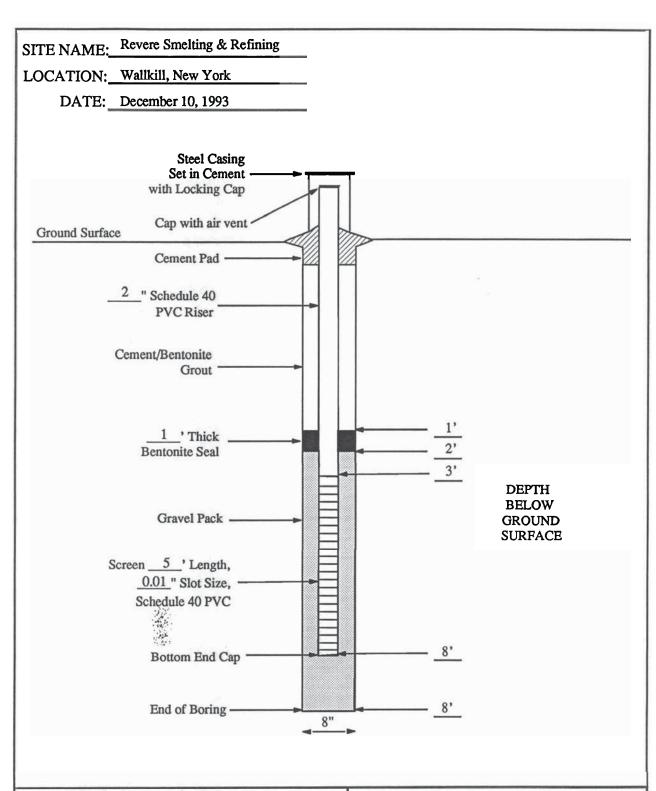
Revere Smelting & Refining Wallkill, New York PA1217-02

Boring No. MW-9 (MW-9S as of 01/16)

Date Drilled 12/13/93

Drilling Co. Empire Soil and Investigations Boring Location <u>Near wastewater treatment</u>
Ground Elevation <u>plant</u> Driller . Glen Stevens ESC Geologist Patrick Peterson TOC Elevation

Hole Dia	Hollow : meter Diameter	sing Stem Auger 8-inch 4.25-inc 16.2 feet	h s	Type Casing/ PVC Diameter 2-inc Screen Length 5 Screen Slot Size	ch 5-foot	Sampler Split-spoon
Depth (ft)	P.I.D. (ppm)	Percent Recovery	Sample Depth (ft		Sample Number	Sample Description
0	N/A	N/A	N/A	N/A	N/A	Concrete with re-bar, 1.8'
1.8	N/A	75	2-4	5-14-12-13	MW9-1	GRAVEL, some sand and silt,
						Fill.
3.5	N/A	75	4-6	12-24-24-26	MW9-2	SILT, some clay, yellowish
						some mottling, non-plastic,
						moist.
6	N/A	75	6-8	14-14-15-13	MW9-3	GRAVELLY SILT, some clay and
					ļ	sand, some mottling, rounded
						medium gravel, non-plastic,
					-	natural soil.
	N/A	75	8-10	12-18-14-14	MW9-4	Same as above, wet
		400	10.10	15.00.00.01	1,500	
10	N/A	100	10-12	17-28-30-24	MW9-5	SILT, some fine sand and fine
						round gravel, non-plastic,
					-	yellowish brown, moist,
					-	natural soil.
12	N/A	75	12-14	13-21-22-27	MW9-6	SILTY FINE SAND, some round fine
12	11/22	7.5	12 11	10 21 22 27	11113	gravel, trace clay, yellowish
					1.00	brown, dense, moist.
	N/A	75	14-16	26-33-50-	MW9-7	Same as above, with cobble size
				100/3"		shale fragments, moist.
			l de la companya de l			W. 1994 - 1
16	N/A	0	16-16.	2 100/2"		SHALE, dark gray, competent,
						auger refusal at 16.2 feet.
			A			
a						





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Four Penn Center West • Suite 315
Pittsburgh, Pennsylvania 15276
(412) 787-5100

AS-BUILT DIAGRAM FOR WELL MW-10 (MW-10S as of 01/16)

Environmental Strategies Corporation

Four Penn Center West, Ste. 315 Pittsburgh, Pennsylvania 15276

PROJECT

Revere Smelting & Refining
Wallkill, New York

PA1217-02

Boring No. $\underline{MW-10}$ Sheet $(\underline{MW-10S} \text{ as of } \underline{01/16})$

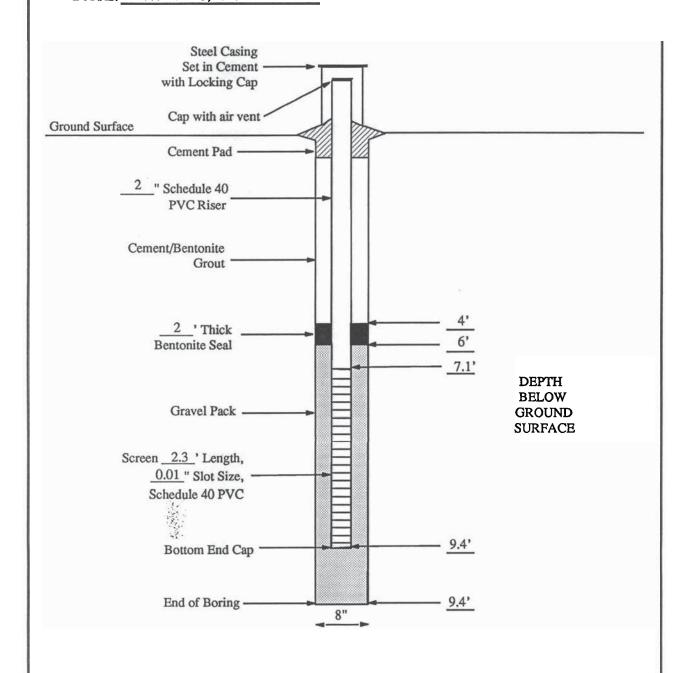
Date Drilled <u>12/10/93</u>

Drilling Co. Empire Soil and Investigations Boring Location Near culvert by R.R. tracks Ground Elevation _ Driller Glen Stevens , ESC Geologist _ Patrick Peterson TOC Elevation Boring Casing/Screen Sampler Method Hollow Stem Augers Type PVC Method Split-spoon Hole Diameter 8-inch
Inside Diameter 4.25-inch Diameter 2-inch Length (ft) _ 2-foot 5-foot Screen Length Hammer (1b) 140 Total Depth 8-feet Screen Slot Size __0.01-inch Fall (in) Depth P.I.D Percent Sample Sample (ft) Recovery Depth (ft) Blows/6" Number Sample Description (ppm) 75 N/A 0-2 3-4-5-7 MW10-1 TOPSOIL, brown, fine sand, trace silt and gravel, moist, Fill. SILT, some sand and fine to medium 1 gravel, trace clay, non-plastic, brown, moist, Fill. GRAVELLY SILT, some fine to N/A 30 2-4 7-5-6-4 coarse sand, saturated, Fill. 21-51-49-15 GRAVELLY SAND, dark gray, some 3.8 N/A 50 4-6 anthropogenic material, little fines, saturated, Fill, 53-7-9-8 CLAY, some roots, black, trace silt 7.5 N/A 50 6-8 slightly fat, organic rich odor, natural topsoil. Note: Water measured at 2 feet. 40

SITE NAME: Revere Smelting & Refining

LOCATION: Wallkill, New York

DATE: December 15, 1993





ENVIRONMENTAL STRATEGIES CORPORATION Four Penn Center West • Sulte 315 Pittsburgh, Pennsylvania 15276 (412) 787-5100

AS-BUILT DIAGRAM FOR WELL MW-11 (MW-11S as of 01/16)

Environmental Strategies
Corporation
Four Penn Center West, Ste. 315

Pittsburgh, Pennsylvania 15276

PROJECT Revere Smelting & Refining Wallkill, New York

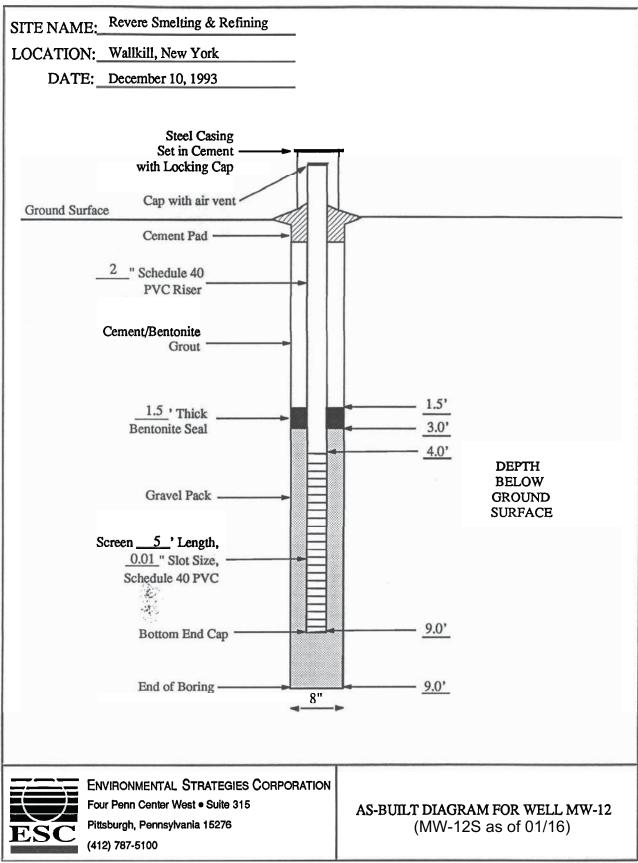
Boring No. <u>MW-11</u>
Sheet (MW-11S as pf 01/16)

Date Drilled <u>12/15/93</u>

Drilling Co. Empire Soil and Investigation
Driller Glen Stevens
ESC Geologist Patrick T. Peterson

Boring Location Near-Ballard Road
Ground Elevation NA
TOC Elevation NA

					1		
Method <u>Ho</u> Hole Diamet Inside Diar Total Depth	ter <u>8.</u>	<u>Auger</u> 00" .25"	Di	pe <u>PVC</u> ameter <u>2-</u> reen Lengt	inch h 2.3 fee Size 0.010	t	Sampler Method Split-spoon Length (ft) 2.0' Hammer (lb) 140 Fall (in) 30
Depth	P.I.D. (ppm)	g Recov	Sample Depth		lows/6"		Sample Description
D	NA	75	0-2	3-12-1	.2-9	TOPSOIL,	silt, some clay and
			MW11-1				trace sand, slightly
						plastic,	brown, moist
2	NA	100	2-4		2-48		eathered shale fragments,
	-		MW11-2				lay, brown and gray, dry,
	-					natural	soil, non-plastic
4	NA NA	100	4-5.	5 18-59-	104	WEATHERE	ED SHALE, gray and brown,
	1		MW11-3				d oxidized iron staining
6	NA	75	6-8	30-26-	18-18	Same as	above, wet at 8 feet
			MW11-4				
8	NA	75	8-9.2	21-50-	100/2"	SHALE, d	dark gray, competent, some
							ing, saturated.
	-						
						Auger re	efusal at 9.2 feet
					,	1787	
-			-				- F*
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Environmental Strategies
Corporation
Four Penn Center West, Ste. 315

Pittsburgh, Pennsylvania 15276

PROJECT

Revere Smelting & Refining
Wallkill, New York
PA1217-02

Boring No. MW-12

(MW-12S as of 01/16) Sheet 1 of 1

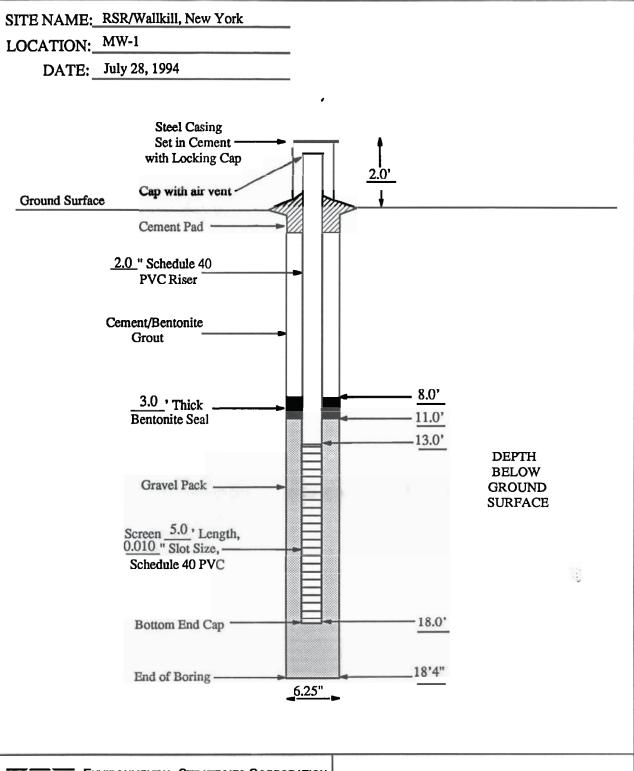
Date Drilled <u>12/10/93</u>

Drilling Co. Empire Soil and Investigations
Driller Glen Stevens
ESC Geologist Patrick Peterson

Boring Location Near pond and R.R. tracks
Ground Elevation TOC Elevation

Boring
Method
Hole Diameter
Total DepthCasing/Screen
FyeMethod
PVCSampler
Method
Split-spoon
Screen Length
Screen Slot Size
0.01-inchCasing/Screen
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Depth (ft) (ppm) P.I.D Percent Recovery Depth (ft) Blows/6" Number Sample Number Sample Description 0 N/A 75 0-2 1-3-6-10 MW12-1 TOPSOIL, silt, brown, trace and gravel, moist. 0.4 CLAY, some silt, little sub gravel and sand, moderately plastic, brown, gray mottli bedding structure, Fill. 2 N/A 60 2-4 3-6-7-12 MW12-2 FINE GRAVELLY CLAY, some si low to high plasticity, brown, some roots and asphalt, blu mottling, stiff, moist, Fill mottling, stiff, moist, Fill moderate plasticity, moist, soil. 8.8 N/A 80 4-6 5-4-5-5 MW12-3 CLAY, some silt and organic gray, little sand and fine medium round gravel, slight moderate plasticity, moist, soil. 6.2 N/A 100 6-8 4-6-8-12 MW12-4 CLAY, light brown, fat clay sand, some round fine grave to well, stiff, natural soi Increase in silt with depth little reddish brown mottli oxidized, dark brown stiff Till at 9.7 feet. Note: Water measured at 4.2	reen Slot	s	<u> </u>	9.7-feet	epth	Total De
and gravel, moist. CLAY, some silt, little sub gravel and sand, moderately plastic, brown, gray mottli bedding structure, Fill. N/A 60 2-4 3-6-7-12 MW12-2 FINE GRAVELLY CLAY, some si low to high plasticity, brown some roots and asphalt, blu mottling, stiff, moist, Fill moderate plasticity, moist, soil. N/A 80 4-6 5-4-5-5 MW12-3 CLAY, some silt and organic gray, little sand and fine medium round gravel, slight moderate plasticity, moist, soil. N/A 100 6-8 4-6-8-12 MW12-4 CLAY, light brown, fat clay sand, some round fine grave to well, stiff, natural soi Increase in silt with depth little reddish brown mottli 9.7 N/A 100 8-10 4-2-12-28 GRAVELLY SILT, some sand and to medium round gravel, sli oxidized, dark brown, stiff Till at 9.7 feet.	Blows/6"	ple (ft)	Samp Depth	Percent Recovery] .	
0.4 CLAY, some silt, little sub gravel and sand, moderately plastic, brown, gray mottli bedding structure, Fill. 2 N/A 60 2-4 3-6-7-12 MW12-2 FINE GRAVELLY CLAY, some si low to high plasticity, brown some roots and asphalt, blu mottling, stiff, moist, Fil moterate plasticity, moist, soil. 3.8 N/A 80 4-6 5-4-5-5 MW12-3 CLAY, some silt and organic gray, little sand and fine medium round gravel, slight moderate plasticity, moist, soil. 6.2 N/A 100 6-8 4-6-8-12 MW12-4 CLAY, light brown, fat clay sand, some round fine grave to well, stiff, natural soi Increase in silt with depth little reddish brown mottli 9.7 N/A 100 8-10 4-2-12-28 GRAVELLY SILT, some sand and to medium round gravel, slift oxidized, dark brown, stiff Till at 9.7 feet.	1-3-6-10		0-2	75		0
gravel and sand, moderately plastic, brown, gray mottlided bedding structure, Fill. 2 N/A 60 2-4 3-6-7-12 MW12-2 FINE GRAVELLY CLAY, some sill low to high plasticity, brown, some roots and asphalt, blue mottling, stiff, moist, Fill mottling, stiff, mottling,						
gravel and sand, moderately plastic, brown, gray mottlided bedding structure, Fill. 2 N/A 60 2-4 3-6-7-12 MW12-2 FINE GRAVELLY CLAY, some sill low to high plasticity, brown, some roots and asphalt, blue mottling, stiff, moist, Fill mottling, stiff, mottling,						
plastic, brown, gray mottli bedding structure, Fill. 2 N/A 60 2-4 3-6-7-12 MW12-2 FINE GRAVELLY CLAY, some si low to high plasticity, bro some roots and asphalt, blu mottling, stiff, moist, Fil 3.8 N/A 80 4-6 5-4-5-5 MW12-3 CLAY, some silt and organic gray, little sand and fine medium round gravel, slight moderate plasticity, moist, soil. 6.2 N/A 100 6-8 4-6-8-12 MW12-4 CLAY, light brown, fat clay sand, some round fine grave to well, stiff, natural soi Increase in silt with depth little reddish brown mottli 9.7 N/A 100 8-10 4-2-12-28 GRAVELLY SILT, some sand an to medium round gravel, sli oxidized, dark brown, stiff Till at 9.7 feet.						0.4
bedding structure, Fill. 2 N/A 60 2-4 3-6-7-12 MW12-2 FINE GRAVELLY CLAY, some si low to high plasticity, bro some roots and asphalt, blu mottling, stiff, moist, Fil mottling, stiff, moist, Fil CLAY, some silt and organic gray, little sand and fine medium round gravel, slight moderate plasticity, moist, soil. 6.2 N/A 100 6-8 4-6-8-12 MW12-4 CLAY, light brown, fat clay sand, some round fine grave to well, stiff, natural soi Increase in silt with depth little reddish brown mottli 9.7 N/A 100 8-10 4-2-12-28 GRAVELLY SILT, some sand an to medium round gravel, sli oxidized, dark brown, stiff Till at 9.7 feet.						
2 N/A 60 2-4 3-6-7-12 MW12-2 FINE GRAVELLY CLAY, some si low to high plasticity, bro some roots and asphalt, blu mottling, stiff, moist, Fil 3.8 N/A 80 4-6 5-4-5-5 MW12-3 CLAY, some silt and organic gray, little sand and fine medium round gravel, slight moderate plasticity, moist, soil. 6.2 N/A 100 6-8 4-6-8-12 MW12-4 CLAY, light brown, fat clay sand, some round fine grave to well, stiff, natural soi Increase in silt with depth little reddish brown mottli 9.7 N/A 100 8-10 4-2-12-28 GRAVELLY SILT, some sand and to medium round gravel, sli oxidized, dark brown, stiff Till at 9.7 feet.						
low to high plasticity, bro some roots and asphalt, blu mottling, stiff, moist, Fil mottling, stiff, some silt and organic gray, little sand and fine medium round gravel, slight moderate plasticity, moist, soil. 6.2 N/A 100 6-8 4-6-8-12 MW12-4 CLAY, light brown, fat clay sand, some round fine grave to well, stiff, natural soi Increase in silt with depth little reddish brown mottli in moderate plasticity, moist, soil. 9.7 N/A 100 8-10 4-2-12-28 GRAVELLY SILT, some sand and to medium round gravel, sli oxidized, dark brown, stiff Till at 9.7 feet.		1				
low to high plasticity, bro some roots and asphalt, blu mottling, stiff, moist, Fil mottling, stiff, moist, Silt and organic gray, little sand and fine medium round gravel, slight moderate plasticity, moist, soil. 6.2 N/A 100 6-8 4-6-8-12 MW12-4 CLAY, light brown, fat clay sand, some round fine grave to well, stiff, natural soi Increase in silt with depth little reddish brown mottli little reddish brown mottli oxidized, dark brown, stiff Till at 9.7 feet.	3_6_7_12		2-4	60	NI / A	2
some roots and asphalt, blu mottling, stiff, moist, Fil 3.8 N/A 80 4-6 5-4-5-5 MW12-3 CLAY, some silt and organic gray, little sand and fine medium round gravel, slight moderate plasticity, moist, soil. 6.2 N/A 100 6-8 4-6-8-12 MW12-4 CLAY, light brown, fat clay sand, some round fine grave to well, stiff, natural soi Increase in silt with depth little reddish brown mottli 9.7 N/A 100 8-10 4-2-12-28 GRAVELLY SILT, some sand an to medium round gravel, sli oxidized, dark brown, stiff Till at 9.7 feet.	5 0 7 12		2-1	- 00	N/A	
mottling, stiff, moist, Fil 3.8 N/A 80 4-6 5-4-5-5 MW12-3 CLAY, some silt and organic gray, little sand and fine medium round gravel, slight moderate plasticity, moist, soil. 6.2 N/A 100 6-8 4-6-8-12 MW12-4 CLAY, light brown, fat clay sand, some round fine grave to well, stiff, natural soi Increase in silt with depth little reddish brown mottli 9.7 N/A 100 8-10 4-2-12-28 GRAVELLY SILT, some sand an to medium round gravel, sli oxidized, dark brown, stiff Till at 9.7 feet.						
3.8 N/A 80 4-6 5-4-5-5 MW12-3 CLAY, some silt and organic gray, little sand and fine medium round gravel, slight moderate plasticity, moist, soil. 6.2 N/A 100 6-8 4-6-8-12 MW12-4 CLAY, light brown, fat clay sand, some round fine grave to well, stiff, natural soi Increase in silt with depth little reddish brown mottli 9.7 N/A 100 8-10 4-2-12-28 GRAVELLY SILT, some sand an to medium round gravel, sli oxidized, dark brown, stiff Till at 9.7 feet.						
gray, little sand and fine medium round gravel, slight moderate plasticity, moist, soil. 6.2 N/A 100 6-8 4-6-8-12 MW12-4 CLAY, light brown, fat clay sand, some round fine grave to well, stiff, natural soi Increase in silt with depth little reddish brown mottli 9.7 N/A 100 8-10 4-2-12-28 GRAVELLY SILT, some sand an to medium round gravel, sli oxidized, dark brown, stiff Till at 9.7 feet.			-			
gray, little sand and fine medium round gravel, slight moderate plasticity, moist, soil. 6.2 N/A 100 6-8 4-6-8-12 MW12-4 CLAY, light brown, fat clay sand, some round fine grave to well, stiff, natural soi Increase in silt with depth little reddish brown mottli 9.7 N/A 100 8-10 4-2-12-28 GRAVELLY SILT, some sand an to medium round gravel, sli oxidized, dark brown, stiff Till at 9.7 feet.	5-4-5-5		4-6	80	N/A	3.8
moderate plasticity, moist, soil. 6.2 N/A 100 6-8 4-6-8-12 MW12-4 CLAY, light brown, fat clay sand, some round fine grave to well, stiff, natural soi Increase in silt with depth little reddish brown mottli 9.7 N/A 100 8-10 4-2-12-28 GRAVELLY SILT, some sand and to medium round gravel, sli oxidized, dark brown, stiff Till at 9.7 feet.						
soil. 6.2 N/A 100 6-8 4-6-8-12 MW12-4 CLAY, light brown, fat clay sand, some round fine grave to well, stiff, natural soi Increase in silt with depth little reddish brown mottli 9.7 N/A 100 8-10 4-2-12-28 GRAVELLY SILT, some sand and to medium round gravel, sli oxidized, dark brown, stiff Till at 9.7 feet.						
soil. 6.2 N/A 100 6-8 4-6-8-12 MW12-4 CLAY, light brown, fat clay sand, some round fine grave to well, stiff, natural soi Increase in silt with depth little reddish brown mottli 9.7 N/A 100 8-10 4-2-12-28 GRAVELLY SILT, some sand and to medium round gravel, sli oxidized, dark brown, stiff Till at 9.7 feet.						
sand, some round fine grave to well, stiff, natural soi Increase in silt with depth little reddish brown mottli 9.7 N/A 100 8-10 4-2-12-28 GRAVELLY SILT, some sand an to medium round gravel, sli oxidized, dark brown, stiff Till at 9.7 feet.						
sand, some round fine grave to well, stiff, natural soi Increase in silt with depth little reddish brown mottli 9.7 N/A 100 8-10 4-2-12-28 GRAVELLY SILT, some sand an to medium round gravel, sli oxidized, dark brown, stiff Till at 9.7 feet.	4-6-8-12		6-8	100	N/A	6.2
to well, stiff, natural soi Increase in silt with depth little reddish brown mottli 9.7 N/A 100 8-10 4-2-12-28 GRAVELLY SILT, some sand an to medium round gravel, sli oxidized, dark brown, stiff Till at 9.7 feet.						
9.7 N/A 100 8-10 4-2-12-28 GRAVELLY SILT, some sand an to medium round gravel, sli oxidized, dark brown, stiff Till at 9.7 feet.						
9.7 N/A 100 8-10 4-2-12-28 GRAVELLY SILT, some sand an to medium round gravel, sli oxidized, dark brown, stiff Till at 9.7 feet.						
to medium round gravel, sli oxidized, dark brown, stiff Till at 9.7 feet.						
to medium round gravel, sli oxidized, dark brown, stiff Till at 9.7 feet.	4-2-12-28	0	8-10	100	N/A	9.7
oxidized, dark brown, stiff Till at 9.7 feet.	1 2 12 20	v	9-10	100	N/A	3.1
Till at 9.7 feet.			-			
			-			
Note: Water measured at 4.2		-				
			1			





ENVIRONMENTAL STRATEGIES CORPORATION Four Penn Center West • Suite 315

Pittsburgh, Pennsylvania 15276 (412) 787-5100

AS-BUILT DIAGRAM FOR WELL MW-13 (MW-13S as of 01/16)

Environmental Strategies
Corporation

PROJECT

Revere Smelting & Refining

Wallkill, New York

Casing/Screen

Boring No. <u>MW-13</u>
(MW-13S as of 01/16)
Sheet 1 of 2

Date Drilled <u>7/27-8/94</u>

Sampler

Four Penn Center West, Ste. 315 Pittsburgh, Pennsylvania 15276

Boring

Drilling Co. Parrat Wolff, Inc.
Driller Glen Lansing\ Arnold Chapel
ESC Geologist E. Michael Riggins

Boring Location <u>East of unnamed tributary</u>
Ground Elevation _____
TOC Elevation ____

Screen Society Screen Society Societ	Method Hol			Type	Polyvinyl Chloride	Method Split-spoon Length (ft) 2.0
Depth				Screen	Lerath 5.0'	Hammer (1b) 140
Depth				Screen	n Slot Size 0.01	.0" Fall (in) 30
MW13-1 leaves, and roots 0.3 - 2.0' - SILT - light yellowish brown, little gravel, trace clay, dry, non-plastic		P.I.D.	8	Sample		,
0.3 - 2.0' - SILT - light yellowish brown, little gravel, trace clay, dry, non-plastic 2.0 - 4.0' NS 80 3.0 - 4.0' 12/32/27/35 Same as above to 2.5', little to some sandstone rock fragments from 2.5 - 3.0', then SILT - yellowish gray with orange mottling, little clay, trace rock fragments, non-plastic, dry 4.0 -6.0' NS 0 50/4" No recovery- sandstone fragment in spoon tip 6.0 - 8.0' NS 75 7.0 - 8.0' 25/14/11/13 SILT TILL - yellowish brown, trace clay and sand, some rock fragments, damp at 7.5' 8.0 - 10.0' NS 90 9.0 -10.0' 16/33/22/46 SILT TILL - and rock fragments, shown and the same and the s	0.0 - 2.0'	NS	60	0.3 - 2.0'	5/7/6/25	0.0 - 0.3' - Organics decaying
brown, little gravel, trace clay, dry, non-plastic 2.0 - 4.0' NS 80 3.0 - 4.0' 12/32/27/35 Same as above to 2.5', little to				MW13-1		leaves, and roots
dry, non-plastic						0.3 - 2.0'- SILT - light yellowish
2.0 - 4.0' NS 80 3.0 - 4.0' 12/32/27/35 Same as above to 2.5', little to some sandstone rock fragments from 2.5 - 3.0', then SILT - yellowish gray with orange mottling, little clay, trace rock fragments, non-plastic, dry 4.0 -6.0' NS 0 50/4" No recovery- sandstone fragment in spoon tip 6.0 - 8.0' NS 75 7.0 - 8.0' 25/14/11/13 SILT TILL - yellowish brown, trace MW13-3 clay and sand, some rock fragments, damp at 7.5' 8.0 - 10.0' NS 90 9.0 -10.0' 16/33/22/46 SILT TILL - and rock fragments, and trace clay and sand, dry 10.0 -11.0' NS 100 10.0 - 11.0' 27/70 Rock fragment & SILT TILL - trace clay and sand, weathered and fresh, gray shale fragments, dry 12.0 -14.0' NS 60 12.0 - 14.0' 20/19/18/18 SILT TILL - dark yellowish brown MW13-6 some gray shale fragments, trace						brown, little gravel, trace clay,
MW13-2 some sandstone rock fragments from 2.5 - 3.0', then SILT - yellowish gray with orange mottling, little clay, trace rock fragments, non-plastic, dry 4.0 -6.0' NS 0 50/4" No recovery- sandstone fragment in spoon tip 6.0 - 8.0' NS 75 7.0 - 8.0' 25/14/11/13 SILT TILL - yellowish brown, trace clay and sand, some rock fragments, damp at 7.5' 8.0 - 10.0' NS 90 9.0 -10.0' 16/33/22/46 SILT TILL - and rock fragments, mw13-4 trace clay and sand, dry 10.0 -11.0' NS 100 10.0 - 11.0' 27/70 Rock fragment & SILT TILL - trace clay and sand, weathered and fresh, gray shale fragments, dry 12.0 -14.0' NS 60 12.0 - 14.0' 20/19/18/18 SILT TILL - dark yellowish brown some gray shale fragments, trace						dry, non-plastic
MW13-2 some sandstone rock fragments from 2.5 - 3.0', then SILT - yellowish gray with orange mottling, little clay, trace rock fragments, non-plastic, dry 4.0 -6.0' NS 0 50/4" No recovery- sandstone fragment in spoon tip 6.0 - 8.0' NS 75 7.0 - 8.0' 25/14/11/13 SILT TILL - yellowish brown, trace clay and sand, some rock fragments, damp at 7.5' 8.0 - 10.0' NS 90 9.0 -10.0' 16/33/22/46 SILT TILL - and rock fragments, mw13-4 trace clay and sand, dry 10.0 -11.0' NS 100 10.0 - 11.0' 27/70 Rock fragment & SILT TILL - trace clay and sand, weathered and fresh, gray shale fragments, dry 12.0 -14.0' NS 60 12.0 - 14.0' 20/19/18/18 SILT TILL - dark yellowish brown some gray shale fragments, trace						
2.5 - 3.0', then SILT - yellowish gray with orange mottling, little clay, trace rock fragments, non-plastic, dry 4.0 -6.0' NS 0 50/4" No recovery- sandstone fragment in spoon tip 6.0 - 8.0' NS 75 7.0 - 8.0' 25/14/11/13 SILT TILL - yellowish brown, trace clay and sand, some rock fragments, damp at 7.5' 8.0 - 10.0' NS 90 9.0 -10.0' 16/33/22/46 SILT TILL - and rock fragments, trace clay and sand, dry 10.0 -11.0' NS 100 10.0 - 11.0' 27/70 Rock fragment & SILT TILL - trace clay and sand, weathered and fresh, gray shale fragments, dry 12.0 -14.0' NS 60 12.0 - 14.0' 20/19/18/18 SILT TILL - dark yellowish brown some gray shale fragments, trace	2.0 - 4.0'	NS	80	3.0 - 4.0'	12/32/27/35	Same as above to 2.5', little to
gray with orange mottling, little clay, trace rock fragments, non- plastic, dry 4.0 -6.0' NS 0 50/4" No recovery- sandstone fragment in spoon tip 6.0 - 8.0' NS 75 7.0 - 8.0' 25/14/11/13 SILT TILL - yellowish brown, trace clay and sand, some rock fragments, damp at 7.5' 8.0 - 10.0' NS 90 9.0 -10.0' 16/33/22/46 SILT TILL - and rock fragments, MW13-4 trace clay and sand, dry 10.0 -11.0' NS 100 10.0 - 11.0' 27/70 Rock fragment & SILT TILL - trace clay and sand, weathered and fresh, gray shale fragments, dry 12.0 -14.0' NS 60 12.0 - 14.0' 20/19/18/18 SILT TILL - dark yellowish brown MW13-6 some gray shale fragments, trace				MW13-2		some sandstone rock fragments from
Clay, trace rock fragments, non-plastic, dry						2.5 - 3.0', then SILT - yellowish
plastic, dry						gray with orange mottling, little
4.0 -6.0' NS 0 50/4" No recovery- sandstone fragment in spoon tip 6.0 - 8.0' NS 75 7.0 - 8.0' 25/14/11/13 SILT TILL - yellowish brown, trace clay and sand, some rock fragments, damp at 7.5' 8.0 - 10.0' NS 90 9.0 -10.0' 16/33/22/46 SILT TILL - and rock fragments, with trace clay and sand, dry 10.0 -11.0' NS 100 10.0 - 11.0' 27/70 Rock fragment & SILT TILL - trace clay and sand, weathered and fresh, gray shale fragments, dry 12.0 -14.0' NS 60 12.0 - 14.0' 20/19/18/18 SILT TILL - dark yellowish brown some gray shale fragments, trace						clay, trace rock fragments, non-
Spoon tip						plastic, dry
Spoon tip						
6.0 - 8.0' NS 75 7.0 - 8.0' 25/14/11/13 SILT TILL - yellowish brown, trace clay and sand, some rock fragments, damp at 7.5' 8.0 - 10.0' NS 90 9.0 -10.0' 16/33/22/46 SILT TILL - and rock fragments, mw13-4 trace clay and sand, dry 10.0 -11.0' NS 100 10.0 - 11.0' 27/70 Rock fragment & SILT TILL - trace clay and sand, weathered and fresh, gray shale fragments, dry 12.0 -14.0' NS 60 12.0 - 14.0' 20/19/18/18 SILT TILL - dark yellowish brown some gray shale fragments, trace	4.0 -6.0'	NS	0		50/4"	No recovery- sandstone fragment in
MW13-3 clay and sand, some rock fragments, damp at 7.5' 8.0 - 10.0' NS 90 9.0 -10.0' 16/33/22/46 SILT TILL - and rock fragments, MW13-4 trace clay and sand, dry 10.0 -11.0' NS 100 10.0 - 11.0' 27/70 Rock fragment & SILT TILL - trace MW13-5 clay and sand, weathered and fresh, gray shale fragments, dry 12.0 -14.0' NS 60 12.0 - 14.0' 20/19/18/18 SILT TILL - dark yellowish brown MW13-6 some gray shale fragments, trace	,					spoon tip
MW13-3 clay and sand, some rock fragments, damp at 7.5' 8.0 - 10.0' NS 90 9.0 -10.0' 16/33/22/46 SILT TILL - and rock fragments, MW13-4 trace clay and sand, dry 10.0 -11.0' NS 100 10.0 - 11.0' 27/70 Rock fragment & SILT TILL - trace MW13-5 clay and sand, weathered and fresh, gray shale fragments, dry 12.0 -14.0' NS 60 12.0 - 14.0' 20/19/18/18 SILT TILL - dark yellowish brown MW13-6 some gray shale fragments, trace						
fragments, damp at 7.5' 8.0 - 10.0' NS 90 9.0 -10.0' 16/33/22/46 SILT TILL - and rock fragments, trace clay and sand, dry 10.0 -11.0' NS 100 10.0 - 11.0' 27/70 Rock fragment & SILT TILL - trace MW13-5 clay and sand, weathered and fresh, gray shale fragments, dry 12.0 -14.0' NS 60 12.0 - 14.0' 20/19/18/18 SILT TILL - dark yellowish brown MW13-6 some gray shale fragments, trace	6.0 - 8.0'	NS	75	7.0 - 8.0'	25/14/11/13	SILT TILL - yellowish brown, trace
8.0 - 10.0' NS 90 9.0 -10.0' 16/33/22/46 SILT TILL - and rock fragments, * MW13-4 trace clay and sand, dry 10.0 -11.0' NS 100 10.0 - 11.0' 27/70 Rock fragment & SILT TILL - trace MW13-5 clay and sand, weathered and fresh, gray shale fragments, dry 12.0 -14.0' NS 60 12.0 - 14.0' 20/19/18/18 SILT TILL - dark yellowish brown MW13-6 some gray shale fragments, trace				MW13-3		clay and sand, some rock
MW13-4 trace clay and sand, dry 10.0 -11.0' NS 100 10.0 - 11.0' 27/70 Rock fragment & SILT TILL - trace MW13-5 clay and sand, weathered and fresh, gray shale fragments, dry 12.0 -14.0' NS 60 12.0 - 14.0' 20/19/18/18 SILT TILL - dark yellowish brown MW13-6 some gray shale fragments, trace						fragments, damp at 7.5'
MW13-4 trace clay and sand, dry 10.0 -11.0' NS 100 10.0 - 11.0' 27/70 Rock fragment & SILT TILL - trace MW13-5 clay and sand, weathered and fresh, gray shale fragments, dry 12.0 -14.0' NS 60 12.0 - 14.0' 20/19/18/18 SILT TILL - dark yellowish brown MW13-6 some gray shale fragments, trace						
10.0 -11.0' NS 100 10.0 - 11.0' 27/70 Rock fragment & SILT TILL - trace MW13-5 Clay and sand, weathered and fresh, gray shale fragments, dry 12.0 -14.0' NS 60 12.0 - 14.0' 20/19/18/18 SILT TILL - dark yellowish brown MW13-6 Some gray shale fragments, trace	8.0 - 10.0'	NS	90	9.0 -10.0'	16/33/22/46	SILT TILL - and rock fragments,
MW13-5 clay and sand, weathered and fresh, gray shale fragments, dry 12.0 -14.0' NS 60 12.0 - 14.0' 20/19/18/18 SILT TILL - dark yellowish brown MW13-6 some gray shale fragments, trace				MW13-4		trace clay and sand, dry
MW13-5 clay and sand, weathered and fresh, gray shale fragments, dry 12.0 -14.0' NS 60 12.0 - 14.0' 20/19/18/18 SILT TILL - dark yellowish brown MW13-6 some gray shale fragments, trace						
fresh, gray shale fragments, dry 12.0 -14.0' NS 60 12.0 - 14.0' 20/19/18/18 SILT TILL - dark yellowish brown MW13-6 some gray shale fragments, trace	10.0 -11.0'	NS	100	10.0 - 11.0'	27/70	Rock fragment & SILT TILL - trace
12.0 -14.0' NS 60 12.0 - 14.0' 20/19/18/18 SILT TILL - dark yellowish brown MW13-6 some gray shale fragments, trace				MW13-5		clay and sand, weathered and
12.0 -14.0' NS 60 12.0 - 14.0' 20/19/18/18 SILT TILL - dark yellowish brown MW13-6 some gray shale fragments, trace						fresh, gray shale fragments,
MW13-6 some gray shale fragments, trace				The second		dry
MW13-6 some gray shale fragments, trace				Land of		
	12.0 -14.0'	NS	60	12.0 - 14.0'	20/19/18/18	SILT TILL - dark yellowish brown
clay and sand, damp at 13.5'				MW13-6		some gray shale fragments, trace
						clay and sand, damp at 13.5'

Environmental Strategies
Corporation

Corporation
Four Penn Center West, Ste. 315
Pittsburgh, Pennsylvania 15276

PROJECT

Revere Smelting & Refining
Wallkill, New York

Boring No. MW-13 (MW-13S as of 01/16) Sheet $\frac{2}{2}$ of $\frac{2}{2}$

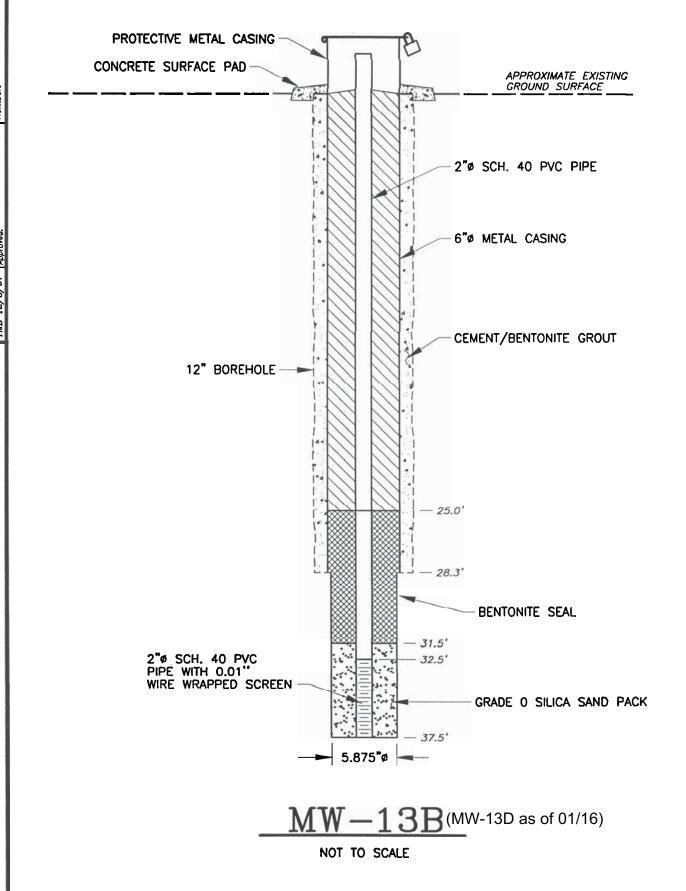
Date Drilled _ 7/27-28/94

Drilling Co.	Parrat Wolff, Inc.	
Driller	Glen Lansing\ Arnold Chapel	
ESC Geologist	E. Michael Riggins	

Boring Location <u>East.of unnamed tributary</u>
Ground Elevation ______
TOC Elevation _____

Method Hol Hole Diamet Inside Diam Total Depth	er 6.	25" .25"	Di Sc	Casing/Screen The Polyvinyl Chloride Tameter 2.0" The Polyvinyl Chloride The Polyvinyl Chlo	Sampler Method Split-spoon Length (ft) 2.0 Hammer (lb) 140 Fall (in) 30
Depth	P.I.D. (ppm)	Recov	Sample Depth		Sample Description

Depth	P.I.D. (ppm)	Recov	Sample Depth	Blows/6"	Sample Description
14.0 -16.0'	NS	75	14.0 -16.0'	7/29/46/36	SILT TILL - dark yellowish gray,
			MW13-7		sandstone fragment in spoon tip,
					trace gray shale fragments, little
				,	sand and clay, damp
16.0-18.0'	NS	80	16.0-18.0'	30/42/50/50/4"	SILT TILL - dark bluish gray,
			MW13-8		dense, little clay, trace rock
					fragments and sand, damp to wet
18.0-20.0'	NS	60	18.0-20.0'	27/33/36/38	SILT TILL - dark bluish gray to
2010 2010	1.0	100	2010 2010	21/00/00/00	yellowish gray, little sand, trace
			2.1		clay and gray shale fragments,
					damp
			7.		
					Δ.
**					
					, , , , , , , , , , , , , , , , , , , ,





Four Penn Center West, Suite 315
Pittsburgh, Pennsylvania 15276
(412) 787-5100

Figure

"AS-BUILT" MONITORING WELL DIAGRAM FOR MW-13B

REVERE SMELTING & REFINING CORPORATION MIDDLETOWN, NEW YORK

PREPARED FOR RSR CORPORATION DALLAS, TEXAS

Environmental Strategies Corporation Campbells Run Road Four Penn Center West, Suite 315 Pittsburgh, PA 15276

PROJECT

213471-02 REVERE SMELTING AND REFINING 65 BALLARD RD.

MIDDLETOWN, NEW YORK

Boring Number: MW-13B Sheet 1 of 2 (MW-13D as of Date Drilled: 6/09/97 to 01/16)

6/12/97

Drilling Company: PARRATT WOLFF, INC. **Driller**: JIM HAMMOND and KEVIN WHITE

ESC Geologist: E. MICHAEL RIGGINS

TOC Elevation: 483.82'
SAMPLER

Boring Location: North of Wakefern, South of Rail Line

BORING SAM

Method: HOLLOW STEM AUGERS/AIR ROTARY

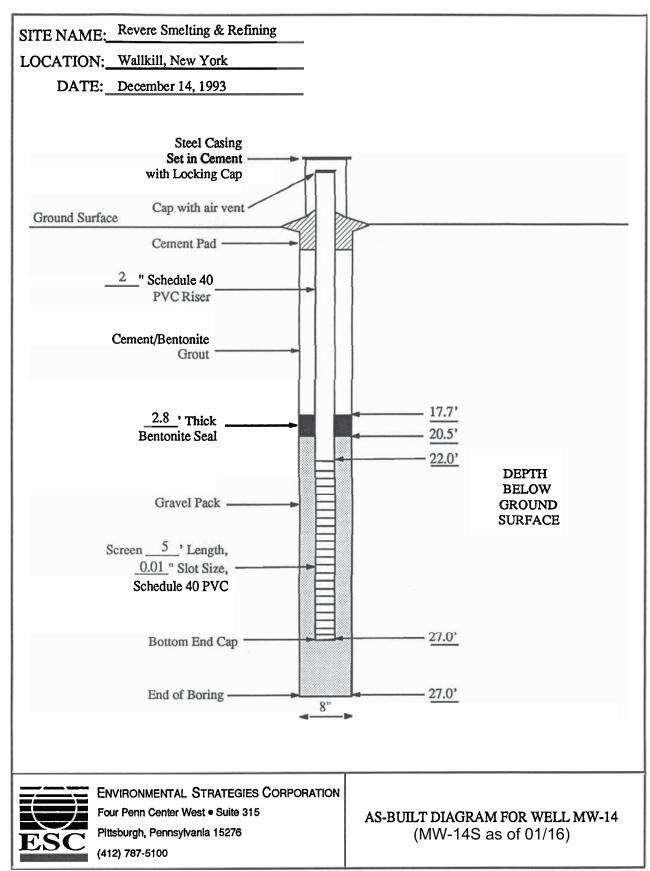
Hole Diameter: 12" / 6" Inside Diameter: 6" Total Depth: 37.5' Method: SPLIT SPOON SAMPLER/BEDROCK CORE

Length (ft): 2 FEET Hammer (lb): 140 LBS Fall (in): 30 INCHES

Ground Elevation: 482.21'

Total Dept	h: 37.5'			Fall (in): 30 INCHES			
Depth Below Grade (ft)	Samples Collected	Percent Recovery	Sample Depth	Blows/6"	Moisture	Sample Description	
0' - 0.4'	MW13B-1 (0'-0.5')	100	0' - 2'	3/5/6/7	Dry	SILT, medium. brown, loamy, non-plastic, trace clay, rock frags., and roots.	
0.4' - 2'	MW13B-2 (0.5'-1') MW13B-3 (1'-1.5') MW13B-4 (1.5'-2')					SILT TILL, yellowish brown, non- plastic, trace clay, rock frags., organics to 1.0'.	
2' - 4'	MW13B-5 (2'-4')	100	2' - 4'	13/16/19/22	Dry	SILT TILL, light yellowish brown to gray, trace to little clay, rock frags., non-plastic, faint mottling.	
4' - 6'	MW13B-6 (4' -6')	100	4' - 6'	14/15/20/27	Damp at 5'	SILT TILL, yellowish to reddish brown to gray, trace sand and clay, little rock frags., slightly plastic.	
6' - 8'	MW13B-7 (6'-8')	100	6' - 8'	21/31/25/26	Moist	SILT TILL, same as above, increasing sand content with depth	
8' – 10'	MW13B-8 (8'-10)	100	8' - 10'	8/54/26/15	Moist to wet	SILT TILL, same as above to 8.5' then gray shale boulder, Silt Till yellowish to grayish brown, trace sand, clay, little rock frags., slightly plastic.	
10' – 12'	MW13B-9 (10'-12')	100	10' - 12'	9/24/26/50	Moist to wet	Same as above, SILT TILL and Rock fragments.	
12'-12.6'	MW13B-10 (12'-12.6')	30	12'-12.6'	44/ 50 for 1"		SILT TILL, gray, trace clay, some rock fragments., weathered shale fragments.	
12.6' –14'						Augered out to 14.0'.	
14' – 16'	MW13B-11 (14'-16')	100	14' - 16'	8/6/14/54	Saturated	SILT TILL, gray, trace clay, little rock fragments., plastic, sticky.	
16'- 16.2'		0	16'-16.2'	50 for 3"		No recovery	
16.3'- 18.5'						Augered out, weathered shale boulder.	
18.5'- 20'	MW13B-12 (18.5'-20')	70	18.5'-20'	26/53/74	Wet	SILT TILL, dark bluish gray, trace clay, little shale fragments., dark gray shale, hard, plastic.	
20' – 22'	MW13B-13 (20'-22')	100	20' - 22'	23/31/44/48		SILT TILL, dark bluish gray to faint yellowish brown, trace sand, clay, and rock frags., plastic, hard, dense.	
22' – 24'	MW13B-14 (22'-24')	100	22' - 24'	22/27/30/25		SILT TILL, Same as above, with sand trace to little.	
24'- 24.6'		20	24'-24.6'	11/60 for 2"		SHALE, dark gray, weathered.	

24.6' – 26'	SHALE, gray to dark gray, weathered.
26' – 28'	SHALE, gray to dark gray, more competent.
28' – 37.5'	SHALE, gray to dark gray
	Bottom of borehole
	G:\wp\files\bcd\midtown\rsrmidt.



Environmental Strategies Corporation Four Penn Center West, Ste. 315

Pittsburgh, Pennsylvania 15276

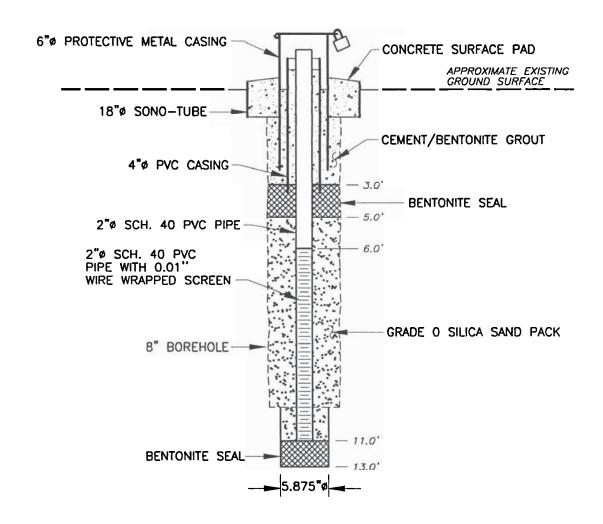
PROJECT Revere Smelting & Refining Wallkill, New York PA1217-02

Boring No. MW-14 Sheet (MW-14S as of 01/16)

Date Drilled <u>12/13-14/93</u>

Drilling Co. Empire Soil and Investigations Driller Glen Stevens
ESC Geologist Patrick Peterson TOC Elevation

Method Hollow Stem Augers Hole Diameter 8-inch Inside Diameter 4.25-inch Total Depth 27-feet				Casing/Screen Type PVC Diameter 2-inch Screen Length 5-foot Screen Slot Size 0.01-inch		Method Split-spoon Length (ft) 2-foot Hammer (1b) 140
Dep (ft		Percent Recovery	Sample Depth (ft)	Blows/6"	Sample Number	Sample Description
0	N/A	50	0-2	7-7-12-14	MW14-1	TOPSOIL, silt with clay, some sand
						and fine gravel, brown, stiff,
	ĺ					moderately plastic, moist.
1.5						CLAYEY SILT, some sand and shale
						fragments, slight to moderate
						plasticity, brown, moist.
						-
3.7	N/A	75	2-4	5-10-10-11	MW14-2	GRAVELLY SILT, with sand and clay,
	N/A	75	4-6	12-14-17-21	MW14-3	some shale fragments, brown, non-
1					MW14-4	plastic, moist, Till.
	N/A	75	6-8	24-36-34-26	MW14-5	
	N/A	75	8-10	24-26-21-17	MW14-6	Note: Color change to gray.
	N/A	75	10-12	16-18-17-13	MW14-7	Note: Some orange brown mottling.
 	-17.11	,,,		100 20 27 20		land the state of
12	N/A	75	12-14	30-26-24-22	MW14-8	GRAVELLY SILT, some sand and clay,
						little shale fragments, non-plastic
						slight mottling, moist, wet zone
						13.8 feet, hard Till.
14	N/A	75	14-16	12-24-26-26	MW14-9	GRAVELLY CLAY, some silt and sand,
	N/A	75	16-18	18-22-24-21	MW14-10	brown/gray, moist, moderately
				1		plastic, hard, Till.
18	N/A	100	18-20	12-20-18-19	MW14-11	CLAYEY SILT, some round gravel and
						sand, trace shale fragments, moist,
	N/A	90	20-22	16-21-19-18	MW14-12	brown, hard, Till, color change to
						gray at 19.5 feet.
22.5	N/A	80	22-24	17-50-67-97	MW14-13	SILT, with shale fragments, dry,
	N/A	75	24-26	37-60-33-32	MW14-14	hard, little clay, gray.
26	N/A	75	26-27.5	37-58-100/4"		SILT with shale fragments,
						saturated at 26 feet. Auger to 27
						feet.



MW-15A (MW-15S as of 01/16) NOT TO SCALE



Figure

BORING LOG

Environmental Strategies Corporation Campbells Run Road Four Penn Center West, Suite 315 Pittsburgh, PA 15276

PROJECT 213471-02 REVERE SMELTING AND REFINING 65 BALLARD RD.

MIDDLETOWN, NEW YORK

Boring Number: MW-15A Sheet 1 of 1 (MW-15S as of Date Drilled: 6/10/97 01/16)

Drilling Company: PARRATT WOLFF, INC. **Driller:** JIM HAMMOND and KEVIN WHITE

ESC Geologist: E. MICHAEL RIGGINS

Boring Location: North of Wakefern, South of Rail Line

Ground Elevation: 484.17'
TOC Elevation: 486.46'

BORING

Method: HOLLOW STEM AUGERS/AIR ROTARY

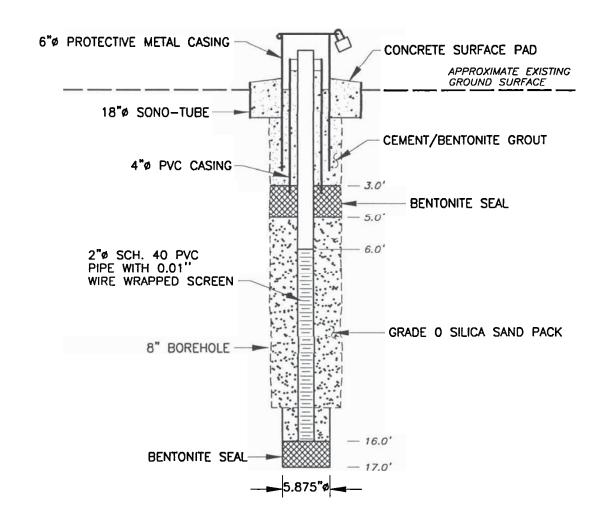
Hole Diameter: 8" / 6"
Inside Diameter: 4.25" /6"
Total Depth: 12'

SAMPLER

Method: SPLIT SPOON SAMPLER/BEDROCK CORE

Length (ft): 2 FEET Hammer (lb): 140 LBS Fall (in): 30 INCHES

Total Dept	h: 13'			Fall (in): 30 INCHES					
Depth Below Grade (ft)	Samples Collected	Percent Recovery	Sample Depth	Blows/6"	Moisture	Sample Description			
0' - 0.5'	MW15A-1 (0'-0.5')	100	0' - 2'	2/2/2/1	Wet	SILT, dark brown, loamy, trace clay, plastic, root zone.			
0.5' - 2'	MW15A-2 (0.5'-1') MW15A-3 (1'-1.5') MW15A-4 (1.5'-2')				Wet	SAND and GRAVEL, medium gray, little silt, plastic.			
2' - 4'	MW15A-5 (2'-4')	100	2'-4'	2/3/5/5	Saturated to 3.5'	SAND and GRAVEL, gray, medium to coarse sand and gravel, trace silt and clay, sticky, to 3.5' then SAND, yellowish brown, little silt, trace clay, slightly plastic, fine-grained.			
4' - 6'	MW15A-6 (4' - 6')	100	4' - 6'	14/20/18/13	Saturated	SAND, same as above to 4.5' then, SAND and GRAVEL, gray, medium to coarse, trace silt, plastic to slightly plastic.			
6' - 8'	MW15A-7 (6'-8')	70	6' - 7.4'	12/22/50 for 4"	Wet	SAND and GRAVEL, same as above to 7.5', then, SILT TILL, bluish gray to light. yellowish brown, little sand, trace gravel and clay, slightly plastic.			
8' - 10'	MW15A-8 (8'-10')	70	8' - 9.5'	37/37/74		SILT TILL, same as above to 10', then weathered shale.			
10'- 13'						SHALE, gray to dark gray, weathered on top to competent at bottom.			
						Bottom of Borehole			
						G:\wp\files\bcd\midtown\rsrmidt. 15			



MW-16 (MW-16S as of 01/16)



ENVIRONMENTAL STRATEGIES CORPORATION

Four Penn Center West, Suite 315 Pittsburgh, Pennsylvania 15276 (412) 787-5100

Figure

"AS-BUILT" MONITORING WELL DIAGRAM FOR MW-16

REVERE SMELTING & REFINING CORPORATION MIDDLETOWN, NEW YORK

PREPARED FOR
RSR CORPORATION
DALLAS, TEXAS

BORING LOG

Environmental Strategies Corporation Campbells Run Road Four Penn Center West, Suite 315 Pittsburgh, PA 15276

PROJECT 213471-02 REVERE SMELTING AND REFINING 65 BALLARD RD.

MIDDLETOWN, NEW YORK

Boring Number: MW-16 Sheet 1 of 1 (MW-16S as of Date Drilled: 6/03/97 to 01/16)

6/04/97

Drilling Company: PARRATT WOLFF, INC.
Driller: JIM HAMMOND and KEVIN WHITE
ESC Geologist: E. MICHAEL RIGGINS

Boring Location: North of Wakefern, South of Rail Line Ground Elevation: 493.12' 492.53 (as of 01/16) TOC Elevation: 495.22' 494.62 (as of 01/16)

BORING

Method: HOLLOW STEM AUGERS/AIR ROTARY

Hole Diameter: 8" / 6" Inside Diameter: 4.25" /6"

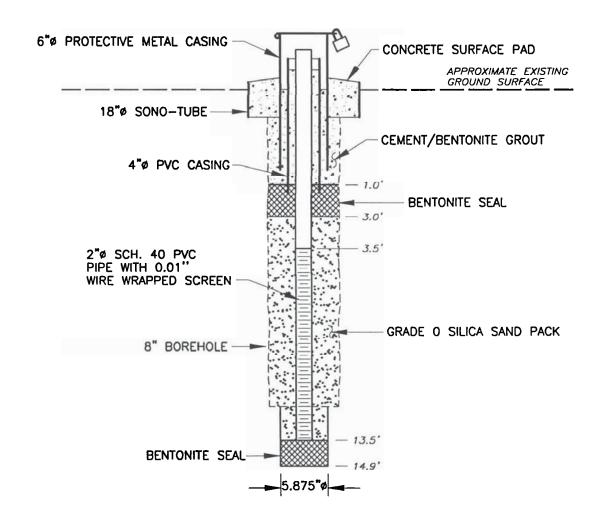
Total Denth: 17'

SAMPLER

Method: SPLIT SPOON SAMPLER/BEDROCK CORE

Length (ft): 2 FEET Hammer (lb): 140 LBS Fall (in): 30 INCHES

Total Dept	h: 17'			Fall (in): 30 INCHES					
Depth Below Grade (ft)	Samples Collected	Percent Recovery	Sample Depth	Blows/6"	Moisture	Sample Description			
0' - 0.6'	MW16A-1 (0'-0.5')	100	0' - 2'	1/3/4/3	Dry	SILT, root zone, trace clay and rock fragments, medium brown.			
0.6' - 2'	MW16A-2 (0.5'-1') MW16A-3 (1'-1.5') MW16A-4 (1.5'-2')				Dry	SILT, trace clay and rock frags, non-plastic, tannish brown.			
2' - 4'	MW16A-5 (2'-4')	100	2' - 4'	18/22/27/32	Dry	SILT, trace clay and rock frags., faint mottling, light yellowish to yellowish brown, non-plastic, brittle.			
4' - 6'	MW16A-6 (4'-6')	100	4' - 6'	27/17/28/18	Dry	SILT same as above to 5.0', then shale fragments to 5.1', then SILT, dark brown to dark. Bluish gray, trace clay and dark gray shale fragments, non-plastic.			
6' - 7.5'	MW16A-7 (6'-8')	100	6' - 8'	13/16/17/21	Moist at 7'	SILT, trace clay and rock fragments, light brown, brittle.			
7.5' - 8'					Moist to wet	SILT, olive gray to gray, trace sand, clay, little rock fragments, slightly plastic.			
8' - 9.5'	MW16A-8 (8'-10')	100	8' - 10'	3/106/7	Wet	SILT and Rock Fragments, dark brown to gray, non-plastic.			
9.5' - 10'					Dry	CLAY, med. gray to yellowish brown, little silt.			
10' - 12'	MW16A-9 (10'-12')	100	10' - 12'	10/14/13/15	Saturated	ROCK FRAGMENTS, shale, dark gray, some silt, trace clay.			
12' – 13.6'	MW16A-10	70	12'-13.6'	20/30/34/50 for 1"	Wet to Saturated	ROCK FRAGMENTS, and SILT, dark brown with dark gray shale fragments, trace clay, slightly plastic.			
13.6'- 17'						SHALE, black to dark gray.			
						Bottom of borehole.			
						G:\wp\files\bcd\midtown\rsrmidt. 16			



MW-17 (MW-17S as of 01/16)



ENVIRONMENTAL STRATEGIES CORPORATION Four Penn Center West, Suite 315 Pittsburgh, Pennsylvonia 15276 (412) 787-5100

Figure

"AS-BUILT" MONITORING WELL DIAGRAM FOR MW-17 REVERE SMELTING & REFINING CORPORATION MIDDLETOWN, NEW YORK

PREPARED FOR RSR CORPORATION DALLAS, TEXAS

BORING LOG

Environmental Strategies Corporation Campbells Run Road Four Penn Center West, Suite 315 Pittsburgh, PA 15276

PROJECT 213471-02 **REVERE SMELTING AND** REFINING

65 BALLARD RD. MIDDLETOWN, NEW YORK Boring Number: MW-17 Sheet 1 of 1 (MW-17S as of

Date Drilled: 6/05/97, 6/06/97 01/16)

Drilling Company: PARRATT WOLFF, INC. Driller: JIM HAMMOND and KEVIN WHITE

ESC Geologist: E. MICHAEL RIGGINS

Boring Location: North of Wakefern, South of Rail Line

SAMPLER

Ground Elevation: 488.87' TOC Elevation: 491.46'

BORING

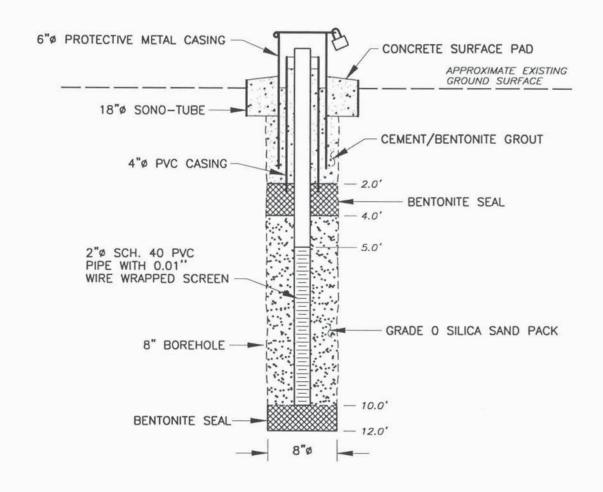
Method: HOLLOW STEM AUGERS/AIRROTARY Method: SPLIT SPOON SAMPLER/BEDROCK CORE

Hole Diameter: 8"/6" Inside Diameter: 4.25"/6" Total Donth: 1/0'

Length (ft): 2 FEET

Hammer (lb): 140 LBS Fall (in): 30 INCHES

Total Dept	h: 14.9'			Fall (in): 30 INCHES				
Depth Below Grade (ft)	Samples Collected	Percent Recovery	Sample Depth	Blows/6"	Moisture	Sample Description		
0'- 0.5'	MW17A-1	100	0' - 2'	4/5/8/7	Moist	SILT, loam, black, roots, some clay, slightly plastic.		
0.5' - 1'	MW17A-2				Wet	CLAY, black, plastic to sticky, little silt, trace rock frags., and roots.		
1' - 2'	MW17A-3				Wet	ROCK FRAGMENTS, dark gray, some silt, trace clay.		
2' - 4'	MW17A-4	100	2' - 4'	46/32/28/26	Moist to wet	CLAY, gray with some rock fragments, trace silt, yellowish brown mottles, plastic and sticky.		
4' - 6'	MW17A-5	100	4' - 6'	4/7/6/8	Moist	SILT TILL, gray, some clay, trace rock fragments, plastic, mottled.		
6' - 8'	MW17A-6	100	6' - 8'	7/8/11/13	Moist	SILT TILL, gray, mottled, trace clay, fine sand, and rock fragments, slightly plastic, shale fragment in tip.		
8' - 10'		0	8' - 10'	23/24/23/20		No recovery, siltstone fragment in tip, dark gray.		
10' - 10.9'	MW17A-7	30	10' - 10.9'	18/50 for 4"		SHALE, dark gray, weathered, bedrock.		
10.9' - 14.9'			10.9' - 14.9'			SHALE, dark gray, weathered top 4", weathered zone at @ 12.5' for 2", calcite streaks in competent shale in core bottom.		
						Bottom of borehole.		
						G:\wp\files\bcd\midtown\rsrmidt. 17		



MW-18S as of 01/16)



ENVIRONMENTAL STRATEGIES CORPORATION

Four Penn Center West, Suite 315 Pittsburgh, Pennsylvania 15276 (412) 787-5100 Figure

'AS-BUILT" MONITORING WELL DIAGRAM FOR MW-18 REVERE SMELTING & REFINING CORPORATION MIDDLETOWN, NEW YORK

PREPARED FOR RSR CORPORATION DALLAS, TEXAS

BORING LOG

Environmental Strategies Corporation Campbells Run Road Four Penn Center West, Suite 315 Pittsburgh, PA 15276

PROJECT 213471-02

REVERE SMELTING AND REFINING 65 BALLARD RD.

MIDDLETOWN, NEW YORK

Boring Number: MW-18 Sheet 1 of 1(MW-18S as of Date Drilled: 6/13/97 01/16)

Drilling Company: PARRATT WOLFF,INC. Driller: JIM HAMMOND and KEVIN WHITE

ESC Geologist: E. MICHAEL RIGGINS

Method: HOLLOW STEM AUGERS

Ground Elevation: 530.92'

TOC Elevation: 533.28'

BORING

SAMPLER Method: SPLIT SPOON SAMPLER

Boring Location: Upgradient Well, North of Revere Facility

Hole Diameter: 8" Inside Diameter: 4.25" Length (ft): 2 FEET Hammer (lb): 140 LBS

Fall (in): 30 INCHES Total Depth: 12' Depth Sample Percent Blows/6" **Below** Samples Collected Moisture Sample Description Grade (ft) Recovery Depth 0' - 1' MW18-1 (0'-0.5') 100 0' - 2' 5/6/5/5 Dry SILT, brown, loamy, trace rock MW18-2 (0.5'-1') fragments and clay, slightly plastic. 1'-2' MW18-3 (1'-1.5') SILT, faint yellowish brown, trace Dry MW18-4 (1.5'-2') silt, mottled, slightly plastic. 2' - 3.8' MW18-5 (2'-4') 100 2' - 4' 3/5/12/12 Moist CLAY, bluish gray to yellowish brown, trace silt, plastic. SAND and GRAVEL, medium to 3.8' - 4' Wet coarse sand, fine to coarse gravel, trace silt and clay. 4' - 6' SILT, medium brown, trace clay 4' - 6' MW18-6 (4'-6') 30 13/20/17/16 Moist and rock fragments, plastic, sticky. SAND and GRAVEL, medium to 6' - 8' MW18-7 (6' - 8') 100 6' - 8' 11/12/10/12 Saturated coarse sand, fine gravel, trace silt and clay, dark brown. 8' - 10' MW18-8 (8'-10') 100 8' - 10' 7/13/11/12 Saturated SAND and GRAVEL, same as above. 10' - 12' MW18-8 (10'-12') 100 10' - 12' 6/8/21/34 Saturated SAND and GRAVEL, medium to coarse sand, fine to coarse gravel, trace silt and clay, shale fragments in spoon tip, dark brown. Bottom of borehole. G:\wp\files\bcd\midtown\rsrmidt. 18

Test Boring Log MW-19(MW-19S as of 01/16)

Proj	roject: Monitoring Well Installation lient: RSR Corporation, Middletown, New York										Boring No.:	MW-19
Clie								ork	market a	0.3800	Sheet No.:	1 of 1
Orill		000000000000000000000000000000000000000	actor:		Drilling, I	nc.		WW. 90 Man	AND THE RESERVE AND ADDRESS OF THE PERSON NAMED AND ADDRESS OF	7-10-10-10-10-10-10-10-10-10-10-10-10-10-	Project No.:	272-01-01
	Gr	oun	dwater Ir	nformatic	n	2	В	oring/Sampling	Methodology		G.S. Elevation:	521.99
			Water	Water			Cas.	Samp.	Core	Tube	W.L. Ref. Elev.:	523.96
	Date		Depth	Elev.	Intake	Туре	F.J.	S.S.		1000	Date Started:	14-Jun-01
25	-Jun-(01	8.13	515.83	5-15'	Diam.	5"	2"		 	Date Finished:	14-Jun-01
100					7 50 778	Wt.	300#	140#	0076		Driller:	T. Kendrick
				\$33.		Fall	30"	30"			Inspector:	M. Colantuono
			Depth	ALCOHOL:	San	nples					inspector.	w. Colantdono
	Well		(feet)		PID	Rec.	Blows					
Con	struci	tion	0	No.	(ppm)	(in.)	Per 6"	e e	Classification	_		
		T		S-1	0.0	6	2		Ciassilication	8	Rem	arks
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							2	ł	<u>FILL</u>		Drive & wash 5" c	
Δ		Δ			8		3	0-55	"Historical Fill"	Material	0 to 5.5 feet below	v grade,
				S-2	0.0	6	2	0.5	i natoricai cii	Material	Advanced becales	L. T
							2	vellow brow	n fmc SAND, lit	la Clavau Cill	Advanced boreho	
							4	little fm	Gravel, damp, g	redicate	rotary drilling to 1	o.u teet
							3		grayish brown C		below grade.	
				S-3	0.0	18	3		and, little(-) fm			
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: r							43	i	moist to wet			
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	-								and to clayey si		Angulai Graveis	
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		•		S-5	0.0	12	20		f Gravel (shale		And the second and the second of the second	ei witti
		٠.	15			,	28	indie citt	saturated	raginerits)	shale fragments	
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Test Boring Log MW-20(MW-20S as of 01/16)

Project		Jespe vy Vete	Monitorin					- W		Boring No.:	MW-20
Client:						own, New Yo	ork			Sheet No.:	1 of 2
Orilling			Kendrick		nc.					Project No.:	272-01-01
	Groun		formatio	n			oring/Sampling	Methodology		G.S. Elevation:	512.32
		Water	Water			Cas.	Samp.	Core	Tube	W.L. Ref. Elev.:	511.94
Dat		Depth	Elev.	Intake	Туре	F.J.	\$.\$.			Date Started:	14-Jun-01
25-Ju	in-01	11.26	500.68	19-29	Diam.	5"	2"	8401.0	00 1440000	Date Finished:	14-Jun-01
	222.0				Wt.	300#	140#	19642		Driller:	T. Kendrick
	- 1				Fall	30"	30"	100 100 100 100 100 100 100 100 100 100		Inspector:	M. Colantuor
	**	Depth			nples		3.5%				
We		(feet)		PID	Rec.	Blows					
Constru	uction	0	No.	(ppm)	(in.)	Per 6"		Classifications		Rema	arks
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4	Δ				10	43	Tan Brown (Clayey SILT, little	(+) f Gravel,		
-							little(-) f Sand, dry, d	lense	Advanced borehol	
/				8		- 100				rotary drilling to 29	9.0 feet
1							ł			below grade.	
										g.	
1		5									
			S-2	0,0	12	20	Brown	f Sand and Cla	vev Silt	5	
				MINNO	61	12		ic Gravel, damp		e:	
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1				2		17					
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_						200.00					
			1								
7		10	S-3	0.0	14.5	23	Brown f	m Sand and Cla	ayey Silt,		
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						35*	1 ~	acod, very del	100		
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-	- 1.	<u></u>				20*	little fmc C	Gravel, trace shall	e fragments		
-	→.					27*		aturated, very de			
• 1	- 1.	25	1	1	1	40*	10%			I.	

Test Boring Log MW-20(MW-20S as of 01/16)

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Proje Clier			Monitorin							Boring No.:	MW-20
	nt: ing Contr					own, New Yo	rk			Sheet No.:	2 of 2
OI III			Kendrick formatio		ric.					Project No.:	272-01-01
-	Ground			n				Methodology		G.S. Elevation:	512.32
1	Date	Water Depth	i	Imhalea	77.	Cas.	Samp.	Core	Tube	W.L. Ref. Elev.:	511.94
	-Jun-01	11.26	Elev. 500.68	Intake	Type	F.J. 5"	S.S.			Date Started:	14-Jun-01
25	-Jun-01	11.20	500,00	19-29'	Diam.		2"			Date Finished:	14-Jun-01
 					Wt.	300#	140#			Oriller:	T. Kendrick
		Donath			Fall	30"	30"			Inspector:	M. Colantuono
1	Well	Depth			nples					1	
	struction	(feet) 25	No.	PID	Rec.	Blows			· ·	_	
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•							Eı	nd of Boring @ 29	.0'	Delow grade.	
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1		30									
										Well Installation:	
ı					1					Sandpack 16.0' -	29.0' bas
l			,	Ì	}					Screen 19.0' - 29	
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Test Boring Log

MW-21B

(MW-21D as of 01/16)

Client: Drilling Contractor: Groundwater	Kendrici Informati r Water h Elev. 511.27	ontractor:	RSR Corporation,	Middlet				The second secon	Boring No.:	
Groundwater Water Date Depth 25 Jun-01 4.21	Informati Water Helev. 511.27	ontractor:			own, New Yo	ork			Sheet No.:	MW-21B 1 of 1
Date Depth 25-Jun-01 4.21	Water Elev. 511.27		Kendrick Drilling,				7-9-2		Project No.:	272-01-01
Date Depth 25-Jun-01 4.21	511.27	oundwater I	formation		Во	oring/Sampling	Methodology		G.S. Elevation:	515.81
25-Jun-01 4.21 Well (feet) Construction 0 A A A A A A A A A A A A A A A A A A	511.27	Water	Water	14000	Cas.	Samp.	Core	Tube	W.L. Ref. Elev.:	515.48
Well (feet) Construction 0 A A A A A A A A A A A A A A A A A A	h)	Depth	Elev. Intake	Туре	F.J.	S.S.	NX	7400	Date Started:	15-Jun-01
Well (feet) Construction 0 A A A A A A A A A A A A A A A A A A	1	01 4.21	511.27 19-29'	Diam.	5"	2"	2"		Date Started:	15-Jun-01
Well (feet) Construction 0 A A A A A A A A A A A A A A A A A A	1			Wt.	300#	140#			Driller:	
Well (feet) Construction 0 A A A A A A A A A A A A A A A A A A	1			Fall	30"	30"			Inspector:	T. Kendrick
Construction 0 A A A A A A A A A A A A A A A A A A	_	Depth	Sar	nples				!	mspector.	L. Coddington
Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ	No.	(feet)	PID	Rec.	Blows					
Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ		ion 0	A court I Transcribert and	(in.)	Per 6"		Classifications			
Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ		Λ					oradonnou a de la cons	<u></u>	Rema	rks
ΔΔ ΔΔ			ļ			FILL/REW	ORKED ICE (CONTACT	Cut Concrete 2.0' b	
10		^					STATES TOLL	OMIAOI	Cut Concrete 2.0 E	y 2.0 Area
10		2		1	-				Drive & wash 5" ca	sina
10		PI	1	\					0 to 4.0 feet below	
10		<u> </u>				Yellow Brown	cmf SAND, little	e fm Gravel to		g. 4.4.V.
10		/				Gray cmf	SAND and on	of Gravel,	Advanced borehole	by
10	7 04	U	0.4			little Cla	yey Silt, damp	to moist	rotary drilling to 19.	
10	S-1	L =	S-1 0.0	2	100/4.5		DMM65 03,75	4.5'	below grade.	
10	-	<u> پ</u>	Ì					V 5.0%		
10	=	├					<u>BEDROCK</u>		Split Spoon Refusa	l at 4.5 feet.
10	-			}					1985 24	
10		l',	ļ			Dode	Comple Disable	SI T	Hard uniform rotary	
10	1					Dark	Gray to Black S	onale	from 4.5 to 9.0 feet	•.)
10	2 1		1							
10	7	l'.							Fine shale rock cut	
10	7								Trace gray silty clay	(Irom Iractures
15	S-2		S-2 n/a	0	100/0				Split Spoon Refus	ol at 9.0 feat
15		10			1000				(Spoon Bouncing)	al at 5.0 leet.
15				l i					(-p	
15		·'	546	ĺĺĺ	112					
15		ļ.							Rollerbit to 14.0' bg	s.
15	_	'			100 10					10.33
15		·						•6	Hard uniform drillin	g.
15		. 		1					fine shale rock cutt	ngs in wash.
15		(* 								
	Core		Coro pia		NIV	Process Section 1712			enew en	
	- Cole	15	Core n/a	60	NX 14.0'	Dark	Gray Shale Bed		NX Rock Core 14.0	to 19.0' bgs.
<i>,:</i> ├─ :├──	-	1 - 10					rizontal fracture		RQD = 0.69	
	-				to 19.0'	trace sitt	y clay filling in f	ractures.		
	-	:			13.0	0.00			 	
	7								Borehole reamed to	19.0' bgs.
	7	l. —							1	
					i de la company					
•	1		1							
]		End o	f Boring @ 19.0) bas	la l	
									2 8	
20	-1	20							Well Installation:	
	2400					22				
	345								Sandpack 6.0' - 19	.0' bgs
	310								Screen 9.0' - 19,0 '	bgs
	344								Bentonite Slurry 2.	
	32/35								Concrete Seal 0 - 2	
<u> </u>	22/08/	<u> </u>			148				101 26-90-0 17 102	mer sica - s na
				,			2.50		Flush Mount Manh	
<u> </u>	390	5 55 667							2" Sched. 40 PVC	
25	3348								2" ID Sched, 40 P\	C Screen
	32356						189		Concrete Seal 0 - 2 Flush Mount Manh	t.0' bgs ole Cover

Well ID:

MW-23S

Project:

Revere Smelting & Refining

Location:

Middletown, New York

Project No.:

26408.004.400

Client:

NYSDEC

Date Drilled:

Locking Casing:

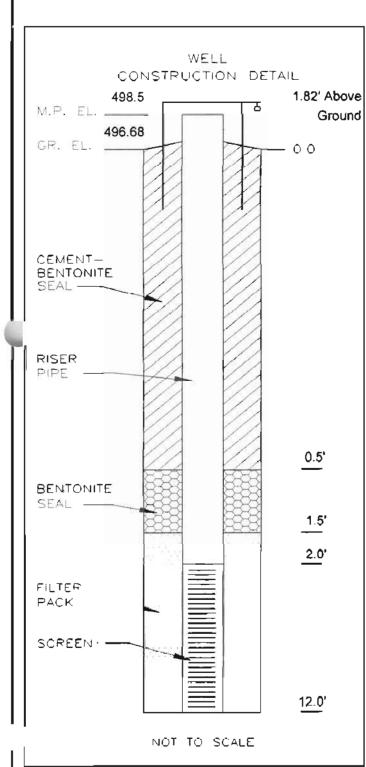
ΙX

Yes

11/7/2001

Date Developed:

11/9/2001



		Inspec	tion Note	s:
Inspector:		Garrett S	leeman	
Drilling Co	ntractor	Parratt V	Volff, Inc.	
Type of W	/ell:	Environn	nental Monit	oring Well
Static Wat Measuring Total Dep	Point:	Top of P	vc	Date: 11/09/01
		(,.		
Drilling	Metho	d - Over	burden:	
Type:	HSA		Diameter:	4 1/4 " ID
Casing:	NA			
•	_		erburder	
			Diameter:	2" OD
Weight:			Fall:	30"
Interval:	2.0'			
Riser Pi	pe Lef	t in Plac	e:	
Material:	Sch 40	PVC	Diameter:	2" ID
Length:	2.0'		Joint Type:	Flush Thread
Screen:		-1.45	.	
Material:			Diameter.	
Slot Size	<u>:</u>		_Joint Type:	Flush Thread
Filter Pa	ack:			
Type:	Sand		Grade:	
interval:	2.0'-12.	0' BS		
Seal(s):				
Type:		-Bentonite	Interval:	0.0'-0.5' B\$
Type:	Bentonit	e Pellets	Interval:	0.5'-1.5' BS
Type:			Interval:	
				_



No

			BRIENE			TES	ST BOF	RING L	.OG	BORING NO. MW-23S			
	PRO.		Revere Sme			no				SHEET 1 OF	: 2		
		Vicinity of the last	YSDEC	9	70 ((0),,,,,	··· <u>5</u>				JOB NO.	26408.004.400		
ŀ		100	CONTRACTO	ND: Do	rro# \Mol	# Inc							
1							of Codingo	t Dand			MEAS. PT. ELEV. GROUND ELEV. 498.50		
1	OF INVESTIGATION	POSE:				Well South			0.00.0				
1			METHOD: 4.5				SAMPLE	CORE	CASING		Ground Surface		
1		L RIG		0 Trac	K	TYPE		DATE STAR					
Ų	DESCRIPTION OF THE		VATER DEPT	ГН:		DIA.				DATE FINIS			
			G POINT:		- 2	WEIGHT					J. Percy & J. Wheeler		
	DATE		IEASUREME			FALL				INSPECTOR	G. Sleeman		
	Depth Ft.	Sample Number	Blows on Sample Spoon per 6*	Penetration Recovery	Unified Classi- fication	G	EOLOG	TION	REMARKS				
ſ			Weight of	0-1.3'		0-1.3' Brow	IN SILT CLA	+) Sand.	"Clean" Fill				
	1	1	Hammer			trace media	um(+) fine G	Gravel			Moist MW-23S (0-1.3' BS) 11:40		
	·	'	•										
	2 —		Weight of Hammer	2.0- 2.4'		1	own SILT CI um fine Gra	e(+) Sand,	"Clean" Fill Very Moist MW-23S (2.0-2.4' BS) 11:45				
1	3 —	2	+						11.45				
	4	2	Weight of Hammer	4-4.2		4.0-4.2' Brown SILTY CLAY, and medium fine(+) SAND					Saturated "Clean" Fill MW-23S (4.0-4.2' BS) "Clean" Fill		
	5 —	3	•							6.0'	11:50		
	6 -		Weight of Hammer	6.0- 7.3'			own SILT CI m(+) fine Gi		medium fin	e(+) Sand,	MW-23S (6.0-7.3' BS) 12:05 Native Till		
	7 —	4	•										
	8 —					NR					No Recovery		
	9 _	5											
1	10 —												

		BRIEN				TEST BORING LOG	BORING N	NO. MW-23S
PRO		NGINEEF Revere Sn					SHEET 2 OF	- 2
		YSDEC	ioning c	,,,,		9	JOB NO.	26408.004.400
Depth Ft.	Sample Number		per 6" Penefration Recovery	Unified	Classì- fication	GEOLOGIC DESCRIF	PTION	REMARKS
			10.0-		-	10.0-10.5' Brown CLAY, some medium fine		MW-23S (10.0-10.5 BS)
11 -	6		10.5			Brown CLAY, some medium, fine(+) sand, medium fine gravel.	10.5'	Completed MW-23S
12 -							12,0	Drilling
13 —								
14 -								
.5 -								
16 -								
17 —								
18 ~								
19 —								
20 —								
21 —								
22 -								

Boring Log: MW-23S-R

Project: Revere Smelting & Refining

Project No.: E0031786

Location: Middletown, NY

Completion Date: September 1, 2016

Surface Elevation (feet AMSL*): 497.76

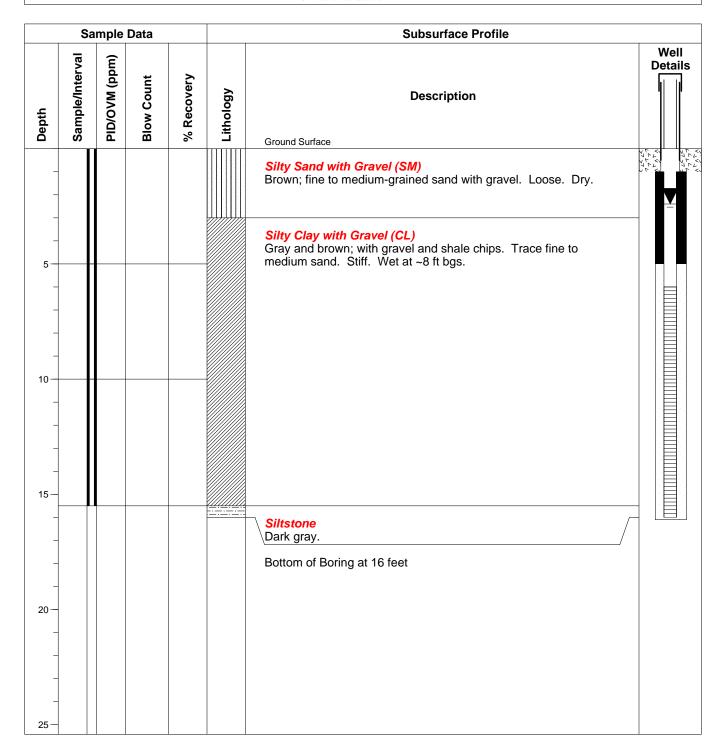
TOC Elevation (feet AMSL*): 500.23

Total Depth (feet): 16

Borehole Diameter (inches): 6

*AMSL = Above mean sea level





Geologist(s): GMB

Subcontractor: ADT-Cascade **Driller/Operator:** Brian Karshick

Method: Rotosonic

WSP USA Corp.

75 Arlington St., 4th Floor

Boston, MA 02116

WELL COMPLETION LOG Well ID: MW-23D **NYSDEC** Project: Revere Smelting & Refining Client: 11/6/01 - 11/7/01 Middleton, New York Date Drilled: Location: Project No.: 26408.004.400 **Date Developed:** 11/09/01 **Inspection Notes:** WELL Garrett Sleeman Inspector: CONSTRUCTION DETAIL GR. EL. 496.72 Drilling Contractor: Parratt Wolff, Inc. 1.34 Above GL W.P. EL. 498.06 Type of Well: **Environmental Monitoring Well** Static Water Level (ft bmp): 7.04 Date: 11/7/2001 Top of PVC Measuring Point: Total Depth of Well (ft bmp): 28.34 CEMENT-Drilling Method - Overburden: 6 1/4" BENTONITE **HSA** Diameter: 4 1/4" JD SEAL #1 Type: Casing: 4.5' Steel CASING-Sampling Method - Overburden: Type: Diameter: Weight: Fall: CEMENT-Interval: BENTONITE SEAL #2-**Drilling Method - Bedrock:** Type: HX Dimond Bit Core Diameter: 4" 17.01 2" PVC Casing: OVERBURDEN BEDŘOCK Sampling Method - Bedrock: 4" OD (HX) Diamond 8 Diameter: 25" Interval: 18.5 Riser Pipe Left in Place: BENTONITE Material: Sch 40 PVC Diameter: SEAL -Length: 23.70 Joint Type: Flush Thread 20.01 RISER Screen: PIPE Material: Sch 40 PVC Diameter: Joint Type: Flush Thread Slot Size: FILTER 22.0 PACK Filter Pack: Type: Sand Grade: Interval: 27.0-20.0' SCREEN -Seal(s): Type: Cement-Bentonite Grout #1 Interval: 0-18.5' 26.82 Bentonite Interval: 16.5-20.0' Type: Cement-Bentonite Grout #2 Interval: 0.16-5.0' Type: 27.0 X Locking Casing: Nο Yes NOT TO SCALE Form-011 OBRIEN & GERE ENGINEERS, INC.

_															
			=	BRIEN E	_	_		TES	ST BOF	RING L	.OG	BORING NO. MW-23D			
ł	PR	₹O.	JECT:	Revere Sme	elting a	nd Ref	inin	g				SHEET 1 OF	2		
				YSDEC				•				JOB NO.			
	DF	₹ŁI	LING (CONTRACTO	DR: Pa	rratt W	/olfl	Inc.				MEAS, PT. ELEV.			
			POSE:						of Sedimer	nt Pond		GROUND ELEV. 498.50			
	_			METHOD: 4.			<u> </u>		SAMPLE		CASING	DATUM	Ground Surface		
					0 Trac			TYPE				DATE STAR			
	GF	२०।	UND V	VATER DEP	TH:			DIA.				DATE FINISI			
	ME	ΑŞ	SURIN	G POINT:				WEIGHT				DRILLER	J. Percy & J. Wheeler		
	DΑ	\TE	OF N	1EASUREME	NT:			FALL				INSPECTOR	G. \$leeman		
	Depth		Sample Number	Blows on Sample Spoon per 6"	Penetration/ Recovery	Unified Classi-	fication	G	EOLOG	SIC DES	SCRIPT	TON	REMARKS		
				Weight of Hammer	0-1.3				vn SILT CLA um(+) fine G		edium fine(+) Sand,	"Clean" Fill Moist		
	1		1	—											
	2	Hammer 2.4'							own SILT CI um fine Gra		medium find	e(+) Sand,	*Clean" Fill Very Moist		
	4	•		Weight of Hammer	4-4.2'			4.0-4.2' Bro	own SILTY (Saturated "Clean" Fill					
	5		3	+								6.0'			
	6		4	Weight of Hammer	6.0- 7.3'				own SILT CI m(+) fine Gi		medium find	e(+) Sand,	Native Till		
	, ,		4	+											
ě	8 9		5					NR					Na Recovery		
	10)													

	OBRIENS GERE E 13 1 1 2 2 RS 1 1 1 2 2 RS 1 2 RS 1 Refin										TEST BORING LOG	BORING N	IO. MW-23D
PROJ									Refi	nin	g	SHEET 2 OF	2
CLIE												JOB NO.	26408.004,400
Depth		Number Blaus on			per 6"	Penetration	Recovery	Unified	Classic	fication	GEOLOGIC DESCRIP	TION	REMARKS
						10.	-0.				10.0-10.5' Brown CLAY, some medium fine		
11 —	6					10	o ////				trace medium fine Gravel Brown CLAY, some medium, fine(+) sand, to medium fine gravel.	10.5'	
12 -						\geq	\leq					12.0*	
12											See Core Log for MW-23D Coring completed at 27 ft.		
13 —											Note: Soil descriptions taken from MW-23S	log.	
14 —													
–													
16 -													
17 —		-											
18 —													
19 —													
20 -													
21 -													
22 _													

							C	3				%68							100%		_				
						4) - -				93.6%							100%						
4.400	6-Nov-0	7/01	Total Depth:10' (27' bgs)	.72		I. NA	0 0 E					4. -4.							න හ						
408.00		ed: 11	10' (2	/.: 496	¥	searing		اد ا		<u> </u>	<u> </u>	<u>, </u>	1	П	\top	Т	Т	ΓŢ	111	11		П			Т
Job No.: 26408.004.400	Date Started:	Date Finished: 11/7/01	Depth	Ground Elev.: 496.72		Inclination/Bearing:	1	á				_		ı				ļ		ł			1		
Job N	Date	Date	Total	Groun	S.W.L.:	Inclin		<u> </u>				izontal with						i	with						
-23D							0	= 				ith hor infilled						1	estone						
.: MW	of 1					5-27'		ן ו מכננ				thale w						i	Jy Lime						
Hole No.: MW-23D	Sheet 1 of 1					Core Size: 2.5" 18.5-27	Lithologic Description	Sill of				Run #1 Limestone: Dark gray, fine grained, shaley limestone to Limey shale with horizontal bedding dipping approximately 45 degrees to the east. Occasional fractures infilled with						1	Run #2 Limestone: Dark gray, fine grained, massive Limestone to muddy Limestone with fewrer jointings and fracture than the overlying material						
	3					Size: 2	uc 1	at 18.5				ne to L ccasio						į	stone t						
45		, Inc				Core :	scription	ce, tex coring (imesto ast. O						ļ	Limes erial						
0		t Wolf	ler	an			Lithologic Description	egan o				haley I	ssive.					i	nassive ng mat						
CORTIOG		Contractor. Parratt Wolff, Inc	J. Percy, J Wheeler	Geologist: Garrett Sleeman	10 ft	ပ္	Litholc	, set BIP at 18.0 Began coring at 18.5				ined, s grees to	argillaceous carbonate stringers, mostly massive.					1	Run #2 Limestone: Dark gray, fine grained, massive Lin fewrer jointings and fracture than the overlying material						
		ractor.	ercy, J	arrett	asing:	: 2" PV	2	BIP at				ne gra 45 deç	s, mos					j	ne gra						
٦				gist: G	Length of Casing:	Casing Size: 2" PVC	7	7', set				gray, fi nately	tringen					 	gray, fi ure tha						
		Drilling	Driller:	Geold	Lengt	Casin	,	Bedrock (Limestone) at 17				Dark opproxir	nate s					į	Dark of fract						
							.!	neston				stone: ping at	carbo					1	sstone: ngs an						
						ks	-	S (Linguage)				1 Lime ing dip	sceons					i	2 Lime r jointii						
				ou		d Tracl		Bedro				Run #	argillo					ļ	Run # fewre						
ļ.,		ing		Infillrati		ail Roa	Depth	17 Z		1	19	1 1		72	ı	1	ı	23	111	25	ı	1 1		ı	L
S, INC		d Refin		drock	y	th of R		+					4 g	<u> </u>						. (i)					
INEER	יזי ע	ing and		low Be	Facilit	rt, Nor	5	3					34 (avq.)							(avg.)					
O'BRIEN & GERE ENGINEERS, INC.	Albany New York 12205	Revere Smelting and Refining	၂	Observe Shallow Bedrock Infillration	South of RSR Facility	Hole Location: In Culvert, North of Rail Road Tracks	Run No.				_	18.5- 23.2						2	23.2- 2 7						
& GFF	ew Yor	Rever	NYDEC	Obser	South	ion:	j.	5				, ·							. 1						_
3RIEN	Albany New	ect:	ᄕ	Purpose:	Location:	Locat	Formation Member																		
Ö ?	¥ 6	Project:	Client:	Pur	ر ک	Hole	Forr		_					_											

Boring Log: MW-23D-R

Project: Revere Smelting & Refining

Project No.: E0031786

Location: Middletown, NY

Completion Date: August 31, 2016

Surface Elevation (feet AMSL*): 497.02

TOC Elevation (feet AMSL*): 499.72

Total Depth (feet): 35

Borehole Diameter (inches): 6

*AMSL = Above mean sea level



	Sa	mple	Data			Subsurface Profile
Depth	Sample/Interval	PID/OVM (ppm)	Blow Count	% Recovery	Lithology	Description Ground Surface
-						Silty Sand with Gravel (SM) Brown; fine to medium-grained sand with gravel. Loose. Dry.
5-						Silty Clay with Gravel (CL) Gray and brown; with gravel. Stiff. Wet at ~8 ft bgs.
-						
10-						
_						
15 —						Clayey Sand with Gravel (SC) 13-15 ft bgs: Gray-brown coarse sand and rocks. Wet. 15-18.5 ft bgs: Brown clayey med-v.cse sand and rocks. Wet. 18.5-20 ft bgs: Gray clayey medium sand and shale fragments. Wet.
20 —						Clay with Gravel (CL) Gray and brown clay with gravel and shale fragments. Stiff. Damp.
- - 25-						

Geologist(s): GMB

Subcontractor: ADT-Cascade **Driller/Operator:** Brian Karshick

Method: Rotosonic

WSP USA Corp.

75 Arlington St., 4th Floor

Boston, MA 02116

Boring Log: MW-23D-R

Project: Revere Smelting & Refining

Project No.: E0031786

Location: Middletown, NY

Completion Date: August 31, 2016

Surface Elevation (feet AMSL*): 497.02

TOC Elevation (feet AMSL*): 499.72

Total Depth (feet): 35

Borehole Diameter (inches): 6

*AMSL = Above mean sea level



	Sa	mple	Data			Subsurface Profile	
Depth	Sample/Interval	PID/OVM (ppm)	Blow Count	% Recovery	Lithology	Description	Well Details
30 — 35 — 40 — 45 — 50 —						Siltstone Dark gray. Thinly to massively bedded. Fractured. (continued) Bottom of Boring at 35 feet	

Geologist(s): GMB

Subcontractor: ADT-Cascade **Driller/Operator:** Brian Karshick

Method: Rotosonic

WSP USA Corp.

75 Arlington St., 4th Floor

Boston, MA 02116

Well ID:

MW-24

(MW-24S as of 01/16)

Project:

Revere Smelting & Refining

Location: Middletown, New York

Project No.: 26408.004.400

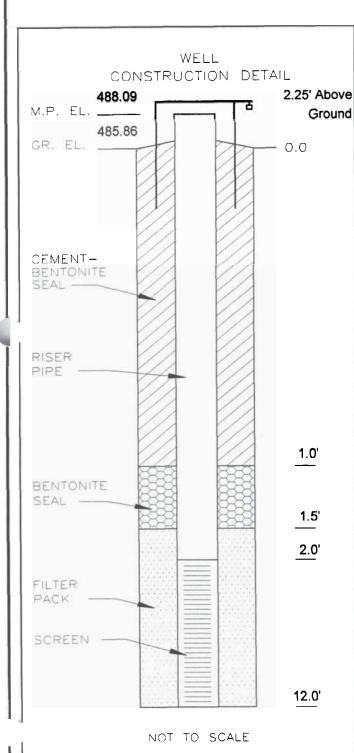
Client:
Date Drilled:

Locking Casing:

NYSDEC

Date Developed: 1

11/8/2001 11/9/2001



	li	nspecti	on Notes	:	
Inspector:		Garrett S	leeman_		
Drilling Co	•				
_	•		ental Monit	oring W	/ell
Static Wate Measuring Total Dept	Point:	Top of P\		Date:	11/09/01
Drilling		·			
Type:	HSA		Diameter:	4 1/4 "	<u>ID</u>
Casing:	NA				
•	_		erburder		
		0011	Diameter: Fall:	30"	
Weight:		itinuous S		30	
Riser Pi	pe Left	in Plac	e: Diameter:		
Length:	4.45		Joint Type:	Flush	Thread
Screen: Material:		PVC	Diameter:		
Slot Size	:		Joint Type:	Flush	Thread
Filter Pa					
Type:			Grade:		
Interval:	15.0-12	.2' BS			
Seal(s):					
Type:		Bentonit <u>e</u>	-	0-1.0'	
• .	Bentonit	e Pellets	Interval:	1.0-1.	5' BS
Type:			Interval:		

OBRIEN 6 GERE ENGINEERS, INC.

Yes

No

Form 00

	_	BRIEN E	_		TES	ST BOR	RING L	.OG	BORING NO. MW-24 (MW-24S as of 01/16)			
PROJI		Revere Sme			ing				SHEET 1 OF 2			
		YSDEC							JOB NO. 26408.004.400			
		CONTRACTO	DR: Pa	rratt Wo	Iff Inc.				MEAS. PT. ELEV.			
PURP					tion South o	f Railroad	Tracks		GROUND ELEV.			
		METHOD: 4.				SAMPLE		DATUM Ground Surface				
	_		0 Trac		TYPE	-		CASING	DATE STAR			
		VATER DEP			DIA.	1.5"	2.0" OD	41/4"	DATE FINIS			
MEAS	URIN	G POINT:			WEIGHT				DRILLER	J. Percy & J. Wheeler		
DATE		TEASUREME			FALL				INSPECTOR	R G. Sleeman		
Depth Ft.	Sample Number	Blows on Sample Spoon per 6"	Penetration/ Recovery	Unified Classi-	G G	EOLOC	SIC DES	SCRIPT	TION	REMARKS		
1 - 2 - 3 - 4 - 5 -		Weight of Hammer 1 4 5 5 13 13 13	2.0- 3.9'		with roots 0.4-0.8' Ye little Silt 2.0-2.6' Ye little Silt 2.6-3.9' Ye medium fir	ellowish Gragellowish Browne Gravel, life gravel, life gravel and the gravel and	wn CLAY, trawn CLAY, trawn CLAY, stitle medium	ce coarse of ace coarse ome Silt, litter fine Sand	Gravel Gravel tle coarse	A _o Horizon Moist Moderately Compact Histic B _{ig} Horizon MW-24 (0-0.8' BS) 14:10 Saturated B _{ig} (Histic Soils) MW-24 (2.0-3.9' BS) 14:15 Dry Perched/Water Table Confining Clay Layer Poorly Sorted MW-24 (4.0-4.9' BS) 14:45		
6 — 7 —		14 11 13 20 20	6.0- 7.2'			ark Yellowisl and, little Sil				MW-24 (6.0-7.2' BS) 14:40 Firmly Compact		
8 -		15 22 17	8.0-			ark Yellowisl and, little Sil				MW-24 (8.0-9.5' BS) 14:50		
10		10 7										

		Ale A	EN E	S.	ΑİZ	٧		TEST BORING LOG	BORING NO. MW-24 (MW-24S as of 01/16)			
			re Sme	elting	g aı	nd F	Refinir	ng	SHEET 2 OF			
CLIE	NT: N	YSDE	<u>C</u>	7 =	_				JOB NO.	26408.004.400		
Depth	Sample	Blows on Sample	Spoon per 6"	Penetration	Recovery	Unified	Classi- fication	GEOLOGIC DESCRIPT		REMARKS		
11 -		6 20 37		10. 11.	.0-			10.0-11.5' Dark Yellowish Brown CLAY, little of medium Sand, some coarse(-) medium fine(+) Gravel	MW-24 (20.0-11.5' BS) 15:05 Base of 12.0' Tip of Spoon Shale - Possible Bedrock End of Drilling		
12 -		37										
13 –												
14 —												
ია –												
16 -												
17 —				-								
18 —												
19 —												
20 -												
21 -												

Well ID:

MW-25

(MW-25S as of 01/16)

Project:

Revere Smelting & Refining

Location:

Middletown, New York

Project No.:

26408.004.400

Client:

NYSDEC

Date Drilled:

11/8/2001

Date Developed:

11/9/2001

	WELL	_	
CC	NSTRUCTIO		AIL
494.1	6		
M.P. EL		4	
491.6 GR. EL	55		- 0.0
			0.0
		22	
CEMENT- BENTONITE			
SEAL —			
RISER			
PIPE	1/4		
			4.00
		<i>5</i> 4	1.0'
BENTONITE		833	
SEAL			1.5'
		8888	-1.5
			2.0'
EU TEO			
FILTER PACK			
SCREEN -			
			12.0'
		· · · =	
	NOT TO SO	JALE	

Inspection Notes:

				_	
Inspector:		Garrett S	leeman		
Drilling Co					
Type of W	ell:	Environn	nental Monit	oring Well	
Cantin Mara	!!	(ft h).	4.06	Data: 4	4100104
			4.26	Date	1/09/01
Measuring					
Total Dept	in of vvei	ı (π bmp):	14.51		
Drilling	Metho	d - Over	burden:		
_				4 1/4 " ID	•
		· · · · · · · · · · · · · · · · · · ·	Diameter:	4 1/4 10	
Casing:	IVA			<u> </u>	
Samplin	a Meth	od - Ov	erburder/		
-	_				
1 ypc.	140 #	0011	Diameter:	30"	
			Fall:	30	
mervai.	2.0 Coi	ntinuous_S	ampling		
Riser Pi	no Loff	in Dlac	·o'		
	-			011 ID	
			Diameter:		
Length:			Joint Type:	Flush In	read
Concent					
Screen:					
			Diameter:		
Slot Size	<u></u>		_Joint Type:	Flush Th	read
Eiller De	s ales				
Filter Pa					
Type:		0.50	_Grade:		
Interval:	15.0-12	.0' BS			
Seal(s):					
• •	Coment	Bentonite	Interval:	•	
Type:		_	Interval:	1.0-1.5' E	
Type:	Bentonite	e renets	-	1.0-1.5	,
Type:			Interval:		
Locking C	asing:	X	Yes	N	0



-															
		BRIENE NGINEER.			TES	ST BOF	RING L	.OG	BORING NO. MW-25 (MW-25S as of 01/16)						
PRO.	JECT:	Revere Sme	elting a	nd Refinir	ng				SHEET 1 OF 2						
		YSDEC							JOB NO. 26408.004.400						
DRIL	LING	CONTRACTO	OR: Pa	rratt Wolf	ff Inc.				MEAS. PT. ELEV.						
PUR	POSE:	Monitorir	ng Well	Installati	on South o	f Railroad	Tracks		GROUND ELEV.						
DRIL	LING I	METHOD: 4.	5 Split	Barrel		SAMPLE	CORE	DATUM Ground Surface							
		TYPE:			TYPE				DATE STAR						
		VATER DEP	TH:		DIA.				DATE FINIS						
		IG POINT:	-NIT.		WEIGHT				DRILLER INSPECTOR	J. Percy & J. Wheeler G. Sleeman					
DATE	OF N	1EASUREME			FALL				INSPECTOR	G. Sieeman					
Depth	Sample Number	Blows on Sample Spoon per 6"	Penetration Recovery	Unified Classi- fication	G	EOLOC	SIC DE	SCRIPT	TON	REMARKS					
			0-0.9'			Brown CLA									
		<u> 1</u>	-			ellowish Brov and, some n			e coarse	0.5' BS - Saturated MW-25 (0-0.9' BS)					
		2			medium Sa	and, some n	neaium iine	(+) Gravei		12:25					
1 -		_	1	1						Native					
		3								Subangular Gravel					
			1												
2 -		6	2.0-		20201	llowish Brov	un CLAV o	nd coorce r	nodium	Firmly Compact					
		12	3.0'			ne medium			nealam	Till					
		12	10.0		0,1110,001	no modiam	III10(+) Olu			MW-25 (2.0-3.0' BS)					
3 -		21				12:35									
- ۱		_					Angular-Subangular								
		17					Gravel								
		19	11	1											
4 -	1	10	4.0-	1	4.0-4.8' Ye	llowish Brov	wn CLAY ar	nd coarse m	edium	MW-25 (4.0-5.1' BS)					
		5	5.1'		SAND, son	ne medium	fine(+) Grav	/el		12:45					
		•								Firmly Compact					
5 -		8		-	A 8-5 11 VA	llowish Brov	un SII T an	d medium fi	ne(+)	Till					
		7	11	1	SAND, sor		THI OILI AIN	a medium II	('/						
			//]											
6 -		5					Au =		,	A DA 4 O D 4 O D D D D D D D D D D D D D D D					
		5	6.0- 7.0'			ayish Browr			dium fine	MW-25 (6.0-7.0' BS) 12:50					
		5	1'.0		Joana, Imie	medium fin	e(T) Gravel			12.00					
_		11													
7 -	1		1	1											
		11	1/	1											
		12	11	1											
8 -	1	14	8.0-	1	8.0-9.6' Ye	llowish Brov	CLAY and	Very firmly Compact							
		2	9.6'		coarse(+) medium SAND, some coarse medium fine(+) MW-25 (8.0-9.6' B										
			1		Gravel, alternating Clay Silt partings 12:55										
9 _		3	-												
		13													
_				1											
10 -		11	11												
I 'U -	1			1	1					1					

7									Î	
		BRI	EN8	<u>.</u> G	ĒF	RE		TEST BORING LOG	BORING N	IO. MW-25 V-25S as of 01/16)
PRO	JECT:	Reve	re Sm	eltine	g ar	nd F	Refinir	ng	SHEET 2 OF	2
		YSDE							JOB NO.	26408.004.400
Depth Ft.	Sample Number	_		Penetration	Recovery	Unified	Classi- fication	GEOLOGIC DESCRIPT		REMARKS
				10.	.0-			10.0-10.6' Yellowish Brown coarse medium fi		MW-25 (10.0-10.6 BS)
11 –		13		10/	6'			Gravel, little Silt Clay, some coarse(+) mediu	m Sand 10.6'	13:00 Very Compact Till Gravel Angular Subrounded Completed MW-25 Drilling
12 -		10			7					
13 -										
14 -										
– د،										
16 -										
17 —										
18 -										
19 —										
20 -										
21 -										
22 –		-		-						

Well ID:

MW-26

(MW-26S as of 01/16)

Project:

Revere Smelting & Refining

Location: Project No.: Middletown, New York

26408.004.400

Client: **NYSDEC**

Date Drilled: **Date Developed:**

11/8/2001 11/9/2001

Inspection Notes:

Inspector:

Garrett Sleeman

Drilling Contractor: Parratt Wolff, Inc.

Type of Well:

Environmental Monitoring Well

Static Water Level (ft bmp): 9.07 Date: 11/09/01

Measuring Point: Top of PVC

Total Depth of Well (ft bmp): 16.85

Drilling Method - Overburden:

Type:

HSA

Diameter: 4 1/4 " ID

Casing: NA

Sampling Method - Overburden:

Type:

Split-Spoon . Diameter: 2" OD

Weight: 140 #

Fall:

30"

Interval: 2.0' Continuous Sampling

Riser Pipe Left in Place:

Material: Sch 40 PVC

Diameter: 2" ID

Length: 10.0'

Joint Type: Flush Thread

Screen:

Material: Sch 40 PVC

Diameter: 2" ID

Slot Size:

Joint Type: Flush Thread

Filter Pack:

Type:

Sand

Grade:

Interval: 7.0-15.0' BS

Seai(s):

Type: Type: Cement-Bentonite Interval:

0-5.0' BS

Bentonite Pellets Interval: Interval:

5.0-7.0' BS

Type:

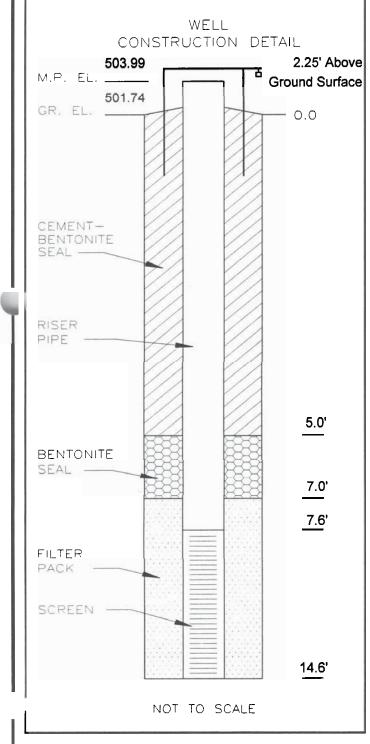
Locking Casing:

X

Yes

No

ENGINEERS, INC



			RIE		GEF	RE		TES	ST BOF	RING L	.OG	BORING NO. MW-26 (MW-26S as of 01/16)					
PRO	JECT:				elting a	nd Re	finir	ng				SHEET 1 OF	2				
CLIE	NT: N	IYS[DEC		-	-						JOB NO.	26408.004.400				
DRIL	LING	CON	NTR/	CTC	DR: Pa	rratt V	Volf	f Inc.				MEAS. PT. E	LEV.				
PURI	POSE	:	Mon	itorir	ng Well	Instal	latio	on, Just Ea	st of Pond		GROUND ELEV.						
DRIL	LING	MET	THOE	D: 4.	5 Split I	Barrel			SAMPLE	CORE	DATUM						
	L RIG							TYPE				DATE STAR					
	UND '				<u>TH:</u>			DIA.				DATE FINIS					
	SURI				NIT.			WEIGHT				DRILLER	J. Percy & J. Wheeler				
DATE	OF N	VIEA	SUK					FALL		-		INSPECTOR	G. Sleeman				
Depth	Sample Number	Blows on	Sample	spoon per 6"		Unified Classi-	_		EOLOG				REMARKS				
		3			0-0.7'			0-0.7' Brow medium fin	n SILT, little e Gravel	e medium fi	ne Sand, tra	ace	Fill, Dry, Loose MW-26 (0-0.7' BS) 8:05				
1 -		8	1 2 1 1 2														
		7															
2 -		6			2.0-			The state of the s	own SILT, tr	Fill, Dry, Loose							
		8			2.7'			Tine Gravei	me Gravel MW-26 (2.0-2.7' BS) 8:10								
3 —		7															
		4															
4 -		2			4.0- 5.5'			medium(+)	own SILT, tr fine Gravel				Moist Fill Possible Native				
5 —		4						4.1-5.4' Gravel	ay CLAY, tra	ace fine Sa	nd, little me	dium fine(+)	MW-26 (4.0-5.5' BS) 8:20				
		7							llowish Brov		SILT CLAY,	5.4' some					
6 -		6			6.0-			6.0-6.6' Ye	llowish Brov		CLAY, some	e medium	Moist				
		4			6.6'			fine(+) Gra	vel				MW-26 (6.0-6.6' BS) 8:30				
7 —		5															
		9															
8 -		5			8.0- 8.7'			8.0-8.7' Bro	Moist MW-26 (8.0-8.7' BS)								
9 _		10		A.				8:35									
	10																
10 —	12											V C DANS					

harr		BRI	EN E	5 GE 3.	R	Ē	TEST BORING LOG		NO. MW-26 MW-26S as of 01/16)			
	JECT:	Reve	re Sme	_	anc	d Refinir	ng	SHEET 2 OF				
CLIE	NT: N	YSDE	C	Te	_			JOB NO.	26408.004.400			
Depth Ft.	Samp le Numb er	Blows on Sample	Spoon per 6"	Penetration	Leifled	Unined Classi- fication	GEOLOGIC DESCRIPT	ΓΙΟΝ	REMARKS			
		8			Y		No Recovery		Saturated No Recovery			
11 -		16			11111				No Necovery			
12 -		12		12.0 13.0			12.0-13.0' Yellowish Brown CLAY SILT, little medium Sand, some coarse medium fine(+)		MW-26 (12.0-13.0' BS) 8:50			
13 –		11										
14 -		10		14.0 15.0			14.0-14.5' Yellowish Brown CLAY SILT, some fine(+) Gravel 14.5-15.0' Gray Shale	e medium 14.5'	MW-26 (14.0-15.5' BS) 9:15 Bedrock at 15.0'			
10-		9					14.5-15.0 Gray Griate	15.0'				
16 -		30										
17 —												
18 –												
19 —												
20 -												
21 -												
22 -												

Boring Log: MW-26S-R

Project: Revere Smelting & Refining

Project No.: E0031786

Location: Middletown, NY

Completion Date: September 1, 2016

Surface Elevation (feet AMSL*): 502.62

TOC Elevation (feet AMSL*): 505.46

Total Depth (feet): 15.5

Borehole Diameter (inches): 6

*AMSL = Above mean sea level



	Sa	mple	Data			Subsurface Profile	
Depth	Sample/Interval	PID/OVM (ppm)	Blow Count	% Recovery	Lithology	Description	Well Details
5				6	7	Silty Sand with Gravel (SM) Brown; fine to medium-grained sand with gravel. Loose. Dry. Silty Clay with Gravel (CL) Brown and gray; with gravel. Stiff. Dry. Silty Clay with Gravel (CL) Brown, dark gray, black, and green-gray; occasional 1/4" thick layer silty medium sand. Layered. Soft. Wet at ~8 ft bgs.	
15-						Silty Clay with Sand and Gravel 10-11.5 ft bgs: Gray silty fine-cse sand. Dense. Wet. 11.5-12.5 ft bgs: Gray and brown silty clay with pebbles. 12.5-14 ft bgs: Yellow-brown and gray silty clay and rocks. Dark gray shale chips at 13 ft bgs. 14-15.5 ft bgs: Brown clayey fine to very coarse sand and gravel. Loose. Wet. Bottom of Boring at 15.5 feet	

Geologist(s): GMB

Subcontractor: ADT-Cascade **Driller/Operator:** Brian Karshick

Method: Rotosonic

WSP USA Corp.

75 Arlington St., 4th Floor

Boston, MA 02116

Boring Log: MW-27A (MW-27S as of 01/16)

Project: Revere Smelting and Refining Surface Elevation (feet AMSL*): 480.19

Project No.: 080309 TOC Elevation (feet AMSL*): 482.18

Location: Middletown, NY Total Depth (feet): 20

Completion Date: April 9, 2009 Borehole Diameter (inches): 8.25

*AMSL = Above mean sea level



	Sa	mple	Data			Subsurface Profile		
Depth	Sample/Interval	PID/OVM (ppm)	Blow Count	% Recovery	Lithology	Description	M De	/ell tails
5— - 10— - 15—	S S S S S S S S S S S S S S S S S S S	<u>a</u>	Δ.	%		Not sampled. See log for soil boring WSP-DP-01 for lithology at this location.	1 7 7 7 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
20 —						Bottom of Boring at 20 feet		⊒;]

Geologist(s): Erik S. Reinert
Subcontractor: Parratt Wolff, Inc.
Driller/Operator: Lee Penrod
Method: Hollow Stem Auger

WSP Environment & Energy 11190 Sunrise Valley Drive Reston, VA 20191 (703) 709-6500 Boring Log: WSP-DP-01

Project: Revere Smelting and Refining

Project No.: 080309

Location: Middletown, NY

Completion Date: March 30, 2009

Surface Elevation (feet AMSL*): NM

Total Depth (feet): 19

Borehole Diameter (inches): 3.25

*AMSL = Above mean sea level



	Sa	ample	Data			Subsurface Profile	
Depth	Sample/Interval	PID/OVM (ppm)	Blow Count	% Recovery	Lithology	Description Ground Surface	
5-	1	NA	- - -	70		Silty Gravel with Sand (GM) Yellowish-brown (10YR 5/4) sub-rounded gravel, little fine to medium-grained sand, little silt; dense; dry.	
-	2	NA	- - -	50		Silt (ML) Light brownish-gray (2.5Y 6/2) silt, little clay, trace fine to coarse-grained sand, trace sub-rounded gravel, trace roots; loose to medium dense; moist.	
10—	3	NA	- - - -	60		Poorly-Graded Gravel with Silt and Sand (GP-GM) Grayish-brown (2.5Y 5/2) gravel and cobbles, some fine to medium-grained sand, trace to little silt; dense; moist. Poorly-Graded Gravel with Sand (GP) Light olive brown (2.5Y 5/4) sub-angular gravel, some fine to coarse-grained sand, trace silt; loose; moist, becoming wet between 13 and 18.8 feet.	
-	4	NA		100			
20-						Shale Dark gray (2.5Y 4/1) shale. Bottom of Boring at 19 feet Refusal on bedrock interface. Set 5 feet of 0.010-inch-slotted 1-inch-diameter polyvinyl chloride screen to collect groundwater sample.	

Geologist(s): Erik S. Reinert
Subcontractor: Nothnagle Drilling, Inc.
Driller/Operator: Jeff Schweitzer

Method: Direct Push

WSP Environment & Energy 11190 Sunrise Valley Drive

Reston, VA 20191 (703) 709-6500 Boring Log: MW-27B (MW-27D as of 01/16)

Project: Revere Smelting and Refining Surface Elevation (feet AMSL*): 480.71

Project No.: 080309 TOC Elevation (feet AMSL*): 482.34

Location: Middletown, NY **Total Depth (feet):** 37

Completion Date: April 9, 2009 Borehole Diameter (inches): 6

*AMSL = Above mean sea level



	Sa	mple	Data			Subsurface Profile	
Depth	Sample/Interval	PID/OVM (ppm)	Blow Count	% Recovery	Lithology	Description Ground Surface	Well Details
						Not Sampled	

Geologist(s): Erik S. Reinert
Subcontractor: Parratt Wolff, Inc.
Driller/Operator: Lee Penrod
Method: Down-Hole Air Hammer

WSP Environment & Energy 11190 Sunrise Valley Drive Reston, VA 20191 (703) 709-6500 Boring Log: MW-27B (MW-27D as of 01/16)

Project: Revere Smelting and Refining Surface Elevation (feet AMSL*): 480.71

Project No.: 080309

TOC Elevation (feet AMSL*): 482.34

Location: Middletown, NY

Total Depth (feet): 37

Completion Date: April 9, 2009

Borehole Diameter (inches): 6

*AMSL = Above mean sea level



	Sa	ample	Data			Subsurface Profile	
Depth	Sample/Interval	PID/OVM (ppm)	Blow Count	% Recovery	Lithology	Description	Well Details
22-						Not Sampled (continued)	
26	1	NA	- - - -	Total: 70 Solid: 42 RQD: 32		Shale Bluish-black (5PB 2.5/1) shale; strong; fresh; wet; aphanitic, slaty; thinly bedded; slightly decomposed in fractures zones; competent; intensely fractured; fracture zone at 26.5 to 27 feet, 27.9 to 28.7 feet, and 29.2 to 29.5 feet, unknown dip, not healed, infilled with cohesive sediment, oxidized, rough, wet with continuous seepage; joints at 28.9 and 29.1 feet, 10-degree dip, extremely narrow, not healed, surface oxidation, rough, planar, wet with minor seepage.	
30—	2	NA	- - - -	Total: 100 Solid: 100 RQD: 95		Shale Bluish-black (5PB 2.5/1) shale; strong; fresh; wet; aphanitic, slaty; thin to medium bedded, slaty texture is not parallel to bedding; fresh; competent; mechanical breaks parallel to slaty cleavage at 30.8, 31.3, 33.3, and 34.1 feet, 35-degree dip, extremely narrow or tight, not healed, no infilling or mineralization, smooth, dry.	
36—38—40—	3	NA	- - - -	Total: 100 Solid: 100 RQD: 96		Shale Bluish-black (5PB 2.5/1) shale; strong; fresh; wet; aphanitic, slaty; thin to medium bedded, slaty texture is not parallel to bedding; fresh; competent; joints at 35.4 and 35.5 feet, 10-degree dip, extremely to very narrow, not healed, secondary mineralization on fracture surfaces, rough, wet with continuous seepage. Bottom of Boring at 37 feet Bottom 2 feet of borehole lost due to cave-in from above.	

Geologist(s): Erik S. Reinert
Subcontractor: Parratt Wolff, Inc.
Driller/Operator: Lee Penrod
Method: Down-Hole Air Hammer

WSP Environment & Energy 11190 Sunrise Valley Drive Reston, VA 20191 (703) 709-6500 Boring Log: MW-28S

Project: Revere Smelting & Refining Surface Elevation (feet AMSL*): 532.84

Project No.: E0031786

TOC Elevation (feet AMSL*): 535.50

Location: Middletown, NY Total Depth (feet): 12.5

Completion Date: December 15, 2015 Borehole Diameter (inches): 8

*AMSL = Above mean sea level



	Sa	mple	Data			Subsurface Profile	
Depth	Sample/Interval	PID/OVM (ppm)	Blow Count	% Recovery	Lithology	Description Ground Surface	Well Details
-	\backslash	\	1 2 1 6	70		Lean Clay with Gravel (CL) Brown clay with pebbles. Moist. Soft.	77.7
_			8 12 15 12	80		Lean Clay with Gravel (CL) Brown, gray, red-brown; clay with shale fragments. Dense. Damp at 6 feet bgs.	
5—	X		28 28 28 25	45		at 6 feet bgs.	
_			16 18 15 20	85			
10-		\	38 50/3"	100		Weathered Siltstone Dark gray; dense.	
-							
-						Bottom of Boring at 12.5 feet	
15 —							
_							
20 —							
25 —							

Geologist(s): GMB

Subcontractor: Parratt Wolff, Inc.
Driller/Operator: Richard Navatla
Method: Hollow Stem Auger

WSP

1740 Massachusetts Avenue Boxborough, MA 01719 Boring Log: MW-28D

Project: Revere Smelting & Refining

Surface Elevation (feet AMSL*): 532.625

Project No.: E0031786

TOC Elevation (feet AMSL*): 534.40

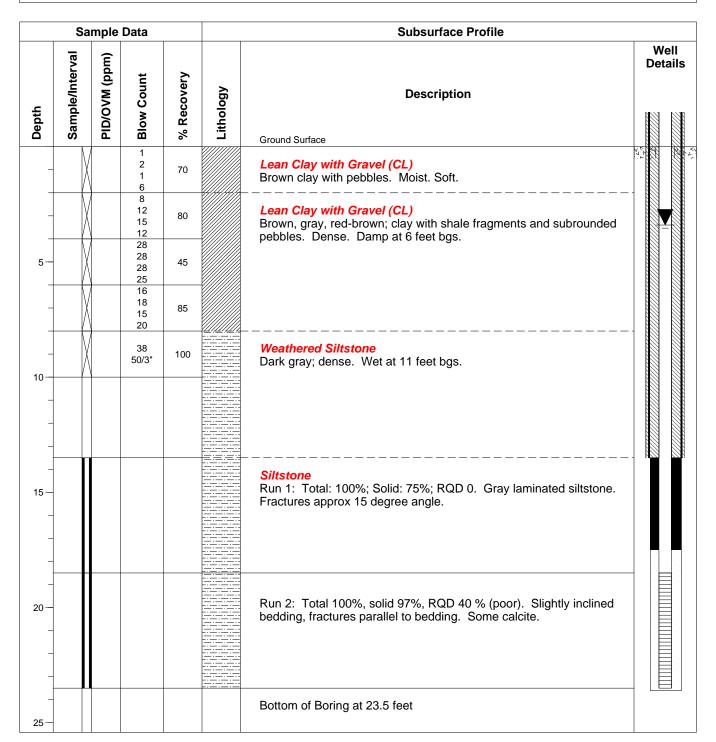
Location: Middletown, NY

Total Depth (feet): 23.5

Completion Date: December 29, 2015

Borehole Diameter (inches): 8/4

*AMSL = Above mean sea level



Geologist(s): GMB

Subcontractor: Parratt Wolff, Inc. **Driller/Operator:** Richard Navatla

Method: HSA/core

WSP

Boring Log: MW-29S

Location: Middletown, NY

Project: Revere Smelting & Refining Surface Elevation (feet AMSL*): 521.78

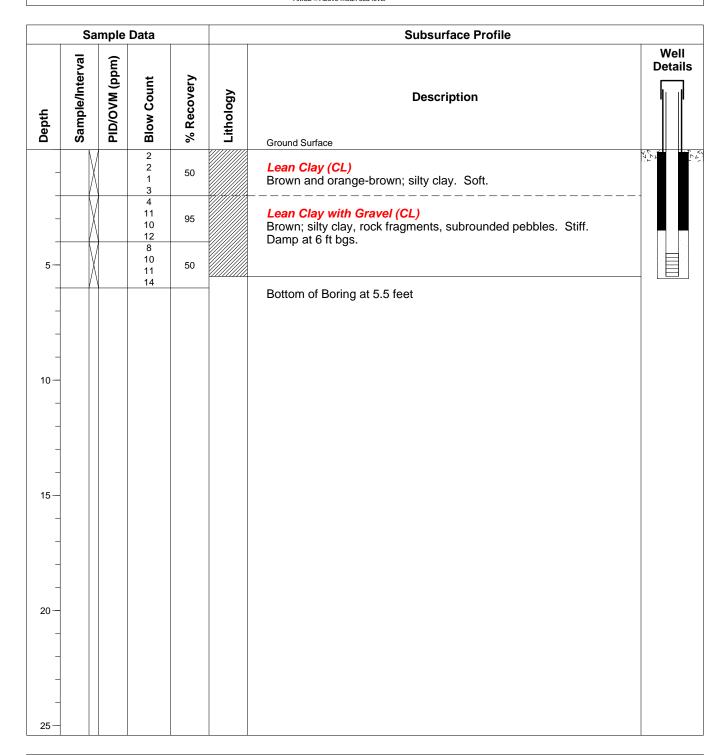
Project No.: E0031786 TOC Elevation (feet AMSL*): 524.25

Total Depth (feet): 5.5

Completion Date: December 17, 2015 Borehole Diameter (inches): 8

*AMSL = Above mean sea level





Geologist(s): GMB

Subcontractor: Parratt Wolff, Inc.
Driller/Operator: Richard Navatla
Method: Hollow Stem Auger

WSP

Boring Log: MW-29 I

Project: Revere Smelting & Refining

Surface Elevation (feet AMSL*): 521.545

WSP

Project No.: E0031786

TOC Elevation (feet AMSL*): 523.61

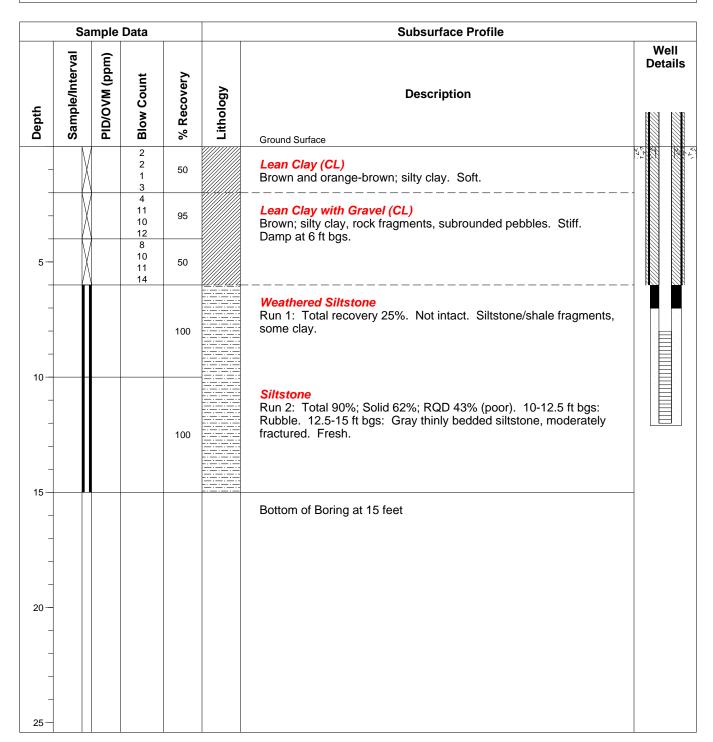
Location: Middletown, NY

Total Depth (feet): 15

Completion Date: December 17, 2015

Borehole Diameter (inches): 8/4

*AMSL = Above mean sea level



Geologist(s): GMB

Subcontractor: Parratt Wolff, Inc. **Driller/Operator:** Richard Navatla

Method: HSA/core

WSP

Boring Log: MW-29D

Project: Revere Smelting & Refining Surface Elevation (feet AMSL*): 521.68

Project No.: E0031786

TOC Elevation (feet AMSL*): 522.61

Location: Middletown, NY **Total Depth (feet):** 23.5

Completion Date: December 30, 2015 Borehole Diameter (inches): 8/4

*AMSL = Above mean sea level



	Sa	mple	Data			Subsurface Profile	
Depth	Sample/Interval	PID/OVM (ppm)	Blow Count	% Recovery	Lithology	Description	Well Details
			2	•`		Ground Surface	12 m
	X		2 1 3	50		Lean Clay (CL) Brown and orange-brown; silty clay. Soft.	
-	<u> </u>		4 11 10 12	95		Lean Clay with Gravel (CL) Brown; silty clay, rock fragments, subrounded pebbles. Stiff. Damp at 6 ft bgs.	
5-	<u> </u>		8 10 11 14	50		· 	
-	X		15 15 15 15	50		Weathered Siltstone	
10							
15 —				100		Siltstone Run 1: Total: 100%; Solid 95%; RQD 53% (fair). Pieces 1"-3" from 13.5 to 16.25 ft bgs; slightly broken 16.25-18.5 ft bgs, fractures approx 10 degrees. Gray laminated siltstone. Fresh.	
20 —				100		Run 2: Total 100%; Solid 100%; RQD 100%. Gray laminated siltstone. Vertical fracture at 19-19.75 ft bgs. Clay on fracture face. Bedding plane fracture at 20.75 ft bgs. Other fractures at ~30 degrees.	
25 —						Bottom of Boring at 23.5 feet	

Geologist(s): GMB

Subcontractor: Parratt Wolff, Inc. **Driller/Operator:** Richard Navatla

Method: HSA/core

WSP

Boring Log: MW-30S

Project No.: E0031786

Project: Revere Smelting & Refining Surface

Surface Elevation (feet AMSL*): 523.315

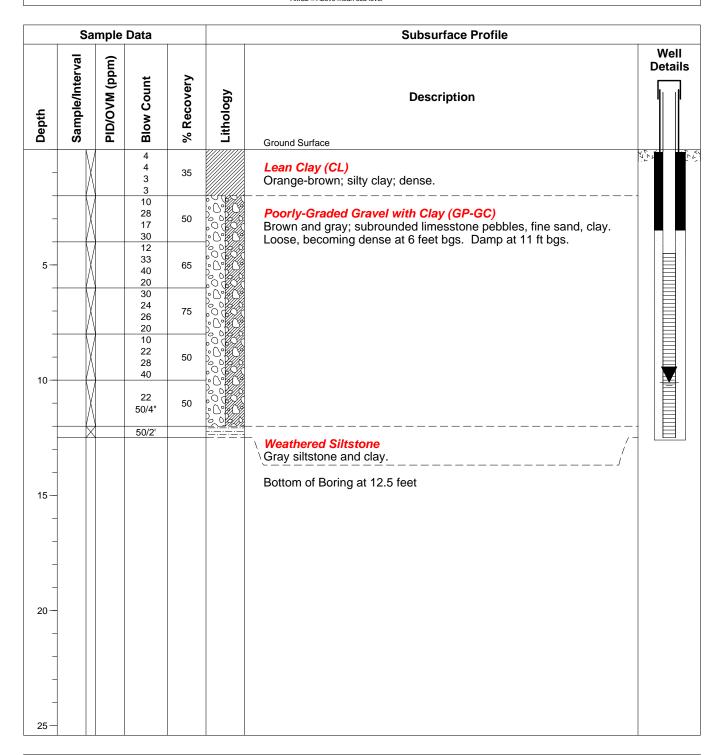


Location: Middletown, NY Total Depth (feet): 12.5

Completion Date: December 18, 2015 Borehole Diameter (inches): 8

*AMSL = Above mean sea level





Geologist(s): GMB

Subcontractor: Parratt Wolff, Inc.
Driller/Operator: Richard Navatla
Method: Hollow Stem Auger

WSP

Boring Log: MW-30D

Project: Revere Smelting & Refining Surface Elevation (feet AMSL*): 522.83

Project No.: E0031786

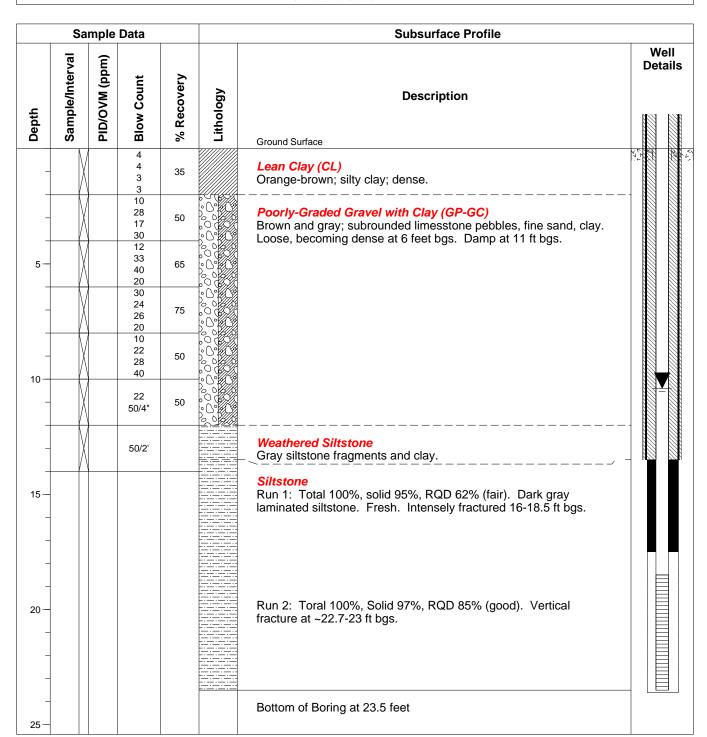
TOC Elevation (feet AMSL*): 523.78

Location: Middletown, NY

Total Depth (feet): 23.5

Completion Date: December 29, 2015 Borehole Diameter (inches): 8/4

*AMSL = Above mean sea level



Geologist(s): GMB

Subcontractor: Parratt Wolff, Inc. **Driller/Operator:** Richard Navatla

Method: HSA/core

WSP

Boring Log: MW-31S

Project: Revere Smelting & Refining

Project No.: E0031786

Location: Middletown, NY

Completion Date: September 6, 2016

Surface Elevation (feet AMSL*): 515.73

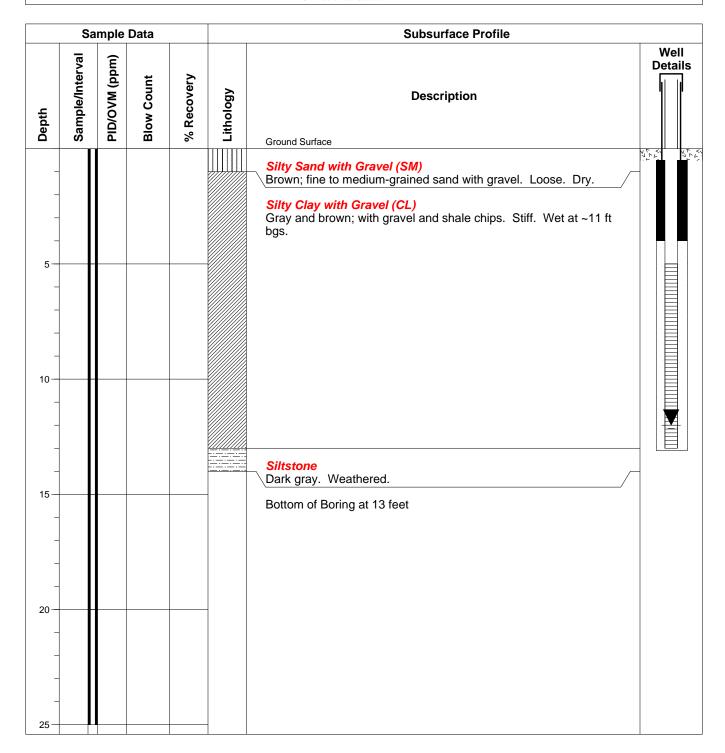
TOC Elevation (feet AMSL*): 518.37

Total Depth (feet): 13

Borehole Diameter (inches): 6

*AMSL = Above mean sea level





Geologist(s): GMB

Subcontractor: ADT-Cascade **Driller/Operator:** Brian Karshick

Method: Rotosonic

WSP USA Corp.

75 Arlington St., 4th Floor

Boring Log: MW-31D

Project: Revere Smelting & Refining

Project No.: E0031786

Location: Middletown, NY

Completion Date: September 6, 2016

Surface Elevation (feet AMSL*): 514.82

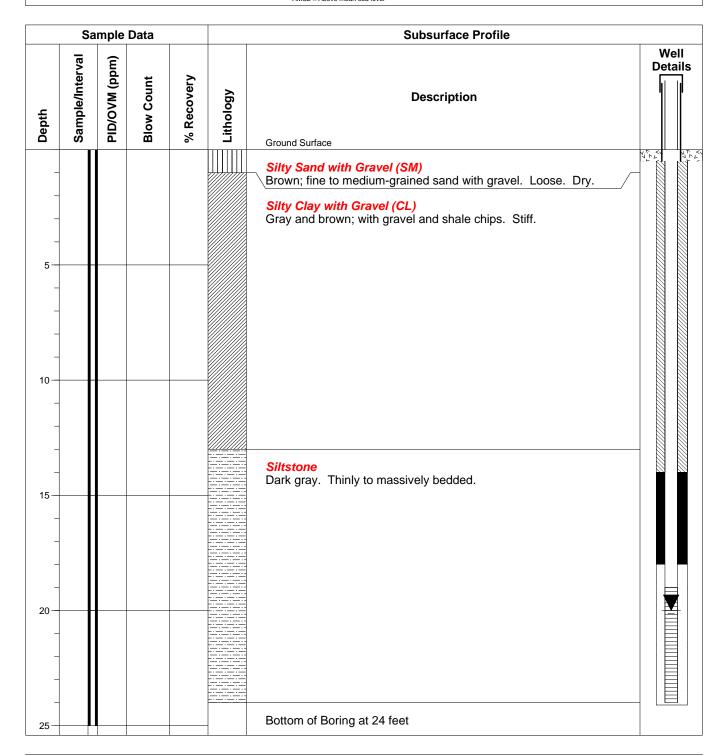
TOC Elevation (feet AMSL*): 517.77

Total Depth (feet): 24

Borehole Diameter (inches): 6

*AMSL = Above mean sea level





Geologist(s): GMB

Subcontractor: ADT-Cascade **Driller/Operator:** Brian Karshick

Method: Rotosonic

WSP USA Corp.

75 Arlington St., 4th Floor

Boring Log: MW-32S

Project: Revere Smelting & Refining

Project No.: E0031786

Location: Middletown, NY

Completion Date: September 6, 2016

Surface Elevation (feet AMSL*): 530.07

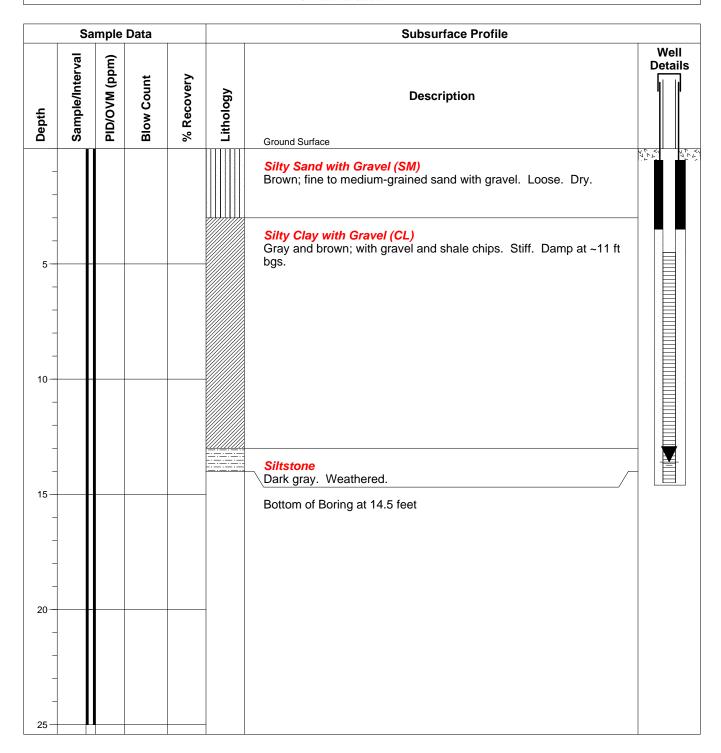
TOC Elevation (feet AMSL*): 532.73

Total Depth (feet): 14.5

Borehole Diameter (inches): 6

*AMSL = Above mean sea level





Geologist(s): GMB

Subcontractor: ADT-Cascade **Driller/Operator:** Brian Karshick

Method: Rotosonic

WSP USA Corp.

75 Arlington St., 4th Floor

Boring Log: MW-32D

Project: Revere Smelting & Refining

Project No.: E0031786

Location: Middletown, NY Total Depth (feet): 27

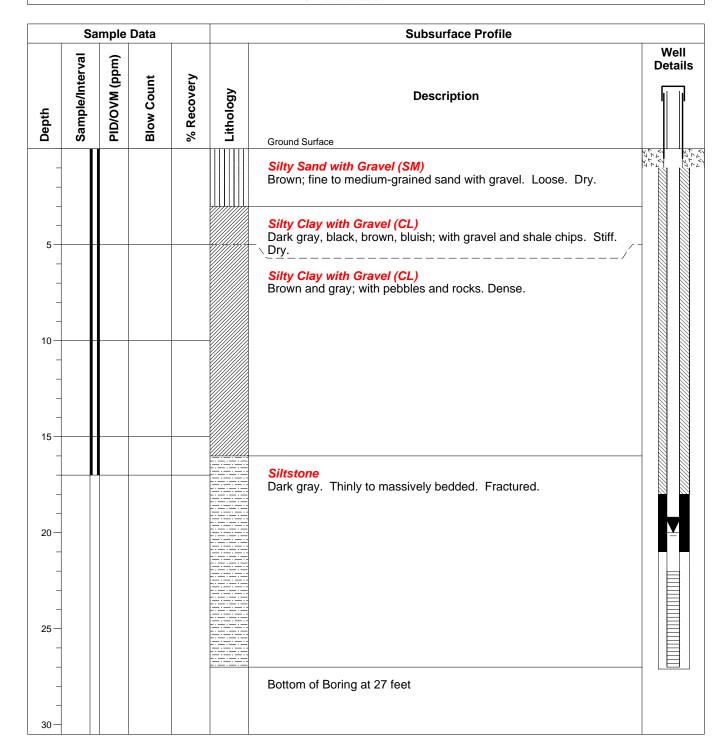
Completion Date: September 1, 2016 **Borehole Diameter (inches):** 6

*AMSL = Above mean sea level

Surface Elevation (feet AMSL*): 530.21

TOC Elevation (feet AMSL*): 532.97





Geologist(s): GMB

Subcontractor: ADT-Cascade **Driller/Operator:** Brian Karshick

Method: Rotosonic

WSP USA Corp.

75 Arlington St., 4th Floor

Boring Log: MW-33S

Project: Revere Smelting & Refining

Project No.: E0031786

Location: Middletown, NY

Completion Date: August 30, 2016

Surface Elevation (feet AMSL*): 514.80

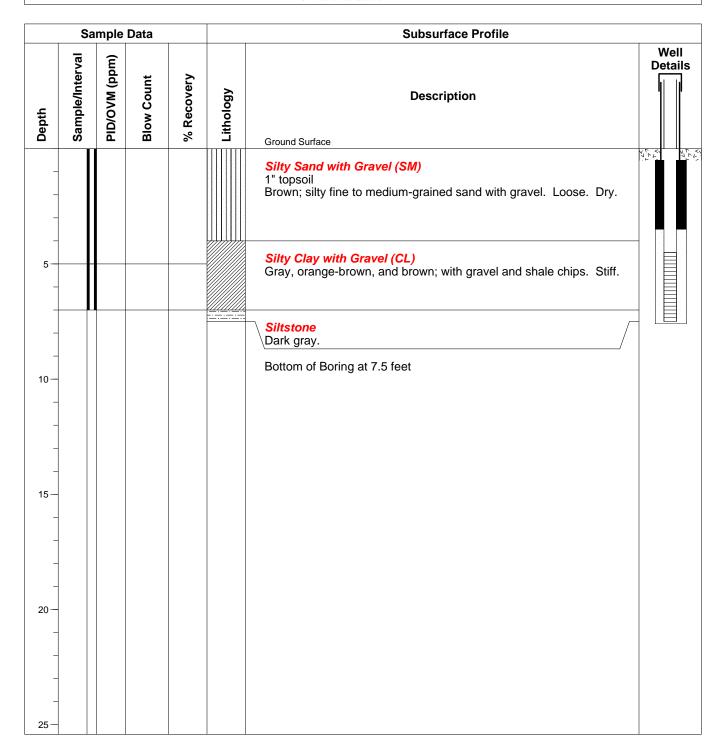
TOC Elevation (feet AMSL*): 517.57

Total Depth (feet): 7.5

Borehole Diameter (inches): 6

*AMSL = Above mean sea level





Geologist(s): GMB

Subcontractor: ADT-Cascade **Driller/Operator:** Brian Karshick

Method: Rotosonic

WSP USA Corp.

75 Arlington St., 4th Floor

Project: RSR-Middletown Surface Elevation (feet AMSL*): 529.00

Project No.: 214861 TOC Elevation (feet AMSL*): 531.13

Location: Middletown, NY Total Depth (feet): 10.2

Completion Date: August 23, 1999 Borehole Diameter (inches): 8.25

*AMSL = Above mean sea level



	Sa	mple	Data		Subsurface Profile					
Depth	Sample/Interval	PID/OVM (ppm)	Blow Count	% Recovery	Lithology	Description Ground Surface	Well Details			
5—	1	NA NA NA NA	9 11 18 23 21 20 23 13 8 10 8 13 12 13 7 6	NR NR NR NR	Control of the contro	Silt (GM) Brown silt, little to some gravel, little to some fine to medium-grained sand; moist; very loose to medium dense Weathered Bedrock Dark grey weathered shale; moist; dense. Bottom of Boring at 10.2 feet				

Geologist(s): E. Michael Riggins **Subcontractor:** Parratt Wolff, Inc.

Driller/Operator: Mick Marshall, Rick Navata

Method: Hollow Stem Auger

Environmental Strategies Consulting LLC

11911 Freedom Drive, Suite 900

Project: RSR-Middletown Surface Elevation (feet AMSL*): 527.69

Project No.: 214861 TOC Elevation (feet AMSL*): 529.75

Location: Middletown, NY **Total Depth (feet):** 14.2

Completion Date: August 24, 1999 Borehole Diameter (inches): 8.25

*AMSL = Above mean sea level



	Sa	mple	Data			Subsurface Profile	
Depth	Sample/Interval	PID/OVM (ppm)	Blow Count	% Recovery	Lithology	Description Ground Surface	Well Details
_	1	NA	7 10 10 13	NR		Silt (GM) Brown silt, little to some gravel, little to some fine to medium-grained sand; trace to little clay; dry; medium dense to dense.	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4
_	2	NA	21 25 25 23	NR		sand; trace to little clay; dry; medium dense to dense. Moist between 6 and 8 feet.	
5—	3	NA	9 18 24 16	NR		Wet between 8 and 10 feet.	
_	4	NA	14 20 16 12	NR			
10-	5	NA	6 7 7 55	NR			
-	6	NA	11 14 16 17	NR		Weathered Bedrock Dark grey weathered shale; moist to wet; dense.	
_	7	NA	12 15 14 11	NR			
15—						Bottom of Boring at 14.2 feet	
_							
_							
20-							
_							
_							

Geologist(s): E. Michael Riggins **Subcontractor:** Parratt Wolff, Inc.

Driller/Operator: Mick Marshall, Rick Navata

Method: Hollow Stem Auger

Environmental Strategies Consulting LLC

11911 Freedom Drive, Suite 900

Project: RSR-Middletown Surface Elevation (feet AMSL*): 523.82

Project No.: 214861 TOC Elevation (feet AMSL*): 525.72

Location: Middletown, NY Total Depth (feet): 14

Completion Date: August 24, 1999 Borehole Diameter (inches): 8.25

*AMSL = Above mean sea level



	Sa	mple	Data			Subsurface Profile					
Depth	Sample/Interval	PID/OVM (ppm)	Blow Count	% Recovery	Lithology	Description Ground Surface	Well Details				
-	1	NA	4 6 6 65 21	NR		Silt (GM) Yellowigh-brown silt, little to some gravel, little clay, trace fine-grained sand; dry; medium dense to dense	4.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4.				
-	2	NA	24 6 5	NR		fine-grained sand; dry; medium dense to dense					
5-	3	NA	2 1 4	NR		Clay (CL) Bluish-grey clay, trace silt, trace gravel; moist; plastic, soft.					
_	4	NA	2 2 4 4	NR		Silt (ML) Grey silt; trace clay, some organic material near 5 feet; wet; medium dense					
10-	5	NA	5 9 30 7	NR		Weathered Bedrock					
_	6	NA	17 9 11 4	NR		Dark grey weathered shale; wet; dense					
_	7	NA	8 30 50	NR		Pottom of Poving at 14 fact					
15-						Bottom of Boring at 14 feet					
-											
20-											
-											
_											

Geologist(s): E. Michael Riggins **Subcontractor:** Parratt Wolff, Inc.

Driller/Operator: Mick Marshall, Rick Navata

Method: Hollow Stem Auger

Environmental Strategies Consulting LLC

11911 Freedom Drive, Suite 900

Project: RSR-Middletown Surface Elevation (feet AMSL*): 522.92

Project No.: 214861 TOC Elevation (feet AMSL*): 524.74

Location: Middletown, NY Total Depth (feet): 14

Completion Date: August 24, 1999 Borehole Diameter (inches): 8.25

*AMSL = Above mean sea level



	Sa	mple	Data			Subsurface Profile				
Depth	Sample/Interval	PID/OVM (ppm)	Blow Count	% Recovery	Lithology	Description Ground Surface	Well Details			
_	1	NA	4 7 7 7	NR		Sand (SM) - Fill Material Brown to dark-brown medium-grained sand, trace silt; dry; loose	41414 41414 41414 41414 41414 41414 41414 41414 41414 41414 41414			
-	2	NA	3 2 2 3	NR		Clay (CL) Reddish-brown to greenish-grey clay, trace silt, trace gravel; moist;				
5—	3	NA	2 2 3 6	NR		plastic, soft Silt (GM)				
-	4	NA	5 5 3 6	NR		Bluish-grey silt, trace to some fine sand, trace gravel; moist; medium dense.				
10-	5	NA	7 7 7 12	NR		Wet between 6 and 8 feet. Weathered Bedrock				
-	6	NA	6 8 8 13	NR		Dark grey weathered shale; wet, dense				
_	7	NA	9 9 50 -	NR						
15—						Bottom of Boring at 14 feet				
-										
20-										
-										

Geologist(s): E. Michael Riggins **Subcontractor:** Parratt Wolff, Inc.

Driller/Operator: Mick Marshall, Rick Navata

Method: Hollow Stem Auger

Environmental Strategies Consulting LLC

11911 Freedom Drive, Suite 900

Project: RSR-Middletown Surface Elevation (feet AMSL*): 523.06

Project No.: 214861 TOC Elevation (feet AMSL*): 522.64

Location: Middletown, NY Total Depth (feet): 14

Completion Date: August 30, 1999 Borehole Diameter (inches): 8.25

*AMSL = Above mean sea level



	Sa	mple	Data			Subsurface Profile	
Depth	Sample/Interval	PID/OVM (ppm)	Blow Count	% Recovery	Lithology	Description Ground Surface	Well Details
5	3 3 4 5 7	NA NA NA NA NA NA	12 11 9 8 2 2 1 3 1 2 2 4 4 2 3 5 5 7 3 3 5 5 5 5 5 5 12 14 18 12 5 5 5 5 5 5 5 5 5 5 7 7 7 8 7 8 7 8 7 8	50 0 50 75 50 75 100	Li Control Con	Silt (GM) - Fill Material Brown silt, some gravel, trace-fine-grained sand; dry; loose to medium dense. Silt (ML) Dark grey to brown silt and clay; moist; loose. Sand (SP) Greenish-grey to grey fine-grained sand, some medium-grained sand; wet; loose; faint solvent-like odor between 9.8 and 10 feet. Silt (ML) Dark grey silt, little clay, trace coarse-grained sand; moist; loose to medium dense. Weathered Bedrock Grey weathered shale; moist to wet; medium dense. Bottom of Boring at 14 feet	

Geologist(s): David P. Bouchard **Subcontractor:** Parratt Wolff, Inc.

Driller/Operator: Mick Marshall, Rick Navata

Method: Hollow Stem Auger

Environmental Strategies Consulting LLC

11911 Freedom Drive, Suite 900

Project: RSR-Middletown Surface Elevation (feet AMSL*): 522.74

Project No.: 214861 TOC Elevation (feet AMSL*): 524.39

Location: Middletown, NY Total Depth (feet): 15

Completion Date: August 25, 1999 Borehole Diameter (inches): 8.25

*AMSL = Above mean sea level



	Sa	mple	Data			Subsurface Profile	
Depth	Sample/Interval	PID/OVM (ppm)	Blow Count	% Recovery	Lithology	Description Ground Surface	Well Details
-	2	NA NA	5 7 7 5 3 4 3 1	83		Silt (GM) - Fill Material Brown to greyish-brown silt, little to some gravel; dry; loose.	17 51 51 51 51 51 51 51 51 51 51 51 51 51
5—	3	NA	1 1 2 2 2	50	-	Silt (ML) Grey silt; moist; loose.	
_	5	NA NA	3 3 4 4 6	100	-	Wet between 6.0 and 7.5 feet.	
10-	6	NA	9 11 6 9 9	25		Weathered Bedrock Dark grey weathered shale; wet; medium dense to dense.	
-	7	NA	12 12 11 10 9	50			
15— 20—	8	NA	14 -	100		Bottom of Boring at 15 feet	

Geologist(s): David P. Bouchard
Subcontractor: Parratt Wolff, Inc.

Driller/Operator: Mick Marshall, Rick Navata

Method: Hollow Stem Auger

Environmental Strategies Consulting LLC

11911 Freedom Drive, Suite 900

Project: RSR-Middletown Surface Elevation (feet AMSL*): 519.80

Project No.: 214861 TOC Elevation (feet AMSL*): 521.38

Location: Middletown, NY Total Depth (feet): 10

Completion Date: August 25, 1999 Borehole Diameter (inches): 8.25

*AMSL = Above mean sea level



	Sa	mple	Data			Subsurface Profile					
Depth	Sample/Interval	PID/OVM (ppm)	Blow Count	% Recovery	Lithology	Description Ground Surface	Well Details				
_	1	NA	9 19 11 7	50		Sand (SP) - Fill Material Brown medium to fine-grained sand, little gravel; dry; loose	2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2				
_	2	NA	6 7 9 19	100		Silt (ML) Greyish-brown to grey silt, trace to little clay, little gravel; moist; loose					
5—	3	NA	10 18 17 20	83		\to medium dense					
-	4	NA	9 15 14 14	83		Weathered Bedrock Dark grey to brownish-grey weathered shale; moist; medium dense to dense					
10-	5	NA	40 45 48 35	25		Wet between 5.8 and 10 feet.					
15—						Bottom of Boring at 10 feet					

Geologist(s): David P. Bouchard **Subcontractor:** Parratt Wolff, Inc.

Driller/Operator: Mick Marshall, Rick Navata

Method: Hollow Stem Auger

Environmental Strategies Consulting LLC

11911 Freedom Drive, Suite 900

Project: RSR-Middletown Surface Elevation (feet AMSL*): 528.86

Project No.: 214861 TOC Elevation (feet AMSL*): 527.62

Location: Middletown, NY Total Depth (feet): 13.4

Completion Date: August 25, 1999 Borehole Diameter (inches): 8.25

*AMSL = Above mean sea level



	Sai	mple]	Data		Subsurface Profile					
Depth	Sample/Interval	PID/OVM (ppm)	Blow Count	% Recovery	Lithology	Description Ground Surface	Well Details			
5- - 10- - - 20-	1 2 3 4 5 6 7 7 X	NA NA NA NA NA	2 4 4 4 5 9 28 19 20 24 30 38 28 26 35 43 42 4 11 12 13 9 13 11 13 27 51 50 -	83 50 25 75 50 75	Lith	Silt (ML) Brown to greyish-brown to grey silt, little to no gravel; dry; loose to dense Weathered Bedrock Brown to greyish-brown weathered shale; moist; medium dense. Wet between 9.8 and 13.4 feet. Bottom of Boring at 13.4 feet				

Geologist(s): David P. Bouchard **Subcontractor:** Parratt Wolff, Inc.

Driller/Operator: Mick Marshall, Rick Navata

Method: Hollow Stem Auger

Environmental Strategies Consulting LLC

11911 Freedom Drive, Suite 900

Project: RSR-Middletown **Surface Elevation (feet AMSL*):** 519.76

Project No.: 214861 TOC Elevation (feet AMSL*): 521.52

Location: Middletown, NY **Total Depth (feet):** 15.2

Completion Date: August 31, 1999 Borehole Diameter (inches): 8.25

*AMSL = Above mean sea level



	Sai	mple	Data			Subsurface Profile	
Depth	Sample/Interval	PID/OVM (ppm)	Blow Count	% Recovery	Lithology	Description Ground Surface	Well Details
-						Silt and Gravel (GM) - Fill Material Brown silt and gravel, little fine to coarse sand; dry; loose	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
5—	1	NA	4 6 9 11 4	100		Silt (GM) Brown to greyish-brown silt, little to no gravel, trace fine-grained sand, trace clay; dry; loose to medium dense.	30
-	2	NA	10 10 16 10	100		Wet between 8.25 and 8.5 feet.	
10-	3	NA	16 22 29 22	83			
-	4	NA	29 50 - 24 40	29		Weathered Bedrock Grey to greyish-brown weathered shale; wet; medium dense to dense.	
15—	5 6	NA NA	12 10 30 49	75 50			
-			50		V//AV	Bottom of Boring at 15.2 feet	
-							
20 —							
-							

Geologist(s): David P. Bouchard **Subcontractor:** Parratt Wolff, Inc.

Driller/Operator: Mick Marshall, Rick Navata

Method: Hollow Stem Auger

Environmental Strategies Consulting LLC

11911 Freedom Drive, Suite 900

Project: RSR-Middletown Surface Elevation (feet AMSL*): 517.68

Project No.: 214861 TOC Elevation (feet AMSL*): 519.54

Location: Middletown, NY Total Depth (feet): 13.1

Completion Date: August 25, 1999 Borehole Diameter (inches): 8.25

*AMSL = Above mean sea level



S	ample	Data			Subsurface Profile	
Depth Sample/Interval	PID/OVM (ppm)	Blow Count	% Recovery	Lithology	Description Ground Surface	Well Details
5 10 - 1 1 - 2 15 - 3 - 4 15	NA NA NA NA NA NA NA	5 17 29 39 11 14 20 26 8 4 2 3 2 5 6 12 16 16 9 11 7 8 8 15 17 37 50 -	50 75 75 75 50 100		Silt (ML) Light brown to brown silt, trace to little gravel; dry; loose to medium dense. Silt (GM) Brown silt, little to some gravel, little to some fine to medium-grained sand; moist; very loose to medium dense. Sand (SP Brown medium to fine-grained sand; wet; loose. Silt (GM) Brown to grey silt; some shale gravel, little sand; moist to wet; medium dense to very dense Bottom of Boring at 13.1 feet	

Geologist(s): David P. Bouchard **Subcontractor:** Parratt Wolff, Inc.

Driller/Operator: Mick Marshall, Rick Navata

Method: Hollow Stem Auger

Environmental Strategies Consulting LLC

11911 Freedom Drive, Suite 900

Project: RSR-Middletown Surface Elevation (feet AMSL*): 516.84

Project No.: 214861 TOC Elevation (feet AMSL*): 519.18

Location: Middletown, NY Total Depth (feet): 14

Completion Date: August 31, 1999 Borehole Diameter (inches): 8.25

*AMSL = Above mean sea level



	Sa	mple	Data			Subsurface Profile	
Depth	Sample/Interval	PID/OVM (ppm)	Blow Count	% Recovery	Lithology	Description Ground Surface	Well Details
-						Silt and Gravel (GM) - Fill Material Brown silt and gravel, little fine to coarse sand; dry; loose.	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
5—	1	NA	4 10 12 16	50		Silt (GM) Brown to greyish-brown silt, some medium to fine-grained sand, little to no gravel, trace cobbles; dry; loose to very dense.	8 8
-	2	NA	12 21 32 50	50		to no gravel, trace cobbles; dry; loose to very dense. Wet between 11.5 and 13.5 feet.	
10-	3	NA	6 8 50 -	33			
-	4	NA	10 21 33 31	50			
-	5	NA	12 23 29 31	50			
15-						Weathered Bedrock Grey to greyish-brown weathered shale; wet; medium dense to dense	
-						Bottom of Boring at 14 feet	
20-							
_							
_							

Geologist(s): David P. Bouchard **Subcontractor:** Parratt Wolff, Inc.

Driller/Operator: Mick Marshall, Rick Navata

Method: Hollow Stem Auger

Environmental Strategies Consulting LLC

11911 Freedom Drive, Suite 900

Project: RSR-Middletown Surface Elevation (feet AMSL*): 512.72

Project No.: 214861 TOC Elevation (feet AMSL*): 514.80

Location: Middletown, NY Total Depth (feet): 14

Completion Date: August 30, 1999 Borehole Diameter (inches): 8.25

*AMSL = Above mean sea level



	Sa	mple	Data			Subsurface Profile							
Depth	Sample/Interval	PID/OVM (ppm)	Blow Count	% Recovery	Lithology	Description Ground Surface	Well Details						
_	1	NA	3 4 3 5	50		Silt (GM) Brown to greyish-brown silt, some gravel, little to some fine-grained sand; dry; loose to medium dense.	7 2 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7						
_	2	NA	4 6 5 10	50		sand; dry; loose to medium dense. Wet between 8 and 10 feet.							
5-	3	NA	36 23 46 42	50			<u> </u>						
_	4	NA	46 45 50	25									
10-	5	NA	12 35 43 25	50									
_	6	NA	5 16 36 31	50		Weathered Bedrock							
_	7	NA	25 19 21 50	50		Grey to greyish-brown weathered shale; wet; medium dense to dense.							
15-						Bottom of Boring at 14 feet							
_													
_													
20-													
_													

Geologist(s): David P. Bouchard **Subcontractor:** Parratt Wolff, Inc.

Driller/Operator: Mick Marshall, Rick Navata

Method: Hollow Stem Auger

Environmental Strategies Consulting LLC

11911 Freedom Drive, Suite 900

Project: RSR-Middletown **Surface Elevation (feet AMSL*):** 514.17

Project No.: 214861 TOC Elevation (feet AMSL*): 514.86

Location: Middletown, NY **Total Depth (feet):** 30

Completion Date: September 1, 1999 Borehole Diameter (inches): 8.25

*AMSL = Above mean sea level



	Sa	mple	Data			Subsurface Profile	
Depth	Sample/Interval	PID/OVM (ppm)	Blow Count	% Recovery	Lithology	Description Ground Surface	Well Details
- - - 5—	1	NA	7 18 7 12 7 7	50		Silt and Gravel (GM) - Fill Material Brown silt and gravel, little fine to coarse sand; dry; loose.	7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7
10-	3		6 6 4 2 2 5 2 3 4 5	25		Silt (GM) Greyish-brown to greyish-black silt, some to little gravel, trace to no fine to medium-grained sand, trace cobbles; dry to moise; loose to medium dense. Wet between 11.5 and 13.5 feet	
15—	6		3 3 4 15 50 - - 13 19 23	50			
20-	9		27 28 50 - 19 50 - 15 29 20 32	0 0 75			

Geologist(s): David P. Bouchard
Subcontractor: Parratt Wolff, Inc.

Driller/Operator: Mick Marshall, Rick Navata

Method: Hollow Stem Auger

Environmental Strategies Consulting LLC

11911 Freedom Drive, Suite 900

Project: RSR-Middletown **Surface Elevation (feet AMSL*):** 514.17

Project No.: 214861 TOC Elevation (feet AMSL*): 514.86

Location: Middletown, NY Total Depth (feet): 30

Completion Date: September 1, 1999 **Borehole Diameter (inches):** 8.25

*AMSL = Above mean sea level



	Sa	mple	Data		Subsurface Profile						
Depth	Sample/Interval	PID/OVM (ppm)	Blow Count	% Recovery	Lithology	Description	Well Details				
25-	11		16 26 21 26 25	75		Sand (SP) Greyish-brown medium to fine-grained sand, some gravel, little silt; moist; medium dense to dense. <i>(continued)</i>					
-	12		27 20 33	75							
-	13		22 13 22 50	100		Silt and Gravel (GM) Greyish-brown silt and gravel, trace fine sand; wet; medium dense to dense.					
30-						Weathered Bedrock Grey to greyish-brown weathered shale; moist; medium dense to dense Bottom of Boring at 30 feet					
35-											
40-											
45 —											

Geologist(s): David P. Bouchard **Subcontractor:** Parratt Wolff, Inc.

Driller/Operator: Mick Marshall, Rick Navata

Method: Hollow Stem Auger

Environmental Strategies Consulting LLC

11911 Freedom Drive, Suite 900

Project: RSR-Middletown **Surface Elevation (feet AMSL*):** 506.81

Project No.: 214861 TOC Elevation (feet AMSL*): 508.77

Location: Middletown, NY Total Depth (feet): 24

Completion Date: September 2, 1999 Borehole Diameter (inches): 8.25

*AMSL = Above mean sea level



	Sai	mple	Data			Subsurface Profile		
Depth	Sample/Interval	PID/OVM (ppm)	Blow Count	% Recovery	Lithology	Description Ground Surface	W Det	
5- 5- 10- 15- 20-	- 1	NA	4 5 4 4 1 2 3 5 5 6 5 5 6 5 5 5 4 3 3 4 4 7 6 6 6 10 12 12 12 10 16 23 18 26 20 20 47 50 20 20 20 20 20 20 20 20 20 20 20 20 20	50 25 50 25 75 25 100 75		Silt (GM) Greyish-brown to brown silt, some to little gravel, trace to no fine to medium-grained sand, trace cobbles; dry to moist; loose to dense. Wet between 21 to 23.5, moist between 23.5 and 24	2, 2, 3, 1111111111111111111111111111111	27.5.7.3
25-	12		32 11 23 40 31	75		Bottom of Boring at 24 feet		

Geologist(s): David P. Bouchard **Subcontractor:** Parratt Wolff, Inc.

Driller/Operator: Mick Marshall, Rick Navata

Method: Hollow Stem Auger

Environmental Strategies Consulting LLC

11911 Freedom Drive, Suite 900

Project: RSR-Middletown **Surface Elevation (feet AMSL*):**

Project No.: 214861 TOC Elevation (feet AMSL*):

Location: Middletown, NY Total Depth (feet): 8

Completion Date: September 19, 2011 Borehole Diameter (inches): 8.25

*AMSL = Above mean sea level



	Sa	mple	Data			Subsurface Profile	
Depth	Sample/Interval	PID/OVM (ppm)	Blow Count	% Recovery	Lithology	Description Ground Surface	Well Details
5—	1	NA		50		Lean Clay with Gravel (CL) Logged from cuttings: interbedded gravelly clay and weathered shale gravel.	
- 10 —						Bottom of Boring at 10 feet	
20-							

Geologist(s): Steven Dawson

Subcontractor: Aquifer Drilling & Testing, Inc.

Driller/Operator: Shawn Miller**Method:** Hollow Stem Auger

Project: RSR-Middletown **Surface Elevation (feet AMSL*):**

Project No.: 214861 **TOC Elevation (feet AMSL*):**

Location: Middletown, NY Total Depth (feet): 13

Completion Date: September 19, 2011 **Borehole Diameter (inches):** 8.25

*AMSL = Above mean sea level



	Sa	mple	Data			Subsurface Profile	
Depth	Sample/Interval	PID/OVM (ppm)	Blow Count	% Recovery	Lithology	Description Ground Surface	Well Details
_	1	NA		50		Lean Clay (CL) Brown sandy lean clay (CL); stiff; trace gravel from 0 to 0.5 feet bgs; organic from 0 to 0.5 feet bgs; grading to silty clay from 0.5 to 4 feet	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
_	2	NA		50		bgs; moist.	
5—	3	NA		20		Well-Graded Gravel (GW) Weathered shale; angular broken gravel.	
_	4	NA		50		Lean Clay with Gravel (CL) Light brown gravely clay (CL); few sand; grading to weathered shale.	
10-	5	NA		50			
-	6	NA		100			
15—						Bottom of Boring at 13 feet	

Geologist(s): Steven Dawson

Subcontractor: Aquifer Drilling & Testing, Inc.

Driller/Operator: Shawn Miller**Method:** Hollow Stem Auger

Project: RSR-Middletown **Surface Elevation (feet AMSL*):**

Project No.: 214861 TOC Elevation (feet AMSL*):

Location: Middletown, NY Total Depth (feet): 13

Completion Date: September 19, 2011 Borehole Diameter (inches): 8.25

*AMSL = Above mean sea level



	Sa	mple	Data			Subsurface Profile	
Depth	Sample/Interval	PID/OVM (ppm)	Blow Count	% Recovery	Lithology	Description Ground Surface	Well Details
_	1	NA		10		Well-Graded Gravel with Clay (GW-GC) Gray gravel; trace clay; unconsolidated; moist.	7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7
_	2	NA		0			
5-	3	NA		20			
-	4	NA		100		Lean Clay (CL) Brown silty clay; trace sand; stiff; trace gravel from 6 to 7 feet bgs; moist.	
10-	5	NA		100		Well-Graded Gravel (GW) Sandy gravel; weathered shale; moist. (logged cuttings from 8 to 13 feet bgs: weathered shale with some clay sediment)	
15— 15— - 20—						Bottom of Boring at 14.65 feet	

Geologist(s): Steven Dawson

Subcontractor: Aquifer Drilling & Testing, Inc.

Driller/Operator: Shawn Miller**Method:** Hollow Stem Auger

Project: RSR-Middletown **Surface Elevation (feet AMSL*):**

Project No.: 214861 TOC Elevation (feet AMSL*):

Location: Middletown, NY Total Depth (feet): 13

Completion Date: September 19, 2011 **Borehole Diameter (inches):** 8.25

*AMSL = Above mean sea level



	Sa	mple	Data			Subsurface Profile		
Depth	Sample/Interval	PID/OVM (ppm)	Blow Count	% Recovery	Lithology	Description Ground Surface	Well Details	
_	1	NA		50		Gravelly Lean Clay (CL) Dark brown organic silt (GM); some clay; trace gravel; soft; moist.	2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2	1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-
	2	NA		50		Lean Clay (CL) Dark brown gravelly clay (CL); some silt; trace sand; hard; moist.		
5—	3	NA		10		Silty Gravel (GM) Grayish brown silt (GM); some highly weathered gravel; moist.		
-	4	NA		20		Lean Clay (CL) Dark brown gravelly clay (CL); little sand; stiff; moist; becoming wet from 10 to 12 feet bgs.		
10-	5	NA		50				
-	6	NA		20		Well-Graded Gravel with Clay (GW-GC)		
15—						Dark brown weathered shale; some unconsolidated clay sediment; wet. Bottom of Boring at 13 feet		
-								
20-								
-								
-								

Geologist(s): Steven Dawson

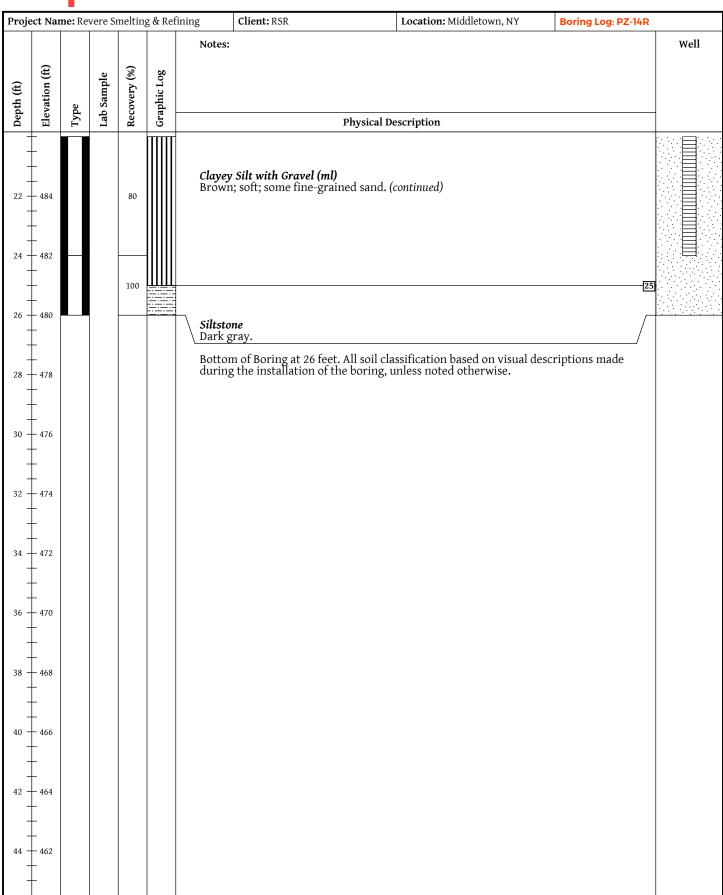
Subcontractor: Aquifer Drilling & Testing, Inc.

Driller/Operator: Shawn Miller**Method:** Hollow Stem Auger



Proie	ect Nar	ne: Re	vere S	meltin	ıg & Re	fining	Client: RSR		Location: Middletown, NY	Boring Log: PZ-14R	
	ed By:					8	Drill Start Dat	e: 8/16/2018	Drill End Date: 8/16/2018	Drill Method: Rotoso	onic
	ed By:				Терпе		Total Depth: 2		Bore Diameter: 6	Ground Surface: 505	
				535.14	06/956	551.0873	Well Permit N			Top-of-Casing: 509.14 ft	
						ll Constructi	struction Annulus				
			Mate	rial			Diameter (in)	Depth (ft)	Material		Depth (ft)
Scree	e n: 0.01	-inch	Sched	ule 40	PVC Sc	creen	2	14 to 24	Filter Pack: US SIlica #1		13 to 24
Riser	: Sched	lule 40	PVC I	Riser			2	-3.3 to 14	Seal: Hydrated Bentonite Chip	5	10 to 13
Othe	r:								Other: Cement-Bentonite Grou	ıt	1 to 10
						Notes:					Well
Depth (ft)	Elevation (ft)	Type	Lab Sample	Recovery (%)	Graphic Log		0.6	Physical	Description		-
2 - - 4 -	- 504			80		Poorly Gray;		l with Sand (gp)		[4.5	
- - -	- 500 498			65		Clay Red; s	tiff.			<u>-</u> E	
10 -	496				-	Clayey Brown	y Silt with Grav n; soft; some fir	rel (ml) ne-grained sand.			
-	- 494 492			70							
-	- 490 488			80							







		•					T -				
	ct Nan					efining	Client: RSR		Location: Middletown, NY	Boring Log: PZ	
	ed By:			my Tr	riepke		Drill Start Da		Drill End Date: 8/15/2018	Drill Method: I	
Logg	ed By:	Spiros	Zois				Total Depth:	11	Bore Diameter: 6	Ground Surfac	e: 529.55 ft
Coor	dinate	s (X/Y): 5309	920.70	86/957	625.1958	Well Permit N	Number:	1	Top-of-Casing:	532.19 ft
					We	ll Constructi				Annulus	
			Mate				Diameter (in)	Depth (ft)	Materia	1	Depth (ft)
	e n: 0.01				PVC So	creen	2	5 to 10	Filter Pack: US SIlica #1		4 to 10
	: Sched	dule 40	PVC F	Riser			2	-2.6 to 5	Seal: Hydrated Bentonite Chip	os .	1 to 4
Othe	r:								Other:		
Depth (ft)	Elevation (ft)	Type	Lab Sample	Recovery (%)	Graphic Log	Notes:		Physical	Description		Well
	ш			<u> </u>	"	Ground	Surface	Filysical	Description		
_	- - - 528 - - - - 526			75		Poorly Gray.	-Graded Grave Silt with Grave e brown; stiff;	vel (ml)			
6 — — — 8 — — — — — — — — — — — — — — —	- 524 - 524 522 520			100	-						
- -	- -			100							10.5
12 -	- - 518					Siltsto Dark g	ne gray.				
- 14 - -	- - - 516 -					Bottor during	n of Boring at g the installati	11 feet. All soil con of the boring,	assification based on visual c unless noted otherwise.	descriptions made	
-	- 514 512										
-	- - -										



ъ.			?	100	. 0 5	Continue	ali u pap		Total Control of the				
						efining	Client: RSR	1 0/10/1555	Location: Middletown, NY	Boring Log: PZ-20			
	ed By:			emy Tr	riepke		Drill Start Da		Drill End Date: 8/14/2018	Drill Method: Rotoso			
	ed By:						Total Depth:		Bore Diameter: 6	Ground Surface: 530			
Coor	dinate	s (X/Y	(): 5309	928.99		7659.8253	Well Permit N	Number:		Top-of-Casing: 533.0	6 ft		
			34.1.	1	We	ell Constructi		D (1) (6)		nnulus	D(1, (6)		
Scro	e n: 0.01	-inch	Mate		DVC S	croon	Diameter (in)	Depth (ft) 5.5 to 10.5	Material Filter Pack: US SIlica #1		Depth (ft) 4.5 to 10.5		
	:: Sched				PVC 3	Creen	2	-3 to 5.5	Seal: Hydrated Bentonite Chips		1 to 4.5		
Othe		iuie 40	PVCI	xiser			2	-3 10 5.5	Other:		to		
Othe	1.		1						other.				
						Notes:					Well		
_	Elevation (ft)		le	%	go,								
Depth (ft)	tion		Lab Sample	Recovery (%)	Graphic Log						" "		
ept	leva	Туре	ab S	eco	rapl			Physical Description					
I	ш			<u> </u>	+	Ground	Surface	r ilysicai D	escription		-		
_	İ İ				600)	Surrec						
_								1 (1 - 1()		/ <u>1</u>			
-	- 1				Ш	\ Poorly Gray;	-Graded Grave gravel fill.	el with Sand (gp)					
2 -	- 528			100	Ш		<u> </u>						
_	_				Ш	o1	o:1, :,1 o	1 (1)					
-	- 1				Ш	Orang	Silt with Gra ne e brown; stiff;	vei (mi) dry.					
4 -	526				11111			-					
_				100	Ш								
-	- 1				Ш								
6 -	524				11111								
_				100	Ш								
-	- 1				$\parallel \parallel \parallel$								
8 -	522				Ш								
_				100	Ш								
-	- 1				Ш								
10 -	- 520				Ш					10.5			
_	[100						10.5	<u> </u>		
-	-						no				-		
12 -	- 518					Dark g							
_	_					Bottor	n of Boring at	11.5 feet. All soil	classification based on visual d	escriptions			
-						made	during the ins	stallation of the bo	classification based on visual d oring, unless noted otherwise.	-			
14 -	- 516												
-	ļ												
-													
16 -	- 514												
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18 -	- 512												
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	ct Nan					fining	Client: RSR		Location: Middletown, NY	Boring Log: I		
Drille	ed By:	Cascac	le/Jere	my Tr	riepke		Drill Start Da	te: 8/15/2018	Drill End Date: 8/15/2018	Drill Method	l: Rotoso	onic
Logge	ed By:	Spiros	Zois				Total Depth:	5	Bore Diameter: 6	Ground Surf	ace: 518	.74 ft
Coord	dinate	s (X/Y): 5309	960.672	26/957	341.7299	Well Permit N	Number:		Top-of-Casin	ig: 518.3	9 ft
					Wel	ll Constructi	on			Annulus		
			Mate	rial			Diameter (in)	Depth (ft)	Materi	al		Depth (ft)
Scree	en: 0.01	-inch	Sched	ule 40	PVC Sc	creen	2	3 to 6	Filter Pack: US SIlica #1			2 to 6
Riser	: Schec	lule 40	PVC I	Riser			2	0.35 to 3	Seal: Hydrated Bentonite Chi	ips		0.5 to 2
Other	r:								Other:			to
Depth (ft)	Elevation (ft)	o,	Lab Sample	Recovery (%)	Graphic Log	Notes:						Well
Dept	Elev	Type	Lab	Reco	Grap			Physical	Description			-
						Ground	Surface		1			·
2 -	_ _ _ _ 517 _			92				el with Sand (gp)			0.5	4 C C C C C C C C C C C C C C C C C C C
4 -	- - 515 - -			100		Clayey Orang	v Silt with Grave brown; stiff;	vel (ml) dry.				
6 -	- - 513 -			100		Siltsto Dark g	ne gray.					
8 -	- - 511 -					Bottor during	n of Boring at g the installati	6 feet. All soil cla on of the boring,	assification based on visual d unless noted otherwise.	escriptions made		
10 -	- - 509 -											
12 -	- - 507 -											
14 -	- - 505 - -											
16 -	- - 503 - -											
18 -	- - 501 - -											



					g & Refining	Client: RSR		Location: Middletown, NY	Boring Log: PZ				
Drilled By: Cascade/Jeremy Triepke						Drill Start Da	te: 8/15/2018	Drill End Date: 8/15/2018	Drill Method: F	Rotosonic			
Logg	ed By:	Spiros	Zois			Total Depth: 6 Bore Diameter: 6			Ground Surfac	e: 517.63 ft			
Coor	dinate	s (X/Y): 530	974.940	7/957338.2745	Well Permit N	lumber:		Top-of-Casing:	517.09 ft			
					Well Constructi	ion			Annulus				
			Mate	rial		Diameter (in)	Depth (ft)	Materia	ıl	Depth (ft			
Scree	en: 0.01	l-inch	Sched	ule 40 1	PVC Screen	2	3 to 6	Filter Pack: US SIlica #1		2 to 6			
Riser	:: Sched	dule 40	PVC I	Riser		2	0.5 to 3	Seal: Hydrated Bentonite Chi	ps	1 to 2			
Other: Other:										to			
					Notes:					Well			
Depth (ft)	Elevation (ft)	Type	Lab Sample	Graphic Log									
<u> </u>	Щ	L			Ground Surface	Physical Description							
_	Ţ			000						0.5			
- - 2 -					Poorly-Grad Gray; grave	led Gravel with l fill.	ı Sand (gp)			45 45 V			
4 -	- 514				Clayey Silt with Gravel (ml) Orange brown; stiff; dry.								
6 -	512 				Siltstone Dark gray.								
8 -	510 				Bottom of E the installa	Boring at 6 feet tion of the bor	. All soil classific ing, unless noted	ation based on visual descrip l otherwise.	tions made during				
10 -	- 508 												
12 -	506 												
14 -	504 												
16 -	- 502 												
18 -	500 												
	_												



							1			1		
Project Name: Revere Smelting & Refining							Client: RSR		Location: Middletown, NY	Boring Log: PZ-23		
Drilled By: Cascade/Jeremy Triepke							Drill Start Dat	te: 8/15/2018	Drill End Date: 8/15/2018	Drill Method: Rotosonic		
Logged By: Spiros Zois							Total Depth: 21 Bore Diameter: 6			Ground Surface: 512.38 ft		
Coord	dinate	s (X/Y): 530	781.	757	3/956954.8978	Well Permit N	Iumber:		Top-of-Casing: 511.9	6 ft	
						Well Construction	on		An	nulus		
	Material Diameter (in) Depth (ft) Material											
Scree	Screen: 0.01-inch Schedule 40 PVC Screen210 to 20Filter Pack: US SIlica #1											
Riser: Schedule 40 PVC Riser 2 0.4 to 10 Seal: Hydrated Bentonite Chips										6 to 9		
Other	Other: Other: Cement-Bentonite Grout										1 to 6	
						Notes:					Well	
Depth (ft)	Elevation (ft)	e	Lab Sample	Granhic I og	gon and							
Dep	Elev	Type	Lab	- Crar	2			Physical Desc	ription		1	
	•	-	<u> </u>			Ground Surface		•	-		·	
]	_			20		$\overline{}$				[0.5]		
+	-					Poorly-Grad Gray: grayel	ed Gravel with fill.	Sand (gp)				
2 —	- 510			Ш	Ш	(224), 824, 62						
	_			Ш	Ш							
	-			Ш	Ш	Clayey Silt w	vith Gravel (m l ay to orange b	l) rown: stiff				
4 -	- 508			Ш	Ш	brown to gr	ay to orange o	71 O W 11, 3C111.				
+	-			Ш	Ш							
	_			Ш	Ш							
6	- - 506			Ш	Ш							
1	-			Ш	Ш							
+	-			Ш	Ш							
	- - 504			Ш	Ш							
8 —	- 504			Ш	Ш							
1 4	-			Ш	Ш						[] [] [] [] [] [] [] [] [] []	
+	-			Ш	Ш							
10	- 502			Ш	Ш							
	_			Ш	Ш							
	-			Ш	Ш							
12	- 500			Ш	Ш							
+	-			Ш	Ш							
	_				$\ \ $							
14	- - 498											
	-				$\ \ $							
+	-			$\parallel \parallel$	₩							
1, 1	-			$\parallel \parallel$	$\parallel \parallel \parallel$					15.5		
16	- 496 -					Clayey Silt v	vith Gravel (ml	!) rown; stiff; trace :	1 ,	ļ.,		
	-				$\ \ $	Brown to gr	ay to orange b	rown; stiff; trace	sand; wet.			
+	-											
18 —	- 494				$\ \ $	Clayev Silt v	vith Gravel (ml	1)				
†	_					Brown to gr	ay to orange b	l) rown; stiff; wet.				
l]					$\ \ $							
1	_			Ш	Ш							

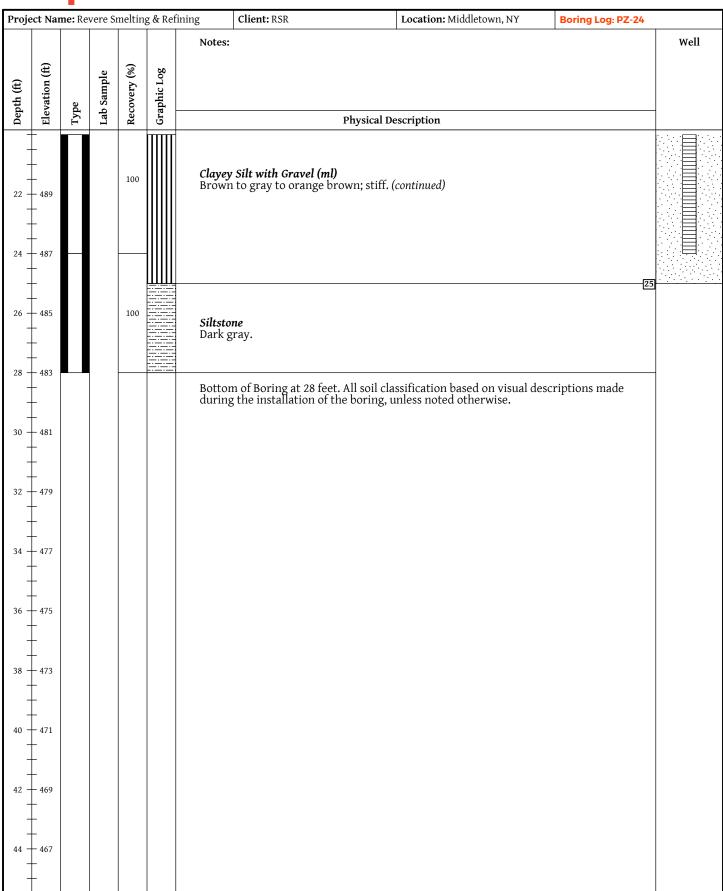


Proje	ct Nar	ne: Re	vere S	melting	g & Refining	Client: RSR	Location: Middletown, NY	Boring Log: PZ-23	
11050	ct Mai	ne. Re	Vere		Notes:	Chefft, Rok	Eccution, Middletown, 141	Borning Log. P2-23	Well
					Notes.				Well
	Elevation (ft)		le	go					
1 (ft)	tion		amp	hic I					
Depth (ft)	leva	Type	Lab Sample	Graphic Log		Physical Desc	rintion		
Δ_	E	I	-	9		Filysical Desc	триоп	20	te te sit stete se s
-	-								
-	_				Siltstone				<u> </u>
22 -	- - 490				Siltstone Dark gray.				
-	-				Bottom of B	Boring at 21 feet. All soil classific installation of the boring, unless	ration based on visual description	ons made	
-	_				auring the	installation of the boring, unless	s noted otherwise.		
24 -	- - 488								
-	-								
-	-								
26 -	- - 486								
-	-								
28 -	- 484								
-	-								
30 -	- - 482								
-	_								
_	_								
32 -	- 480								
-	-								
_	_								
34 -	- 478								
-	-								
	_								
36 -	- 476								
-	_								
-									
38 -	- 474								
-	-								
-									
40 -	- 472								
-	-								
-	-								
42 -	- 470								
-									
	_								
44 -	- 468								
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Project Name: Revere Smelting & Refining							ning	Client: RSR		Location: Middletown, NY	Boring Log: PZ-24		
Drilled By: Cascade/Jeremy Triepke								· · · · · · · · · · · · · · · · · · ·			Drill Method: Rotoso	od: Rotosonic	
Logged By: Spiros Zois								Total Depth: 28 Bore Diameter: 6 Ground Surface			Ground Surface: 511	ce: 511.49 ft	
Coordinates (X/Y): 530808.012/956957.043 Well Permit									Number:		Top-of-Casing: 511.2	0 ft	
					W	lell	Constructi	on		Ar	nulus		
			Mate	rial				Diameter (in)	Depth (ft)	Material		Depth (ft)	
Scree	en: 0.01	-inch	Schedi	ıle 40	PVC	Scr	een	2	14 to 24	Filter Pack: US SIlica #1		13 to 24	
Riser	: Schec	lule 40	PVC F	Riser				2	0.3 to 14	Seal: Hydrated Bentonite Chips		10 to 13	
Other	Other: Cement-Bentonite Grout											1 to 10	
Depth (ft)	Elevation (ft)	Type	Lab Sample	Recovery (%)	Graphic Log	0	Notes:		ph. : In			Well	
	Щ	T		8	9	+	Cround	Surface	Physical Do	escription			
+	-				600	g	Ground	Surtace				\^ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	
- - -	- - - - - - - - - 507			95					vel (ml) ange brown; stiff.		0.5	2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 -	
- -	- -			50									
14	_ _ _ 495 _ _			100			Brown		ange brown; stiff; t	race sand.			
- - -	- - -				-		Cl ayey Brown	o Silt with Gravito ora	vel (ml) ange brown; stiff.				







Project Name: Revere Smelting & Refining							Client: RSR Location: Middletown, NY Boring Log: F		Boring Log: PZ-25			
Drille	ed By: (Cascac	le/Jere	my Tı	riepke					Drill Method: Rotoso	Rotosonic	
Logg	ed By:	Spiros	Zois				Total Depth: 2	24	Bore Diameter: 6	Ground Surface: 508	e: 508.85 ft	
Coor	dinates	(X/Y): 5305	86.85	3/9566	630.6641	Well Permit N	lumber:		Top-of-Casing: 508.4	7 ft	
					We	ell Construct			A	nnulus		
			Mate				Diameter (in)	Depth (ft)	Material		Depth (ft)	
	Screen: 0.01-inch Schedule 40 PVC Screen 2 14 to 24 Filter Pack: US SIlica #1										13 to 24	
	Riser: Schedule 40 PVC Riser20.4 to 14Seal: Hydrated Bentonite Chips										10 to 13	
Othe	r:								Other: Cement-Bentonite Grout		1 to 10	
Depth (ft)	Elevation (ft)	Type	Notes: A 1 1 1 1 1 1 1 1 1								Well	
_	_				1 00	Ground	Surface				\	
2 - 2 - 4				90		Poorly Gray;	y-Graded Grave gravel fill. y Silt with Grav n to orange bro	vel (ml) own; stiff.		1.5		
8 -	- 503 - - - 501 - - 499 - - - 497			85		<i>Claye</i> Brow	y Silt with Gra v n to orange bro	vel (ml) own; soft.		8	¥	
14 16 18 	- - -			90		Clave	tic Soil (ol/oh) y Silt with Gray n to orange bro	vel (ml) own; soft; some co	parse-grained sand.	[14] 15		



