VOLUNTARY REMEDIATION PROGRAM SITE ASSESSMENT REPORT QUALITY CARRIERS, INC. PROPERTY INSTITUTE, WEST VIRGINIA

VRP #11680

SAIC Project 4501020069

Prepared for:

Quality Distribution, Inc.
211 Welsh Pool Road
Suite 100
Exton, PA 19341

December 27, 2012

SAIC Energy, Environment & Infrastructure, LLC
300 Wharton Circle, Suite 176 / Triadelphia, WV 26059 / tel: 304.547.2100 / www.saic.com/EEandI

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Respectfully submitted,

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EXECUTIVE SUMMARY

The Quality Carriers, Inc. (QCI) site (the Site) is comprised of slightly more than 142 acres, located along Route 25 in Institute, West Virginia, approximately 4.5 miles west of Charleston and about 1,500 feet north of the Kanawha River. Approximately 10 acres of the Site have been developed. The developed area is roughly an elongated rectangle, oriented east-west along the north side of Route 25. The remainder of the Site is comprised of steep, heavily wooded hillsides.

Much of the area along the north side of the Kanawha River is heavily industrialized. There is no groundwater use at the Site and there is no known use of groundwater for potable supply purposes in the vicinity of the Site. The Site and surrounding area is served by the West Virginia American Water Company public water supply system.

Since 1963, the Site has been used as a bulk liquid chemical trucking terminal and tanker cleaning facility. In response to allegations of on-site burial of drummed waste from facility operations, an investigation and subsequent excavation of drummed waste and associated soil was performed in 1995, in accordance with an agreement with the West Virginia Department of Environmental Protection (WVDEP). Subsequent ex-situ treatment of excavated soil was performed under the term of a Consent Agreement with the WVDEP and a Post-Closure Care Permit under the Resource Conservation and Recovery Act (RCRA) ("Permit"). As part of the remediation work, a stockpile of treated soil was constructed near the eastern end of the developed portion of the Site and is still present.

Under the Permit and later modifications, additional site characterization and in-situ remediation of groundwater were conducted (August 2003 until October 2005), and a schedule of periodic groundwater sampling was established. The final groundwater monitoring event, demonstrating attainment of the cleanup goals at all compliance wells, was conducted in December 2005. A report documenting attainment of the West Virginia Groundwater Protection Standards (WVGPS) at all compliance wells was submitted to the WVDEP in January 2006.

A Voluntary Remediation Agreement (VRA), pursuant to the West Virginia Voluntary Remediation and Redevelopment Act (VRRA), was executed for the Site on February 29, 2012. Site characterization activities under the VRA, pursuant to an approved Site Assessment Work Plan, were performed during the period from August through December 2012. Soil samples were collected from 22 locations in five areas of the Site where releases to soil are known or suspected to have occurred. A total of 59 soil samples were collected and analyzed for selected metals, volatile organic compounds (VOCs), and semi-volatile organic compounds (SVOCs). Selected soil samples were also analyzed for pesticide/herbicide compounds, polychlorinated biphenyls (PCBs), and dioxin/furan compounds.

Only arsenic was reported in soil samples at concentrations exceeding VRRA risk-based De Minimis Values (DMV) or United States Environmental Protection Agency (USEPA) Regional Screening Levels (RSL); however, all arsenic concentrations were within the natural background range for West Virginia soil, as reported in VRRA guidance. Certain other metals, VOCs, SVOCs, and pesticide/herbicide compounds were reported above leaching-based DMV and/or RSL, which conservatively assume that groundwater beneath the Site is used for potable supply purposes. Except for two VOCs in two samples, all results for soil samples from the treated soil stockpile were below Land Disposal Restrictions (LDRs) under RCRA.

During the VRA site assessment, groundwater samples were collected on two occasions from nine monitoring wells and three temporary sampling points. Groundwater samples were analyzed for selected metals, VOCs, SVOCs, pesticide/herbicide compounds, and PCBs. Certain metals, VOCs, and SVOCs were reported at concentrations above groundwater DMV and RSL values, predominantly at wells adjacent to or near the former drum burial area. Concentrations decrease rapidly with distance away from the drum burial area. In nearly all cases, concentrations are similar to or lower than historical values. Except for the MW-102 monitoring well, none of the samples from locations along or near the downgradient boundary of the Site exhibited concentrations above DMV or RSL values.

At MW-102, one VOC was reported at concentrations near its DMV/RSL; one pesticide/herbicide compound was reported with quality assurance/quality control (QA/QC)

qualifiers; and, PCB Aroclor 1260 was reported somewhat above its DMV/RSL. The analytical results for groundwater indicate minimal potential for migration of contaminants in groundwater beyond the downgradient boundary of the Site at concentrations exceeding DMV and/or RSL values.

The predominant migration pathway for COI in soil is by leaching to groundwater. Volatilization of VOCs from soil and migration to ambient air or into a hypothetical future building may also occur, if no engineering control or mitigation measure is in place. Exposure to COI in soil could occur by direct contact with soil, incidental ingestion of soil, and/or inhalation of VOCs that volatilize from soil. The most likely receptors are daily site workers or excavation workers that could be involved in a future construction or maintenance project. These possible exposure pathways will be further evaluated in the Site-Specific Risk Assessment to be prepared under the VRA.

The predominant migration pathway for COI in groundwater is transport of dissolved COI according to groundwater flow conditions. Concentrations of COI in groundwater decrease rapidly with distance away from the drum burial area. Available data indicate the potential for contaminant concentrations that are above DMV and/or RSL values to persist far downgradient of the drum burial area is minimal. Also, there is no groundwater use in the area. Very conservative analysis indicates that the potential for impacts to surface water in the Kanawha River as a result of groundwater discharge to the river is negligible.

Volatilization of VOCs from groundwater and migration to ambient air or into a hypothetical future building may also occur, if no engineering control or mitigation measure is in place. Exposure to COI in groundwater could occur by direct contact and/or incidental ingestion of groundwater and by inhalation of VOCs by an excavation worker who encounters shallow groundwater. Exposure to VOCs in groundwater could also occur as a result of vapor migration and intrusion of VOCs into a hypothetical future building. These possible exposure pathways will be further evaluated in the Site-Specific Risk Assessment to be prepared under the VRA.

1.0 INTRODUCTION

Since 1963, the Quality Carriers, Inc. (QCI) site (the Site) that is the subject of this report has been used as a bulk liquid chemical trucking terminal and tanker cleaning facility. In response to allegations of on-site burial of drummed waste from facility operations, an investigation and subsequent excavation of drummed waste and associated soil was performed in 1995, in accordance with an agreement with the West Virginia Department of Environmental Protection (WVDEP). Subsequent ex-situ treatment of excavated soil was performed under the term of a Consent Agreement with the WVDEP and a Post-Closure Care Permit under the Resource Conservation and Recovery Act (RCRA) ("Permit").

Under the Permit and later modifications, additional site characterization and in-situ remediation of groundwater were conducted (August 2003 until October 2005), and a schedule of periodic groundwater sampling was established. The second permit modification also identified certain monitoring wells as compliance wells and specified that remediation and monitoring could be terminated when West Virginia Groundwater Protection Standards (WVGPS) for site-related parameters were met at each well for six consecutive semiannual monitoring events (three-year period). The final groundwater monitoring event, demonstrating attainment of the WVGPS at all compliance wells, was conducted in December 2005. The report documenting attainment of the WVGPS at all compliance wells was submitted to the WVDEP in January 2006.

A Voluntary Remediation Agreement (VRA) pursuant to the Voluntary Remediation and Redevelopment Act (VRRA) was executed for the Site on February 29, 2012. The VRA and subsequent Modification No. 1 require preparation and/or execution of the following:

- Site Assessment Work Plan (SAWP) (no later than First Quarter 2012),
- Site Assessment Report (no later than Fourth Quarter 2012),
- Human Health and Ecological Risk Assessment (no later than First Quarter 2013), and
- Remedial Action Work Plan (no later than Third Quarter 2013).

The SAWP was approved by the WVDEP by letter dated July 6, 2012. The remainder of this report provides a description of Site background information, including investigation, remediation, and monitoring activities that preceded the VRA, a description of the work performed under the SAWP, and the results and interpretations from that work.

2.0 SITE DEFINITION AND PHYSICAL SETTING

The QCI property is located at 38° 23' 40" north latitude and 81° 47' 45" west longitude, along Route 25 in Institute, West Virginia, approximately 4.5 miles west of Charleston on the north side of State Route 25 (the "Site"). The southern boundary of the Site is from approximately 700 feet to about 1,500 feet north of the Kanawha River. The Site appears on the Saint Albans, West Virginia, United States Geological Survey (USGS), 7.5-minute topographic quadrangle (**Figure 1**).

For purposes of implementing the VRP at the subject site, the Site is hereby defined as 142.305 acres, comprised of 6 parcels which are as follows:

- Parcel 1: Deed book 2159, page 315 (0.502 acres)
- Parcel 2: Deed book 2159, page 315 (0.622 acres)
- Parcel 3: Deed book 1480, page 648 (0.254 acres)
- Parcel 4: Deed book 1542, page 445 (118.19 acres)
- Parcel 5: Deed book 1480, page 643 (21.93 acres)
- Parcel 6: Deed book 1480, page 665 (0.807 acres)

A map depicting the site boundaries is provided as **Figure 2**. A legal description is provided in **Appendix A**.

Approximately 10 acres of the Site have been developed/improved. The improved area is roughly an elongated rectangle, oriented east-west along the north side of Route 25 (**Figure 3**). The remainder of the Site is comprised of steep, heavily wooded hillsides. Other than some limited timber removal that reportedly occurred at some time in the past, this heavily wooded area of the Site is undeveloped and has never been used by site operators.

Land surface elevation of the developed portion of the Site averages around 600 feet above mean sea level (msl), with a slight slope to the south (toward Route 25). The majority of the developed portion of the Site is gravel-covered and used for truck parking.

The wooded hillsides to the north rise steeply to elevations over 1,000 feet above msl. A localized surface-water drainage basin extends from the south-central area of the Site, upslope into the highland area to the north and northeast. The USGS topographic map does not indicate a perennial stream in this drainage basin, and reports of long-time employees at the Site indicate that the drainage carries only intermittent wet weather runoff. This runoff is carried beneath the developed portion of the Site through a 48-inch-diameter pipe.

Much of the area along the north side of the Kanawha River is heavily industrialized. Immediately to the south of the Site, between Route 25 and the river, is a large wastewater treatment plant for an adjacent industrial complex. Groundwater in the area of the Site is not known to be used for potable supply purposes, and the area is served by the West Virginia American Water Company public water supply system.

3.0 DEVELOPMENT AND OPERATIONAL HISTORY

Ownership of the Site prior to 1942 is unknown. From 1942 to 1962, the Site was owned by Union Carbide, the former owner of the industrial complex and wastewater treatment facility to the south of Route 25 from the Site. During this time, the Site was undeveloped. In 1963, the Site was purchased by Chemical Leaman Tank Lines, Inc. (CLTL), which constructed the existing facility building and a wastewater treatment plant for use in the cleaning of tanker trucks used to haul bulk liquid chemicals. In 1993, Quality Systems, Inc. (QSI) began operating the commercial tank wash business.

In 1998, Chemical Leaman Corporation (owner of CLTL and QSI) merged with Montgomery Tank Lines, Inc. (MTL). Operations at the facility continued under the names Quality Carriers, Inc. (QCI) and Quala Systems, Inc., both indirect subsidiaries of Quality Distribution, Inc. (QDI). Under this structure, QSI continued as the operating entity for the tank washing operations. Currently, the Site is owned by QCI, which has no company operations at that location. Trucking operations were managed by an affiliate partner, a third-party company called Transtech Logistics (TTL), under contract to QCI until July 29, 2012. Effective on that date, a new affiliate, LMI, assumed management of the transportation operations. The tank washing operation was operated by TTL, using another company name, but under agreement with QSI, until August 1, 2012, when an independent third party company called Qualawash Holdings, LLC replaced TTL.

The facility is an active bulk chemical trucking terminal, consisting of parking areas, dispatch offices, a maintenance shop, the tanker cleaning operation, and the wastewater treatment plant used to treat nonhazardous wastewater. Cleaning operations utilize both steam and cleaning reagents. Discharge from the treatment plant is to the Kanawha River, under a National Pollutant Discharge Elimination System (NPDES) permit held by QSI.

4.0 HISTORY OF REMEDIATION AND DATA COLLECTION

4.1 Buried Drum Excavation

In response to allegations by former employees regarding the on-site burial of drummed waste material, the WVDEP and CLTL agreed to conduct an assessment of the then CLTL facility in the mid-1990s. From August 1995 through November 1995, approximately 500 drums of waste and impacted soil were excavated from an area measuring approximately 50 feet by 100 feet, just east of the facility building (see **Figure 4**). For purposes of this report, this area is referred to as the former Drum Burial Area (DBA). Approximately 750 tons of excavated material was sent off-site for disposal. In addition, an estimated 2,400 cubic yards (yd^3) of impacted soil was placed in a series of eight cells (bio-cells) constructed on-site for biological treatment.

4.2 Ex-Situ Bio-Remediation of Excavated Soil

Approximate locations of the eight bio-cells are shown on **Figure 4**. The bio-cells were constructed by excavating to a depth of approximately two feet within the footprint of the cell. The excavated soil was used to construct a berm around each cell. The floor of each cell was sloped to promote drainage to a collection sump. An impermeable liner was placed on the bottom of the cell, and a drainage layer consisting of six inches of sand and gravel was laid on the liner. Filter fabric was placed over the drainage layer, and the cell was then filled with soil to be remediated. A system of polyvinyl chloride (PVC) piping was installed within the soil and connected to a blower to supply air to the soil, and an enzymatic solution was applied to the soil.

During a period from late July through early August 1997, the eight original bio-cells were consolidated into two cells, which were operated for an additional six weeks, in accordance with a plan approved by the WVDEP. Confirmation sampling of the soil in the cells was then performed, and the results were submitted to the WVDEP for review in October 1997. In November 1997, the bio-cells were closed in accordance with a plan approved by the WVDEP. Soil that exceeded Land Disposal Restrictions (LDRs) under the RCRA regulations was sent for off-site disposal. Soil that met LDRs was moved to a treated soil stockpile (TSS) constructed at

the eastern end of the Site (**Figure 4**). Reportedly, the TSS contains approximately 2,200 yd^3 of soil. In connection with the construction of the stockpile, the land was cleared and leveled, a liner was placed, soil was placed on top and graded, and seeding was applied, and erosion controls were implemented.

Closure of the bio-cells included backfilling of the areas with clean soil from the Site and regrading. More detailed information related to the operation, sampling, and consolidation of the bio-cells is provided in the following reports by Weavertown Environmental Group:

- *Biocell Sampling and Analysis Report, CLTL Terminal, Institute, West Virginia* (March, 1997);
- *Work Plan for Ex-Situ Bioremediation, Chemical Leaman Truck Lines Terminal, Institute, West Virginia* (April 18, 1997); and
- *Closure Report for Biocells, Chemical Leaman Truck Lines Terminal, Institute, West Virginia* (November 21, 1997).

4.3 Post-Closure Care Groundwater Monitoring

Prior to the remediation activity at the DBA, the QCI facility was classified as a small quantity generator (SQG) of hazardous waste. The QSI facility was a large quantity generator (LQG). In September 1995, CLTL was issued an Emergency Permit for Temporary Management of Hazardous Waste by the WVDEP. The permit expired on November 25, 1995, and was replaced by a second emergency permit, which expired on January 29, 1996.

The remainder of the remediation was conducted under the terms of a Consent Order executed between WVDEP and CLTL on March 6, 1997. The Consent Order required CLTL to obtain a RCRA Post-Closure Care Permit for the DBA. That permit (WVR000001719) was issued by the WVDEP on June 30, 1999. The permitted area was divided into three areas, as follows:

- Buried drum excavation area (0.10 acre);
- Bioremediation area (0.56 acre); and
- Treated soil stockpile (0.11 acre).

During August 1999, six groundwater monitoring wells, designated MW-101 through MW-106, were installed at the Site. Monitoring well locations are shown on **Figure 5**. As part of this work, one soil sample from each monitoring well borehole was analyzed for volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs). The first sampling of the monitoring wells was performed in September 1999, with samples being analyzed for parameters specified in condition IV-C-2 of the Post-Closure Care Permit, which included total organic carbon (TOC), VOCs, SVOCs, and total lead.

Because certain parameters were reported at concentrations above the maximum concentrations established in the permit, the monitoring wells were resampled in October 1999, for analysis of parameters specified in 40 Code of Federal Regulations (CFR) 264, Appendix IX, pursuant to condition IV-C-4-a-I of the permit. Routine sampling of monitoring wells MW-101 through MW-106 was conducted again in December 1999, March 2000, and June 2000, with analyses for TOC, VOCs, SVOCs, and total and dissolved lead.

In response to the detection of certain parameters at concentrations above limits established in the permit, WVDEP issued modification No. 1 to the Post-Closure Care Permit in May 2000. The modification provided for the installation of four additional monitoring wells (MW-107 through MW-110, see **Figure 5**) to further assess groundwater conditions beneath the Site. The four additional wells were installed in July 2000. This well installation program also included the following:

- Collection of one soil sample from the vadose zone at each well location for analysis of permeability, volumetric air content, volumetric water content, total porosity, soil bulk density, and moisture content;
- Installation of one soil boring adjacent to MW-101 to collect a soil sample for TOC analysis;

- Hydraulic conductivity (slug) tests on all of the groundwater monitoring wells;
- Collection of samples from all groundwater monitoring wells for analysis of parameters which affect the natural attenuation process, including dissolved oxygen, nitrate, ferrous iron, sulfate, and methane;
- Collection of samples from all groundwater monitoring wells for analysis of VOCs, SVOCs, dissolved and total lead, pH, conductivity, and TOC;
- Baseline risk evaluation to identify potential exposure pathways; and
- Modeling for each compound detected in groundwater on-site to assess the potential maximum extent of downgradient migration.

Results from the additional site characterization work completed under modification No. 1 were provided to the WVDEP in the form of a Site Characterization Report/Corrective Action Plan (SAIC, May 2002), submitted in conjunction with a request for modification (No. 2) to the Post-Closure Care Permit. The scope and implementation of the proposed Corrective Action Plan were negotiated during the period from May 2002 through March 2003.

During the period from June 2000 through May 2003, routine semiannual sampling of all groundwater monitoring wells continued, with analyses for VOCs, SVOCs, nitrate-nitrogen, sulfate, and total and dissolved lead. During June 2001, ferrous iron was also analyzed, and during May 2003, ferrous iron and dissolved oxygen were analyzed.

4.4 In-Situ Groundwater Remediation

In January 2003, WVDEP issued modification No. 2 to the Post-Closure Care Permit for the DBA. Among other things, the modification authorized the implementation of in-situ bioremediation of groundwater in the DBA using the introduction of bio-amendments to stimulate naturally occurring microorganisms. Five injection wells were installed in August 2003 to supply oxygen to the shallow groundwater using the in-situ oxygen curtain (ISOC) technology. In-situ groundwater treatment continued until October 2005.

Each month during the first six months of operation of the groundwater remediation system, samples were collected from wells MW-104, MW-105, MW-106, MW-108, and MW-109 for analysis of the following system operating parameters:

- TOC
- Ammonia-nitrogen
- Nitrate-nitrogen
- Sulfate
- Temperature
- pH
- Conductivity
- Dissolved oxygen

During the period from May 2003 through December 2005, routine semiannual groundwater sampling continued, with all site monitoring wells being sampled and analyzed for TOC, VOCs, SVOCs, nitrate-nitrogen, sulfate, total and dissolved lead, ferrous iron, and dissolved oxygen.

Modification No. 2 to the site Post-Closure Care Permit also identified monitoring wells MW-102, MW-103, MW-107, MW-108, and MW-109 as compliance wells and specified that remediation and monitoring could be terminated when WVGPS for site-related parameters were met at each of these monitoring wells for six consecutive semiannual monitoring events (three-year period). Operation of the groundwater remediation system was discontinued in October 2005. The final groundwater monitoring event, demonstrating attainment of the WVGPS at all compliance wells, was conducted in December 2005. The report documenting attainment of the WVGPS at all compliance wells was submitted to the WVDEP in January 2006.

4.5 Polymer Spill

According to facility personnel, approximately five years ago, a small volume of product called FLOC2000 was released from a tanker trailer that was parked in the gravel-covered lot west of

the facility buildings (see **Figure 2**). FLOC2000 is powdered polymer that turns to a gel consistency when it contacts water. When released to the ground, the FLOC2000 turned to a gel, so the release was limited to a localized area. Facility personnel indicate that the WVDEP was notified of the release, and the material and a small volume of underlying soil were removed for off-site disposal. The area affected by the spill was estimated to be 5 feet by 20 feet.

4.6 Wastewater Treatment Area Tank Seepage

Recently, seepage occurred from the Chemical Batch Reactor (CBR) tank in the facility's wastewater treatment area. The CBR tank collects all water from the facility's tanker cleaning operations. The primary function of the tank is precipitation and solids removal. Water in the tank is first treated with sulfuric acid to reduce the pH to approximately five. The pH is then returned to near neutral through the addition of sodium hydroxide. A flocculent and aluminum sulfate are added to promote solids removal. The CBR tank is an aboveground tank constructed of concrete panels. The seepage occurred along one or more seams in the tank and flowed along the concrete floor of a small building in which the tank is located and onto the ground outside the building. The area of soil affected by the seepage is estimated to be four feet by five feet.

4.7 Disposal Pit Area – AOC No. 1

On October 27, 2009, representatives of Tetra Tech EC, Inc. (Tetra Tech), and United States Environmental Protection Agency (USEPA) conducted a RCRA site visit at the QCI facility. Tetra Tech issued a Final RCRA Site Visit Report dated March 31, 2010. The report identified an area near the wastewater treatment facility as Area of Concern (AOC) No. 1. Former employees of the QCI facility identified the area as one of two locations where drums may have been buried (The other area was the confirmed DBA described in Section 4.1. In response, the WVDEP conducted a subsurface investigation of the area. Reportedly, two soil borings were drilled, and three monitoring wells were installed in the area, although currently, only two monitoring wells can be located. Hereafter, these monitoring wells will be designated WWT-1 through WWT-2. According to the Tetra Tech report, analyses of soil samples indicated no

exceedence of Toxicity Characteristic Leaching Procedure (TCLP) priority pollutants; however, the WVDEP indicated that additional characterization of this area was warranted.

4.8 Summary of Pre-Existing Data

Through the activities described in Section 4.1 through 4.7, extensive sampling and analysis of soil and groundwater at the Site were conducted. The following sections provide summaries of the resulting analytical results. It is noted that these data were not validated pursuant to the VRP and are being presented in this section of the Site Assessment Report solely as background information to support the Scope of Site Investigation described in Section 5.

4.8.1 Soil

The drum excavation project conducted during 1995 is described in the report titled "Closure Summary, Chemical Leaman Tank Lines, Institute, WV" (Vector Enterprises, 1996). The excavation work utilized a systematic grid approach to the removal of drums and associated soil. The depth of the excavation reportedly ranged from 5 feet to 18 feet. As part of the excavation project, confirmation soil samples were collected from various sidewall and base locations within the excavation grid system. The samples were reported as "composite" samples. A total of 38 confirmation samples were collected, with the samples being analyzed for varying combinations of gasoline-range and diesel-range organic compounds (GRO and DRO, respectively), VOCs, and SVOCs. A summary of compounds reported in the confirmation samples is provided as **Table 1**.

Where applicable, **Table 1** indicates the VRP De Minimis Values (DMV) for industrial direct contact and for migration to groundwater. Although the DMVs are not directly applicable to composite samples, the results provide a general indication of residual concentrations in soil in the area of the excavation at that time.

VOCs that were reported at concentrations above their respective DMV in one or more samples included methylene chloride, chlorobenzene, and trichloroethene (TCE). SVOCs that were reported above their respective DMV in one or more samples were:

- naphthalene,
- bis(2-ethylhexyl)phthalate,
- hexachlorobenzene,
- 2-chlorophenol,
- 1,2,4-trichlorobenzene, and
- N-nitrosodiphenylamine.

It is noted that all of the results exceeding a DMV were for the migration to groundwater pathway. None of the composite sample results exceeded the risk-based, industrial direct contact value.

4.8.2 Groundwater

Groundwater conditions associated with the former DBA, bio-cell areas, and the TSS were investigated through the installation and sampling of 10 groundwater monitoring wells (MW-101 through MW-110). Monitoring wells MW-101 through MW-106, installed during August 1999, were sampled 17 times during the period from September 1999 through December 2005. Monitoring wells MW-107 through MW-110, installed during July 2000, were sampled 12 times during the period from September 2000 through December 2005. Monitoring wells MW-101 and MW-110 are regarded to be hydraulically upgradient from areas of the Site where remediation activities have taken place (see **Figure 4**) and, therefore, are regarded to represent background water quality conditions.

It is noted that two additional monitoring wells are located near the wastewater treatment plant (see **Figure 4**). The history of installation, and construction details for these wells, as well as the nature of analytical results for any samples from these wells, are uncertain. For purposes of this report, these wells have been designated WWT-1 through WWT-2.

The parameters or parameter groups analyzed on groundwater samples from the MW series wells and the number of times that each parameter or group was analyzed are as follows:

Total Organic Carbon:	17 events
General Chemistry:	12 events
Lead:	6 events
Metals:	1 event
VOCs (8260):	17 events
SVOCs (8270):	17 events
Pesticides/Herbicides:	1 event
Dioxins/Furans:	1 event
40CFR264 (Appendix IX):	1 event

Summaries of these monitoring data are provided in the following tables:

Table 2:	TOC/General Chemistry
Table 3:	Metals
Table 4:	VOCs
Table 5:	SVOCs
Table 6:	Pesticides/Herbicides/Dioxins/Furans

Each of these categories of water quality data is discussed in the following sections. For purposes of establishing the scope of available data and describing pre-existing conditions at the site, limited interpretation of the data is provided. Rather, analytical results are compared to potentially relevant criteria, mainly the WVGPS established under Title 46, Series 12, Appendix A, and the DMVs established under the VRP.

4.8.2.1 General Chemistry

TOC was analyzed on all groundwater samples from all wells, representing a total of up to 17 sampling events. Other general chemistry parameters that were analyzed on samples from 12 monitoring events, beginning in September 2000 through December 2005, include:

- Nitrate-N
- Ammonia-N
- Sulfate
- Ferrous iron
- Dissolved oxygen

Results for general chemistry parameters are summarized in **Table 2**.

Groundwater in the unconsolidated zone beneath the site is characterized by a near neutral pH, typically between 6.0 and 8.0 standard units. pH values appear consistent among the 10 monitoring wells, indicating there is no effect on pH related to the former DBA and subsequent remediation activities. Sulfate concentrations at monitoring wells MW-101 and MW-110 typically range from around 30 milligrams per liter (mg/L) to around 80 mg/L. In wells near and downgradient from the DBA (e.g., MW-104, MW-105, and MW-106), sulfate values increased substantially in mid-2003, as a result of the in-situ bioremediation program. In the most recent groundwater monitoring events, sulfate values approached those in background wells. Results for nitrate-N exhibit a similar pattern, with concentrations in wells MW-101 and MW-110 commonly less than 0.3 mg/L. TOC values for background wells are typically below 5.0 mg/L. In wells near the DBA, historical TOC values were commonly between 10 mg/L and 100 mg/L, although at most wells, there appears to be an overall decreasing trend.

4.8.2.2 Metals

Lead has been analyzed on samples collected during all groundwater sampling events. Metals listed in 40CFR264 Appendix IX and analyzed on samples collected during October 1999 include:

Aluminum*	Calcium*	Magnesium*	Silver
Antimony	Chromium	Manganese*	Sodium*
Arsenic	Cobalt	Mercury	Thallium
Barium*	Copper*	Nickel*	Vanadium*
Beryllium	Iron*	Potassium*	Zinc*
Cadmium	Lead*	Selenium	

Metals detected at one or more monitoring wells are marked with '*'. **Table 3** provides a summary of results for those metals detected in samples collected during the October 1999 Appendix IX sampling event, along with respective WVGPS and DMV for groundwater.

Of the metals detected, barium, lead, iron, manganese, and vanadium were reported at concentrations exceeding their respective WVGPS and/or DMV. With one exception, detections of these metals above WVGPS and/or DMV were limited to monitoring wells MW-104, MW-105, and MW-106, located adjacent to or downgradient from the DBA. Manganese was also reported above its DMV at MW-102, which is along the downgradient Site boundary near the TSS. It is noted that the metals results are for total metals. Such results can reflect, at least in part, suspended sediment in the samples that is digested by the acid used to preserve samples for metals analyses.

4.8.2.3 VOCs

VOCs reported in one or more groundwater samples from the site included the following:

Acetone*
Benzene*
Chlorobenzene*
1,2-Dichloroethane (1,2-DCA)*
1,1-Dichloroethene (1,1-DCE)
1,2-Dichloroethene (1,2-DCE)*
1,2-Dichloropropane (1,2-DCP)*
Ethylbenzene*
Methyl ethyl ketone (MEK)
Methyl isobutyl ketone (MIBK)*
Tetrachloroethene (PCE)*
1,1,2,2-Tetrachloroethane (1,1,2,2-TCA)*
Trichloroethene (TCE)*
Toluene
Vinyl Chloride*
Xylenes
1,1,2-Trichloroethane (1,1,2-TCA)*

Table 4 provides a summary of those VOCs detected in one or more groundwater samples, along with respective WVGPS and DMV for groundwater. VOCs detected at concentrations above their respective WVGPS and/or DMV at one or more monitoring wells are marked with '*'.

The monitoring wells with the most frequent detections of VOCs above a WVGPS and/or DMV were:

MW-102: 1,2-DCP
MW-104: chlorobenzene
MW-106: TCE, 1,2-DCE, 1,1,2-TCA, benzene, and chlorobenzene

MW-102 is located just southwest of the TSS; MW-104 is located adjacent to the DBA; and MW-106 is located hydraulically downgradient from the DBA. Except for benzene and chlorobenzene at MW-106, concentrations of these VOCs appear to show an overall decreasing trend.

During the June and December 2005 monitoring events, VOCs regulated by condition IV-C-2 of the Post-Closure Care Permit (Modification 002) were reported only in the MW-104 and MW-106 wells. In monitoring wells along the downgradient boundary of the Site (i.e., MW-102, MW-103, MW-107, MW-108, and MW-109), only 1,2-DCP, for which no limit is established under permit condition IV-C-2, was reported above its WVGPS or DMV.

4.8.2.4 SVOCs

SVOCs reported in one or more groundwater samples included:

Aniline*	3-Methylphenol (m-Cresol)
Bis(2-chloroisopropyl)ether*	4-Methylphenol (p-Cresol)
Bis(2-ethylhexyl)phthalate*	1,2-Dichlorobenzene
4-Chloroanaline*	1,4-Dichlorobenzene*
2-Chlorophenol*	2,4-Dimethylphenol
2-Methylphenol (o-Cresol)*	Naphthalene*

Table 5 provides a summary of those SVOCs detected in one or more groundwater samples, along with respective WVGPS and DMV for groundwater. SVOCs detected at concentrations above their respective WVGPS and/or DMV at one or more monitoring wells are marked with '*'.

The monitoring wells with the most frequent detections of SVOCs above WVGPS and/or DMV were:

MW-104: 2-chlorophenol, 1,4-dichlorobenzene, bis(2-chloroisopropyl)ether, naphthalene
MW-106: bis(2-chloroisopropyl)ether

Of the SVOCs reported in groundwater samples, maximum concentrations were established in the Post-Closure Care Permit for 1,2-dichlorobenzene, 1,4-dichlorobenzene, and bis(2-ethylhexyl)phthalate. Of these, bis(2-ethylhexyl)phthalate was largely below detection in groundwater, with only one reported detection at MW-102 and one at MW-104, both during the September 1999 sampling event. During the June and December 2005 groundwater sampling events, all of these SVOCs were below detection at monitoring wells along the downgradient Site boundary.

The only SVOCs reported above their respective WVGPS and/or DMV during these sampling events were naphthalene at MW-104, and bis(2-chloroisopropyl)ether at MW-106. In cases where SVOCs were reported relatively consistently at a monitoring well, the long-term trend in concentrations was determined to be downward.

4.8.2.5 PCBs/Pesticides/Herbicides/Dioxins/Furans

Groundwater samples collected during the October 1999 sampling event were analyzed for the polychlorinated biphenyls (PCBs), pesticides, herbicides, dioxins, and furans included in 40CFR264, Appendix IX. A summary of the detected compounds is provided in **Table 6**.

Beta-BHC and octafuran (1,2,3,4,6,7,8,9-OCDF) were reported in the sample from monitoring well MW-106. Octadioxin (1,2,3,4,6,7,8,9-OCDD) was reported in samples from all wells except MW-101. The beta-BHC result for MW-106 is above the DMV. The OCDF and OCDD analytical results were converted to total 2,3,7,8-tetrachlorodibenzodioxin (TCDD) toxicity equivalents using applicable toxicity equivalency factors (TEFs) for dioxins and dioxin-like compounds (**Table 6**). The results for all samples were below the DMV. It is noted that the detections of these compounds were not regarded to be substantive and were not incorporated into the permit modification conditions by the WVDEP.

5.0 SCOPE OF VRP SITE ASSESSMENT INVESTIGATION

5.1 Objectives

The primary objectives for the VRP Site Assessment for the former QCI site are as follows:

- Provide survey and legal description of the site;
- Confirm contaminants of interest (COI);
- Confirm the current extent of contamination in soil and groundwater;
- Determine current representative concentrations of COI in soil and groundwater relative to VRP DMV and USEPA Risk-Based Screening Levels (RBSLs) ;
- Determine current concentrations of COI in the TSS relative to RCRA LDRs;
- Identify/confirm potential migration pathways for COI;
- Identify/confirm potential receptors; and
- Provide data for use in ecological and human health risk screening or assessment, as applicable.

5.2 Scope of Investigation

The Site Assessment included five main tasks:

- Review of historical land use,
- Soil sampling,
- Installation of temporary groundwater sampling points,
- Groundwater sampling, and
- Groundwater flow mapping.

The specific scope of each of these tasks is described in the following sections.

5.2.1 Review of Historical Land Use

Other than the ±10-acre area between the base of the wooded hillside and Route 25, there is no known previous use of the Site. To confirm that no other solid waste management units or AOCs where hazardous substances or petroleum products may have been released exist on the Site, a review of historical land use for the entire Site was performed. The review included a review of historical aerial photographs and topographic maps, a walking reconnaissance of undeveloped areas of the Site, and inquiries with Mr. Ron Baker (current facility manager), who has been employed at the facility since the mid-1990s.

SAIC engaged INFOMAP Technologies, Inc. to provide historical aerial photographs and topographic maps. Coverage for the following years was provided:

Aerial photographs:	1957, 1971, 1990, 1996, and 2011
Topographic maps:	1899, 1909, 1909 (reprinted 1920), 1931, 1933, 1933 (reprinted 1939), 1958, 1958 (revised 1971), and 1958 (revised 1976)

Copies of the photographs and maps are provided in Appendices B-1 and B-2, respectively.

5.2.2 Soil Sampling

5.2.2.1 Former Drum Burial Area

Soil samples were collected at seven locations at the DBA; designated DBA-1 through DBA 5, DBA-7, and DBA-8. The sampling locations were intended to provide data to represent soil conditions in close proximity to the former excavation. **Figure 5** shows the approximate configuration of the area from which drums and soil were excavated in 1995, along with the soil sampling locations. Due to repeated refusal of the sampling device within the area of the planned sampling location, no samples were collected at the DBA-6 location.

Soil sampling was performed using direct-push (e.g., Geoprobe®) sampling methods, as described in the Site Assessment Work Plan (SAWP), dated June 4, 2012, and approved by the WVDEP. Continuous soil sampling was performed to a depth of 20 feet or to the top of bedrock, whichever was encountered first. Copies of the boring log forms for the DBA are provided in **Appendix C-1**.

At each location, three soil samples were collected for laboratory analyses, as follows:

1. 0- to 2-foot depth interval to represent surface soil.
2. Because the depth of the excavation area was reported to be up to 18 feet, a soil sample also was collected from the 16- to 18-foot depth interval, or from the last soil interval above bedrock, whichever was encountered first.
3. 6- to 8-foot depth interval, or from the interval with the highest flame ionization detector/photoionization detector (FID/PID) screening result.

All soil samples from the DBA were analyzed for RCRA metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver), vanadium, VOCs, and SVOCs (including polynuclear aromatic hydrocarbons [PAHs] compounds). Based on the results of the field PID screening, five soil samples were selected for additional analyses, including pesticides, herbicides, PCBs, dioxins, and furans. Analyses were performed by TestAmerica Laboratories, Inc. (TestAmerica).

5.2.2.2 Treated Soil Stockpile

The TSS measures approximately 75 feet by 150 feet. Soil samples were collected at nine locations on the stockpile, designated TSS-1 through TSS-9, as shown in **Figure 6**.

Soil sampling was performed using direct-push (e.g., Geoprobe®) sampling methods, as described in the SAWP, dated June 4, 2012, and approved by the WVDEP. Copies of the boring log forms for the TSS are provided in **Appendix C-2**.

At each location, the soil samples from the two depth intervals that yield the highest readings from the PID scan were collected for laboratory analyses. Soil samples were analyzed for RCRA metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver), vanadium, VOCs, and SVOCs (including PAH compounds). Based on the results of these analyses, the soil sample from the TSS-2, 5- to 7-foot depth interval was also analyzed for pesticides/herbicides, PCBs, and dioxins/furans.

5.2.2.3 Polymer Spill Area

The approximate location of the Polymer Spill Area (PSA) is shown in **Figure 2**. Soil samples were collected at two locations in this area, designated PSA-1 and PSA-2 (**Figure 7**). Soil sampling was performed using direct-push (e.g., Geoprobe®) sampling methods, as described in the SAWP. Copies of the boring log forms for the PSA are provided in **Appendix C-3**.

At each location, two soil samples were collected for laboratory analyses. No positive PID readings were recorded for samples from this area. In accordance with the SAWP, soil samples for laboratory analyses were collected from the 0- to 2-foot and 6- to 8-foot depth intervals. All soil samples from the PSA were analyzed for RCRA metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver), vanadium, VOCs, and SVOCs (including PAH compounds).

5.2.2.4 Wastewater Treatment Plant Area

The area of soil affected by seepage from the wastewater treatment tank was inspected and reviewed with facility personnel. Soil samples were collected at two locations in this area, designated WWTP-1 and WWTP-2, focusing on areas where it appeared the seepage may have pooled for a period of time (**Figure 4**).

The samples were collected from the upper one foot of soil using manual sampling methods, as described in the SAWP. Copies of the soil descriptions for the WWTP soil samples are provided in **Appendix C-4**. The soil samples were analyzed for RCRA metals (arsenic, barium, cadmium,

chromium, lead, mercury, selenium, silver), vanadium, VOCs, and SVOCs (including PAH compounds).

5.2.2.5 Disposal Pit Area – AOC No. 1

Soil samples were collected at two locations (designated WTA-1 and WTA-2) within the area believed to correspond to the reported disposal pit area, just north-northeast of the wastewater treatment area (**Figure 4**).

Soil sampling was performed using direct-push (e.g., Geoprobe®) sampling methods, as described in the SAWP. Continuous soil sampling was performed to a depth of 12 feet or to the top of bedrock, whichever was encountered first. Copies of the boring log forms for the WTA locations are provided in **Appendix C-5**.

At each location, three soil samples were collected for laboratory analyses. The samples were collected from the three depth intervals that yield the highest readings from the PID scan. If no positive PID readings were recorded, soil samples were collected from the 0- to 2-foot, 6- to 8-foot, and 10- to 12-foot depth intervals. If bedrock is encountered, the lowermost sample was collected from immediately above the top of bedrock.

All soil samples from the WTA locations were analyzed for RCRA metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver), vanadium, VOCs, and SVOCs (including PAH compounds). Based on results from analyses of these parameters, the samples from the WTA-2 location, 3- to 5-foot and 12- to 13-foot intervals were also analyzed for pesticides/herbicides, PCBs, and dioxins/furans.

5.2.3 Installation of Temporary Groundwater Sampling Points

As requested by WVDEP personnel during a site visit conducted on February 29, 2012, temporary groundwater monitoring points, designated TMP-1 through TMP-3, were installed at the following locations:

- TMP-1: in the polymer spill area;
- TMP-2: midway between existing monitoring wells MW-103 and MW-108; and,
- TMP-3: directly south of the treated soil stockpile.

The SAWP called for a fourth temporary sampling point (TMP-4) to be installed near the southeast corner of the TSS, but this location could not be accessed by the equipment available at the time the other points were installed. Installation of TMP-4 was deferred, pending evaluation of results for groundwater samples from TMP-3.

During the site reconnaissance described in Section 5.2.1, the MW-108 monitoring well (a flush-mount well in a gravel-covered portion of the facility parking lot) could not be located. As an interim measure, a temporary groundwater sampling point (TMP-5) was installed at the approximate location of the MW-108 well.

Approximate locations for the temporary monitoring points are shown in **Figure 5**. Logs from the installation of the points are provided in **Appendix D**.

5.2.4 Groundwater Sampling

Groundwater samples were collected from monitoring wells (MW series and WWT series) and temporary monitoring points (TMP series) on two occasions, August 15-16, 2012, and September 19-20, 2012. Because the MW series monitoring wells were last sampled in 2005, and the last sampling date for the WWT wells is unknown, an attempt was made to redevelop the existing monitoring wells prior to sampling. Well development and sampling procedures were as described in the SAWP.

During the sampling events, the following deviations from the planned sampling program occurred:

August: WWT-1, WWT-2, and TMP-1 did not yield sufficient water for sampling.

September: WWT-2 did not yield sufficient water for sampling. WWT-1 and TMP-1 yielded only sufficient water for collection of samples for VOC analyses.

With the exceptions noted above, all groundwater samples from both sampling events were analyzed for arsenic, barium, lead, iron, manganese, vanadium, VOCs, and SVOCs. Metals were analyzed on both unfiltered and filtered samples.

Groundwater samples from the first sampling event were also analyzed for pesticides/herbicides and PCBs. With two exceptions (see Section 6.5), results for these compounds were below DMV, WVGPS, and USEPA RBSL values for all samples from the first sampling event. Based on these results, pesticides/herbicides and PCBs were not analyzed on samples from the second sampling event.

Sampling log forms for both groundwater sampling events are provided in **Appendix E**.

5.2.5 Groundwater Flow Mapping

In conjunction with each groundwater sampling event, depth-to-water measurements were made in all existing monitoring wells and temporary monitoring points. The measurements and reference point elevations for each well/point were used to determine the groundwater elevation at that location. The groundwater elevations were plotted on a site base map and contoured to evaluate horizontal hydraulic gradients and general groundwater flow directions in the unconsolidated zone.

6.0 DESCRIPTION OF SITE CONDITIONS

6.1 Historical Land Use

As described in Section 5.2.1, historical land use on the Site was evaluated through a walking reconnaissance of undeveloped portions of the Site and a review of historical aerial photographs and topographic maps.

6.1.1 Reconnaissance

A walking reconnaissance of the undeveloped portion of the Site was conducted on August 6, 2012. Owing to dense vegetation and steep terrain and associated safety considerations, the reconnaissance focused largely on areas that could be observed from the access road for the communications tower located along the east-central boundary of the Site and all-terrain vehicle (ATV) trails along a portion of the western Site boundary. As described below, the road used to access the communications tower existed prior to the QSI facility (i.e., prior to 1958). Considering this history, the area immediately adjacent to the road is regarded to have the greatest potential for the presence of previously unidentified disposal/dump sites. No evidence of significant disposal activity was observed during the reconnaissance. Representative photographs from the site reconnaissance are provided in **Appendix F**.

6.1.2 Aerial Photographs

A summary of observations relating to each of the aerial photographs provided by INFOMAP (**Appendix B-1**) is given below.

1957: Image is very dark, so details are hard to discern. Dirt road used to access communications tower is well-defined. Near the south-central limit of the image, a loop-shaped access road is visible at the approximate location of the current QSI facility and wastewater treatment plant. Just east of that location, several structures,

believed to be houses, are visible, at the approximate locations of Parcels 1, 2, 3, and 6 on the current Site survey (see **Figure 2**).

1971: Resolution of image is poor. Dirt road used to access communications tower is well defined. Main QSI facility building is visible near south-central margin of image. Presence of structures/houses east of facility is uncertain.

1990: Dirt road used to access communications tower is well-defined. Main QSI facility building is visible near south-central margin of image. Wastewater treatment plant appears to be present just north of facility building. Structures/houses east of facility do not appear to be present.

1996: Ongoing or recent logging activity apparent over much of the undeveloped portion of the Site. Bio-cells for treatment of soil excavated from DBA visible east of facility building.

2011: Communications tower access road less pronounced (overgrown). QSI facility, treatment plant, and truck parking areas in current configuration.

6.1.3 Topographic Maps

A summary of observations relating to each of the topographic maps provided by INFOMAP (**Appendix B-2**) is given below.

1899: Road (old Route 25) appears closer to base of valley wall. No development apparent at location of current QSI facility. Single structure indicated in approximate location of current Parcel 6.

1909: Single structure indicated at approximate location of current QSI facility (south side of road at that time).

1909: (reprinted 1920) Area of the Site unchanged from original 1909 map.

1931: Route 25 appears to more closely align with current location. Structure at approximate location of current QSI facility still indicated. Structure at approximate location of current Parcel 6 no longer indicated.

1933: Area of the Site appears unchanged from 1931 map.

1933: (reprinted 1939) Area of the Site appears unchanged from 1933 map.

1958: Structure no longer indicated at approximate location of current QSI facility. Two structures indicated at approximate location of current Parcels 1, 2, 3 and 6 (consistent with 1957 aerial photograph). Road used to access current communications tower indicated. Large industrial complex to the east-southeast of the Site indicated for the first time.

1958: (revised 1971) Current QSI facility building indicated. Five structures indicated at approximate location of current Parcels 1, 2, 3 and 6.

1958: (revised 1976) Area of the Site unchanged from 1971 map revision.

The reconnaissance and review of aerial photographs and topographic maps described above do not provide any indication of previously unidentified disposal sites or dumps. In addition to these activities, anecdotal evidence provided by Mr. Ron Baker, employed at the QSI facility since the mid-1990s and who periodically hunts and takes walks on the undeveloped portion of the Site, does not indicate the presence of any unidentified disposal or dumping areas.

6.2 Hydrology

The predominant surface water feature in the area of the Site is the Kanawha River, which is some 1,000 to 1,200 feet south of the southern boundary of the Site. Surface drainage from the steep, undeveloped portion of the Site is generally to the south, either by overland flow, or by a deeply-incised natural drainage system that collects surface runoff from much of the upland area. The drainage is routed to a single tributary that exits the upland area near the facility's wastewater treatment plant. At that point, the drainage is routed through an underground pipe (48-inch-diameter) that extends to the south, beneath Route 25. To the south of Route 25, the drainage is by surface ditch to the Kanawha River.

A small area in the northernmost portion of the Site includes part of a surface drainage basin that extends to the north-northeast, to a perennial stream known as Rocky Fork.

The USGS topographic map for the Site (Saint Albans, W. VA., 1976) does not indicate any perennial or intermittent streams on the Site. Long-time facility employees indicate that drainage

from the upland area occurs only during wet seasons or immediately following significant precipitation events.

Runoff from the relatively flat, developed areas of the Site is by overland flow to roadside collection ditches along the north side of Route 25.

6.3 Geology/Hydrogeology

A total of 12 groundwater monitoring wells and five temporary groundwater monitoring points have been installed at the site, including 10 MW series wells (MW-101 through MW-110), two wells designated as WWT-1 and WWT-2, and TMP-1 through TMP-3 and TMP 5. No boring log or well construction information is available for the WWT series wells installed by the WVDEP. Well logs for the MW series wells have been provided to the WVDEP in previous submittals and are provided again as **Appendix G**. Logs for TMP monitoring points are included in **Appendix D**.

6.3.1 Unconsolidated

The site is immediately underlain by unconsolidated deposits comprised predominantly of varying mixtures of clay, silt, sand, and rock fragments. These deposits represent colluvial material resulting from the weathering of the adjacent bedrock valley wall. At monitoring well locations MW-102, MW-103, and MW-109, more well-sorted sand was recorded near the bottom of the well boreholes, suggesting the lateral margin of Kanawha River alluvial terrace deposits. The unconsolidated deposits overlie bedrock at depths ranging from around 20 feet to around 35 feet below ground surface (bgs). A general geologic cross-section for the Site is shown in **Figure 8**.

During the installation of monitoring wells MW-107 through MW-110 in July 2000, soil samples were collected from the soil/groundwater interface to determine the porosity and bulk density. Results indicate that the porosity of the soils ranges from 29.8 percent to 35.9 percent, and soil density ranges from 1.73 grams per cubic centimeter (g/cm^3) to 1.86 g/cm^3. In addition, a soil

sample from a boring drilled near MW-101 was analyzed for TOC content. The resulting value was 3.5 percent TOC.

Based on observations made along steep drainage ways in the undeveloped portion of the Site, upland areas are covered by a relatively thin soil layer, comprised of bedrock residuum and plant matter.

6.3.2 Bedrock

The site is located in the unglaciated portion of the Appalachian Plateau Physiographic Province. Bedrock underlying the site is comprised of the Kanawha Formation of the Pottsville Group. The Kanawha Formation is comprised of alternating beds of siltstone, sandstone, and shale (commonly containing plant debris), coal, and occasionally, thin limestone beds. The bedrock has a well-developed, blocky fracture pattern, which has moderate porosity and permeability.

A rose diagram of bedrock bedding and fracture sets observed and measured at the Site is shown in **Figure 9**. The diagram illustrates fracture orientation and relative degree of development. The bedding strike (intersection of bedding plane with the horizontal) was measured to be generally north 55 degrees east with a dip of 2 degrees to 13 degrees south. Two main fracture trends were measured: north 2 to 32 degrees east and north 10 to 20 degrees west. Both fracture sets were nearly vertical.

6.3.3 Groundwater Occurrence and Flow

The uppermost groundwater beneath the site occurs near the base of the unconsolidated zone. The depth to groundwater is in the range of 15 to 25 feet bgs at most monitoring well locations on the Site. Review of boring logs for monitoring wells suggests that the saturated zone may occur most commonly near the interface between the unconsolidated zone and the top of bedrock, with the saturated zone being on the order of a few feet thick, although groundwater elevations in the wells are somewhat higher. Recharge to the shallow groundwater zone is by infiltration from the surface and by the discharge of groundwater to the unconsolidated deposits

from the underlying bedrock valley wall. By this condition, and consistent with the observation that water levels in monitoring wells are typically somewhat higher than the level where saturation was first observed, the overall vertical hydraulic gradient beneath the developed areas of the Site is interpreted to be upward.

In conjunction with each groundwater sampling event, depth-to-water measurements were made in all existing monitoring wells and temporary monitoring points. The measurements and reference point elevations for each well/point were used to determine the groundwater elevation at that location. Water level elevation data for both monitoring events are summarized in **Table 7.**

The groundwater elevations were plotted on a site base map and contoured to evaluate horizontal hydraulic gradients and general groundwater flow directions in the unconsolidated zone. A representative groundwater elevation contour map for the unconsolidated zone is provided as **Figure 10**. The horizontal hydraulic gradient and direction of groundwater flow in the unconsolidated zone are generally to the south, toward Route 25. In the absence of groundwater pumping in the area, it is expected that groundwater in the unconsolidated zone downgradient from the Site discharges to the Kanawha River.

Results of hydraulic testing conducted in accordance with modification No. 1 to the Post-Closure Care Permit indicated an average hydraulic conductivity value of 68.62 gallons per day per square foot (gpd/ft^2) for the unconsolidated zone. The groundwater flow velocity in the unconsolidated zone can be estimated by the equation V = Ki/n, where:

V = groundwater flow velocity in feet/day
K = hydraulic conductivity feet/day
i = horizontal hydraulic gradient (dimensionless), and
n = effective porosity

For K:

Using a conversion factor of 7.48 gallons per cubic foot (gal/ft^3), the average hydraulic conductivity (K) converts to 9.17 feet/day.

For i:

From **Figure 10**, the hydraulic gradient calculated between monitoring wells MW-104 and MW-108, directly downgradient from the DBA, is 0.085. This is consistent with the average gradient values calculated between these wells for the groundwater monitoring events performed at the Site from September 2000 through June 2005 (11 events).

For n:

Although the total porosity values obtained for samples from the unconsolidated deposits range from 29.8 percent to 35.9 percent, the effective porosity is typically somewhat lower and often regarded to be equivalent to the specific yield of the deposits. According to Driscoll (1986), the specific yield for clay sediments is typically in the range of 1 to 10 percent, and 10 to 30 percent for sand. Given that the unconsolidated deposits beneath the Site are a mixture of clay, silt, and sand, an overall value of 10 percent is regarded to be reasonable for n.

Based on these input values, the groundwater flow velocity is calculated as:

$$V = 9.17 \text{ ft/day } (0.085)/0.10 = 7.8 \text{ ft/day}.$$

It is noted that the composition of the unconsolidated zone and the horizontal hydraulic gradient are variable beneath the Site. As shown in **Figure 10**, the horizontal hydraulic gradient is generally lower in the area of the TSS. Based on these factors, groundwater flow velocities would be expected to exhibit localized variability.

6.4 Analytical Results for Soil

As described in Section 5, soil samples were collected in the following five areas of the developed portion of the Site:

- Former Drum Burial Area (DBA);
- Treated Soil Stockpile (TSS);
- Polymer Spill Area (PSA);
- Wastewater Treatment Plant Area; and,
- Disposal Pit Area – AOC No. 1.

The following sections describe the analytical results for each area. Laboratory data are tabulated according to each area and each category of analyses (e.g., metals, VOCs, SVOCs). In accordance with VRP guidance, a minimum of 10 percent of the laboratory data for soil samples was subjected to Level III data validation. The general criteria used to assess the analytical integrity of the data were based on an examination of: case narrative, analytical holding times, sample preservation, method calibration, method and project blanks, analytical surrogate recoveries, internal standard performance, MS/MSD recoveries and differences, LCS recoveries, and re-analysis and secondary dilution recovery. Documentation of the data validation process and findings is provided in **Appendix H.**

To provide a frame of reference and as described in the SAWP, analytical results are compared to VRP DMV and USEPA Regional Screening Levels (RSL). For both DMV and RSL, two values are given, a risk-based value that assumes incidental direct contact with and ingestion of soil under an industrial land use scenario (i.e., Industrial Soil value) and a leaching-based value that is regarded to be protective of groundwater (i.e., Migration to Groundwater value). It is noted that the Migration to Groundwater value assumes that groundwater potentially impacted by leaching of the contaminants from the soil is used for residential potable supply. For purposes of the discussions in the following sections, this provides a very conservative screening of the analytical results, as there is no known groundwater use in the vicinity of the Site.

With regard to results for metals, analytical results are also compared to natural background levels for soil in West Virginia, as reported in the VRP Guidance Manual (v 2.1).

It is noted that in accordance with paragraph 18 of the VRA, applicable cleanup standards for the site will be determined at a future time, based on the reports to be prepared under the VRA. The future determination of standards will be described in a modification to the VRA.

6.4.1 Former Drum Burial Area

A total of 21 soil samples were collected from seven locations at the DBA (see **Figure 5**). At each location, soil samples were collected from surface soil (0- to 2-foot depth interval), from a depth interval near or below the base of the former excavation (i.e., 16- to 18-foot depth interval), and from the 6- to 8-foot depth interval or the interval that yielded the highest field PID screening result. All soil samples from the DBA were analyzed for RCRA metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver), vanadium, VOCs, and SVOCs (including PAHs compounds). Based on the results of the field PID screening, five soil samples were selected for additional analyses, including pesticides, herbicides, PCBs, dioxins, and furans. The analytical results for the DBA soil samples are provided in **Tables 8 through 13**. The results are discussed in the following sections.

6.4.1.1 Metals (Table 8)

Chromium, mercury, silver, and vanadium were consistently below detection or below their respective DMV and RSL in all samples from the DBA. Metals reported above their DMV and/or RSL in one or more samples were arsenic, barium, cadmium, lead, and selenium. None of the reported values for these metals exceeded the risk-based DMV. Only arsenic exceeded the risk-based RSL. All of the results exceeding the DMV or RSL were above the Migration to Groundwater value (i.e., DMV_{GW} and RSL_{GW}, respectively), which conservatively assumes that groundwater beneath the Site is used for residential potable supply. Results for arsenic, barium, cadmium, lead, and selenium are discussed further in the following paragraphs.

Arsenic

Results for all soil samples from the DBA were above the risk-based RSL, which is a factor of 17 lower than the risk-based DMV and nearly a factor of five lower than the mean value reported in VRP guidance for natural background concentrations of arsenic in soil in West Virginia. Arsenic was reported above the DMV_{GW} (5.8 milligrams per kilogram [mg/kg]) in 12 of 21 samples. The RSL_{GW}, which is 0.29 mg/kg, was exceeded in all samples. All results that exceeded the DMV and/or RSL were within the reported range of natural background levels. The reported range of natural background values for West Virginia soil is 5.9 mg/kg to 13 mg/kg, with a mean of 8.64 mg/kg. The range of arsenic concentrations reported for soil samples from the DBA was 1.9 mg/kg to 12 mg/kg, with 16 of the 21 reported values being below the background mean.

Barium

None of the barium results exceeded the DMV_{GW} of 1,600 mg/kg. The RSL_{GW}, which is 82 mg/kg, was exceeded in 19 of the 21 samples. All results that exceeded the RSL_{GW} were within the range of natural background levels for barium in soil in West Virginia. For barium, the reported range of natural background values is 300 mg/kg to 500 mg/kg, with a mean of 360 mg/kg. The range of concentrations reported for soil samples from the DBA was 22 mg/kg to 460 mg/kg, with all but one of the reported values being below the background mean of 360 mg/kg. It is noted that the RSL_{GW} is substantially lower than the reported natural background range and mean value.

Cadmium

Cadmium was below detection in all but two samples, with only the result for the DBA-4 (16 to 18 feet) sample exceeding the DMV or RSL. This sample result is anomalous by comparison to cadmium results for all other soil samples from the Site and, therefore, is regarded to be uncertain.

Lead

The DMV_{GW} and RSL_{GW} for lead are 270 mg/kg and 14 mg/kg, respectively. Concentrations of lead were below the DMV_{GW} in all samples from the DBA, but exceeded the RSL_{GW} in 13 of the 21 samples. The natural background range for lead in soil in West Virginia is reported to be 10 mg/kg to 20 mg/kg, with a mean of 16.5 mg/kg. The RSL_{GW} is substantially lower than the reported background range and mean value. Of the 13 samples where the reported lead value exceeded the RSL_{GW}, three values (two results of 23 mg/kg and one result of 27 mg/kg) marginally exceeded the reported natural background range. These results are not regarded to represent impacts to soil associated with the DBA.

Selenium

The DMV_{GW} and RSL_{GW} for selenium are 5.2 mg/kg and 0.26 mg/kg, respectively. The range of natural background concentrations for West Virginia soil is reported to be up to 0.8 mg/kg. Only one result (5.6 mg/kg) for soil samples from the DBA exceeded the DMV_{GW}. All reported detections of selenium exceeded the RSL_{GW} and the natural background range. It is noted that selenium was reported in nearly all of the soil samples from the DBA, including samples from all depth intervals, regardless of the relative position of the sample to the former excavation. Also, except for the value of 5.6 mg/kg, the range of reported concentrations was from 1.5 mg/kg to 3.9 mg/kg, which is relatively consistent for an analyte in natural soil. In addition, the selenium values for the DBA soil samples are similar to values reported for soil samples from other areas of the Site where no evidence of impacts was determined (e.g., polymer spill area, described below). Considering these observations, the concentrations of selenium reported for soil samples from the DBA are regarded to represent natural conditions for soil in the local area.

6.4.1.2 VOCs (Table 9)

VOCs were reported above the sample reporting limits in 12 of 21 soil samples collected in the DBA. A total of 23 different VOCs were reported in at least one sample, with the following 13 compounds reported above their respective DMV and/or RSL in at least one sample.

1,1,2-Trichloroethane	Benzene	Methylene Chloride
1,1-Dichloroethane	Chlorobenzene	Naphthalene
1,1-Dichloroethene	Chloroform	Trichloroethene
1,2-Dichloroethane	cis-1,2-Dichloroethene	Vinyl Chloride
1,2-Dichloropropane		

All of the results exceeding the DMV or RSL were above the DMV_{GW} and/or RSL_{GW}. None of the reported values for these VOCs exceeded the risk-based DMV or RSL.

The DMV_{GW} and/or RSL_{GW} were not exceeded in any of the soil samples from the DBA-3 location. One VOC exceeded its DMV_{GW} and/or RSL_{GW} at DBA-2 (chlorobenzene), DBA-4 (vinyl chloride), and DBA-7 (methylene chloride). At the remaining locations (DBA-1, DBA-5, and DBA-8), the predominant VOCs exceeding their respective standards were benzene, chlorobenzene, naphthalene, trichloroethene, cis-1,2-dichloroethene, and vinyl chloride. At both DBA-5 and DBA-8, located within the approximate outline of the former excavation area, the results exceeding DMV_{GW} and/or RSL_{GW} were for samples from the 6- to 8-foot and 16- to 18-foot depth interval.

6.4.1.3 SVOCs (Table 10)

The only SVOCs reported at concentrations above their sample reporting limits were bis(2-ethylhexyl)phthalate (10 samples), naphthalene (one sample), and 2-methylnaphthalene (one sample). Of these, only the reported result for naphthalene in the 6- to 8-foot sample from the DBA-8 location exceeded its DMV and/or RSL. The result was well below both risk-based values, but above the DMV_{GW} and RSL_{GW}.

6.4.1.4 Pesticides/Herbicides (Table 11)

Based on field screenings to identify samples potentially containing relatively high levels of contamination, five samples from the DBA were selected for analysis of pesticide and herbicide compounds. All of the results were below sample reporting limits.

6.4.1.5 PCBs (Table 12)

Based on field screenings to identify samples potentially containing relatively high levels of contamination, five samples from the DBA were selected for analysis of PCBs. All of the results were below sample reporting limits.

6.4.1.6 Dioxins/Furans (Table13)

Based on field screenings to identify samples potentially containing relatively high levels of contamination, five samples from the DBA were selected for analysis of dioxin/furan compounds. The analytical results were converted to total 2,3,7,8-TCDD toxicity equivalents using applicable TEFs for dioxin and dioxin-like compounds. The results for all samples are below the DMV and RSL.

6.4.2 Treated Soil Stockpile

A total of 20 soil samples (including two duplicate samples) were collected from nine locations at the TSS (see **Figure 6**). At each location, the soil samples from the two depth intervals that yield the highest readings from the PID scan were collected for laboratory analyses. All soil samples from the TSS were analyzed for RCRA metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver), vanadium, VOCs, and SVOCs (including PAH compounds). These results are given in **Tables 14 through 16**. Based on the results of the field PID screening, the sample from the 5- to 7-foot depth interval at the TSS-7 location was selected for additional analyses, including pesticides, herbicides, PCBs, dioxins, and furans. These are included in **Tables 11 through 13**. The results are discussed in the following sections.

6.4.2.1 Metals (Table 14)

Cadmium, chromium, mercury, silver, and vanadium were consistently below detection or below their respective DMV and RSL in all samples from the TSS. Metals reported above their DMV and/or RSL in one or more samples were arsenic, barium, lead, and selenium. None of the

reported values for these metals exceeded the risk-based DMV. Only arsenic exceeded the risk-based RSL. All of the results exceeding the DMV or RSL were above the Migration to Groundwater value (i.e., DMV_{GW} and RSL_{GW}, respectively), which conservatively assumes that groundwater beneath the Site is used for residential potable supply. Results for arsenic, barium, lead, and selenium are discussed further in the following paragraphs.

Arsenic

Results for all soil samples from the TSS were above the risk-based RSL, which is a factor of 17 lower than the risk-based DMV and nearly a factor of five lower than the mean value reported in VRP guidance for natural background concentrations of arsenic in soil in West Virginia. Arsenic was reported above the DMV_{GW} (5.8 mg/kg) in 17 of 20 samples and above the RSL_{GW}, which is 0.29 mg/kg, in all samples. All results that exceeded the DMV and/or RSL were within the reported range of natural background levels. The reported range of natural background values for West Virginia soil is 5.9 mg/kg to 13 mg/kg, with a mean of 8.64 mg/kg. The range of arsenic concentrations reported for soil samples from the TSS was 3.7 mg/kg to 11 mg/kg, with 17 of the 20 reported values being below the background mean.

Barium

None of the barium results exceeded the DMV_{GW} of 1,600 mg/kg. The RSL_{GW}, which is 82 mg/kg (approximately a factor of 20 lower than the DMV_{GW}), was exceeded in 17 of 20 samples. All results that exceeded the RSL_{GW} were within the range of natural background levels for barium in soil in West Virginia. For barium, the reported range of natural background values is 300 mg/kg to 500 mg/kg, with a mean of 360 mg/kg. The range of concentrations reported for soil samples from the TSS was 30 mg/kg to 230 mg/kg, with all of the reported values being below the background mean of 360 mg/kg.

Lead

The DMV_{GW} and RSL_{GW} for lead are 270 mg/kg and 14 mg/kg, respectively. Concentrations of lead were below the DMV_{GW} in all samples from the TSS, but exceeded the RSL_{GW} in 19 of 20 samples. The natural background range for lead in soil in West Virginia is reported to be 10 mg/kg to 20 mg/kg, with a mean of 16.5 mg/kg. The RSL_{GW} is substantially lower than the reported background range and mean value. Of the 19 samples where the reported lead value exceeded the RSL_{GW}, four values (ranging from 21 mg/kg to 23 mg/kg) marginally exceeded the reported natural background range. These results are not regarded to represent impacts to soil associated with the TSS.

Selenium

The DMV_{GW} and RSL_{GW} for selenium are 5.2 mg/kg and 0.26 mg/kg, respectively. None of the results for soil samples from the TSS exceeded the DMV_{GW}. Results for all soil samples exceed the RSL_{GW}. The range of natural background concentrations for West Virginia soil is reported to be up to 0.8 mg/kg. Although all reported detections of selenium also exceed the reported natural background range, it is noted that values for samples from the TSS are similar to values reported for soil samples from other areas of the Site where no evidence of impacts was determined (e.g., polymer spill area, described below). Considering these observations, the concentrations of selenium reported for soil samples from the DBA are regarded to represent natural conditions for soil in the local area.

Results for the TSS soil samples were also compared to LDRs under the RCRA, specifically, the Universal Treatment Standards under the CFR, Title 40, Subpart D, §268.48. The LDRs are the highest concentration of a substance that can be present in a waste to be eligible for land disposal. In the case of metals, the LDRs are based on the concentration in leachate resulting from the leaching of the waste material using the TCLP. For the metals detected in the TSS soil samples, given below are the LDRs and the range of total metals concentrations reported in the samples.

METAL	LDR (mg/L)	CONCENTRATION RANGE (mg/kg)
Arsenic	5.0	3.7 – 11
Barium	21	30 – 230
Chromium	0.6	14 – 29
Lead	0.75	12 – 23
Mercury	0.025	0.035 – 0.055
Selenium	5.7	1.6 – 4.3
Vanadium	1.6	18 – 47

Although total metals concentrations are not directly comparable to leaching-based LDRs, at the total concentrations reported for each of these metals, it is considered unlikely that these concentrations would yield leachate concentrations exceeding the LDRs.

6.4.2.2 VOCs (Table 15)

VOCs were reported above the sample reporting limits in 17 of 20 soil samples collected in the TSS, including samples from eight of the nine sampling locations. A total of 17 different VOCs were reported in at least one sample, with the following compounds reported above their respective DMV and/or RSL in at least one sample.

Benzene	Ethylbenzene	Naphthalene
Chlorobenzene	Methylene Chloride	Trichloroethene

All of the results exceeding the DMV or RSL were above the DMV_{GW} and/or RSL_{GW}. None of the reported values for these VOCs exceeded the risk-based DMV or RSL.

VOC results for the TSS soil samples were also compared to LDRs. VOC concentrations exceeded the LDRs in two samples from the TSS, as summarized below.

VOC	LDR	TSS-2 (5'-7')	TSS-4 (6'-8')
Ethylbenzene	10,000 µg/kg	< LDR	11,000 µg/kg
Naphthalene	5,600 µg/kg	7,400 µg/kg	26,000 µg/kg

6.4.2.3 SVOCs (Table 16)

SVOCs reported in TSS soil samples were 2-methylnaphthalene, bis(2-ethylhexyl)phthalate, naphthalene, and N-nitrosodiphenylamine. None of these compounds exceeded their risk-based DMV or RSL values. Bis(2-ethylhexyl)phthalate was reported above its RSL_{GW} in five samples and naphthalene was reported above its DMV_{GW} and RSL_{GW} in seven samples. One or both of these compounds exceeded its DMV_{GW} and/or RSL_{GW} in soil samples from all locations except TSS-7 and TSS-8.

SVOC results for the TSS soil samples also were compared to LDRs, as available. None of the results exceeded LDRs.

6.4.2.4 Pesticides/Herbicides (Table 11)

Based on field screenings to identify samples potentially containing relatively high levels of contamination, the soil sample from the 5- to 7-foot interval at the TSS-2 location was selected for analysis of pesticide and herbicide compounds. Alpha-BHC (0.013 mg/kg) and beta-BHC (0.02 mg/kg) were reported at concentrations exceeding their respective DMV_{GW} of 0.011 mg/kg and 0.0043 mg/kg. Both results were well below their respective risk-based DMV and RSL, and also well below the LDRs for these compounds (0.066 mg/kg).

6.4.2.5 PCBs (Table 12)

Based on field screenings, the soil sample from the 5- to 7-foot interval at the TSS-2 location also was selected for analysis of PCBs. All results were below the sample reporting limits.

6.4.2.6 Dioxins/Furans (Table 13)

Based on field screenings, the soil sample from the 5- to 7-foot interval at the TSS-2 location also was selected for analysis of dioxin/furan compounds. The analytical results were converted to total 2,3,7,8-TCDD toxicity equivalents using applicable TEFs for dioxin and dioxin-like compounds. The resulting value is below the DMV and RSL. Individual dioxin and furan compounds detected in the sample were well below their respective LDRs.

6.4.3 Polymer Spill Area

Soil samples were collected at two locations in the PSA, designated PSA-1 and PSA-2 (see **Figure 7**). At each location, two soil samples were collected for laboratory analyses. In accordance with the work plan, soil samples for laboratory analyses were collected from the 0- to 2-foot and 6- to 8-foot depth intervals. A total of five soil samples from the PSA were analyzed, including one duplicate sample. PSA soil samples were analyzed for RCRA metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver), vanadium, VOCs, and SVOCs (including PAH compounds). The analytical results for the PSA soil samples are provided in **Tables 17 through 19**. The results are discussed in the following sections.

6.4.3.1 Metals (Table 17)

Cadmium, chromium, mercury, and vanadium were consistently below detection or below their respective DMV and RSL in all samples from the PSA. Metals reported above their DMV and/or RSL in one or more samples were arsenic, barium, lead, selenium, and silver. None of the reported values for these metals exceeded the risk-based DMV. Only arsenic exceeded the risk-based RSL. All of the results exceeding the DMV or RSL were above the Migration to Groundwater value (i.e., DMV_{GW} and RSL_{GW}, respectively), which conservatively assumes that groundwater beneath the Site is used for residential potable supply. Results for arsenic, barium, lead, and selenium are discussed further in the following paragraphs.

Arsenic

Arsenic results for all soil samples from the TSS were above the risk-based RSL, which is a factor of 17 lower than the risk-based DMV and nearly a factor of five lower than the mean value reported in VRP guidance for natural background concentrations of arsenic in soil in West Virginia. Arsenic was reported above the DMV_{GW} (5.8 mg/kg) in the samples from PSA-1 and above the RSL_{GW}, which is 0.29 mg/kg, in all samples. All results that exceeded the DMV and/or RSL were within the reported range of natural background levels and below the mean background value. The reported range of natural background values for West Virginia soil is 5.9 mg/kg to 13 mg/kg, with a mean of 8.64 mg/kg. The range of arsenic concentrations reported for soil samples from the PSA was 2.9 mg/kg to 6.8 mg/kg.

Barium

None of the barium results exceeded the DMV_{GW} of 1,600 mg/kg. The RSL_{GW}, which is 82 mg/kg (approximately a factor of 20 lower than the DMV_{GW}), was exceeded in all of the PSA soil samples. All results that exceeded the RSL_{GW} were within the range of natural background levels for barium in soil in West Virginia and below the mean background value. For barium, the reported range of natural background values is 300 mg/kg to 500 mg/kg, with a mean of 360 mg/kg. The range of concentrations reported for soil samples from the PSA was 110 mg/kg to 190 mg/kg.

Lead

The DMV_{GW} and RSL_{GW} for lead are 270 mg/kg and 14 mg/kg, respectively. Concentrations of lead were below the DMV_{GW} in all samples from the PSA, but exceeded the RSL_{GW} in four of five samples. The natural background range for lead in soil in West Virginia is reported to be 10 mg/kg to 20 mg/kg, with a mean of 16.5 mg/kg. The RSL_{GW} is substantially lower than the reported background range and mean value. Results for two of the four samples where the reported lead value exceeded the RSL_{GW} (21 mg/kg and 28 mg/kg) marginally exceeded the

reported natural background range. These results are not regarded to represent impacts to soil associated with the TSS.

Selenium

The DMV_{GW} and RSL_{GW} for selenium are 5.2 mg/kg and 0.26 mg/kg, respectively. None of the results for soil samples from the PSA exceeded the DMV_{GW}. Results for four of the five soil samples exceed the RSL_{GW}. The result for the remaining sample was reported as <2.3 mg/kg. Although this reporting limit is above the RSL_{GW}, no estimated detection above the method detection limit of 0.21 mg/kg was reported. The range of natural background concentrations for West Virginia soil is reported to be up to 0.8 mg/kg. Although all reported detections of selenium exceed the reported natural background range, it is noted that there are no other indications of impacts to soil at the PSA (see discussion below). In addition, similar selenium values have been reported for samples from all other areas of the Site, regardless of depth interval or location relative to areas of past or suspected releases. Considering these observations, the concentrations of selenium reported for soil samples from the PSA are regarded to represent natural conditions for soil in the area.

Silver

Silver was reported in one sample (PSA-2 ─ 0 to 2 feet), at a concentration that is above the RSL_{GW}. No natural background data are provided for silver in the VRP guidance manual. However, this is the only detection of silver out of the 51 soil samples analyzed from the Site. Consistent with guidance addressing low frequency detections in Section 2.6.2.2 of the VRP guidance manual, silver is not present consistently enough or at high enough concentration to contribute significantly to risk at the Site.

6.4.3.2 VOCs (Table 18)

VOCs reported in one or more soil samples from the PSA were acetone, cis-1,2-DCE, trans-1,2-DCE, TCE, and xylenes. None of the results exceeded DMV or RSL values.

6.4.3.3 SVOCs (Table 19)

SVOCs reported in one or more soil samples from the PSA were acetophenone, benzo(g,h,i)perylene, bis(2-ethylhexyl)phthalate, fluoranthene, and pyrene. None of the results exceeded DMV or RSL values.

6.4.4 Wastewater Treatment Plant Area

Soil samples were collected at two locations where it appeared that seepage from the leaking treatment tank may have pooled for a period of time. The samples were designated WWTP-1 and WWTP-2 and were collected from the upper one foot of soil. The samples were analyzed for RCRA metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver), vanadium, VOCs, and SVOCs (including PAH compounds). The analytical results for the WWTP soil samples are provided in **Tables 20 through 22**. The results are discussed in the following sections.

6.4.4.1 Metals (Table 20)

Cadmium, chromium, silver, and vanadium were consistently below detection or below their respective DMV and RSL in the WWTP samples. Metals reported above their DMV and/or RSL were arsenic, barium, lead, mercury, and selenium. None of the reported values for these metals exceeded the risk-based DMV. Only arsenic exceeded the risk-based RSL. All of the results exceeding the DMV or RSL were above the Migration to Groundwater value (i.e., DMV_{GW} and RSL_{GW}, respectively), which conservatively assumes that groundwater beneath the Site is used for residential potable supply. Results for arsenic, barium, lead, mercury, and selenium are discussed further in the following paragraphs.

<u>Arsenic</u>

Arsenic results for both WWTP soil samples were above the risk-based RSL, which is a factor of 17 lower than the risk-based DMV and nearly a factor of five lower than the mean value reported

in VRP guidance for natural background concentrations of arsenic in soil in West Virginia. Arsenic was reported above the RSL_{GW} in both samples and above the DMV_{GW} (5.8 mg/kg) in the WWTP-1 sample. Both results are within the reported range of natural background levels and below the mean background value.

Barium

Neither of the barium results exceeded the DMV_{GW} of 1,600 mg/kg. The RSL_{GW}, which is 82 mg/kg (approximately a factor of 20 lower than the DMV_{GW}), was exceeded in the WWTP-1 sample. Both results are within the range of natural background levels for barium in soil in West Virginia and below the mean background value. For barium, the reported range of natural background values is 300 mg/kg to 500 mg/kg, with a mean of 360 mg/kg. The barium concentrations in the WWTP soil samples were 74 mg/kg to 150 mg/kg.

Lead

The DMV_{GW} and RSL_{GW} for lead are 270 mg/kg and 14 mg/kg, respectively. Concentrations of lead were below the DMV_{GW}, but above the RSL_{GW} in both WWTP samples. The natural background range for lead in soil in West Virginia is reported to be 10 mg/kg to 20 mg/kg, with a mean of 16.5 mg/kg. The RSL_{GW} is substantially lower than the reported background range and mean value. The lead result for the WWTP-1 sample (29 mg/kg) marginally exceeds the reported natural background range. These results are not regarded to represent impacts to soil associated with the WWTP.

Mercury

Neither of the WWTP mercury results exceeded the DMV_{GW} of 2.1 mg/kg. The RSL_{GW}, which is 0.1 mg/kg (approximately a factor of 20 lower than the DMV_{GW}), was exceeded in the WWTP-2 sample (1.5 mg/kg). VRP guidance reports the natural background range for mercury in soil in West Virginia to be 0.02 mg/kg to 0.44 mg/kg, with a mean value of 0.14 mg/kg. The mercury value for the WWTP-2 sample also exceeds the reported background range.

Selenium

The DMV_{GW} and RSL_{GW} for selenium are 5.2 mg/kg and 0.26 mg/kg, respectively. Neither of the results for the WWTP soil samples exceeds the DMV_{GW}. Results for both samples exceed the RSL_{GW}. The range of natural background concentrations for selenium in West Virginia is reported to be up to 0.8 mg/kg. Although both reported detections of selenium also exceed the reported natural background range, similar selenium values have been reported for samples from all other areas of the Site, regardless of depth interval or location relative to areas of past or suspected releases. Considering these observations, the concentrations of selenium reported for the WWTP soil samples are regarded to represent natural conditions for soil in the area.

6.4.4.2 VOCs (Table 21)

All VOCs analyzed were below detection in both WWTP soil samples.

6.4.4.3 SVOCs (Table 22)

Eleven SVOCs were reported in the WWTP soil samples. Bis(2-ethylhexyl)phthalate was the only SVOC reported in the WWTP-1 sample. Ten additional SVOCs, predominantly PAH compounds, were reported in the WWTP-2 sample. None of the SVOCs concentrations exceed their respective risk-based DMV or RSL values, or the DMV_{GW}. Concentrations of benzo(a)anthracene and benzo(b)fluoranthene exceed their respective RSL_{GW}. It is noted that PAH compounds are constituents in a variety of common materials, such as coal and asphalt. As such, the isolated detections of certain PAH compounds at concentrations below the DMV_{GW}, but above the RSL_{GW}, are not regarded to represent impacts to soil at the WWTP.

6.4.5 Disposal Pit Area – AOC No. 1

Soil samples were collected at two locations (designated WTA-1 and WTA-2) within the area believed to correspond to the reported disposal pit area, just north-northeast of the wastewater treatment area (see **Figure 4**). At each location, three soil samples were collected for laboratory

analyses. In addition, a field duplicate sample was collected. All soil samples were analyzed for RCRA metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver), vanadium, VOCs, and SVOCs (including PAH compounds). These results are provided in **Tables 23 through 25**. Based on results of field screenings, the samples from the WTA-2 location, 3- to 5-foot and 12- to 13-foot intervals, were also analyzed for pesticides, herbicides, PCBs, dioxins, and furans. These results are included in **Tables 11 through 13**. The results are discussed in the following sections.

6.4.5.1 Metals (Table 23)

Cadmium, chromium, mercury, silver, and vanadium were consistently below detection or below their respective DMV and RSL in all of the WTA samples. Metals reported above their DMV and/or RSL in one or more samples were arsenic, barium, lead, and selenium. None of the reported values for these metals exceeded the risk-based DMV. Only arsenic exceeded the risk-based RSL. All of the results exceeding the DMV or RSL were above the Migration to Groundwater value (i.e., DMV_{GW} and RSL_{GW}, respectively), which conservatively assumes that groundwater beneath the Site is used for residential potable supply. Results for arsenic, barium, lead, and selenium are discussed further in the following paragraphs.

<u>Arsenic</u>

Results for all WTA soil samples were above the risk-based RSL, which is a factor of 17 lower than the risk-based DMV and nearly a factor of five lower than the mean value reported in VRP guidance for natural background concentrations of arsenic in soil in West Virginia. Arsenic was reported above the DMV_{GW} (5.8 mg/kg) in six of the seven samples and above the RSL_{GW}, which is 0.29 mg/kg, in all samples. All results that exceeded the DMV and/or RSL were within the reported range of natural background levels. The reported range of natural background values for West Virginia soil is 5.9 mg/kg to 13 mg/kg, with a mean of 8.64 mg/kg. The range of arsenic concentrations reported for the WTA soil samples was 4.5 mg/kg to 8.8 mg/kg, with six of the seven reported values being below the background mean. These results are not regarded to represent impacts to soil associated with the alleged disposal pit area.

Barium

None of the barium results exceeded the DMV_{GW} of 1,600 mg/kg. The RSL_{GW}, which is 82 mg/kg (approximately a factor of 20 lower than the DMV_{GW}), was exceeded in six of the seven samples. All results that exceeded the RSL_{GW} were within the range of natural background levels for barium in soil in West Virginia and below the background mean value. For barium, the reported range of natural background values is 300 mg/kg to 500 mg/kg, with a mean of 360 mg/kg. The range of concentrations reported for the WTA soil samples was 72 mg/kg to 170 mg/kg. These results are not regarded to represent impacts to soil associated with the alleged disposal pit area.

Lead

The DMV_{GW} and RSL_{GW} for lead are 270 mg/kg and 14 mg/kg, respectively. Concentrations of lead were below the DMV_{GW} in all WTA samples, but exceeded the RSL_{GW} in six of seven samples. The natural background range for lead in soil in West Virginia is reported to be 10 mg/kg to 20 mg/kg, with a mean of 16.5 mg/kg. The RSL_{GW} is substantially lower than the reported background range and mean value. Of the seven samples where the reported lead value exceeded the RSL_{GW}, only one value (21 mg/kg) marginally exceeded the reported natural background range. These results are not regarded to represent impacts to soil associated with the alleged disposal pit area.

Selenium

The DMV_{GW} and RSL_{GW} for selenium are 5.2 mg/kg and 0.26 mg/kg, respectively. None of the results for the WTA soil samples exceed the DMV_{GW}. Results for all soil samples exceed the RSL_{GW}. The range of natural background concentrations for West Virginia soil is reported to be up to 0.8 mg/kg. Although all reported detections of selenium also exceed the reported natural background range, it is noted that values for the WTA samples are similar to values reported for soil samples from other areas of the Site where no evidence of impacts was determined (e.g., polymer spill area). It is also noted that similar selenium values have been reported for

samples from all other areas of the Site, regardless of depth interval or location relative to areas of past or suspected releases. Considering these observations, the concentrations of selenium reported for the WTA soil samples are regarded to represent natural conditions for soil in the local area.

6.4.5.2 VOCs (Table 24)

VOCs were not reported in any of the samples from the WTA-1 location, but were reported in all samples from the WTA-2 location. A total of 30 different VOCs were reported in the WTA-2 samples, with the following 17 compounds reported above their respective DMV and/or RSL in at least one sample.

1,1,2-Trichloroethane	Benzene	Naphthalene
1,1-Dichloroethene	Chlorobenzene	Tetrachloroethene
1,2-Dichlorobenzene	Chloroform	Toluene
1,2-Dichloroethane	cis-1,2-Dichloroethene	Trichloroethene
1,2-Dichloropropane	Ethylbenzene	Trichlorofluoromethane
	Methylene Chloride	Vinyl Chloride

All of the results exceeding the DMV or RSL were above the DMV_{GW} and/or RSL_{GW}. None of the reported values for these VOCs exceeded the risk-based DMV or RSL. In general, the highest concentrations of VOCs were reported in the 12- to 13-foot sample.

6.4.5.3 SVOCs (Table 25)

A total of 17 SVOCs were reported in the WTA soil samples, with detections in three of the seven samples. SVOCs reported above their respective DMV_{GW} and/or RSL_{GW} values were bis(2-ethylhexyl)phthalate, naphthalene, and n-nitrosodiphenylamine in the WTA-2 (12- to 13-foot) sample and naphthalene in the WTA-2 (3- to 5-foot) sample. SVOC detections were more prevalent and at higher concentrations in the WTA-2 (12- to 13-foot) sample. None of the detected values exceed their risk-based DMV or RSL.

6.4.5.4 Pesticides/Herbicides (Table 11)

Except for alpha-BHC, all pesticide/herbicide compounds were below detection in the two WTA soil samples analyzed for this group of parameters. Alpha-BHC was reported in both samples at concentrations (0.013 mg/kg and 0.018 mg/kg) nominally above the DMV_{GW} of 0.011 mg/kg. Neither of these results is above the risk-based DMV or RSL values.

6.4.5.5 PCBs (Table 12)

All PCBs were below detection in both WTA soil samples analyzed for this group of parameters.

6.4.5.6 Dioxins/Furans (Table 13)

The analytical results for dioxin/furan compounds were converted to total 2,3,7,8-TCDD toxicity equivalents using applicable TEFs for dioxin and dioxin-like compounds. The resulting values for both WTA soil samples are below the DMV and RSL.

6.4.6 Summary of Soil Results

In all, a total of 59 soil samples (including duplicate samples) were collected from various depth intervals at 22 locations and five areas on the Site where contaminants are known or suspected to have been released to soil.

6.4.6.1 Metals

RCRA metals and vanadium were analyzed on all samples from the Site. Cadmium, chromium, and vanadium were below detection or below their respective DMV and RSL values in all samples. Silver was reported in only one soil sample from the Site, with the result above the RSL_{GW}. Mercury was reported in two soil samples, both from the wastewater treatment plant seepage area, with one of the results above the RSL_{GW}. Metals reported above their DMV and/or RSL most consistently were arsenic, barium, lead, and selenium. Of these, only arsenic was

reported at concentrations above a risk-based criterion (RSL). Barium, lead, and selenium were reported only above their respective Migration to Groundwater DMV and/or RSL, which conservatively assumes that groundwater beneath the Site is used for residential potable supply. All of the results for arsenic and barium are within or below natural background concentrations, as reported in the VRP guidance manual. Certain lead results marginally exceed the reported natural background range, but are not regarded to represent impacts to soil associated with the Site. All of the detected concentrations of selenium exceed the reported natural background range and the RSL_{GW}; however, the results for all areas of the Site fall within a fairly narrow concentration range and there is no apparent relationship of higher concentration to potential release locations and/or depth interval. Considering these conditions, the selenium results are regarded to represent natural conditions for soil at the Site. Overall, the analytical results indicate that impacts to soil at the Site by metals are negligible.

6.4.6.2 VOCs

No VOCs were reported in soil samples from the wastewater treatment plant seepage area, and only low-level detections of a few VOCs were reported for samples from the polymer spill area, with no results exceeding DMV or RSL values.

VOCs exceeding their respective DMV_{GW} and/or RSL_{GW} in samples from the TSS were benzene, chlorobenzene, ethylbenzene, methylene chloride, naphthalene, and TCE. Naphthalene exceeded the LDR in two samples and ethylbenzene exceeded the LDR in one sample from the TSS.

VOC detections above DMV_{GW} and/or RSL_{GW} values occurred most predominantly in soil samples from the DBA and the WTA-2 location in the area believed to correspond to a former disposal pit just north-northeast of the wastewater treatment plant. In these areas, VOCs exceeding DMV_{GW} and/or RSL_{GW} were the following:

1,1,2-Trichloroethane	Benzene	Tetrachloroethene
1,1-Dichloroethane	Chlorobenzene	Toluene
1,1-Dichloroethene	Chloroform	Trichloroethene

1,2-Dichloroethane	Ethylbenzene	Trichlorofluoromethane
cis-1,2-Dichloroethene	Methylene Chloride	Vinyl Chloride
1,2-Dichloropropane	Naphthalene	

None of the detections of VOCs in any of the soil samples from the Site exceeded risk-based DMV or RSL values.

6.4.6.3 SVOCs

SVOC detections above DMV_{GW} or RSL_{GW} values were sporadic. No SVOC detections exceeding DMV_{GW} or RSL_{GW} were reported for samples from the PSA. SVOCs exceeding DMV_{GW} and/or RSL_{GW} in other areas of the Site are the following:

Naphthalene
Bis(2-ethylhexyl)phthalate
Benzo(a)anthracene
Benzo(b)fluoranthene
N-Nitrosodiphenylamine

None of the results for these compounds exceed risk-based DMV or RSL values, and none of the results for samples from the TSS exceed applicable LDRs.

6.4.6.4 Pesticides/Herbicides

Alpha-BHC and beta-BHC were the only pesticide/herbicide compounds reported above their DMV_{GW} and/or RSL_{GW}. Both compounds exceeded their DMV_{GW} and RSL_{GW} in the soil sample from the TSS-2 location. Alpha-BHC was reported above its DMV_{GW} and RSL_{GW} in both samples analyzed from the WTA locations. None of the results were above risk-based DMV or RSL values. None of the results for the TSS exceeded LDR values.

6.4.6.5 PCBs

PCBs were below detection in all soil samples analyzed.

6.4.6.6 Dioxins/Furans

Dioxin/furan results were converted to TCDD toxicity equivalents using applicable TEFs for dioxins and dioxin-like compounds. The resulting values for all samples analyzed for dioxin/furan compounds were below DMV and RSL values. Results for individual dioxin/furan compounds in the sample from the TSS were below LDR values.

6.5 Analytical Results for Groundwater

As described in Section 5.2.4, groundwater samples were collected from nine MW series groundwater monitoring wells and three temporary (TMP series) groundwater sampling points. Monitoring wells MW-101 and MW-110 are located hydraulically upgradient from areas of current or previous waste handling (see **Figure 10**). Wells MW-102, MW-103, MW-107, and MW-109, and temporary points TMP-2, TMP-3, and TMP-5 are located along a line just north of and roughly parallel to the downgradient boundary of the Site. Wells MW-104, MW-105, and MW-106, and temporary point TMP-1, are located within or adjacent to known or suspected release areas.

Laboratory data are tabulated according to each category of analyses (e.g., metals, VOCs, SVOCs). In accordance with VRP guidance, a minimum of 10 percent of the laboratory data for soil samples was subjected to Level III data validation. The general criteria used to assess the analytical integrity of the data were based on an examination of: case narrative, analytical holding times, sample preservation, method calibration, method and project blanks, analytical surrogate recoveries, internal standard performance, MS/MSD recoveries and differences, LCS recoveries, and re-analysis and secondary dilution recovery. Documentation of the data validation process and findings is provided in **Appendix H.**

The wells and temporary points were sampled twice, once in August and once in September 2012. During each event, samples were analyzed for arsenic, barium, iron, lead, manganese, vanadium, VOCs, and SVOCs. For metals, both field filtered and unfiltered samples were collected. Samples from the August sampling event were also analyzed for pesticide/herbicide compounds and PCBs. It is noted that during the August sampling event, monitoring wells WWT-1 and WWT-2, and temporary point TMP-1 did not yield sufficient water for sampling. During the September event, WWT-1 and TMP-1 yielded sufficient water for analysis of VOCs only. The analytical results for groundwater samples are provided in **Tables 26 through 30**.

The following sections describe the analytical results for groundwater. To provide a frame of reference and as described in the SAWP, analytical results are compared to VRP DMV and USEPA RSL values. For groundwater, both DMV and RSL values assume that groundwater beneath the Site is used for residential potable supply. For purposes of discussions in the following sections, this provides a very conservative screening of the analytical results, as there is no known groundwater use in the vicinity of the Site.

6.5.1 Metals (Table 26)

Because existing groundwater monitoring wells had not been sampled since 2005, efforts were made to redevelop the wells prior to the August sampling event. At least several well volumes of water were removed from each well the week before the initial sampling event. Each sampling event also included purging of at least three well volumes of water prior to sample collection at each well. Wells that went dry during purging were sampled upon recovery. Despite redevelopment and pre-sample purging, groundwater from the monitoring wells and temporary points was characterized by varying degrees of turbidity. As a result, metals results for unfiltered samples are regarded to be highly biased by suspended sediment in the samples that is digested by the acid preservative in the sample bottles. The discussions below are based on results for filtered samples.

Results for barium and lead were below DMV and RSL values in all groundwater samples collected during both sampling events. Results for arsenic, iron, manganese, and vanadium are discussed in the following paragraphs.

Arsenic

Arsenic was reported above DMV and RSL values (both 10 micrograms per liter [µg/L]) only in samples from the MW-104 and MW-105 monitoring wells, with all results for both of these wells exceeding the DMV and RSL. Arsenic results for these wells range from 25 µg/L to 60 µg/L. Arsenic occurs in groundwater in two forms, As^{+5} and As^{+3}, with the reduced form exhibiting substantially greater solubility. Because arsenic exhibits increased solubility under reducing conditions, it is considered likely that the results reflect the reduced form of arsenic (As^{+3}).

Both MW-104 and MW-105 are located adjacent to the DBA, where the highest concentrations of organic compounds have been historically reported in groundwater at the Site. An increased level of biological activity associated with the degradation of organic compounds can result in reducing (oxygen depleted) conditions in the groundwater. Under these reducing conditions, naturally-occurring arsenic in soil and bedrock would tend to be more soluble. Considering these conditions, the higher levels of arsenic in groundwater in this area of the Site are not interpreted to be directly associated with former disposal or current materials management practices at the Site, but rather, the increased solubility of naturally-occurring arsenic under reducing conditions.

Iron

Iron was reported above the DMV (26,000 µg/L) and RSL (11,000 µg/L) values only in samples from MW-104 and MW-105. Iron was above both the DMV and RSL in both samples from MW-105 (75,000 µg/L and 95,000 µg/L) and above just the RSL in the sample and duplicate collected in August from MW-104 (14,000 µg/L and 13,000 µg/L). Iron most typically occurs in groundwater as ferrous iron (Fe^{+2}) and ferric iron (Fe^{+3}), with reduced ferrous iron being the

predominant form in solution. Given the concentrations of iron reported for the MW-104 and MW-105 wells, it is considered likely that the results reflect the reduced form of iron.

High concentrations of iron, probably reduced ferrous iron, in samples from MW-104 and MW-105 are consistent with arsenic results discussed above. That is, reducing conditions resulting from consumption of dissolved oxygen by the biological degradation of organic compounds in groundwater in that area of the Site supports the occurrence of highly-soluble ferrous iron.

Manganese

Manganese was reported at concentrations above its DMV (there is no established RSL for manganese) in one or both groundwater samples from the following locations: MW-104, MW-105, MW-106, MW-107, TMP-2, and TMP-5. Manganese concentrations above the DMV range from 1,800 µg/L to 5,100 µg/L. Manganese concentrations for samples from monitoring wells MW-101 and MW-110 were less than 1,000 µg/L. In the majority of cases, concentrations for the filtered and unfiltered samples are similar, indicating that manganese concentrations are not heavily biased by turbidity in the samples, unlike other metals analyzed.

Vanadium

Vanadium was reported at concentrations exceeding the DMV in samples from all monitoring wells at the Site, including upgradient wells MW-101 and MW-110. None of the values exceed the USEPA RSL. It is noted that the DMV (2.6 µg/L) is a factor of 30 lower than the RSL (78 µg/L). Values for the upgradient wells are from 3.6 µg/L to 4.4 µg/L. Except for reported values of 15 µg/L and 12 µg/L for the September samples from MW-103 and TMP-2, respectively, the range for all other values above the DMV is 2.8 µg/L to 6.7 µg/L. It has been suggested that the presence of high concentrations of ferrous iron may, to some degree, affect the solubility of vanadium, in the form of ferrous vanadate (Hem, 1985). Based on this relationship, the presence of ferrous iron in groundwater at the Site, and the prevalence of vanadium in groundwater across the Site, the reported vanadium values are not regarded to reflect impacts to

groundwater directly associated with former or current materials disposal or management practices at the Site.

6.5.2 VOCs (Table 27)

A total of 21 VOCs were reported in one or more groundwater samples. Of these, the nine VOCs listed below were reported at concentrations above their respective DMV and/or RSL.

COMPOUND	OCCURRENCE SUMMARY		DMV/RSL (µg/L)	RANGE EXCEEDING DMV/RSL (µg/L)
	# WELLS	OVERALL FREQUENCY >DMV/RSL*		
1,1,2-Trichloroethane	1	2/26	5/5	24 - 25
1,2-Dichloropropane	1	2/26	5/5	5.6 – 7.9
1,4-Dichlorobenzene	1	1/26	370/75	150
1,4-Dioxane	1	2/26	0.67/0.67	280 - 390
Benzene	3	5/26	5/5	5.2 - 120
Chlorobenzene	2	4/26	100/100	1,500 – 4,100
cis-1,2-Dichloroethene	2	2/26	70/70	71 – 120
Trichloroethene	2	3/26	5/5	49 – 170
Vinyl Chloride	1	2/26	2/2	5.2 – 5.6

*-Field duplicates samples treated as single sample for frequency determination.

Except for the two detections of 1,2-dichloropropane, all of these reported VOC detections are for samples from monitoring wells MW-104, MW-105, and MW-106, which are adjacent to or immediately downgradient from the former DBA. The detections of 1,2-dichloroporopane that nominally exceed the DMV and RSL were at monitoring well MW-102. No other detections of VOCs exceeding DMV or RSL values were reported for sampling locations along the downgradient boundary of the Site. These results indicate minimal potential for the migration of VOCs in groundwater beyond the downgradient boundary of the Site at concentrations exceeding DMV and/or RSL values.

Table 4 provides a historical summary of VOCs most commonly reported in groundwater samples at concentrations exceeding DMV values. Of the four locations where VOCs were reported above DMV and/or RSL values during the two most recent groundwater sampling

events, the recent results are generally consistent with historical conditions at MW-104 and MW-105, which are closest to the DBA. At all other downgradient monitoring wells, including MW-102 and MW-106, VOC results for the recent sampling events are substantially lower than historical values, indicating continued natural degradation/attenuation of VOCs in groundwater at the Site.

6.5.3 SVOCs (Table 28)

A total of 29 SVOCs were reported in one or more groundwater samples. Of these, the 11 SVOCs listed below were reported at concentrations above their respective DMV and/or RSL.

COMPOUND	OCCURRENCE SUMMARY		DMV/RSL (µg/L)	RANGE EXCEEDING DMV/RSL (µg/L)
	# WELLS	OVERALL FREQUENCY >DMV/RSL*		
1,1'-Biphenyl	1	2/23	300/0.83	1.1 – 1.7
1,4-Dioxane	5	8/23	0.67/0.67	0.92 – 190
Benzo(a)anthracene	3	3/23	0.029/0.029	0.038 – 1.1
Benzo(a)pyrene	1	1/23	0.2/0.2	0.8
Benzo(b)fluoranthene	3	3/23	0.029/0.029	0.061 – 1.1
Benzo(k)fluoranthene	1	1/23	0.29/0.29	1.2
Bis(2-chloroethyl)ether	2	4/23	0.012/0/012	3.3 – 6.9
Dibenz(a,h)anthracene	3	3/23	0.0029/0.0029	0.036 – 1.2
Hexachlorobutadiene	4	4/23	0.86/0.26	0.3 – 1.2
Indeno(1,2,3-cd)pyrene	3	3/23	0.029/0.029	0.036 – 1.2
Naphthalene	1	2/23	0.14/0.14	23 - 36

*-Field duplicates samples treated as single sample for frequency determination.

Of these, the PAH compounds, specifically benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene, can be associated with natural materials, such as organic-rich shale and coal, which are both prevalent in bedrock in the Kanawha River valley and can be present in unconsolidated deposits throughout the area. As such, concentrations of these compounds in groundwater samples can be biased by suspended sediment in the samples that is subject to digestion as part of the analytical process. Despite redevelopment and pre-sample purging, groundwater samples from the monitoring wells and temporary points were characterized by varying degrees of turbidity. It is

noted that in all cases where PAH compounds were reported above DMV/RSL values during the August sampling event, the corresponding result for the September sampling event was either below DMV/RSL values or substantially lower than the initial result. This is interpreted to indicate continued development of the sampling points with successive purging and sampling events, resulting in decreased turbidity of samples collected during the September event and lower PAH results. Results for these compounds are not regarded to reflect impacts to groundwater by PAH compounds associated with prior disposal or materials management at the Site.

Of the remaining SVOC compounds reported above DMV and/or RSL values, 1,4-dioxane was reported in all samples from monitoring wells MW-104, MW-105, and MW-106. These wells are all adjacent to or immediately downgradient from the DBA. Hexachlorobutadiene was above its RSL (0.26 µg/L) in the August samples from MW-104 (0.39 µg/L) and MW-105 (0.30 µg/L). Results for the September samples from both wells were below detection. 1,1'-Biphenyl was reported above the USEPA RSL only at monitoring well MW-104 (1.1 µg/L and 1.7 µg/L). It is noted that these results are nominally above the RSL (0.83 µg/L), but well below the DMV of 300 µg/L. Naphthalene also was reported above the DMV and RSL only in samples from MW-104. MW-104 is the closest well to the former DBA.

With regard to monitoring wells along or near the downgradient boundary of the Site, detections of SVOCs above DMV or RSL values were few and sporadic. 1,4-Dioxane was reported in the September samples from MW-102 and MW-103; both results of 0.92 µg/L. This result is marginally above the DMV and RSL of 0.67 µg/L. Hexachlorobutadiene was reported above its DMV (0.86 µg/L) in the August sample from MW-102 (1.2 µg/L). The September sample from MW-102 (0.22 µg/L) was below both the DMV and RSL. Hexachlorobutadiene also was above its RSL (0.26 µg/L) in one sample from MW-103 (0.34 µg/L). These results indicate minimal potential for migration of SVOCs in groundwater beyond the downgradient boundary of the Site at concentrations exceeding DMV and/or RSL values.

Table 5 provides a historical summary of SVOCs reported in groundwater samples at concentrations exceeding DMV values. Only monitoring well MW-104 has a consistent history

of SVOC detections, with concentrations exceeding DMV. Results for the most recent sampling events are generally consistent with historical data for this well.

6.5.4 Pesticides/Herbicides (Table 29)

The only pesticide/herbicide compound reported at a concentration exceeding its DMV or RSL was Aldrin in the August sample from monitoring well MW-102. The result of 0.0008 µg/L exceeds the RSL of 0.00021 µg/L, but is below the DMV of 0.004 µg/L. It is also noted that the result is flagged for certain quality assurance/quality control (QA/QC) issues and is, therefore, regarded as unreliable. All other pesticide/herbicide results were below detection or below DMV and RSL values.

6.5.5 PCBs (Table 30)

The only PCB result that was above detection was PCB Aroclor 1260 in the sample from MW-102. The reported result of 0.16 µg/L exceeds the DMV and RSL values of 0.034 µg/L.

7.0 CONTAMINANT FATE AND TRANSPORT

The following sections provide discussions of potential transport pathways for contaminants in soil and groundwater at the Site. These evaluations are considered in the conceptual site model (see Section 8 below) and provide support for the identification and evaluation of potential exposure scenarios (current and hypothetical future) in the Site-Specific Risk Assessment.

7.1 Soil

Primary transport pathways for constituents in soil typically include erosion and transportation as suspended or dissolved material in storm water runoff, erosion and transportation of fine particulate material by wind, and leaching of water-soluble constituents by infiltration. Volatilization and transport into the atmosphere or intrusion into buildings is also a potential transport pathway for VOCs in soil. These potential transport pathways are discussed in the following sections.

7.1.1 Erosion/Storm water Runoff

The developed portion of the Site, where contaminants have been detected in soil samples, is largely covered by gravel, except in its eastern end, where it is covered by grasses and light brush. This portion of the Site also is relatively flat, such that the potential for high runoff velocity and associated erosion is reduced. Lastly, data from the soil sampling conducted under the VRP indicates that contaminants are largely non-detect or occur at low levels (e.g., below risk-based DMV and/or RSL) in surface soil samples (0- to 2-foot depth interval). Based on the combination of these conditions, the potential for transport of contaminants from the Site by way of erosion and storm water runoff is regarded to be negligible.

7.1.2 Erosion/Particulate Emissions

As discussed above for erosion and storm water runoff, the developed portion of the Site is largely covered by gravel and grass. Contaminants in soil were largely non-detect or below

risk-based DMV and RSL values, the derivation of which considers incidental contact with and ingestion of soil particulate, in surface soil samples. Based on the combination of these conditions, the potential for transport of contaminants at the Site by way of wind erosion and particulate emissions is regarded to be negligible.

7.1.3 Leaching

The potential for leaching and transport of water-soluble constituents from soil to groundwater was evaluated by comparing analytical results for soil samples to leaching-based DMV and RSL values, and also by the collection and analysis of groundwater samples from a total of 14 locations at the Site, with analyses for selected metals, VOCs, SVOCs, pesticides/herbicides, PCBs, and dioxins/furans.

Certain metals, VOCs, SVOCs, and pesticide/herbicide compounds were reported in soil samples at concentrations above their respective Migration to Groundwater DMV and/or RSL values, indicating a potential for leaching to groundwater to occur. It is noted that these leaching-based values assume that groundwater is used for residential potable supply purposes, but there is no such use of groundwater at or in the vicinity of the Site.

As described in Section 6.5, four metals, nine VOCs, 11 SVOCs, one pesticide/herbicide compound, and one PCB Aroclor were reported in at least one groundwater sample at concentrations exceeding its DMV and/or RSL. These data confirm that leaching of water-soluble constituents from soil to groundwater is a transport mechanism at the Site. The migration of dissolved constituents in groundwater is discussed below in Section 7.2.

7.1.4 Volatilization

Concentrations of VOCs in surface soil samples were typically below detection or below DMV and RSL values. As such, volatilization from soil to atmospheric air is not regarded to be a significant contaminant transport pathway at the Site. However, because volatilization to ambient air and inhalation of VOCs is not considered in the derivation of DMV values, this

potential migration and exposure pathway will be evaluated further through the Site-Specific Risk Assessment, in accordance with VRP guidance.

7.1.5 Vapor Intrusion

Existing facility buildings do not directly overly and are not immediately adjacent to any of the locations where VOCs were detected in soil samples. As such, the potential for volatilization and intrusion of VOCs into existing Site buildings is regarded to be negligible. Because the areas where VOCs occur in soil are largely flat-lying and could be subject to development in the future, the vapor intrusion migration pathway for a hypothetical future building is a potentially significant pathway and will be evaluated in the Site-Specific Risk Assessment.

7.2 Groundwater

Potential transport pathways relating to groundwater include the movement of dissolved constituents according to hydraulic gradients (i.e., from areas of higher hydraulic potential to areas of lower hydraulic potential), and the volatilization of VOCs from the groundwater and movement through the overlying soil to the atmosphere or into structures. Each of these potential transport pathways are discussed in the following sections.

7.2.1 Migration of Dissolved Constituents

Constituents dissolved in groundwater move according to prevailing groundwater flow patterns, from areas of higher hydraulic potential (higher groundwater elevation) to areas of lower hydraulic potential (lower groundwater elevation). Concentrations typically tend to decrease with distance away from a source and/or time, due to factors such as dilution, degradation, adsorption to aquifer matrix materials, and chemical processes. As discussed in Section 6.3.3, groundwater flow in the unconsolidated deposits beneath the Site is generally to the south. Movement of constituents dissolved in the groundwater beneath the Site would be expected to also be in this direction.

Analytical results for groundwater samples show substantial decreases in concentrations of contaminants, especially VOCs and SVOCs, over relatively short distances downgradient from source areas. More specifically, concentrations of VOCs and SVOCs are much lower at sampling locations MW-108/TMP-5, TMP-2, and MW-103 than at MW-104, MW-105, and MW-106. These data indicate rapid attenuation with groundwater flow distance in the unconsolidated deposits.

As discussed in Section 6.5, analytical results for monitoring points along or near the downgradient boundary of the Site (i.e., MW-102, MW-103, MW-107, MW-108/TMP-5, MW-109, TMP-2, and TMP-3) indicate minimal potential for migration of contaminants in groundwater beyond the downgradient boundary of the Site at concentrations exceeding DMV and/or RSL values. Further, there is no known use of groundwater for potable supply purposes in the vicinity of the Site.

Because the Kanawha River is interpreted to be the discharge point for shallow groundwater in the area, the potential for impacts to the Kanawha River by dissolved constituents migrating in groundwater from beneath the Site was analyzed.

The first step in this analysis was to screen constituents detected in one or more groundwater samples against West Virginia Water Quality Standards (WQS) listed in 47CSR2, Appendix E, Table 1. To provide a conservative screening, the highest concentration reported for any groundwater sample collected during the VRP sampling program, regardless of location on the Site, was compared to the lowest listed WQS. If the highest groundwater concentration did not exceed the lowest WQS, the constituent was not carried further in the analysis. **Table 31** provides a summary of this screening for those constituents detected in groundwater that have WQS established under 47CSR2. It is noted that the WQS provided in **Table 31** reflect the designated use of the Kanawha River, which is a warm water fishery. Although there are no public water supply intakes on the Kanawha River near the Site, WQS values for protection of human health relating to consumption of fish and water are included in **Table 31**.

Constituents whose highest groundwater concentration exceeded the lowest WQS were further evaluated by application of a "dilution factor." In this analysis, the volume of groundwater moving from beneath the Site was calculated and compared to the 7Q10 flow volume of the Kanawha River. This comparison was used to determine a "dilution factor" that was then applied to the highest constituent concentrations in groundwater at the Site to produce a theoretical concentration in the river as a result of the groundwater discharge. It is noted that this analysis conservatively assumes that the highest groundwater concentration occurs at the downgradient boundary of the Site and that no degradation or other attenuation of the reported groundwater concentration occurs between the Site and the river, a distance of about 1,500 feet.

The groundwater discharge volume was calculated by the equation Q = KIA, where:

Q = groundwater flow in cubic feet per day (ft^3/d),
K = hydraulic conductivity (9.17 ft/day, see Section 6.3.3),
I = horizontal hydraulic gradient (0.085, see Section 6.3.3),
A = cross-sectional area of aquifer (saturated thickness x length perpendicular to the direction of flow).

The value for saturated thickness was determined using the depth to bedrock and the depth to groundwater at Site monitoring wells. In reviewing boring logs for the monitoring wells at the Site, the borings for five wells were found to have reached bedrock. The data for these wells is summarized below.

WELL	DEPTH TO TOP OF BEDROCK (FT)	DEPTH TO GROUNDWATER (FT) (9/2012)	SATURATED THICKNESS (FT)
MW-101	20.0	17.51	2.49
MW-103	26.7	22.36	4.34
MW-105	31.5	20.04	11.46
MW-106	36.0	20.30	15.70
MW-110	33.0	21.91	11.09

To provide a conservative analysis, a thickness of 15 feet was used.

The length of the groundwater discharge zone perpendicular to the direction of flow was assumed to be the distance between monitoring wells MW-109 and the eastern end of the TSS, a distance of approximately 800 feet. Using this value and a saturated thickness of 15 feet, the cross-sectional area (A) of the groundwater discharge zone is calculated to be 12,000 square feet (ft^2).

Using this value for A, the volume of groundwater flow from beneath the area of interest at the Site is calculated as follows:

$$Q = KIA$$
$$Q = 9.17 \text{ ft/d} \times 0.085 \times 12{,}000 \text{ ft}^2$$
$$Q = 9{,}353 \text{ ft}^3\text{/d}$$

Data regarding the flow of the Kanawha River was obtained from the USGS online Water Information System (WIS) for the gauging station at Charleston, West Virginia. The lowest mean daily flow for a seven-day period for the 10-year period September 1, 2001, through September 30, 2011, was used. The resulting value was 2,030 ft^3 per second (CFS). Converting the calculated groundwater discharge volume to CFS gives 0.108 CFS. Comparing the groundwater discharge rate to the river flow rate, yields a dilution factor of about 18,800.

This dilution factor was then applied to the highest concentration reported for each constituent detected in any of the monitoring wells/points at the Site (regardless of location) during the two groundwater sampling events conducted under the VRP to provide a theoretical in-stream concentration that would result from the discharge of groundwater to the river. For metals, the filtered data were used in the analysis of dissolved contaminant migration. The results are summarized in **Table 31** and show that none of the resulting theoretical in-stream concentrations exceed their lowest WQS value. By this conservative analysis, the migration of dissolved constituents in groundwater beneath the Site is predicted to have negligible effect on surface water in the Kanawha River.

7.2.2 Volatilization from Groundwater

The monitoring wells and sampling points where concentrations of VOCs are reported in groundwater are not immediately adjacent to existing Site buildings. The closest monitoring well to the main facility building is MW-104, which is some 80 feet to the east. As such, the potential for the volatilization of VOCs from groundwater to impact existing Site buildings is regarded to be negligible. As part of the Site-Specific Risk Assessment, the migration of VOCs from soil and groundwater to atmospheric air and to hypothetical future buildings in other areas of the Site by vapor intrusion will be evaluated.

8.0 PRELIMINARY CONCEPTUAL SITE MODEL

As part of the VRP Site Assessment Work Plan, a Preliminary Conceptual Site Model (PCSM) was developed to assist in identifying potential COI, contaminant migration pathways, and receptors, and to guide the planning of data collection activities. The PCSM was based on extensive pre-existing data and previous studies relating to groundwater flow, potential contaminant movement in groundwater, and groundwater use in the area.

The following sections provide updates to the PCSM, based on data and associated interpretations from implementation of the VRP SAWP, as described in prior sections of this report. The revised Conceptual Site Model (CSM) will be used to support preparation of the Site-Specific Risk Assessment. A summary of the CSM is provided as **Figure 11**.

8.1 Contaminants of Interest (COI)

The following paragraphs provide a discussion of the identification of specific COI for the Site. The main criteria used in identifying specific COI were the frequency of detection and concentration relative to DMV and RSL values. For metals in soil, concentrations relative to the range of natural background concentrations, as reported in VRP guidance, were also considered. As described in Section 6.4, a total of 51 soil samples were collected across the Site. Groundwater samples were collected from 12 locations on two occasions. Constituents that were reported in less than 10 percent of the total samples (five or fewer for soil and two or fewer for groundwater), and the concentrations that were less than the DMV or RSL values were not retained as COI for the Site. All other parameters are retained as COI. Further discussions of the COI are provided in the following sections.

8.1.1 Soil

General categories of COI for soil identified in the Site Assessment Work Plan were certain metals, VOCs, SVOCs, pesticides/herbicides, PCBs, and dioxins/furans. A summary of the COI evaluation for soil is provided in **Table 32**.

Metals

Cadmium and silver were reported infrequently is soil samples and are not retained as COI for soil. Mercury was reported in approximately half of the soil samples, with only one result marginally exceeding the range of natural background concentrations for West Virginia soil, as reported in VRP guidance. As such, mercury is not retained as a COI for soil. Metals reported in nearly all soil samples were arsenic, barium, chromium, lead, selenium, and vanadium. Chromium and vanadium were not reported above their respective DMV or RSL values and were consistently within or below the reported natural background range for these metals. Therefore, chromium and vanadium are not retained as COI. Only arsenic was reported above its risk-based DMV or RSL value. Barium, lead, and selenium were reported above leaching-based DMV and/or RSL values in most or all soil samples. Because arsenic and barium concentrations were all within the reported range of natural background concentrations for West Virginia soil, these metals are not retained as COI. The only metals retained as COI for soil at the Site are lead and selenium.

VOCs

A total of 32 VOCs were reported in one or more soil samples. Of these, 22 VOCs were reported in greater than 10 percent of the soil samples. None of the VOC concentrations exceeded risk-based DMV or RSL values. In some cases, few or none of the reported concentrations exceeded leaching-based DMV and/or RSL values. However, due to the frequency of detection, these 22 VOCs are retained as COI.

SVOCs

A total of 23 SVOCs were reported in one or more soil samples. Of these, three were reported in more than 10 percent of the soil samples, 2-methylnaphthalene, bis(2-ethylhexyl)phthalate, and naphthalene. None of the SVOC concentrations exceeded risk-based DMV or RSL values, but these three compounds are retained as COI for soil.

Pesticides/Herbicides

Of the pesticide/herbicide compounds, alpha-BHC was reported in three soil samples and beta-BHC was reported in one sample. All of the reported concentrations were a factor of 200 or more below risk-based DMV and RSL values. These compounds are not retained as COI for soil at the Site.

PCBs

PCBs were below detection in all soil samples analyzed and are not retained as COI for soil.

Dioxins/Furans

One or more dioxin/furan compounds were reported in all soil samples analyzed for these compounds. Dioxin/furan results were converted to TCDD toxicity equivalents using applicable TEFs for dioxins and dioxin-like compounds. The resulting values for all samples were below DMV and RSL values. Because the highest calculated toxicity equivalence value (10.9) is more than 50 percent of the risk-based RSL value (18), dioxins/furans are retained as COI for soil.

8.1.2 Groundwater

Under the approved SAWP, groundwater samples from the Site were analyzed for selected metals, VOCs, SVOCs, pesticides/herbicides, and PCBs. For each of these categories of constituents, identification of COI for groundwater is discussed in the following sections.

Metals

Metals analyzed for groundwater samples were arsenic, barium, iron, lead, manganese, and vanadium. Results for barium and lead were below DMV and RSL values in all groundwater samples collected and are not retained as COI for groundwater. Arsenic, iron, manganese, and vanadium were above DMV and/or RSL values in samples from certain monitoring wells. Of

these, vanadium concentrations from sampling locations near or downgradient from known or suspected release areas were generally similar to samples from upgradient sampling locations. Based on these results, vanadium is not retained as a COI for groundwater. Arsenic, iron, and manganese are retained as COI, even though concentrations of these metals in groundwater are not regarded to be directly related to former or current materials disposal or management practices at the Site.

VOCs

A total of 21 VOCs were reported in one or more groundwater samples, with nine VOCs reported at concentrations above their respective DMV and/or RSL. Of these, one VOC (1,4-dichlorobenzene) was reported in only one sample and at a concentration that was below the DMV, but above the RSL. Based on this limited occurrence, 1,4-dichlorobenzene is not retained as a COI for groundwater. The remaining eight VOCs retained as COI are given below.

1,1,2-Trichloroethane
1,2-Dichloropropane
1,4-Dioxane
Benzene
Chlorobenzene
cis-1,2-Dichloroethene
Trichloroethene
Vinyl Chloride

SVOCs

A total of 29 SVOCs were reported in one or more groundwater samples, with 11 SVOCs reported at concentrations above their respective DMV and/or RSL. As discussed in Section 6.5.3, concentrations of six PAH compounds in groundwater samples are interpreted to reflect naturally occurring aquifer matrix materials in the form of suspended sediment in the

groundwater samples. The remaining five SVOCs retained as COI for groundwater are given below.

1,1'-Biphenyl
1,4-Dioxane
Bis(2-chloroethyl)ether
Hexachlorobutadiene
Naphthalene

Pesticides/Herbicides

The only pesticide/herbicide compound reported at a concentration exceeding its DMV or RSL was Aldrin, in one sample. The result exceeds the RSL, but is below the DMV, and is flagged for certain QA/QC issues. Considering this one, unreliable result, pesticide/herbicide compounds are not retained as COI for groundwater.

PCBs

Only one PCB result (Aroclor 1260 in one sample) was above detection in groundwater samples. Because the result is more than a factor of four greater than the DMV/RSL value, PCBs are retained as COI for groundwater.

8.2 Potential Exposure Pathways – Human Receptors

Pathways for potential exposure of both human and ecological receptors to COI in environmental media at the Site have been evaluated. As described in Section 7, the media of primary consideration at the Site are soil and groundwater. Analysis of the migration of dissolved constituents in groundwater indicates that the potential for impacts to surface water in the Kanawha River is negligible; therefore, surface water is not retained for further analysis. Discussion of potential exposure pathways relating to soil and groundwater are given in the following sections.

8.2.1 Soil

The current and foreseeable future use of the portion of the Site where releases have occurred is industrial. Because the transport of soil from the Site by surface water runoff and/or wind is regarded to be low (Section 7.1), the potential for exposure of off-site receptors is negligible. By these conditions, exposure to COI in soil at the Site is most likely by day-to-day workers or by visitors. Exposure to surface and sub-surface soil by excavation workers could also occur, in the event of a construction project, utility repair, or other activity that requires excavation. Based on the evaluation of potential transport pathways provided in Section 7, reasonably anticipated exposure pathways for these receptors include the following:

- Direct contact with surface soil – daily worker, excavation worker, visitor;
- Incidental ingestion of surface soil – daily worker, excavation worker, visitor;
- Inhalation of VOCs from soil to ambient air – daily worker, excavation worker, visitor; and,
- Intrusion and inhalation of VOCs in indoor air of a hypothetical future building constructed over areas of soil contamination – daily worker, visitor.

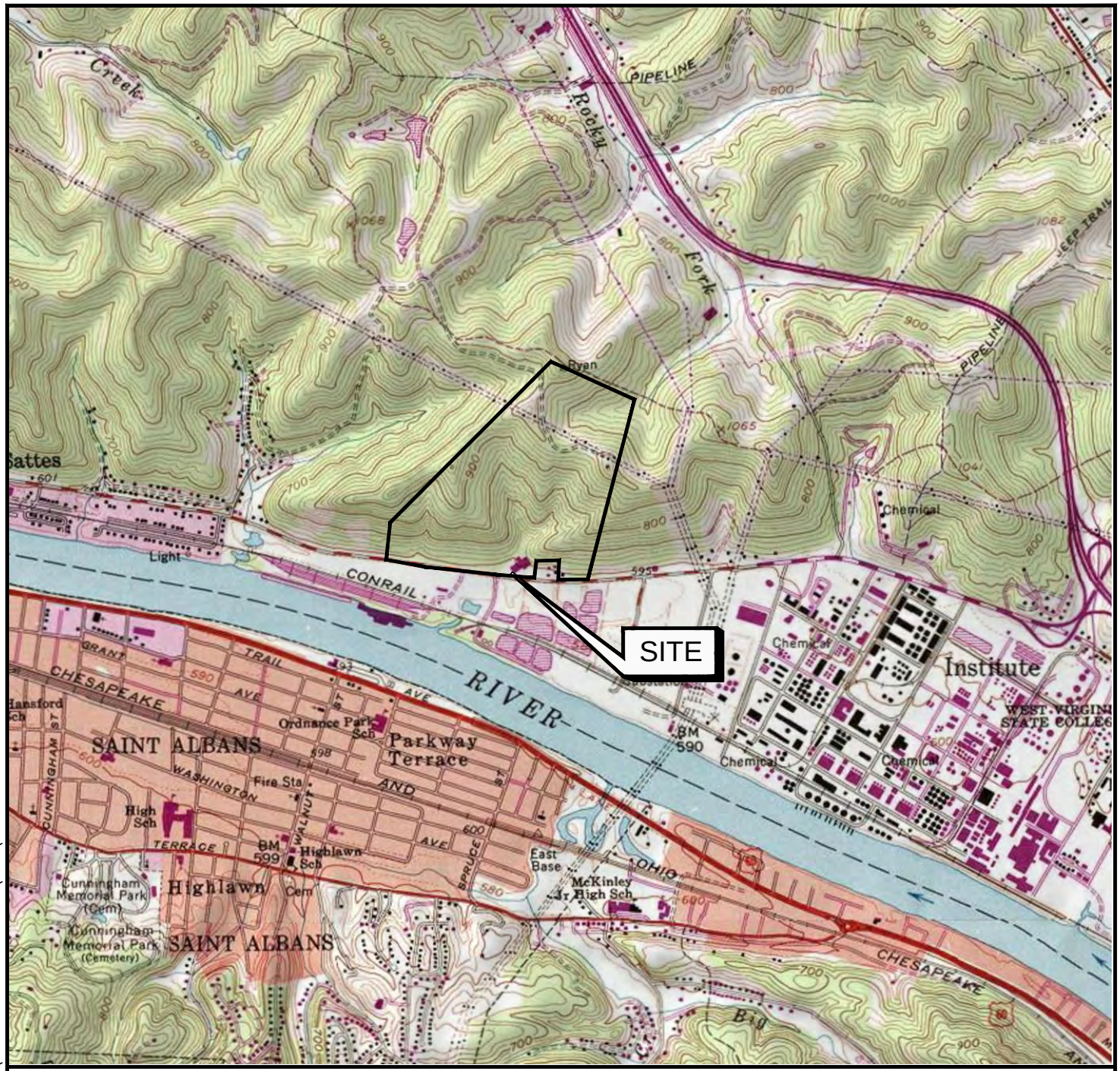
8.2.2 Groundwater

There is no current groundwater use at or in the vicinity of the Site and the Site and immediate area (to a distance of at least 2,500 feet) are served by a public water supply. As such, exposure pathways related to use of groundwater for potable supply purposes (ingestion, dermal contact, inhalation of vapors) are not complete. As described in Section 7.2, volatilization of VOCs from groundwater and intrusion to indoor air of a hypothetical future building constructed over the areas where VOCs are present in groundwater is a potentially complete exposure pathway for site workers or visitors. Also, because groundwater is relatively shallow beneath some areas of the Site, there is a potential for workers involved in an excavation project to be exposed to shallow groundwater by direct contact, incidental ingestion, and inhalation of vapors.

8.3 Potential Exposure Pathways – Ecological Receptors

The western portion of the developed area of the Site and the area around the main facility building are covered by gravel and used as parking for tractor trailer trucks. As such, these areas do not represent quality habitat for potential ecological receptors. The eastern portion of the developed area of the Site is covered by grasses and light brush and could serve as habitat for potential ecological receptors. Potential sources of COI in this area of the Site include the former bio-cell soil treatment areas and the TSS. The former bio-cells were excavated and much of the soil was sent off-site for disposal. Excavated soil that was not sent for off-site disposal was consolidated in the TSS and covered with a vegetated soil cover, as approved by the WVDEP and USEPA. As such, the potential for ecological receptors to contact COI in soil at the Site is regarded to be negligible. As described in Section 7.2.1, analysis of the migration of dissolved constituents in groundwater indicates that the potential for impacts to surface water and associated ecological receptors in the Kanawha River is negligible.

FIGURES



NOTE: BASE MAP FROM THE SAINT ALBANS, W. VA, 7.5 MINUTE USGS TOPOGRAPHIC QUADRANGLE 1976.

2000' 0 2000'

SCALE IN FEET

N

WVA STATE PLANE
NAD 83 SOUTH
US FOOT

QUADRANGLE LOCATION

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SITE LOCATION MAP

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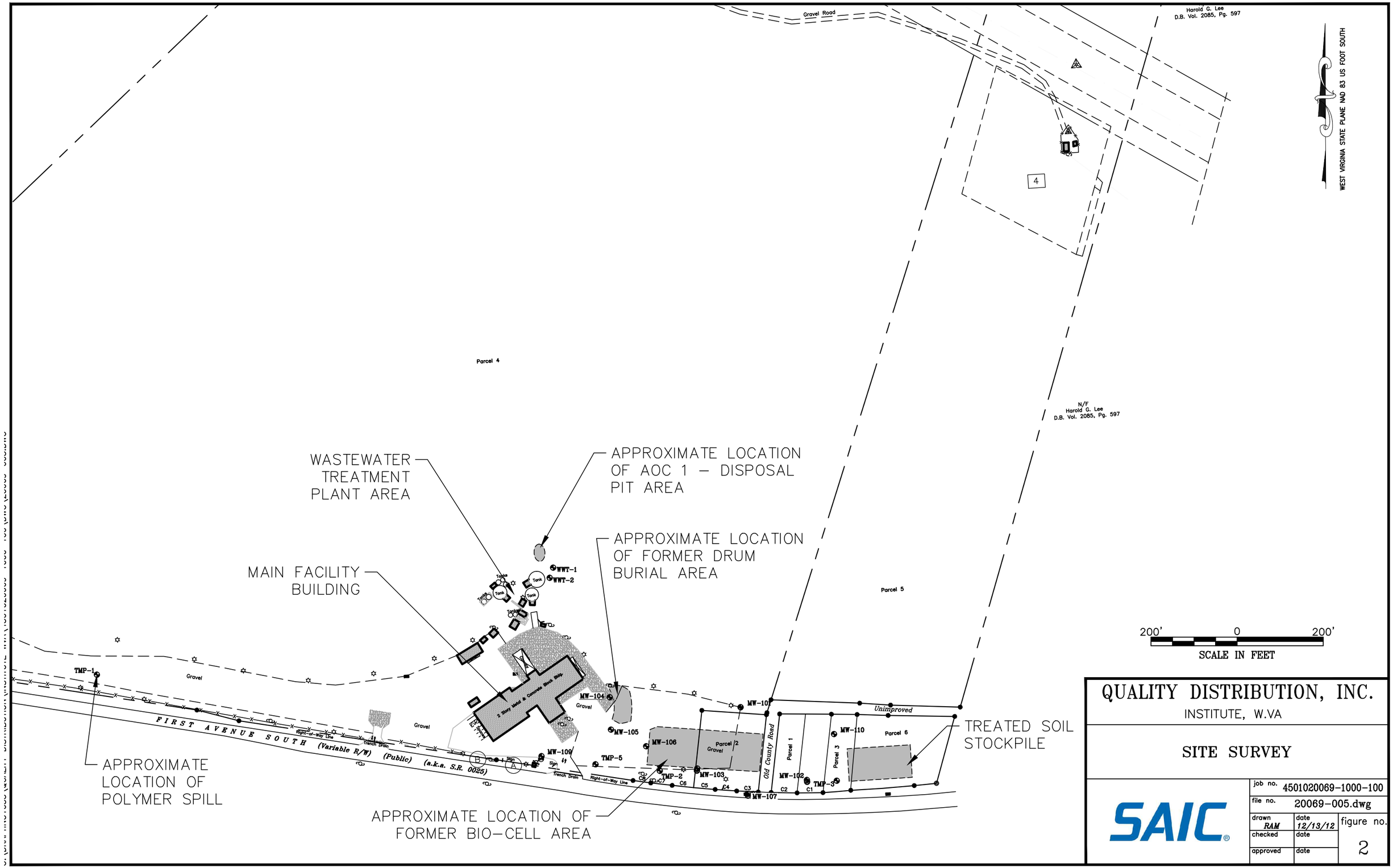

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SITE SURVEY

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SITE FEATURES

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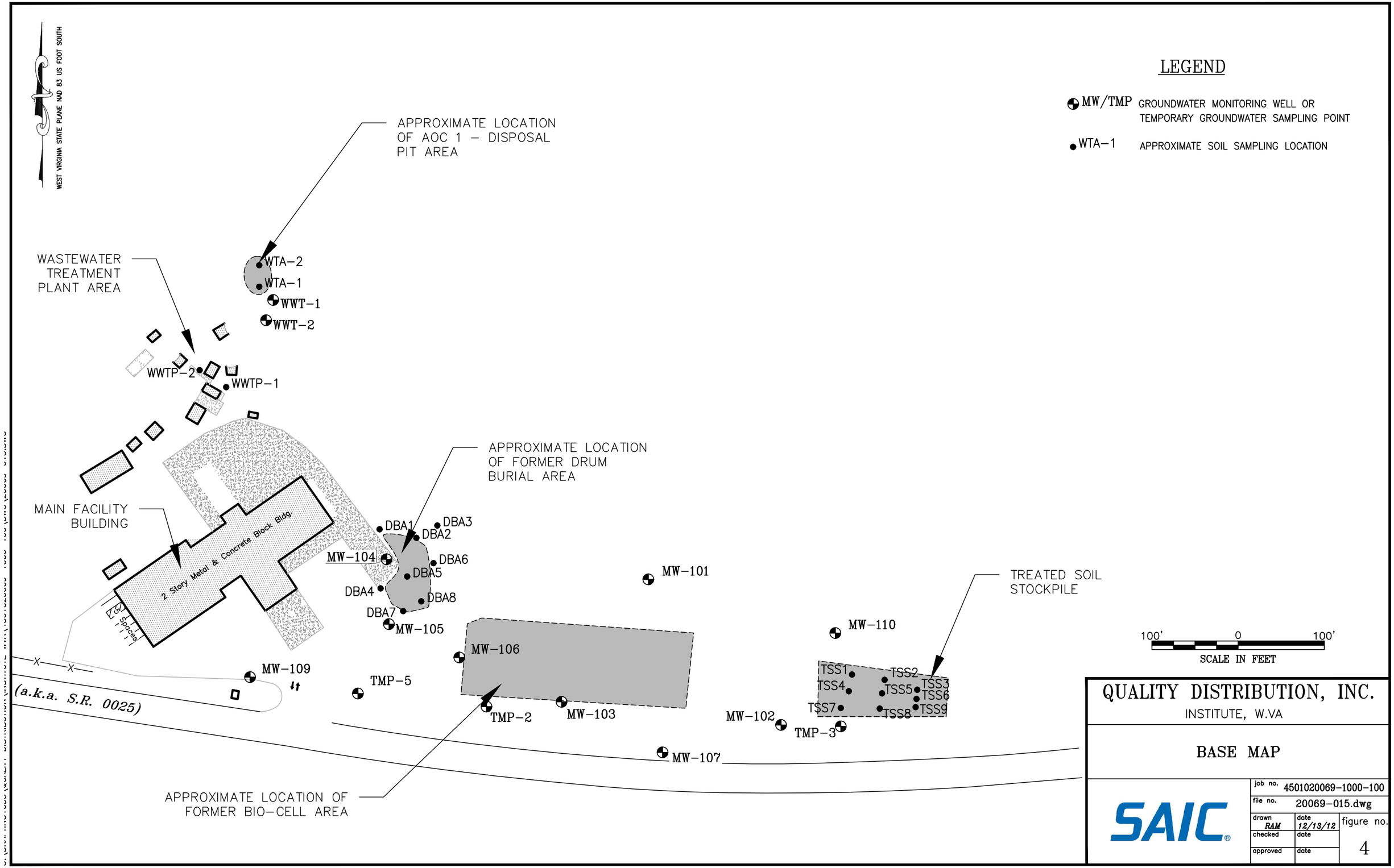
WEST VIRGINIA STATE PLANE NAD 83 US FOOT SOUTH
LEGEND
MW/TMP GROUNDWATER MONITORING WELL OR TEMPORARY GROUNDWATER SAMPLING POINT
WTA-1 APPROXIMATE SOIL SAMPLING LOCATION
APPROXIMATE LOCATION OF AOC 1 – DISPOSAL PIT AREA
WASTEWATER TREATMENT PLANT AREA
WTA-2
WTA-1
WWT-1
WWT-2
WWTP-2
WWTP-1
APPROXIMATE LOCATION OF FORMER DRUM BURIAL AREA
MAIN FACILITY BUILDING
2 Story Metal & Concrete Block Bldg.
Spaces
DBA1
DBA3
DBA2
MW-104
DBA6
DBA5
DBA4
DBA8
DBA7
MW-105
MW-101
TREATED SOIL STOCKPILE
MW-110
MW-106
MW-109
TMP-5
(a.k.a. S.R. 0025)
TMP-2
MW-103
TSS1
TSS2
TSS4
TSS5
TSS3
TSS6
TSS7
TSS8
TSS9
MW-102
TMP-3
MW-107
APPROXIMATE LOCATION OF FORMER BIO-CELL AREA
100' 0 100'
SCALE IN FEET
QUALITY DISTRIBUTION, INC.
INSTITUTE, W.VA
BASE MAP
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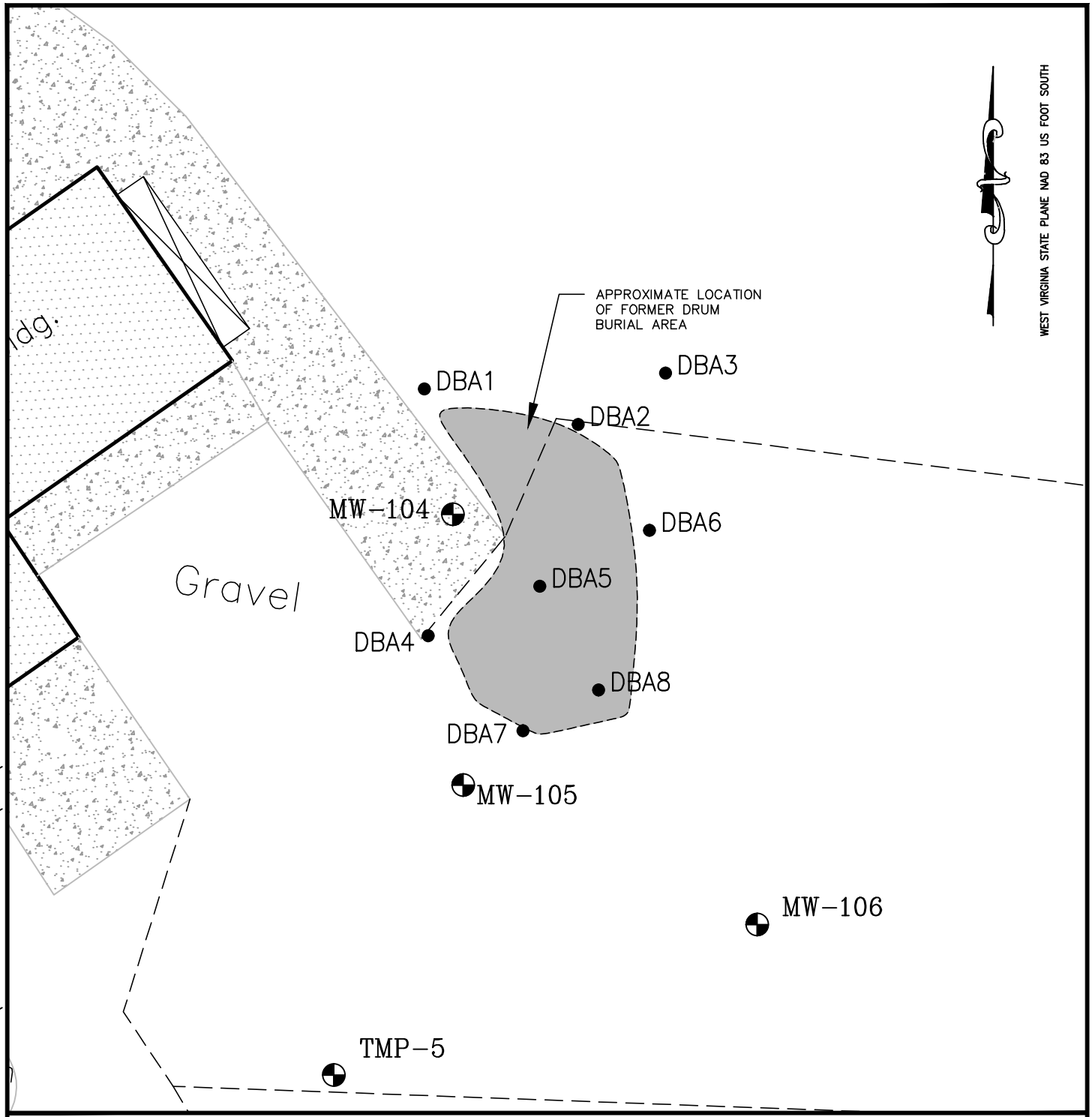

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SCALE IN FEET

LEGEND

MW/TMP GROUNDWATER MONITORING WELL OR TEMPORARY GROUNDWATER SAMPLING POINT

DPA-1 APPROXIMATE SOIL SAMPLING LOCATION

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APPROXIMATE SOIL SAMPLE LOCATIONS
FORMER DRUM BURIAL AREA

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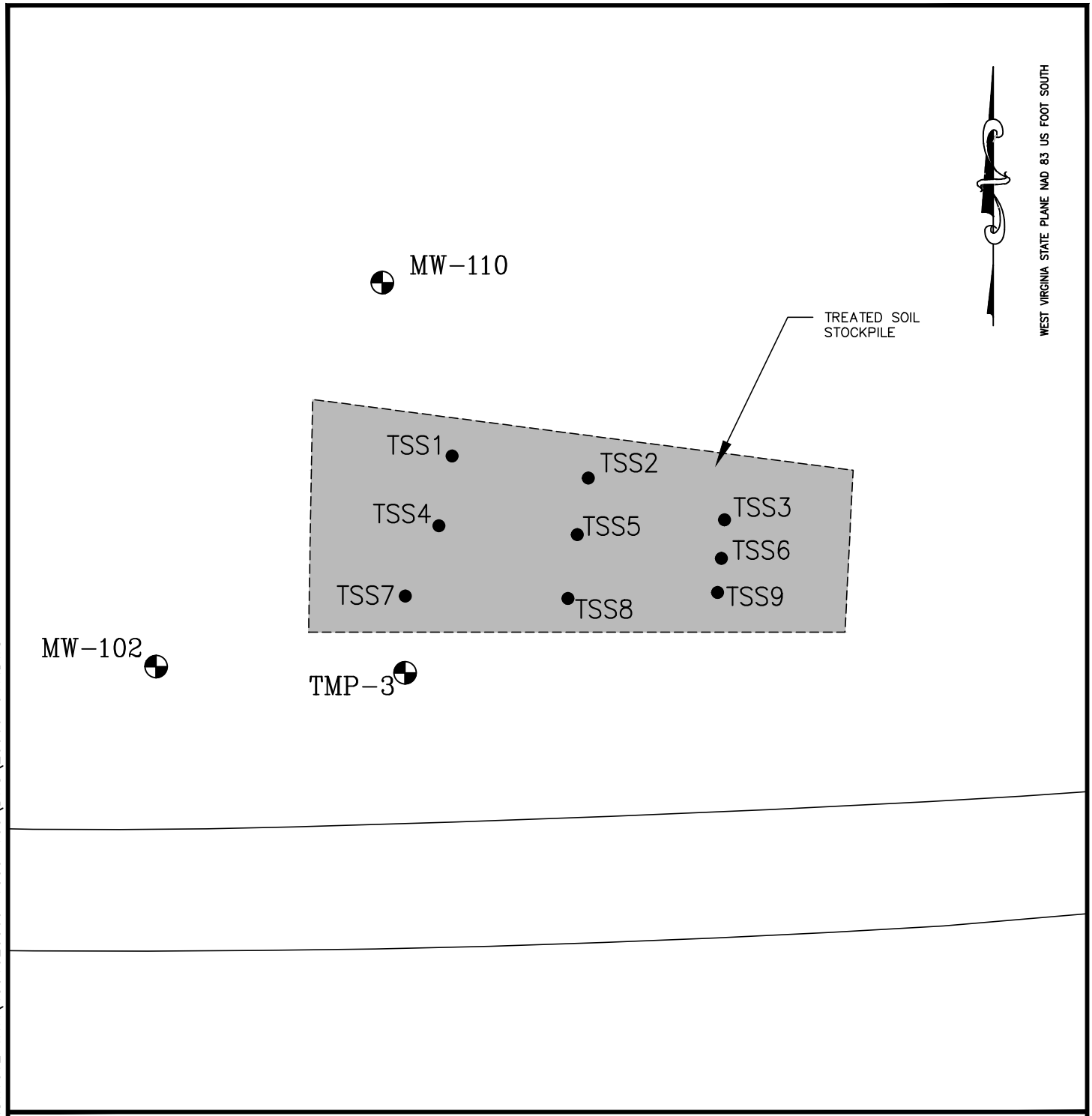

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SCALE IN FEET

LEGEND

MW/TMP GROUNDWATER MONITORING WELL OR TEMPORARY GROUNDWATER SAMPLING POINT

TSS1 APPROXIMATE SOIL SAMPLING LOCATION

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APPROXIMATE SOIL SAMPLE LOCATIONS
TREATED SOIL STOCKPILE

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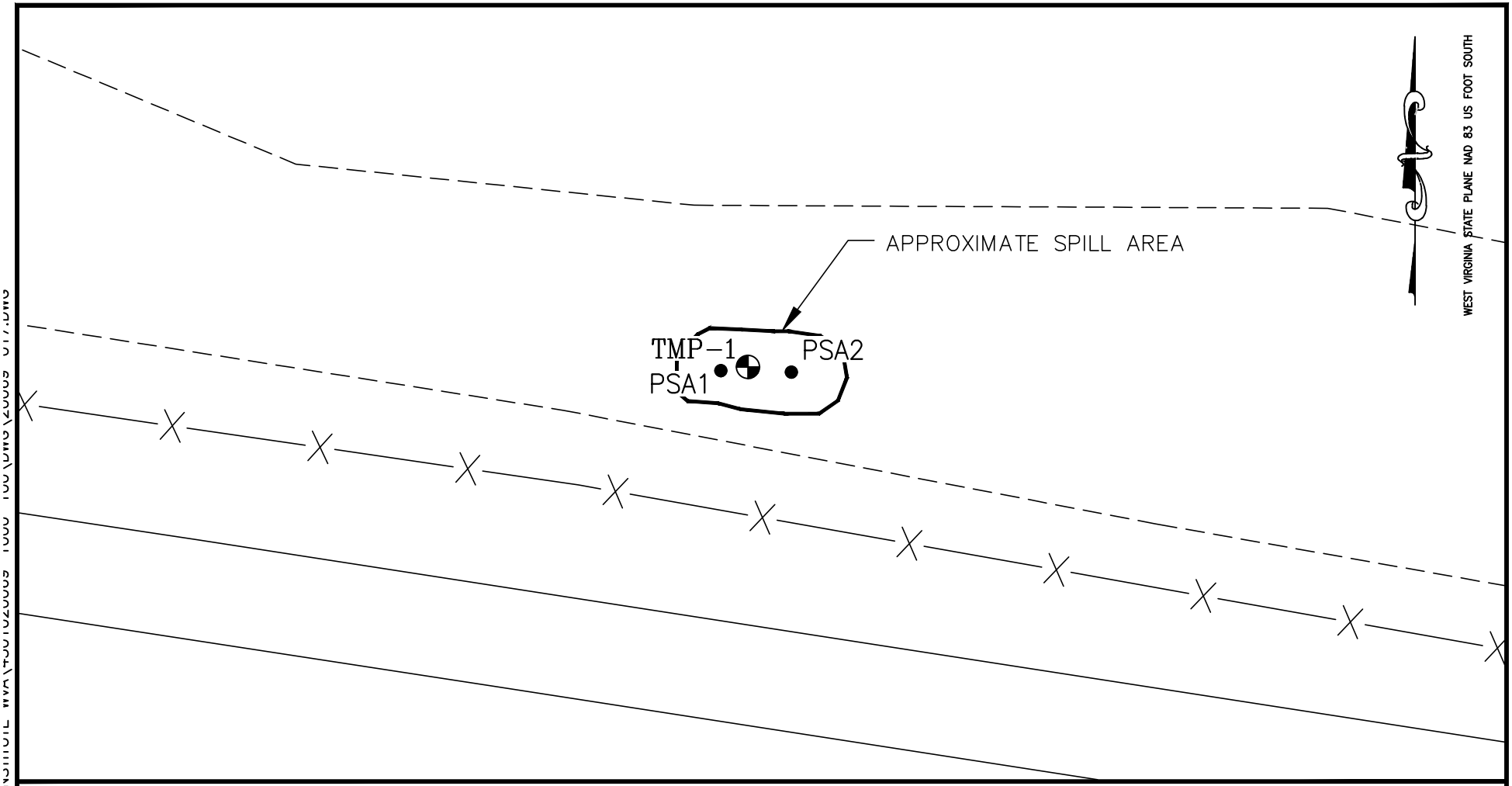

40' 0 40'

SCALE IN FEET

LEGEND

TMP-1 GROUNDWATER MONITORING WELL OR TEMPORARY GROUNDWATER SAMPLING POINT

PSA1 APPROXIMATE SOIL SAMPLING LOCATION

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APPROXIMATE SOIL SAMPLE LOCATIONS POLYMER SPILL AREA

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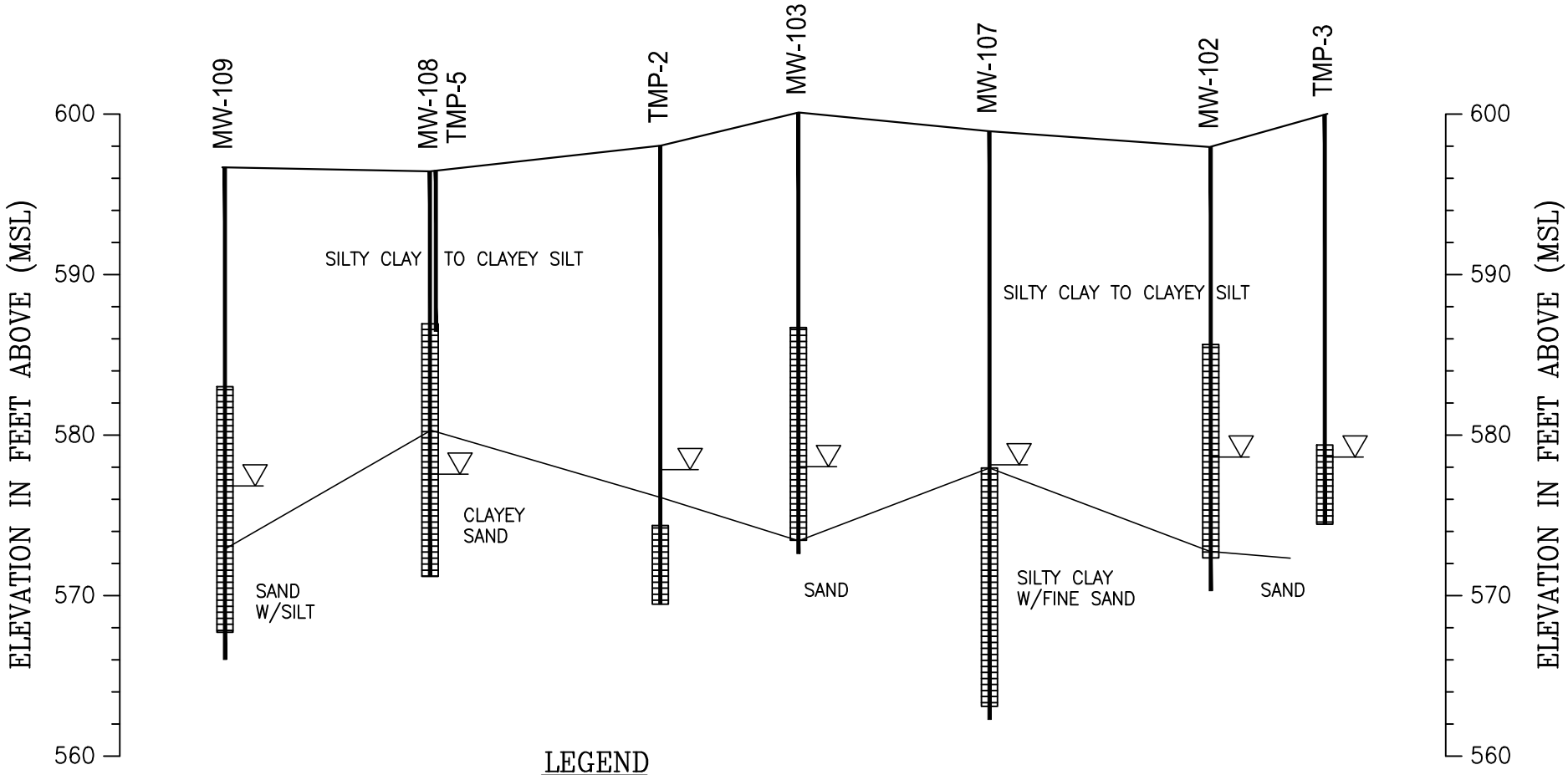

LEGEND

BOREHOLE

GROUNDWATER ELEVATION (9/2012)

SCREENED INTERVAL

TOTAL DEPTH OF BOREHOLE

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GENERALIZED GEOLOGIC CROSS-SECTION

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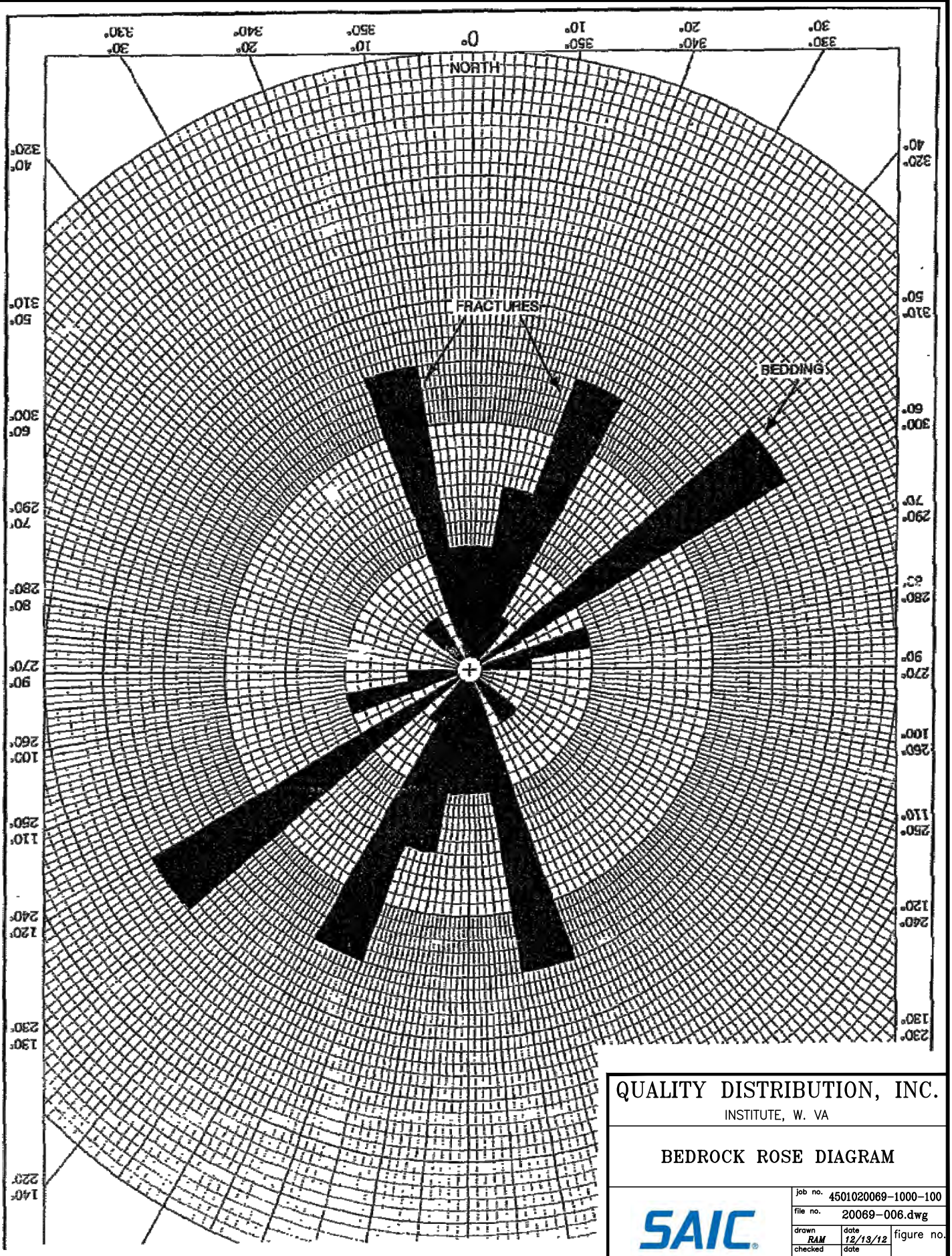

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BEDROCK ROSE DIAGRAM

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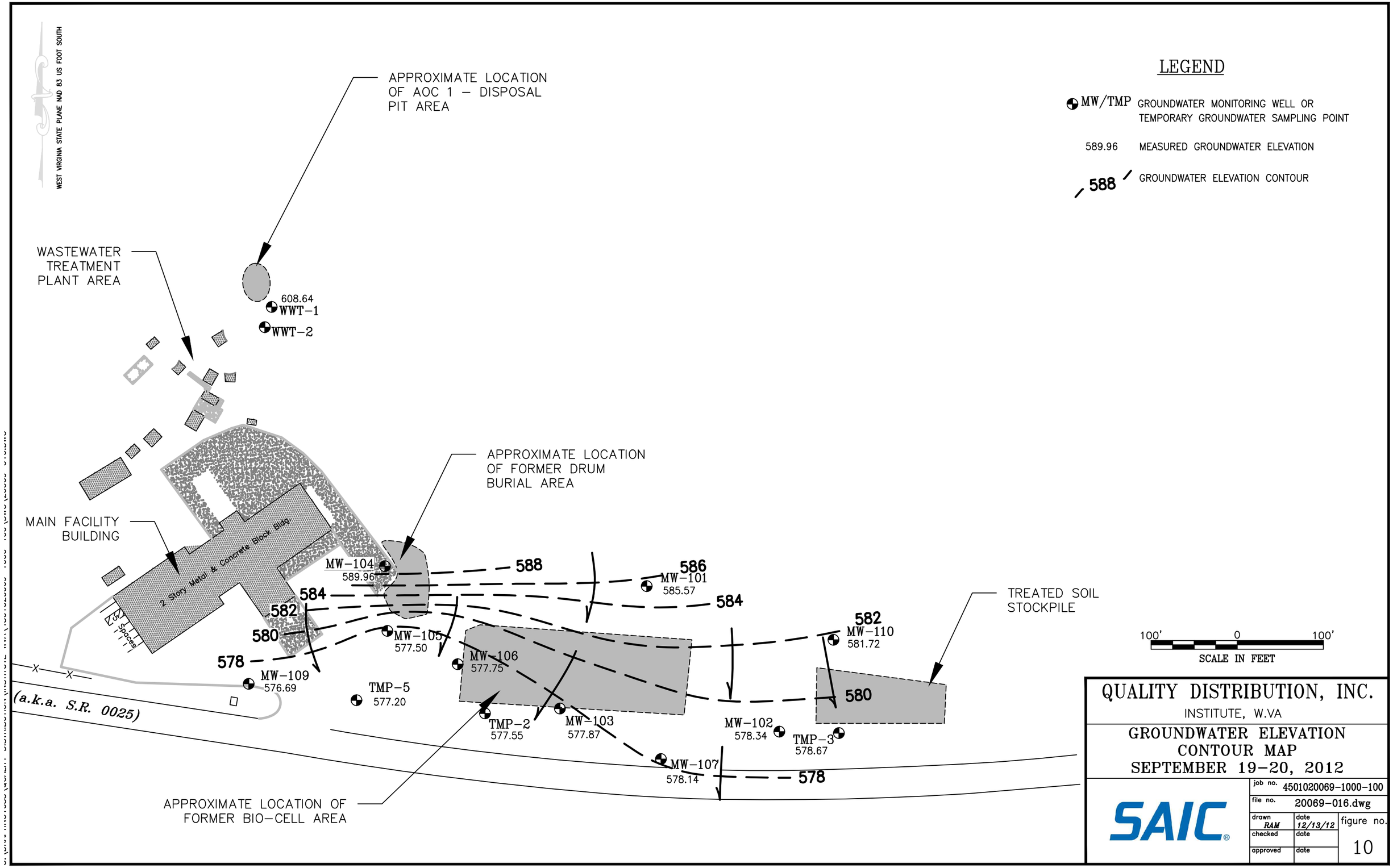
WEST VIRGINIA STATE PLANE NAD 83 US FOOT SOUTH
APPROXIMATE LOCATION OF AOC 1 – DISPOSAL PIT AREA
WASTEWATER TREATMENT PLANT AREA
608.64
WWT-1
WWT-2
APPROXIMATE LOCATION OF FORMER DRUM BURIAL AREA
MAIN FACILITY BUILDING
2 Story Metal & Concrete Block Bldg.
30 Spaces
MW-104
589.96
588
586
MW-101
585.57
584
582
580
578
MW-105
577.50
MW-106
577.75
MW-109
576.69
TMP-5
577.20
(a.k.a. S.R. 0025)
TMP-2
577.55
MW-103
577.87
MW-107
578.14
MW-102
578.34
TMP-3
578.67
MW-110
581.72
TREATED SOIL STOCKPILE
APPROXIMATE LOCATION OF FORMER BIO-CELL AREA
LEGEND
MW/TMP GROUNDWATER MONITORING WELL OR TEMPORARY GROUNDWATER SAMPLING POINT
589.96 MEASURED GROUNDWATER ELEVATION
588 GROUNDWATER ELEVATION CONTOUR
100' 0 100'
SCALE IN FEET
QUALITY DISTRIBUTION, INC.
INSTITUTE, W.VA
GROUNDWATER ELEVATION CONTOUR MAP
SEPTEMBER 19-20, 2012
SAIC
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file no. 20069-016.dwg
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date 12/13/12
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date
approved
date
figure no. 10

HISTORICAL OPERATIONS	PRIMARY RELEASE MECHANISM(S)	COI	POTENTIAL SOURCE AREAS	AFFECTED MEDIA	MIGRATION PATHWAYS: SOIL: SED. RUNOFF	SOIL: WIND(DUST)	SOIL: VOCs to AMBIENT AIR	SOIL: VOCs to INDOOR AIR	SOIL: LEACHING	G-W: DISSOLVED TRANSPORT	G-W: VOCs to AMBIENT AIR	G-W: VOCs to INDOOR AIR
Bulk Liquid Chemical Tanker Truck Cleaning	Releases from Buried Drummed Waste	SOIL Metals - Lead - Selenium VOCs Semi-VOCs Dioxins/Furans	Former Drum Burial Area	Soil			X	X	X			
				Groundwater						X	X	X
			Alleged Burial Area Near Wastewater	Soil			X	X	X			
				Groundwater						X	X	X
	Surface Spills	GROUNDWATER Metals - Arsenic - Iron - Manganese VOCs Semi-VOCs PCBs (aroclor	Polymer Spill Area	Soil			X	X				
	Leaching from Stockpile Soil from Past Remediation		Wastewater Plant Seepage	Soil			X	X				
			Treated Soil Stockpile	Soil			X	X	X			
				Groundwater						X	X	X

CURRENT OR HYPOTHETICAL FUTURE EXPOSURE PATHWAYS	POTENTIAL RECEPTORS: HUMAN: AREA RESIDENTS	HUMAN: DAILY SITE WORKERS	HUMAN: EXCAVATION WORKERS	HUMAN: SITE VISITORS	ECOLOGICAL: TERRESTRIAL	ECOLOGICAL: AQUATIC
SOIL (surface)						
Direct Contact						
Ingestion						
SOIL (sub-surface)						
Direct Contact						
Ingestion						
GROUNDWATER						
Direct Contact						
Ingestion						
Inhalation						
AMBIENT AIR						
Inhalation (vapor)						
INDOOR AIR						
Inhalation						

- Pathway potentially complete/significant. Quatitative evaluation warranted.
- Pathway potentially complete, but likely insignificant. Qualitative evaluation only.
- Pathway not complete. No evaluation warranted.

QUALITY DISTRIBUTION, INC.
INSTITUTE, W.VA

CONCEPTUAL SITE MODEL

SAIC.

job no.	4501020069-1000-100
file no.	20069-019.dwg
drawn RAM	date 12/13/12
checked	date
approved	date
figure no.	11

TABLES

TABLE 1
SUMMARY OF SOIL CONFIRMATION SAMPLE RESULTS
1995 DRUM EXCAVATION PROJECT

		GRID CELL >>	G-1				G-2			G-3			
		LOCATION >>	E-WALL	S-WALL		BASE	S-WALL	W-WALL	BASE	E-WALL	N-WALL	BASE	
		SAMPLE DATE >>	9/12/95	9/12/95	9/20/95	9/20/95	9/12/95	9/20/95	9/20/95	9/28/95	9/28/95	9/28/95	10/3/95
	VRP DE MINIMIS VALUES												
	INDUSTRIAL	SOIL-TO-GW											
GRO			---	---	NA	NA	---	NA	NA	---	---	8.3	NA
DRO			---	11	NA	NA	---	NA	NA	5	---	11	NA
VOCs													
Acetone	200,000	**89**	ALL VOCs NON-DETECT	VOCs NOT ANALYZED	VOCs NOT ANALYZED	---	ALL VOCs NON-DETECT	VOCs NOT ANALYZED	VOCs NOT ANALYZED	ALL VOCs NON-DETECT	ALL VOCs NON-DETECT	VOCs NOT ANALYZED	ALL VOCs NON-DETECT
Methylene Chloride	580	**0.025**				**1.1**							
Toluene	360	**14**				2.0							
Ethylbenzene	190	**16**				0.98							
Chlorobenzene	340	**1.4**				---							
1,2-Dichlorobenzene	150	**12**				---							
1-chloro-2-methyl-benzene						---							
1,2,4-Trichlorobenzene	290	**4.1**				---							
1,2,3-Trimethylbenzene						---							
Trichloroethene	21	**0.036**				---							
cis-1,2-Dichloroethene	83	**0.41**				---							
Styrene	340	**2.2**				---							
1,2,3,4-Tetrahydronaphthalene						---							
Acetic Acid						---							
Heptanoic acid						---							
SVOCs													
Phenol	260,000	**130**	ALL SVOCs NON-DETECT	SVOCs NOT ANALYZED	---	3.0	ALL SVOCs NON-DETECT	---	---	---	ALL SVOCs NON-DETECT	SVOCs NOT ANALYZED	---
2-Chlorophenol	5,200	**0.5**			---	---		---	---	---			---
2,4-Dimethylphenol	18,000	**17**			---	---		---	---	---			---
Butyl benzyl phthalate	13,000	**10**			---	0.68		---	---	---			---
Bis(2-ethylhexyl)phthalate	1,800	**29**			1.4	**140**		1.1	2.1	0.76			---
Naphthalene	180	**0.0094**			**0.42**	**12**		---	---	---			**0.44**
Hexachlorobenzene	15	**0.25**			---	**3.8**		---	---	---			---
Di-n-butyl phthalate	88,000	**180**			---	5.2		---	---	---			---
N-Nitrosodiphenylamine	5,000	**1.5**			---	---		---	---	---			---
1,2-Dichlorobenzene	150	**12**			---	---		---	---	---			---
1,2,4-Trichlorobenzene	290	**4.1**			---	---		---	---	---			---
Phenanthrene	610,000	**7,400**			---	---		---	---	---			---
Fluoranthene	30,000	**3,200**			---	---		---	---	---			---
Pyrene	58,000	**400**			---	---		---	---	---			---

All values given in mg/kg. NA - Not Analyzed --- Compund not detected.

TABLE 1

SUMMARY OF SOIL CONFIRMATION SAMPLE RESULTS

1995 DRUM EXCAVATION PROJECT

		GRID CELL >>	G-4			G-5						G-6		
		LOCATION >>	W-WALL	BASE		N-BASE	S-BASE	W-WALL	N-WALL	S-WALL	E-WALL	BASE	N-WALL	S-WALL
		SAMPLE DATE >>	9/28/95	9/28/95	10/3/95	10/26/95	10/26/95	10/26/95	10/26/95	10/26/95	10/26/95	10/26/95	10/26/95	10/26/95
	VRP DE MINIMIS VALUES													
	INDUSTRIAL	SOIL-TO-GW												
GRO			---	16	7.9	NA	NA	NA	NA	NA	NA	NA	NA	NA
DRO			---	52	140	NA	NA	NA	NA	NA	NA	NA	NA	NA
VOCs														
Acetone	200,000	**89**	ALL VOCs NON-DETECT	VOCs NOT ANALYZED	---	---	---	---	ALL VOCs NON-DETECT	ALL VOCs NON-DETECT	---	---	---	---
Methylene Chloride	580	**0.025**			---	---	---	---			---	---	---	---
Toluene	360	**14**			---	---	---	---			---	0.66	---	---
Ethylbenzene	190	**16**			3.2	2.8	---	---			1.6	1.2	1.9	2.0
Chlorobenzene	340	**1.4**			---	0.68	0.75	1.0			---	0.66	---	**7.2**
1,2-Dichlorobenzene	150	**12**			---	---	---	---			---	---	---	---
1-chloro-2-methyl-benzene					---	---	---	---			---	---	---	---
1,2,4-Trichlorobenzene	290	**4.1**			---	---	---	---			---	---	---	---
1,2,3-Trimethylbenzene					---	---	---	---			---	---	---	---
Trichloroethene	21	**0.036**			---	---	---	---			---	---	---	---
cis-1,2-Dichloroethene	83	**0.41**			---	---	---	---			---	---	---	---
Styrene	340	**2.2**			---	---	---	---			---	---	---	---
1,2,3,4-Tetrahydronaphthalene					---	---	---	---			---	---	---	---
Acetic Acid					---	---	---	---			---	---	---	---
Heptanoic acid					---	---	---	---			---	---	---	---
SVOCs														
Phenol	260,000	**130**	ALL SVOCs NON-DETECT	SVOCs NOT ANALYZED	---	---	ALL SVOCs NON-DETECT	---	---	0.58	---	1.3	0.87	1.3
2-Chlorophenol	5,200	**0.5**			---	---		---	---	---	---	---	**1.0**	---
2,4-Dimethylphenol	18,000	**17**			---	0.95		---	---	---	---	2.8	---	0.73
Butyl benzyl phthalate	13,000	**10**			---	---		---	---	---	---	---	---	---
Bis(2-ethylhexyl)phthalate	1,800	**29**			3.1	4.9		0.57	0.35	5.8	0.37	2.7	0.58	4.3
Naphthalene	180	**0.0094**			**1.6**	**3.7**		---	**3.9**	**7.0**	---	**1.2**	**0.67**	**0.7**
Hexachlorobenzene	15	**0.25**			---	---		---	---	---	---	---	---	---
Di-n-butyl phthalate	88,000	**180**			---	---		---	---	---	---	0.34	---	0.39
N-Nitrosodiphenylamine	5,000	**1.5**			---	---		---	---	---	---	---	---	---
1,2-Dichlorobenzene	150	**12**			0.37	---		---	---	---	---	0.5	---	---
1,2,4-Trichlorobenzene	290	**4.1**			---	---		---	---	---	---	**5.4**	0.35	0.96
Phenanthrene	610,000	**7,400**			---	---		---	---	---	---	---	---	0.69
Fluoranthene	30,000	**3,200**			---	---		---	---	---	---	---	---	0.48
Pyrene	58,000	**400**			---	---		---	---	---	---	---	---	0.36

All values given in mg/kg. NA - Not Analyzed --- Compund not detected.

TABLE 1
SUMMARY OF SOIL CONFIRMATION SAMPLE RESULTS
1995 DRUM EXCAVATION PROJECT

		GRID CELL >>	G-7						G-8								
		LOCATION >>	BASE		N-WALL		S-WALL		BASE		W-WALL		E-WALL	S-WALL		N-WALL	
		SAMPLE DATE >>	10/14/95	10/26/95	10/14/95	10/26/95	10/14/95	10/26/95	10/14/95	10/26/95	10/14/95	10/26/95	10/14/95	10/14/95	10/26/95	10/14/95	10/26/95
	VRP DE MINIMIS VALUES																
	INDUSTRIAL	SOIL-TO-GW															
GRO			470	NA	1.4	NA	7.6	NA	37	NA	---	NA	---	---	NA	0.65	NA
DRO			880	NA	33	NA	55	NA	150	NA	2.7	NA	10	---	NA	7.8	NA
VOCs																	
Acetone	200,000	**89**	2.6	---	0.31	---	0.38	ALL VOCs NON-DETECT	3.9	ALL VOCs NON-DETECT	VOCs NOT ANALYZED	---	---	VOCs NOT ANALYZED	ALL VOCs NON-DETECT	VOCs NOT ANALYZED	ALL VOCs NON-DETECT
Methylene Chloride	580	**0.025**		---	---	---	---		---			---	---				
Toluene	360	**14**	4.1	---	---	---	---		---			---	---				
Ethylbenzene	190	**16**	8.9	---	0.33	---	1.1		---			---	---				
Chlorobenzene	340	**1.4**	**64**	1.0	---	**32**	**2.1**		**55**			**12**	---				
1,2-Dichlorobenzene	150	**12**	3.6	---	---	1.0	---		4.2			1.7	---				
1-chloro-2-methyl-benzene			40	---	---	---	---		0.29			---	---				
1,2,4-Trichlorobenzene	290	**4.1**	**6.0**	---	---	---	---		---			---	---				
1,2,3-Trimethylbenzene			2.1	---	---	---	---		---			---	---				
Trichloroethene	21	**0.036**		---	---	---	---		---			---	**0.74**				
cis-1,2-Dichloroethene	83	**0.41**		---	---	---	---		---			---	0.29				
Styrene	340	**2.2**	**14**	---	---	---	---		---			---	---				
1,2,3,4-Tetrahydronaphthalene			17	---	---	---	---		---			---	---				
Acetic Acid				---	---	---	0.18		---			---	---				
Heptanoic acid				---	---	---	0.13		0.21			---	---				
SVOCs																	
Phenol	260,000	**130**		0.88		---		---		ALL SVOCs NON-DETECT	SVOCs NOT ANALYZED	---	SVOCs NOT ANALYZED	SVOCs NOT ANALYZED	---	SVOCs NOT ANALYZED	---
2-Chlorophenol	5,200	**0.5**		---		---		---				---			---		---
2,4-Dimethylphenol	18,000	**17**		---		---		---				---			---		---
Butyl benzyl phthalate	13,000	**10**	SVOCs NOT ANALYZED	---	SVOCs NOT ANALYZED	0.81	SVOCs NOT ANALYZED	---	SVOCs NOT ANALYZED			---			---		1.7
Bis(2-ethylhexyl)phthalate	1,800	**29**		---		4.8		8.7				2.3			6.5		7.7
Naphthalene	180	**0.0094**		---		**0.49**		---				---			---		---
Hexachlorobenzene	15	**0.25**		---		---		---				---			---		---
Di-n-butyl phthalate	88,000	**180**		---		0.72		---				---			---		---
N-Nitrosodiphenylamine	5,000	**1.5**		---		**5.4**		---				---			---		**16**
1,2-Dichlorobenzene	150	**12**		---		0.61		---				---			---		---
1,2,4-Trichlorobenzene	290	**4.1**		---		0.98		---				---			---		0.51
Phenanthrene	610,000	**7,400**		---		0.41		---				---			---		0.36
Fluoranthene	30,000	**3,200**		---		---		---				---			---		---
Pyrene	58,000	**400**		---		---		---				---			---		---

All values given in mg/kg. NA - Not Analyzed --- Compund not detected.

Table 2

SUMMARY OF ANALYTICAL RESULTS FOR GROUNDWATER - GENERAL CHEMISTRY
FORMER QUALITY CARRIERS, INC. SITE
INSTITUTE, WEST VIRGINIA

Unless otherwise noted, all units are in micrograms per liter (μg/l)

		Laboratory Analysis					Field Measurements				
Location	Sample Date	Total Organic Carbon	Nitrate-Nitrogen	Ammonia Nitogen	Sulfate	Ferrous Iron	Depth to Water (feet below toc)	pH (standard units)	Dissolved Oxygen (mg/l)	Specific Conductance (umhos)	Temperature (degrees C)
MW-101	9/5/1999	1,200	NA	NA	NA	NA	16.09	6.98	NA	663	17.2
	10/18/1999	1,900	NA	NA	NA	NA	15.77	7.37	NA	826	17.7
	12/27/1999	2,100	NA	NA	NA	NA	13.58	7.50	NA	826	14.2
	3/28/2000	22,000	NA	NA	NA	NA	11.93	7.55	NA	749	13.2
	6/29/2000	1,200	NA	NA	NA	NA	13.69	7.40	NA	626	12.3
	9/26/2000	2,200	270	NA	75,000	NA	16.51	6.80	5.40	540	16.8
	12/21/2000	1,000	220	NA	64,000	ND (<1,000)	16.79	6.45	3.90	420	15.0
	6/25/2001	1,500	350	NA	67,000	ND (<1,000)	16.79	7.63	2.70	430	18.3
	12/13/2001	5,400	220	NA	53,000	ND (<1,000)	18.20	7.21	4.00	816	15.7
	5/31/2002	2,500	260	NA	61,000	ND (<1,000)	20.45	7.15	5.60	866	16.5
	12/23/2002	2,400	190	NA	52,000	ND (<1,000)	11.60	7.62	4.50	712	11.5
	5/30/2003	1,600	150	NA	52,000	ND (<1,000)	11.31	7.85	3.30	603	13.2
	11/11/2003	3,700	110	NA	52,000	ND (<1,000)	12.70	7.82	3.20	1,853	16.6
	6/29/2004	1,700	140	NA	51,000	ND (<1,000)	13.40	7.49	5.20	869	17.9
	11/22/2004	ND (<1,000)	120	NA	49,000	ND (<1,000)	12.15	6.81	4.20	786	17.0
	6/14/2005	1,800	180	NA	45,000	ND (<1,000)	13.20	7.24	2.80	730	20.1
	12/2/2005	ND (<1,000)	140	NA	ND (<100,000)	ND (<10,000)	14.85	7.13	1.80	812	12.7
MW-102	9/5/1999	7,400	NA	NA	NA	NA	20.11	7.06	NA	990	17.3
	10/19/1999	7,000	NA	NA	NA	NA	20.21	6.29	NA	1,029	14.5
	12/27/1999	6,500	NA	NA	NA	NA	19.91	7.20	NA	1,030	12.1
	3/28/2000	30,000	NA	NA	NA	NA	19.26	7.08	NA	922	14.1
	6/29/2000	5,200	NA	NA	NA	NA	22.30	6.95	NA	543	13.8
	9/26/2000	4,200	240	NA	120,000	NA	20.00	6.30	6.10	750	16.1
	12/21/2000	4,900	91	NA	120,000	ND (<1,000)	20.20	6.39	1.90	400	14.4
	6/25/2001	2,800	170	NA	140,000	ND (<1,000)	19.25	7.20	6.60	382	17.3
	12/13/2001	13,000	84	NA	110,000	ND (<1,000)	19.86	6.68	3.10	1,166	15.3
	5/31/2002	5,900	140	NA	120,000	ND (<1,000)	18.70	7.14	6.80	992	15.6
	12/23/2002	9,000	88	NA	110,000	ND (<1,000)	18.95	6.53	3.80	730	9.6
	5/30/2003	4,200	110	NA	120,000	ND (<1,000)	17.97	7.58	5.80	821	15.9
	11/11/2003	6,800	200	NA	120,000	ND (<1,000)	17.80	7.68	3.70	520	15.8
	6/29/2004	5,600	100	NA	120,000	ND (<1,000)	17.40	6.45	6.40	1,079	17.7
	11/22/2004	2,000	82	NA	120,000	ND (<1,000)	17.90	6.17	4.60	1,109	15.4
	6/14/2005	1,200	53	NA	100,000	ND (<1,000)	18.20	7.08	4.50	1,101	18.7
	12/2/2005	2,600	130	NA	120,000	ND (<1,000)	19.10	6.39	7.30	1,257	13.6
WVGPS		N/A	10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 2

SUMMARY OF ANALYTICAL RESULTS FOR GROUNDWATER - GENERAL CHEMISTRY
FORMER QUALITY CARRIERS, INC. SITE
INSTITUTE, WEST VIRGINIA

Unless otherwise noted, all units are in micrograms per liter (µg/l)

		Laboratory Analysis					Field Measurements				
Location	Sample Date	Total Organic Carbon	Nitrate-Nitrogen	Ammonia Nitogen	Sulfate	Ferrous Iron	Depth to Water (feet below toc)	pH (standard units)	Dissolved Oxygen (mg/l)	Specific Conductance (umhos)	Temperature (degrees C)
MW-103	9/5/1999	9,100	NA	NA	NA	NA	23.66	7.07	NA	779	16.1
	10/19/1999	4,300	NA	NA	NA	NA	22.86	6.30	NA	935	14.1
	12/27/1999	5,600	NA	NA	NA	NA	22.55	6.90	NA	890	15.2
	3/28/2000	23,000	NA	NA	NA	NA	21.98	7.19	NA	655	14.5
	6/29/2000	2,200	NA	NA	NA	NA	19.68	7.04	NA	696	12.6
	9/26/2000	4,200	530	NA	81,000	NA	22.52	6.05	6.40	416	17.5
	12/21/2000	2,600	800	NA	64,000	ND (<1,000)	22.95	6.10	6.30	412	14.4
	6/25/2001	2,200	1,100	NA	58,000	ND (<1,000)	21.78	7.30	7.50	360	18.1
	12/13/2001	4,600	790	NA	54,000	ND (<1,000)	22.78	6.20	6.40	530	15.3
	5/31/2002	3,800	580	NA	50,000	ND (<1,000)	21.50	8.02	7.60	712	15.6
	12/23/2002	4,900	610	NA	52,000	ND (<1,000)	21.45	7.49	6.60	774	10.4
	5/30/2003	5,600	540	NA	47,000	ND (<1,000)	20.68	7.15	8.10	377	14.0
	11/11/2003	6,600	480	NA	49,000	ND (<1,000)	20.60	7.30	7.20	872	15.5
	6/29/2004	5,800	410	NA	55,000	ND (<1,000)	20.50	7.47	7.20	4,810	19.4
	11/22/2004	2,900	420	NA	46,000	ND (<25,000)	20.35	6.14	6.00	4,503	15.8
	6/14/2005	2,300	280	NA	59,000	ND (<1,000)	20.00	6.97	7.10	675	18.9
	12/2/2005	2,600	280	NA	59,000	ND (<5,000)	21.80	6.12	6.40	5,509	13.8
MW-104	9/5/1999	46,000	NA	NA	NA	NA	9.03	7.25	NA	1,220	19.2
	10/18/1999	47,000	NA	NA	NA	NA	9.30	6.85	NA	1,181	16.2
	12/27/1999	53,000	NA	NA	NA	NA	8.09	6.84	NA	1,237	17.0
	3/28/2000	86,000	NA	NA	NA	NA	6.65	7.24	NA	644	14.2
	6/29/2000	170,000	NA	NA	NA	NA	22.20	7.43	NA	613	14.6
	9/26/2000	87,000	ND (<50)	NA	5,000	NA	8.50	6.83	2.10	749	18.2
	12/21/2000	51,000	76	NA	13,000	ND (<1,000)	10.50	7.25	3.10	420	16.3
	6/25/2001	36,000	55	NA	1,800	2,700	7.42	6.85	ND (<0.50)	695	19.4
	12/13/2001	45,000	2,400	NA	75,000	ND (<1,000)	10.81	6.87	ND (<0.50)	805	17.9
	5/30/2002	28,000	ND (<50)	NA	25,000	ND (<1,000)	6.11	6.95	2.40	1,141	18.0
	12/23/2002	45,000	ND (<50)	NA	14,000	2,000	7.07	7.23	1.20	1,013	11.8
	5/30/2003	24,000	72	NA	70,000	ND (<1,000)	6.02	8.89	2.00	560	14.2
	9/30/2003	47,000	3,900	2,700,000	8,500,000	NA	7.10	6.11	1.16	1,353	16.7
	10/14/2003	40,000	ND (<100)	1,400,000	7,800,000	NA	NA	7.04	2.93	8,736	19.5
	11/11/2003	37,000	62	470,000	2,000,000	ND (<1,000)	8.10	6.17	0.87	5,280	17.9
	12/23/2003	46,000	ND (<50)	290,000	1,400,000	NA	NA	8.84	2.20	2,700	16.8
	1/20/2004	33,000	89	300,000	1,500,000	NA	5.60	6.95	8.60	1,189	8.5
	2/13/2004	64,000	ND (<50)	32,000	460,000	NA	5.50	8.29	ND (<0.50)	3,112	6.2
	6/29/2004	27,000	ND (<50)	NA	920,000	ND (<1,000)	5.75	7.18	ND (<0.50)	3,097	21.3
	11/22/2004	17,000	ND (<50)	NA	530,000	ND (<1,000)	9.00	7.87	1.10	3,002	16.3
	6/14/2005	15,000	93	NA	250,000	ND (<1,000)	5.34	7.63	0.83	1,229	22.0
	12/2/2005	14,000	73	NA	130,000	ND (<1,000)	8.83	7.12	2.30	1,192	15.5
WVGPS		N/A	10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 2

SUMMARY OF ANALYTICAL RESULTS FOR GROUNDWATER - GENERAL CHEMISTRY
FORMER QUALITY CARRIERS, INC. SITE
INSTITUTE, WEST VIRGINIA

Unless otherwise noted, all units are in micrograms per liter (μg/l)

		Laboratory Analysis					Field Measurements				
Location	Sample Date	Total Organic Carbon	Nitrate-Nitrogen	Ammonia Nitogen	Sulfate	Ferrous Iron	Depth to Water (feet below toc)	pH (standard units)	Dissolved Oxygen (mg/l)	Specific Conductance (umhos)	Temperature (degrees C)
MW-105	9/5/1999	130,000	NA	NA	NA	NA	20.30	7.24	NA	1,430	16.6
	10/18/1999	89,000	NA	NA	NA	NA	21.16	6.69	NA	1,375	15.5
	12/27/1999	65,000	NA	NA	NA	NA	19.85	7.05	NA	1,220	13.8
	3/28/2000	83,000	NA	NA	NA	NA	19.15	7.65	NA	856	15.1
	6/29/2000	78,000	NA	NA	NA	NA	19.82	6.85	NA	627	12.1
	9/26/2000	26,000	ND (<50)	NA	18,000	NA	20.45	6.80	2.80	662	16.3
	12/21/2000	20,000	76	NA	3,500	ND (<1,000)	20.51	6.19	0.97	345	15.1
	6/25/2001	29,000	54	NA	2,100	20,000	19.55	6.90	ND (<0.50)	420	17.9
	12/13/2001	32,000	ND (<50)	NA	2,500	9,500	20.23	6.80	ND (<0.50)	1,050	15.9
	5/30/2002	52,000	ND (<50)	NA	1,300	2,700	16.87	6.59	1.40	1,430	18.4
	12/23/2002	31,000	ND (<50)	NA	12,000	23,000	19.10	6.34	0.73	889	9.9
	5/30/2003	23,000	ND (<50)	NA	ND (<20,000)	31,000	18.10	7.09	ND (<0.50)	916	14.9
	9/30/2003	260,000	160,000	21,000,000	68,000,000	NA	18.94	6.13	2.36	1,361	15.4
	10/14/2003	140,000	72,000	9,600,000	38,000,000	NA	NA	6.58	2.39	5,510	16.7
	11/11/2003	120,000	56,000	11,000,000	38,000,000	380,000	18.35	7.14	ND (<0.50)	1,006	18.5
	12/23/2003	52,000	720	2,800,000	11,000,000	NA	NA	7.53	1.70	1,851	15.5
	1/20/2004	38,000	ND (<50)	2,300,000	9,200,000	NA	18.02	6.78	7.60	4,259	14.2
	2/13/2004	36,000	4,200	2,700,000	11,000,000	NA	17.30	8.85	ND (<0.50)	2,900	13.1
	6/29/2004	24,000	360	NA	7,400,000	ND (<1,000)	17.94	6.58	ND (<0.50)	1,660	24.4
	11/22/2004	21,000	ND (<50)	NA	4,400,000	99,000	17.91	8.26	ND (<0.50)	3,210	17.1
	6/14/2005	19,000	ND (<50)	NA	1,000,000	32,000	18.50	6.88	1.20	3,301	17.0
	12/2/2005	15,000	840	NA	270,000	120,000	19.49	6.92	1.90	1,510	15.7
MW-106	9/5/1999	14,000	NA	NA	NA	NA	20.75	7.13	NA	1,250	16.9
	10/18/1999	10,000	NA	NA	NA	NA	20.94	6.90	NA	1,294	15.2
	12/27/2099	12,000	ND (<50)	NA	NA	NA	19.90	7.19	NA	1,312	12.7
	3/28/2000	52,000	NA	NA	NA	NA	19.70	7.34	NA	917	15.2
	6/29/2000	28,000	NA	NA	NA	NA	20.26	6.90	NA	673	11.3
	9/26/2000	12,000	ND (<50)	NA	16,000	NA	20.74	6.55	2.80	911	15.5
	12/21/2000	15,000	ND (<50)	NA	14,000	ND (<1,000)	20.90	6.39	ND (<0.50)	470	14.4
	6/25/2001	12,000	ND (<50)	NA	17,000	ND (<1,000)	19.75	6.96	ND (<0.50)	406	18.7
	12/13/2001	20,000	ND (<50)	NA	14,000	6,900	20.72	6.70	2.90	1,390	15.3
	5/30/2002	16,000	ND (<50)	NA	38,000	ND (<1,000)	19.32	6.62	4.30	1,290	16.2
	12/23/2002	20,000	ND (<50)	NA	13,000	ND (<1,000)	19.55	7.33	2.30	907	12.1
	5/30/2003	13,000	57	NA	13,000	1,400	18.52	7.30	2.50	890	15.0
	9/30/2003	27,000	11,000	1,200,000	5,800,000	NA	19.00	7.05	4.16	943	14.9
	10/14/2003	41,000	4,800	1,800,000	3,300,000	NA	NA	6.62	3.79	2,589	15.9
	11/11/2003	16,000	540	ND (<1,000)	650,000	ND (<1,000)	18.70	6.11	2.60	1,595	15.7
	12/23/2003	14,000	ND (<50)	84,000	270,000	NA	NA	6.83	3.30	1,424	16.0
	1/20/2004	13,000	190	64,000	330,000	NA	18.34	6.90	9.40	731	13.3
	2/13/2004	12,000	91	82,000	320,000	NA	17.65	7.32	2.40	3,433	12.8
	6/29/2004	8,400	450	NA	330,000	ND (<1,000)	18.10	6.73	ND (<0.50)	1,737	23.7
	11/22/2004	7,200	ND (<50)	NA	88,000	ND (<1,000)	18.16	7.21	2.20	1,373	14.4
	6/14/2005	6,300	61	NA	49,000	ND (<1,000)	18.76	6.77	2.60	1,046	17.5
	12/2/2005	6,300	ND (<50)	NA	58,000	1,900	19.72	6.81	3.60	1,422	15.3
WVGPS		N/A	10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 2

SUMMARY OF ANALYTICAL RESULTS FOR GROUNDWATER - GENERAL CHEMISTRY
FORMER QUALITY CARRIERS, INC. SITE
INSTITUTE, WEST VIRGINIA

Unless otherwise noted, all units are in micrograms per liter (µg/l)

		Laboratory Analysis					Field Measurements				
Location	Sample Date	Total Organic Carbon	Nitrate-Nitrogen	Ammonia Nitogen	Sulfate	Ferrous Iron	Depth to Water (feet below toc)	pH (standard units)	Dissolved Oxygen (mg/l)	Specific Conductance (umhos)	Temperature (degrees C)
MW-107	9/26/2000	3,100	ND (<50)	NA	130,000	NA	10.00	5.62	2.70	674	16.0
	12/21/2000	5,900	55	NA	130,000	ND (<1,000)	10.55	6.01	1.50	355	15.0
	6/25/2001	5,200	21	NA	140,000	ND (<1,000)	9.50	6.88	0.89	335	18.3
	12/13/2001	19,000	ND (<50)	NA	100,000	ND (<1,000)	10.21	6.45	1.80	1,107	16.6
	5/31/2002	8,600	ND (<50)	NA	110,000	ND (<1,000)	9.25	6.08	1.70	1,063	16.0
	12/23/2002	19,000	ND (<50)	NA	100,000	ND (<1,000)	9.20	8.06	2.80	906	11.7
	5/30/2003	6,400	ND (<50)	NA	130,000	ND (<1,000)	8.29	6.94	2.80	719	15.2
	11/11/2003	6,900	ND (<50)	NA	140,000	ND (<1,000)	8.30	6.16	2.50	569	15.8
	6/29/2004	3,800	ND (<50)	NA	130,000	ND (<1,000)	8.03	6.89	1.10	1,080	24.6
	11/22/2004	4,700	ND (<50)	NA	130,000	ND (<1,000)	5.70	6.80	3.00	1,299	16.1
	6/14/2005	5,200	250	NA	97,000	ND (<1,000)	8.80	7.86	2.50	1,385	18.7
	12/2/2005	12,000	160	NA	150,000	ND (<1,000)	5.82	7.88	2.30	1,485	12.5
MW-108	9/26/2000	3,200	ND (<50)	NA	180,000	NA	16.13	6.30	3.10	532	15.9
	12/21/2000	3,300	ND (<50)	NA	150,000	ND (<1,000)	16.62	6.20	1.50	400	15.3
	6/25/2001	4,000	ND (<50)	NA	160,000	ND (<1,000)	15.28	6.80	0.82	410	19.6
	12/13/2001	5,500	ND (<50)	NA	150,000	ND (<1,000)	16.00	6.25	2.00	897	15.9
	5/30/2002	4,800	62	NA	160,000	ND (<1,000)	14.90	6.55	1.70	970	15.4
	12/23/2002	5,900	ND (<50)	NA	140,000	ND (<1,000)	14.72	6.77	1.90	810	9.7
	5/30/2003	3,300	110	NA	170,000	ND (<1,000)	13.98	7.04	2.20	598	14.9
	9/30/2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	10/14/2003	6,300	ND (<50)	24,000	260,000	NA	NA	6.48	2.17	843	16.0
	11/11/2003	5,800	290	6,800	200,000	ND (<1,000)	13.90	6.44	1.20	649	15.8
	12/23/2003	3,700	ND (<50)	1,200	170,000	NA	NA	6.18	2.80	726	15.9
	1/20/2004	4,000	82	1,200	180,000	NA	13.80	6.50	7.50	4,040	9.5
	2/13/2004	3,500	270	ND (<1,000)	170,000	NA	13.25	7.21	2.60	3,386	7.6
	6/29/2004	4,000	180	NA	240,000	ND (<1,000)	13.90	7.59	2.40	1,059	17.8
	11/22/2004	2,500	180	NA	150,000	ND (<1,000)	13.65	7.09	2.80	907	14.7
	6/14/2005	1,300	150	NA	14,000	ND (<1,000)	14.25	7.27	2.30	717	20.2
	12/2/2005	2,500	120	NA	160,000	ND (<1,000)	25.13	6.37	2.90	989	15.8
WVGPS		N/A	10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 2

SUMMARY OF ANALYTICAL RESULTS FOR GROUNDWATER - GENERAL CHEMISTRY
FORMER QUALITY CARRIERS, INC. SITE
INSTITUTE, WEST VIRGINIA

Unless otherwise noted, all units are in micrograms per liter (µg/l)

		Laboratory Analysis					Field Measurements				
Location	Sample Date	Total Organic Carbon	Nitrate-Nitrogen	Ammonia Nitogen	Sulfate	Ferrous Iron	Depth to Water (feet below toc)	pH (standard units)	Dissolved Oxygen (mg/l)	Specific Conductance (umhos)	Temperature (degrees C)
MW-109	9/26/2000	3,000	ND (<50)	NA	140,000	NA	19.93	6.30	3.20	484	16.6
	12/21/2000	3,400	ND (<50)	NA	160,000	ND (<1,000)	20.10	6.47	1.20	400	15.7
	6/25/2001	3,900	ND (<50)	NA	140,000	ND (<1,000)	19.12	6.83	0.65	411	18.6
	12/13/2001	8,300	0.069	NA	130,000	ND (<1,000)	19.89	6.30	2.90	671	16.4
	5/30/2002	4,100	ND (<50)	NA	110,000	ND (<1,000)	18.80	6.55	2.30	705	18.9
	12/23/2002	5,400	ND (<50)	NA	110,000	1,900	18.50	6.23	2.00	696	10.2
	5/30/2003	3,300	ND (<50)	NA	140,000	ND (<1,000)	17.90	6.58	2.70	721	14.6
	9/30/2003	4,200	120	22,000	220,000	NA	18.30	5.67	2.32	790	16.4
	10/14/2003	4,700	ND (<50)	14,000	190,000	NA	NA	6.35	3.02	776	16.1
	11/11/2003	4,600	ND (<50)	4,300	170,000	ND (<1,000)	17.80	6.45	1.20	653	17.2
	12/23/2003	3,500	ND (<50)	1,300	180,000	NA	NA	6.06	2.70	716	16.7
	1/20/2004	3,800	ND (<50)	5,000	180,000	NA	28.00	6.39	7.80	4,361	14.4
	2/13/2004	3,500	ND (<50)	ND (<1,000)	160,000	NA	17.14	6.15	2.10	1,490	13.9
	6/29/2004	2,500	ND (<50)	NA	140,000	2,000	17.80	6.24	1.70	867	18.0
	11/22/2004	2,000	ND (<50)	NA	150,000	1,100	17.50	7.28	2.80	823	16.4
	6/14/2005	1,600	ND (<50)	NA	110,000	ND (<1,000)	18.23	5.59	1.80	685	17.8
	12/2/2005	1,900	ND (<50)	NA	140,000	ND (<1,000)	18.95	6.89	3.40	1,013	16.1
MW-110	9/26/2000	7,100	ND (<50)	NA	130,000	NA	21.62	6.49	6.60	563	14.3
	12/21/2000	4,100	ND (<50)	NA	33,000	ND (<1,000)	22.57	6.35	1.10	425	15.1
	6/25/2001	2,400	320	NA	73,000	ND (<1,000)	21.49	6.26	2.70	410	18.3
	12/13/2001	21,000	ND (<50)	NA	46,000	ND (<1,000)	22.55	7.00	2.00	888	14.9
	5/31/2002	5,200	65	NA	36,000	ND (<1,000)	29.00	6.18	2.40	879	15.9
	12/23/2002	9,400	ND (<50)	NA	28,000	ND (<1,000)	21.20	7.48	2.00	642	10.7
	5/30/2003	2,700	150	NA	28,000	ND (<1,000)	20.35	7.63	2.50	588	15.6
	11/11/2003	4,400	ND (<50)	NA	32,000	ND (<1,000)	27.50	6.88	2.60	702	14.9
	6/29/2004	4,700	990	NA	32,000	ND (<1,000)	20.10	7.24	4.00	982	19.2
	11/22/2004	1,700	ND (<50)	NA	29,000	ND (<1,000)	20.30	6.60	2.50	809	15.7
	6/14/2005	ND(<1,000)	120	NA	30,000	ND (<1,000)	20.95	7.03	1.60	842	18.9
	12/2/2005	ND(<1,000)	ND (<50)	NA	38,000	ND (<1,000)	21.50	6.93	2.20	1,105	12.5
WVGPS		N/A	10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

N/A: There is no established West Virginia groundwater protection standard per Title 46, Series 12 Appendix A
NA: Compound was not analyzed during the sampling event

TABLE 3

SUMMARY APPENDIX IX DETECTED METALS

GROUNDWATER SAMPLES COLLECTED OCTOBER 18-19, 1999

Unless otherwise noted, all units are in micrograms per liter (ug/l)

	Total Metals												
Location	Barium	Lead	Copper	Nickel	Zinc	Iron	Manganese	Vanadium	Aluminum	Calcium	Magnesium	Potassium	Sodium
MW-101	300	ND (<100)	ND (<20)	ND (<40)	40	3,800	550	ND (<20)	3,900	47,000	17,000	2,900	120,000
MW-102	120	ND (<100)	ND (<20)	ND (<40)	42	360	**3,200**	ND (<20)	ND (<200)	61,000	26,000	1,900	120,000
MW-103	100	ND (<100)	ND (<20)	ND (<40)	59	1,200	630	ND (<20)	780	39,000	16,000	1,400	140,000
MW-104	1,200	ND (<100)	130	57	110	**27,000**	**2,500**	**36**	6,300	140,000	27,000	2,400	100,000
MW-105	**2,200**	**120**	140	49	93	**77,000**	**3,500**	**40**	6,900	180,000	28,000	7,500	56,000
MW-106	700	ND (<100)	ND (<20)	ND (<40)	23	1,800	**6,600**	ND (<20)	730	130,000	29,000	3,100	93,000
WVGPS	2,000	15	1,300	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
VRP DMV	2,000	15	1,500	730	11,000	26,000	1,700	2.6	37,000	N/A	N/A	N/A	N/A

N/A: There is no established WVGPS or VRP DMV.

Note: Only the detected compounds for the analysis have been reported

Table 4

SUMMARY OF ANALYTICAL RESULTS FOR GROUNDWATER - VOCs
FORMER QUALITY CARRIERS, INC. SITE
INSTITUTE, WEST VIRGINIA

Unless otherwise noted, all units are in micrograms per liter (ug/l)

Location	Sample Date	Vinyl chloride	Acetone	1,1-Dichloroethene	1,2-Dichloroethene	1,2-Dichloroethane	MEK	1,2-Dichloropropane	Trichloroethene
MW-101	9/5/1999	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)
	10/18/1999	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)
	12/27/1999	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)
	3/28/2000	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)
	6/29/2000	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	9/26/2000	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	12/21/2000	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	6/25/2001	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	12/13/2001	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	5/31/2002	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	12/23/2002	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)
	5/30/2003	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)
	11/11/2003	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)
	6/29/2004	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)
	11/22/2004	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)
	6/14/2005	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)
	12/2/2005	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)
	8/15/2012	ND (<1)	ND (<1)	ND (<1)	ND (<1)	ND (<1)	ND (<5)	ND (<1)	ND (<1)
	9/19/2012	ND (<1)	ND (<1)	ND (<1)	ND (<1)	ND (<1)	ND (<5)	ND (<1)	ND (<1)
WVGPS		2	N/A	7	70	5	N/A	5	5
VRP DMV		2	22,000	7	70	5	7,100	5	5

Location	Sample Date	1,1,2-Trichloroethane	Benzene	MIBK	1,1,2,2-Tetrachlorethane	Tetrachloroethene	Toluene	Chlorobenzene	Ethylbenzene	Xylenes
MW-101	9/5/1999	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)
	10/18/1999	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)
	12/27/2099	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<10)
	3/28/2000	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<10)
	6/29/2000	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<10)
	9/26/2000	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<10)
	12/21/2000	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	26	ND(<5)	ND(<10)
	6/25/2001	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	**140**	5.6	ND(<10)
	12/13/2001	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<10)
	5/31/2002	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<10)
	12/23/2002	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<10)
	5/30/2003	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<10)
	11/11/2003	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<10)
	6/29/2004	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<10)
	11/22/2004	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<10)
	6/14/2005	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<10)
	12/2/2005	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<10)
	8/15/2012	ND (<1)	ND (<1)	ND (<5)	ND (<1)	ND (<1)	ND (<1)	ND (<1)	ND (<1)	ND (<3)
	9/19/2012	ND (<1)	ND (<1)	ND (<5)	ND (<1)	ND (<1)	ND (<1)	ND (<1)	ND (<1)	ND (<3)
WVGPS		5	5	N/A	N/A	5	1,000	N/A	700	10,000
VRP DMV		5	5	2,000	0.067	5	1,000	100	700	10,000

Table 4

SUMMARY OF ANALYTICAL RESULTS FOR GROUNDWATER - VOCs
FORMER QUALITY CARRIERS, INC. SITE
INSTITUTE, WEST VIRGINIA

Unless otherwise noted, all units are in micrograms per liter (ug/l)

Location	Sample Date	Vinyl chloride	Acetone	1,1-Dichloroethene	1,2-Dichloroethene	1,2-Dichloroethane	MEK	1,2-Dichloropropane	Trichloroethene
MW-102	9/5/1999	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	**5.3**	ND (<5)
	10/19/1999	ND (<5)	10	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)
	12/27/1999	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)
	3/28/2000	ND (<5)	17	ND (<5)	ND (<5)	ND (<5)	ND (<10)	**6.6**	ND (<5)
	6/29/2000	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	9/26/2000	ND(<5)	ND(<10)	ND(<5)	ND(<5)	**7.7**	ND(<10)	**33**	ND(<5)
	12/21/2000	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	**6.4**	ND(<5)
	6/25/2001	ND(<5)	ND(<10)	ND(<5)	ND(<5)	**9.4**	ND(<10)	**69**	ND(<5)
	12/13/2001	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	**12**	ND(<5)
	5/31/2002	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	**33**	ND(<5)
	12/23/2002	ND (<5)	38	ND (<5)	ND (<5)	ND (<5)	ND (<10)	**23**	ND (<5)
	5/30/2003	ND (<5)	ND(<10)	ND (<5)	ND (<5)	ND (<5)	ND (<10)	**50**	ND (<5)
	11/11/2003	ND (<5)	ND(<10)	ND (<5)	ND (<5)	ND (<5)	ND (<10)	**36**	ND (<5)
	6/29/2004	ND (<5)	ND(<10)	ND (<5)	ND (<5)	ND (<5)	ND (<10)	**37**	ND (<5)
	11/22/2004	ND (<5)	ND(<10)	ND (<5)	ND (<5)	ND (<5)	ND (<10)	**27**	ND (<5)
	6/14/2005	ND (<5)	ND(<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	**17**	ND (<5)
	12/2/2005	ND (<5)	ND(<10)	ND (<5)	ND (<5)	ND (<5)	ND (<10)	**21**	ND (<5)
	8/15/2012	ND (<1)	ND(<1)	ND (<1)	ND (<1)	0.32	ND (<5)	**6.5**	0.15
	9/19/2012	ND (<1)	ND(<1)	ND (<1)	0.25	0.29	ND (<5)	**7.9**	0.22
WVGPS		2	N/A	7	70	5	N/A	5	5
VRP DMV		2	22,000	7	70	5	7,100	5	5

Location	Sample Date	1,1,2-Trichloroethane	Benzene	MIBK	1,1,2,2-Tetrachlorethane	Tetrachloroethene	Toluene	Chlorobenzene	Ethylbenzene	Xylenes
MW-102	9/5/1999	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)
	10/19/1999	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)
	12/27/2099	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<10)
	3/28/2000	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<10)
	6/29/2000	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<10)
	9/26/2000	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	98	ND(<5)	ND(<10)
	12/21/2000	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	**130**	5.8	ND(<10)
	6/25/2001	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	**250**	11	ND(<10)
	12/13/2001	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<10)
	5/31/2002	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<10)
	12/23/2002	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<10)
	5/30/2003	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<10)
	11/11/2003	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<10)
	6/29/2004	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<10)
	11/22/2004	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<10)
	6/14/2005	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<10)
	12/2/2005	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<10)
	8/15/2012	0.25	ND (<1)	ND (<5)	ND (<1)	ND (<1)	ND (<1)	ND (<1)	ND (<1)	ND (<3)
	9/19/2012	ND(<1)	ND (<1)	ND (<5)	ND (<1)	ND (<1)	ND (<1)	ND (<1)	ND (<1)	ND (<3)
WVGPS		5	5	N/A	N/A	5	1,000	N/A	700	10,000
VRP DMV		5	5	2,000	0.067	5	1,000	100	700	10,000

Table 4

SUMMARY OF ANALYTICAL RESULTS FOR GROUNDWATER - VOCs
FORMER QUALITY CARRIERS, INC. SITE
INSTITUTE, WEST VIRGINIA

Unless otherwise noted, all units are in micrograms per liter (ug/l)

Location	Sample Date	Vinyl chloride	Acetone	1,1-Dichloroethene	1,2-Dichloroethene	1,2-Dichloroethane	MEK	1,2-Dichloropropane	Trichloroethene
MW-103	9/5/1999	**29**	ND (<10)	ND (<5)	7.1	ND (<5)	ND (<5)	ND (<5)	ND (<5)
	10/19/1999	**11**	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)
	12/27/1999	ND (<5)	16	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<10)	ND (<5)
	3/28/2000	ND (<5)	32	ND (<5)	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)
	6/29/2000	ND(<5)	ND(<10)	ND(<5)	ND(<5)	**21**	ND(<10)	**38**	ND(<5)
	9/26/2000	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND (<5)	ND(<10)	ND (<5)	ND(<5)
	12/21/2000	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND (<5)	ND(<10)	ND (<5)	ND(<5)
	6/25/2001	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND (<5)	ND(<10)	ND (<5)	ND(<5)
	12/13/2001	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	5/31/2002	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	12/23/2002	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)
	5/30/2003	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)
	11/11/2003	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)
	6/29/2004	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)
	11/22/2004	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)
	6/14/2005	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)
	12/2/2005	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)
	8/15/2012	ND (<1)	ND (<5)	ND (<1)	ND (<1)	ND (<1)	ND (<5)	ND (<1)	ND (<1)
	9/19/2012	ND (<1)	4.9	ND (<1)	ND (<1)	ND (<1)	ND (<5)	ND (<1)	ND (<1)
WVGPS		2	N/A	7	70	5	N/A	5	5
VRP DMV		2	22,000	7	70	5	7,100	5	5

Location	Sample Date	1,1,2-Trichloroethane	Benzene	MIBK	1,1,2,2-Tetrachlorethane	Tetrachloroethene	Toluene	Chlorobenzene	Ethylbenzene	Xylenes
MW-103	9/5/1999	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)
	10/19/1999	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)
	12/27/1999	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)
	3/28/2000	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<10)
	6/29/2000	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<10)
	9/26/2000	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	72	ND(<5)	ND(<10)
	12/21/2000	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	24	ND(<5)	ND(<10)
	6/25/2001	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	**130**	7.2	ND(<10)
	12/13/2001	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<10)
	5/31/2002	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<10)
	12/23/2002	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<10)
	5/30/2003	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<10)
	11/11/2003	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<10)
	6/29/2004	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<10)
	11/22/2004	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<10)
	6/14/2005	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<10)
	12/2/2005	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<10)
	8/15/2012	ND (<1)	ND (<1)	ND (<5)	ND (<1)	ND (<1)	ND (<1)	0.68	ND (<1)	ND (<3)
	9/19/2012	ND (<1)	ND (<1)	ND (<5)	ND (<1)	ND (<1)	ND (<1)	ND (<1)	ND (<1)	ND (<3)
WVGPS		5	5	N/A	N/A	5	1,000	N/A	700	10,000
VRP DMV		5	5	2,000	0.067	5	1,000	100	700	10,000

Table 4

SUMMARY OF ANALYTICAL RESULTS FOR GROUNDWATER - VOCs
FORMER QUALITY CARRIERS, INC. SITE
INSTITUTE, WEST VIRGINIA

Unless otherwise noted, all units are in micrograms per liter (ug/l)

Location	Sample Date	Vinyl chloride	Acetone	1,1-Dichloroethene	1,2-Dichloroethene	1,2-Dichloroethane	MEK	1,2-Dichloropropane	Trichloroethene
MW-104	9/5/1999	**5.6**	ND (<10)	ND (<5)	22	ND (<5)	ND (<5)	ND (<5)	**27**
	10/18/1999	ND (<500)	1,200	ND (<500)	ND (<500)	ND (<500)	ND (<1,000)	ND (<500)	ND (<500)
	12/27/1999	ND (<500)	ND (<500)	ND (<500)	ND (<500)	ND (<500)	ND (<500)	ND (<500)	ND (<500)
	3/28/2000	**24**	170	ND (<5)	**83**	ND (<5)	22	ND (<5)	**54**
	6/29/2000	ND(<100)	ND(<100)	ND(<100)	ND(<100)	ND(<100)	ND(<100)	ND(<100)	ND(<100)
	9/26/2000	ND (<1,000)	ND (<1,000)	ND (<1,000)	ND (<1,000)	ND (<1,000)	ND (<1,000)	ND (<1,000)	ND (<1,000)
	12/21/2000	ND (<1,000)	ND (<1,000)	ND (<1,000)	ND (<1,000)	ND (<1,000)	ND (<1,000)	ND (<1,000)	ND (<1,000)
	6/25/2001	ND (<1,000)	ND (<1,000)	ND (<1,000)	ND (<1,000)	ND (<1,000)	ND (<1,000)	ND (<1,000)	ND (<1,000)
	12/13/2001	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	5/30/2002	ND (<250)	ND(<250)	ND(<250)	ND(<250)	ND(<250)	ND(<250)	ND (<250)	ND(<250)
	12/23/2002	ND (<500)	ND (<500)	ND (<500)	ND (<500)	ND (<500)	ND (<500)	ND (<500)	ND (<500)
	5/30/2003	ND (<250)	ND(<250)	ND(<250)	ND(<250)	ND(<250)	ND(<250)	ND (<250)	ND(<250)
	11/11/2003	ND (<250)	ND(<250)	ND(<250)	ND(<250)	ND(<250)	ND(<250)	ND (<250)	ND(<250)
	6/29/2004	ND (<250)	ND(<250)	ND(<250)	ND(<250)	ND(<250)	ND(<250)	ND (<250)	ND(<250)
	11/22/2004	ND (<250)	ND(<250)	ND(<250)	ND(<250)	ND(<250)	ND(<250)	ND (<250)	ND(<250)
	6/14/2005	ND(<100)	ND(<100)	ND(<100)	ND(<100)	ND(<100)	ND(<100)	ND(<100)	ND(<100)
	12/2/2005	ND(<250)	ND(<250)	ND(<250)	ND(<250)	ND(<250)	ND(<250)	ND(<250)	ND(<250)
	8/15/2012	ND(<250)	ND(<1300)	ND(<250)	120	ND(<250)	ND(<1300)	ND(<250)	59
	9/19/2012	ND(<150)	ND(<1300)	ND(<150)	ND(<150)	ND(<150)	ND(<750)	ND(<150)	ND(<150)
WVGPS		2	N/A	7	70	5	N/A	5	5
VRP DMV		2	22,000	7	70	5	7,100	5	5

Location	Sample Date	1,1,2-Trichloroethane	Benzene	MIBK	1,1,2,2-Tetrachlorethane	Tetrachloroethene	Toluene	Chlorobenzene	Ethylbenzene	Xylenes
MW-104	9/5/1999	ND (<5)	**160**	10	ND (<5)	ND (<5)	140	**19,000**	**820**	170
	10/18/1999	ND (<500)	ND (<500)	1,200	ND (<500)	ND (<500)	ND (<500)	**18,000**	**910**	ND (<500)
	12/27/1999	ND (<500)	ND (<500)	ND (<500)	ND (<500)	ND (<500)	ND (<500)	**16,000**	**730**	ND (<500)
	3/28/2000	ND (<5)	**54**	ND (<10)	ND (<5)	ND (<5)	99	**9,000**	390	70
	6/29/2000	ND(<100)	ND(<100)	ND(<100)	ND(<100)	ND(<100)	120	**9,800**	400	ND(<100)
	9/26/2000	ND (<1,000)	ND (<1,000)	ND (<1,000)	ND (<1,000)	ND (<1,000)	ND (<1,000)	**31,000**	ND (<1,000)	ND (<1,000)
	12/21/2000	ND (<1,000)	ND (<1,000)	ND (<1,000)	ND (<1,000)	ND (<1,000)	ND (<1,000)	**21,000**	ND (<1,000)	ND (<1,000)
	6/25/2001	ND (<1,000)	ND (<1,000)	ND (<1,000)	ND (<1,000)	ND (<1,000)	ND (<1,000)	**32,000**	ND (<1,000)	ND (<1,000)
	12/13/2001	ND (<500)	ND (<500)	ND (<500)	ND (<500)	ND (<500)	ND (<500)	**16,000**	ND(<500)	ND (<500)
	5/30/2002	ND (<250)	ND (<250)	ND (<250)	ND (<250)	ND (<250)	ND (<250)	**19,000**	330	ND (<250)
	12/23/2002	ND (<500)	ND (<500)	ND (<500)	ND (<500)	ND (<500)	ND (<500)	**24,000**	ND (<500)	ND (<500)
	5/30/2003	ND (<250)	ND (<250)	ND (<250)	ND (<250)	ND (<250)	ND (<250)	**5,000**	ND (<250)	ND (<250)
	11/11/2003	ND (<250)	ND (<250)	ND (<250)	ND (<250)	ND (<250)	ND (<250)	**4,500**	ND (<250)	ND (<250)
	6/29/2004	ND (<250)	ND (<250)	ND (<250)	ND (<250)	ND (<250)	ND (<250)	**2,000**	ND (<250)	ND (<250)
	11/22/2004	ND (<250)	ND (<250)	ND (<250)	ND (<250)	ND (<250)	ND (<250)	**1,600**	330	ND (<250)
	6/14/2005	ND(<100)	ND(<100)	ND(<100)	ND(<100)	ND(<100)	ND(<100)	**1,900**	310	510
	12/2/2005	ND(<250)	ND(<250)	ND(<250)	ND(<250)	ND(<250)	ND(<250)	**1,700**	ND(<250)	290
	8/15/2012	ND(<250)	**100**	ND(<1300)	ND(<250)	ND(<250)	ND(<250)	**4,100**	170	ND (<750)
	9/19/2012	ND(<150)	**120**	ND(<750)	ND(<150)	ND(<150)	78	**3,900**	490	ND (<450)
WVGPS		5	5	N/A	N/A	5	1,000	N/A	700	10,000
VRP DMV		5	5	2,000	0.067	5	1,000	100	700	10,000

Table 4

SUMMARY OF ANALYTICAL RESULTS FOR GROUNDWATER - VOCs
FORMER QUALITY CARRIERS, INC. SITE
INSTITUTE, WEST VIRGINIA

Unless otherwise noted, all units are in micrograms per liter (ug/l)

Location	Sample Date	Vinyl chloride	Acetone	1,1-Dichloroethene	1,2-Dichloroethene	1,2-Dichloroethane	MEK	1,2-Dichloropropane	Trichloroethene
MW-105	9/5/1999	ND (<5)	1,500	ND (<5)	ND (<5)	ND (<5)	540	ND (<5)	ND (<5)
	10/18/1999	ND (<50)	1,900	ND (<50)	ND (<50)	ND (<50)	520	ND (<50)	ND (<50)
	12/27/1999	ND (<50)	330	ND (<50)	ND (<50)	ND (<50)	97	ND (<50)	ND (<50)
	3/28/2000	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)
	6/29/2000	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	9/26/2000	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	12/21/2000	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	6/25/2001	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	12/13/2001	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	5/30/2002	ND(<5)	54	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	12/23/2002	ND (<5)	16	ND (<5)	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)
	5/30/2003	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)
	11/11/2003	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)
	6/29/2004	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)
	11/22/2004	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)
	6/14/2005	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)
	12/2/2005	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)
	8/15/2012	**5.2**	ND (<20)	ND (<4)	ND (<4)	ND (<4)	ND (<20)	ND (<4)	ND (<4)
	9/19/2012	**5.6**	ND (<10)	ND (<2)	ND (<2)	ND (<2)	ND (<10)	ND (<2)	ND (<2)
WVGPS		2	N/A	7	70	5	N/A	5	5
VRP DMV		2	22,000	7	70	5	7,100	5	5

Location	Sample Date	1,1,2-Trichloroethane	Benzene	MIBK	1,1,2,2-Tetrachlorethane	Tetrachloroethene	Toluene	Chlorobenzene	Ethylbenzene	Xylenes
MW-105	9/5/1999	ND (<5)	**6.8**	**2,300**	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)
	10/18/1999	ND (<50)	ND (<50)	1,500	ND (<50)	ND (<50)	ND (<50)	**560**	ND (<50)	ND (<50)
	12/27/1999	ND (<50)	ND (<50)	150	ND (<50)	ND (<50)	ND (<50)	ND (<50)	ND (<50)	ND (<50)
	3/28/2000	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<10)
	6/29/2000	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<10)
	9/26/2000	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	**270**	13	ND(<10)
	12/21/2000	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	12	ND(<5)	ND(<10)
	6/25/2001	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	**570**	26	ND(<10)
	12/13/2001	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<10)
	5/30/2002	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<10)
	12/23/2002	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<10)
	5/30/2003	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<10)
	11/11/2003	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	9.8	ND (<5)	ND (<10)
	6/29/2004	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	15	ND (<5)	ND (<10)
	11/22/2004	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	6	ND (<5)	ND (<10)
	6/14/2005	ND (<5)	ND (<5)	11	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<10)
	12/2/2005	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<10)
	8/15/2012	ND (<4)	5.2	ND (<20)	ND (<4)	ND (<4)	ND (<4)	1.8	ND (<4)	ND (<12)
	9/19/2012	ND (<2)	2.7	ND (<10)	ND (<2)	ND (<2)	ND (<2)	1.8	ND (<2)	ND (<6)
WVGPS		5	5	N/A	N/A	5	1,000	N/A	700	10,000
VRP DMV		5	5	2,000	0.067	5	1,000	100	700	10,000

Table 4

SUMMARY OF ANALYTICAL RESULTS FOR GROUNDWATER - VOCs
FORMER QUALITY CARRIERS, INC. SITE
INSTITUTE, WEST VIRGINIA

Unless otherwise noted, all units are in micrograms per liter (ug/l)

Location	Sample Date	Vinyl chloride	Acetone	1,1-Dichloroethene	1,2-Dichloroethene	1,2-Dichloroethane	MEK	1,2-Dichloropropane	Trichloroethene
MW-106	9/5/1999	**40**	ND (<10)	5.7	**170**	**35**	ND (<10)	**7.4**	**330**
	10/18/1999	ND (<50)	ND (<100)	ND (<50)	ND (<50)	ND (<50)	ND (<100)	ND (<50)	ND (<50)
	12/27/1999	ND (<50)	ND (<50)	ND (<50)	**160**	ND (<50)	ND (<50)	ND (<50)	**370**
	3/28/2000	**28**	29	5.2	**110**	**29**	ND (<10)	**7.5**	**340**
	6/29/2000	ND(<50)	ND(<50)	ND(<50)	**120**	**56**	ND(<50)	ND(<50)	**380**
	9/26/2000	ND(<50)	ND(<50)	ND(<50)	**180**	ND (<50)	ND(<50)	ND(<50)	**400**
	12/21/2000	ND(<50)	ND(<50)	ND(<50)	**180**	ND (<50)	ND(<50)	ND(<50)	**370**
	6/25/2001	ND(<50)	ND(<50)	ND(<50)	**140**	ND (<50)	ND(<50)	ND(<50)	**300**
	12/13/2001	**46**	ND(<10)	ND(<5)	**170**	ND(<5)	ND(<10)	ND(<5)	**360**
	5/30/2002	ND(<25)	ND(<25)	ND(<25)	**130**	**30**	ND(<25)	ND(<25)	**290**
	12/23/2002	ND (<25)	ND (<25)	ND (<25)	**130**	ND (<25)	ND (<25)	ND (<25)	**280**
	5/30/2003	**42**	ND (<5)	5.4	**120**	**26**	ND (<5)	5	**280**
	11/11/2003	ND (<50)	ND (<50)	ND (<50)	**150**	ND (<50)	ND (<50)	ND (<50)	**270**
	6/29/2004	ND (<50)	ND (<50)	ND (<50)	**73**	ND (<50)	ND (<50)	ND (<50)	**230**
	11/22/2004	ND (<50)	ND (<50)	ND (<50)	**110**	ND (<50)	ND (<50)	ND (<50)	**270**
	6/14/2005	**30**	ND (<20)	ND (<20)	ND (<20)	ND (<20)	ND (<20)	ND (<20)	ND (<20)
	12/2/2005	ND (<50)	ND (<50)	ND (<50)	**110**	ND (<50)	ND (<50)	ND (<50)	**300**
	8/15/2012	ND (<100)	ND (<500)	ND (<100)	**67**	ND (<100)	ND (<500)	ND (<100)	**150**
	9/19/2012	ND (<100)	ND (<500)	ND (<100)	**71**	ND (<100)	ND (<500)	ND (<100)	**170**
WVGPS		2	N/A	7	70	5	N/A	5	5
VRP DMV		2	22,000	7	70	5	7,100	5	5

Location	Sample Date	1,1,2-Trichloroethane	Benzene	MIBK	1,1,2,2-Tetrachlorethane	Tetrachloroethene	Toluene	Chlorobenzene	Ethylbenzene	Xylenes
MW-106	9/5/1999	**93**	**75**	ND (<10)	ND (<5)	**10**	ND (<5)	**1,400**	ND (<5)	ND (<5)
	10/18/1999	ND (<50)	**65**	ND (<100)	**80**	**310**	ND (<50)	**1,400**	ND (<50)	ND (<50)
	12/27/1999	**68**	**74**	ND (<50)	ND (<50)	ND (<50)	ND (<50)	**1,200**	ND (<50)	ND (<50)
	3/28/2000	**66**	**58**	ND (<10)	ND (<5)	**7.6**	ND (<5)	**1,500**	ND (<5)	ND (<10)
	6/29/2000	**74**	**67**	ND(<100)	ND(<50)	ND(<50)	ND(<50)	**1,400**	ND(<50)	ND(<50)
	9/26/2000	**93**	**75**	ND(<100)	ND(<50)	ND(<50)	ND(<50)	**1,700**	ND(<50)	ND(<50)
	12/21/2000	**79**	**93**	ND(<100)	ND(<50)	ND(<50)	ND(<50)	**1,600**	ND(<50)	ND(<50)
	6/25/2001	**68**	**67**	ND(<100)	ND(<50)	ND(<50)	ND(<50)	**1,600**	ND(<50)	ND(<50)
	12/13/2001	**75**	**82**	ND(<25)	ND(<25)	ND(<25)	ND(<25)	**1,700**	ND(<25)	ND(<25)
	5/30/2002	ND (<25)	**46**	ND(<25)	ND(<25)	ND(<25)	ND(<25)	**1,500**	ND(<25)	ND(<25)
	12/23/2002	ND (<25)	**69**	ND (<25)	ND (<25)	ND (<25)	ND (<25)	**1,400**	ND (<25)	ND (<25)
	5/30/2003	**64**	**66**	ND (<5)	ND (<5)	**7.6**	ND (<5)	**1,400**	ND (<5)	ND (<5)
	11/11/2003	ND (<50)	**60**	ND (<50)	ND (<50)	ND (<50)	ND (<50)	**1,600**	ND (<50)	ND (<50)
	6/29/2004	ND (<50)	ND (<50)	ND (<50)	ND (<50)	ND (<50)	ND (<50)	**2,100**	ND (<50)	ND (<50)
	11/22/2004	ND (<50)	**78**	ND (<50)	ND (<50)	ND (<50)	ND (<50)	**1,500**	ND (<50)	ND (<50)
	6/14/2005	**56**	**74**	ND (<20)	ND (<20)	ND (<20)	ND (<20)	**1,800**	ND (<20)	ND (<20)
	12/2/2005	**59**	**53**	ND (<50)	ND (<50)	ND (<50)	ND (<50)	**1,400**	ND (<50)	ND (<50)
	8/15/2012	**24**	**23**	ND (<500)	ND (<100)	ND (<100)	ND (<100)	**1,500**	ND (<100)	ND (<300)
	9/19/2012	**25**	**22**	ND (<500)	ND (<100)	ND (<100)	ND (<100)	**1,600**	ND (<100)	ND (<300)
WVGPS		5	5	N/A	N/A	5	1,000	N/A	700	10,000
VRP DMV		5	5	2,000	0.067	5	1,000	100	700	10,000

Table 4

SUMMARY OF ANALYTICAL RESULTS FOR GROUNDWATER - VOCs
FORMER QUALITY CARRIERS, INC. SITE
INSTITUTE, WEST VIRGINIA

Unless otherwise noted, all units are in micrograms per liter (ug/l)

Location	Sample Date	Vinyl chloride	Acetone	1,1-Dichloroethene	1,2-Dichloroethene	1,2-Dichloroethane	MEK	1,2-Dichloropropane	Trichloroethene
MW-107	9/26/2000	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	12/21/2000	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	6/25/2001	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	12/13/2001	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	5/31/2002	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	12/23/2002	ND (<5)	20	ND (<5)	12	ND (<5)	ND (<10)	ND (<5)	**31**
	5/30/2003	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	11/11/2003	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	6/29/2004	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	11/22/2004	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	6/14/2005	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	12/2/2005	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	8/15/2012	ND(<1)	2.8	ND(<1)	ND(<1)	ND(<1)	ND(<5)	ND(<1)	ND(<1)
	9/19/2012	ND(<1)	4.1	ND(<1)	ND(<1)	ND(<1)	ND(<5)	ND(<1)	ND(<1)
WVGPS		2	N/A	7	70	5	N/A	5	5
VRP DMV		2	22,000	7	70	5	7,100	5	5

Location	Sample Date	1,1,2-Trichloroethane	Benzene	MIBK	1,1,2,2-Tetrachlorethane	Tetrachloroethene	Toluene	Chlorobenzene	Ethylbenzene	Xylenes
MW-107	9/26/2000	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	32	ND(<5)	ND(<10)
	12/21/2000	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	13	ND(<5)	ND(<10)
	6/25/2001	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	72	ND(<5)	ND(<10)
	12/13/2001	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<10)
	5/31/2002	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<10)
	12/23/2002	ND (<5)	**7**	ND (<10)	ND (<5)	ND (<5)	ND (<5)	**120**	ND (<5)	ND (<10)
	5/30/2003	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<10)
	11/11/2003	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<10)
	6/29/2004	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<10)
	11/22/2004	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<10)
	6/14/2005	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<10)
	12/2/2005	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<10)
	8/15/2012	ND(<1)	ND(<1)	ND(<5)	ND(<1)	ND(<1)	ND(<1)	ND(<1)	ND(<1)	ND(<3)
	9/19/2012	ND(<1)	ND(<1)	ND(<5)	ND(<1)	ND(<1)	ND(<1)	ND(<1)	ND(<1)	ND(<3)
WVGPS		5	5	N/A	N/A	5	1,000	N/A	700	10,000
VRP DMV		5	5	2,000	0.067	5	1,000	100	700	10,000

Table 4

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FORMER QUALITY CARRIERS, INC. SITE
INSTITUTE, WEST VIRGINIA

Unless otherwise noted, all units are in micrograms per liter (ug/l)

Location	Sample Date	Vinyl chloride	Acetone	1,1-Dichloroethene	1,2-Dichloroethene	1,2-Dichloroethane	MEK	1,2-Dichloropropane	Trichloroethene
MW-108	9/26/2000	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	12/21/2000	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	6/25/2001	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	12/13/2001	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	5/30/2002	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	12/23/2002	ND (<5)	20	ND (<5)	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)
	5/30/2003	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	11/11/2003	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	6/29/2004	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	11/22/2004	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	6/14/2005	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	12/2/2005	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
TMP-5	8/15/2012	ND(<1)	ND(<5)	ND(<1)	ND(<1)	ND(<1)	ND(<5)	ND(<1)	ND(<1)
	9/19/2012	ND(<1)	ND(<5)	ND(<1)	ND(<1)	ND(<1)	ND(<5)	ND(<1)	ND(<1)
WVGPS		2	N/A	7	70	5	N/A	5	5
VRP DMV		2	22,000	7	70	5	7,100	5	5

Location	Sample Date	1,1,2-Trichloroethane	Benzene	MIBK	1,1,2,2-Tetrachlorethane	Tetrachloroethene	Toluene	Chlorobenzene	Ethylbenzene	Xylenes
MW-108	9/26/2000	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	82	ND(<5)	ND(<10)
	12/21/2000	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	82	5.9	ND(<10)
	6/25/2001	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	**810**	33	ND(<10)
	12/13/2001	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<10)
	5/30/2002	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<10)
	12/23/2002	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<10)
	5/30/2003	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<10)
	11/11/2003	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<10)
	6/29/2004	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<10)
	11/22/2004	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<10)
	6/14/2005	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<10)
	12/2/2005	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<10)
TMP-5	8/15/2012	ND(<1)	ND(<1)	ND(<5)	ND(<1)	ND(<1)	ND(<1)	ND(<1)	ND(<1)	ND(<3)
	9/19/2012	ND(<1)	ND(<1)	ND(<5)	ND(<1)	ND(<1)	ND(<1)	ND(<1)	ND(<1)	ND(<3)
WVGPS		5	5	N/A	N/A	5	1,000	N/A	700	10,000
VRP DMV		5	5	2,000	0.067	5	1,000	100	700	10,000

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FORMER QUALITY CARRIERS, INC. SITE
INSTITUTE, WEST VIRGINIA

Unless otherwise noted, all units are in micrograms per liter (ug/l)

Location	Sample Date	Vinyl chloride	Acetone	1,1-Dichloroethene	1,2-Dichloroethene	1,2-Dichloroethane	MEK	1,2-Dichloropropane	Trichloroethene
MW-109	9/26/2000	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	12/21/2000	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	6/25/2001	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	12/13/2001	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	5/30/2002	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	12/23/2002	ND (<5)	12	ND (<5)	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)
	5/30/2003	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	11/11/2003	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	6/29/2004	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	11/22/2004	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	6/14/2005	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	12/2/2005	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	8/15/2012	2.0	4.2	ND(<1)	0.55	ND(<1)	ND(<5)	ND(<1)	ND(<1)
	9/19/2012	0.84	ND(<5)	ND(<1)	0.50	ND(<1)	ND(<5)	ND(<1)	ND(<1)
WVGPS		2	N/A	7	70	5	N/A	5	5
VRP DMV		2	22,000	7	70	5	7,100	5	5

Location	Sample Date	1,1,2-Trichloroethane	Benzene	MIBK	1,1,2,2-Tetrachlorethane	Tetrachloroethene	Toluene	Chlorobenzene	Ethylbenzene	Xylenes
MW-109	9/26/2000	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	**200**	8.8	ND(<10)
	12/21/2000	ND(<25)	ND(<25)	ND(<50)	ND(<25)	ND(<25)	ND(<25)	**210**	ND(<25)	ND (<50)
	6/25/2001	ND(<25)	ND(<25)	ND(<50)	ND(<25)	ND(<25)	ND(<25)	**310**	ND(<25)	ND (<50)
	12/13/2001	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<10)
	5/30/2002	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<10)
	12/23/2002	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<10)
	5/30/2003	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<10)
	11/11/2003	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<10)
	6/29/2004	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<10)
	11/22/2004	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<10)
	6/14/2005	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<10)
	12/2/2005	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<10)
	8/15/2012	ND(<1)	ND(<1)	ND(<5)	ND(<1)	ND(<1)	ND(<1)	0.17	ND(<1)	ND(<3)
	9/19/2012	ND(<1)	ND(<1)	ND(<5)	ND(<1)	ND(<1)	ND(<1)	0.59	ND(<1)	ND(<3)
WVGPS		5	5	N/A	N/A	5	1,000	N/A	700	10,000
VRP DMV		5	5	2,000	0.067	5	1,000	100	700	10,000

Table 4

SUMMARY OF ANALYTICAL RESULTS FOR GROUNDWATER - VOCs
FORMER QUALITY CARRIERS, INC. SITE
INSTITUTE, WEST VIRGINIA

Unless otherwise noted, all units are in micrograms per liter (ug/l)

Location	Sample Date	Vinyl chloride	Acetone	1,1-Dichloroethene	1,2-Dichloroethene	1,2-Dichloroethane	MEK	1,2-Dichloropropane	Trichloroethene
MW-110	9/26/2000	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	12/21/2000	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	6/25/2001	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	12/13/2001	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	5/31/2002	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	12/23/2002	ND (<5)	23	ND (<5)	ND (<5)	ND (<5)	ND (<10)	ND (<5)	ND (<5)
	5/30/2003	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	11/11/2003	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	6/29/2004	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	11/22/2004	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	6/14/2005	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	12/2/2005	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)
	8/15/2012	ND(<1)	ND(<5)	ND(<1)	ND(<1)	ND(<1)	ND(<5)	ND(<1)	ND(<1)
	9/19/2012	ND(<1)	5.3	ND(<1)	ND(<1)	ND(<1)	ND(<5)	ND(<1)	ND(<1)
WVGPS		2	N/A	7	70	5	N/A	5	5
VRP DMV		2	22,000	7	70	5	7,100	5	5

Location	Sample Date	1,1,2-Trichloroethane	Benzene	MIBK	1,1,2,2-Tetrachlorethane	Tetrachloroethene	Toluene	Chlorobenzene	Ethylbenzene	Xylenes
MW-110	9/26/2000	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	80	ND(<5)	ND(<10)
	12/21/2000	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	36	ND(<5)	ND(<10)
	6/25/2001	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	**240**	9.9	ND(<10)
	12/13/2001	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<10)
	5/31/2002	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<10)
	12/23/2002	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<5)	ND (<10)
	5/30/2003	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<10)
	11/11/2003	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<10)
	6/29/2004	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<10)
	11/22/2004	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<10)
	6/14/2005	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<10)
	12/2/2005	ND(<5)	ND(<5)	ND(<10)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<10)
	8/15/2012	ND(<1)	ND(<1)	ND(<5)	ND(<1)	ND(<1)	ND(<1)	ND(<1)	ND(<1)	ND(<3)
	9/19/2012	ND(<1)	ND(<1)	ND(<5)	ND(<1)	ND(<1)	ND(<1)	0.2	ND(<1)	ND(<3)
WVGPS		5	5	N/A	N/A	5	1,000	N/A	700	10,000
VRP DMV		5	5	2,000	0.067	5	1,000	100	700	10,000

Table 5

SUMMARY OF ANALYTICAL RESULTS FOR GROUNDWATER - SEMI-VOCs
FORMER QUALITY CARRIERS, INC. SITE
INSTITUTE, WEST VIRGINIA

Unless otherwise noted, all units are in micrograms per liter (ug/l)

Location	Sample Date	Aniline	4-Chloroaniline	2-Chlorophenol	3&4 Methylphenol (m&p-Cresol)	2-Methylphenol (o-Cresol)	1,4-Dichlorobenzene	1,2-Dichlorobenzene	Bis(2-chloroisopropyl) ether	2,4-Dimethylphenol	Naphthalene	Bis(2-ethylhexyl) phthalate
MW-101	9/5/1999	NA	NA	ND (<10)	NA	NA	ND (<10)	ND (<10)	ND (<10)	NA	ND (<10)	ND (<10)
	10/18/1999	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	12/27/1999	NA	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	3/28/2000	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<5)
	6/29/2000	NA	ND(<10)	ND(<5)	ND(<20)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)
	9/26/2000	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	12/21/2000	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	6/25/2001	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	12/13/2001	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	5/31/2002	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	12/23/2002	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	5/30/2003	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	11/11/2003	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	6/29/2004	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	11/22/2004	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<5)
	6/14/2005	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<5)
	12/2/2005	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	8/15/2012	NA	NA	ND (<0.96)	ND (<0.96)	ND (<0.96)	ND (<1)	ND (<1)	NA	ND (<0.96)	ND (<0.0.19)	ND (<1.9)
	9/19/2012	NA	NA	ND (<0.96)	ND (<0.96)	ND (<0.96)	ND (<1)	ND (<1)	NA	ND (<0.96)	ND (<0.0.19)	ND (<1.9)
MW-102	9/5/1999	NA	NA	ND (<10)	NA	NA	ND (<10)	ND (<10)	**48**	NA	ND (<10)	**18**
	10/19/1999	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	12/27/1999	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	3/28/2000	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<5)
	6/29/2000	NA	ND(<10)	ND(<10)	ND(<20)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)
	9/26/2000	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	12/21/2000	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	6/25/2001	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	12/13/2001	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	5/31/2002	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	12/23/2002	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	5/30/2003	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	11/11/2003	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	6/29/2004	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	11/22/2004	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<5)
	6/14/2005	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<5)
	12/2/2005	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	8/15/2012	NA	NA	ND (<0.99)	ND (<0.99)	ND (<0.99)	ND (<1)	ND (<1)	NA	ND (<0.99)	ND (<0.2)	ND (<2)
	9/19/2012	NA	NA	ND(< 1)	ND(< 1)	ND(< 1)	ND(< 1)	ND(< 1)	NA	ND(< 1)	ND (<0.2)	ND (<2)
WVGPS		N/A	N/A	N/A	N/A	N/A	75	600	N/A	N/A	N/A	6
VRP DMV		12	0.34	30	180	1800	75	600	0.32	730	0.14	6

Note: Only the detected compounds for the analysis have been reported
N/A: No standard was given in Appendix A for the specific compound
NA: Compound was not analyzed during the sampling event

Table 5

SUMMARY OF ANALYTICAL RESULTS FOR GROUNDWATER - SEMI-VOCs
FORMER QUALITY CARRIERS, INC. SITE
INSTITUTE, WEST VIRGINIA

Unless otherwise noted, all units are in micrograms per liter (ug/l)

Location	Sample Date	Aniline	4-Chloroaniline	2-Chlorophenol	3&4 Methylphenol (m&p-Cresol)	2-Methylphenol (o-Cresol)	1,4-Dichlorobenzene	1,2-Dichlorobenzene	Bis(2-chloroisopropyl) ether	2,4-Dimethylphenol	Naphthalene	Bis(2-ethylhexyl) phthalate
MW-103	9/5/1999	NA	NA	ND (<10)	NA	NA	ND (<10)	ND (<10)	ND (<10)	NA	ND (<10)	ND (<10)
	10/19/1999	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	12/27/1999	NA	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	3/28/2000	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<5)
	6/29/2000	NA	ND(<10)	ND(<10)	ND(<20)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)
	9/26/2000	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	12/21/2000	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	6/25/2001	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	12/13/2001	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	5/31/2002	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	12/23/2002	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	5/30/2003	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	11/11/2003	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	6/29/2004	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	11/22/2004	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<5)
	6/14/2005	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	12/2/2005	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	8/15/2012	NA	NA	ND (<1)	ND (<1)	ND (<1)	ND (<1)	ND (<1)	NA	ND (<1)	ND (<0.2)	ND (<2)
	9/19/2012	NA	NA	ND (<0.96)	ND (<0.96)	ND (<0.96)	ND (<1)	ND (<1)	NA	ND (<0.96)	ND (<0.0.19)	ND (<1.9)
MW-104	9/5/1999	NA	NA	**49**	NA	NA	28	120	**39**	NA	**33**	**19**
	10/18/1999	**370**	**34**	**33**	ND (<10)	10	74	510	**12**	18	**88**	ND (<10)
	12/27/1999	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	**88**	370	**110**	ND (<10)	**100**	ND (<10)
	3/28/2000	NA	ND (<10)	17	ND (<20)	ND (<10)	61	260	**140**	31	**63**	ND (<5)
	6/29/2000	NA	ND(<10)	14	52	49	34	140	**37**	26	**45**	ND(<10)
	9/26/2000	NA	ND(<10)	**46**	90	18	**93**	370	**64**	49	**100**	ND(<10)
	12/21/2000	NA	ND(<10)	23	86	17	65	280	**140**	52	**69**	ND(<10)
	6/25/2001	NA	ND (<10)	**38**	60	15	**88**	290	**140**	89	**69**	ND (<10)
	12/13/2001	NA	ND (<10)	14	ND (<20)	ND (<10)	61	210	ND (<10)	17	**56**	ND (<10)
	5/30/2002	NA	ND (<10)	14	ND (<20)	ND (<10)	71	230	**79**	21	**64**	ND (<10)
	12/23/2002	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	61	170	**50**	11	**50**	ND (<10)
	5/30/2003	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	12	29	**12**	ND (<10)	ND (<10)	ND (<10)
	11/11/2003	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	15	40	**21**	ND (<10)	**16**	ND (<10)
	6/29/2004	NA	ND (<10)	14	ND (<20)	ND (<10)	36	110	ND (<10)	ND (<10)	**24**	ND (<10)
	11/22/2004	NA	ND (<10)	13	ND (<20)	ND (<10)	65	210	**10**	ND (<10)	**47**	ND (<5)
	6/14/2005	NA	ND (<10)	15	ND (<20)	ND (<10)	62	190	ND (<10)	ND (<10)	**33**	ND (<10)
	12/2/2005	NA	ND (<10)	10	ND (<20)	ND (<10)	30	100	ND (<10)	ND (<10)	**21**	ND (<10)
	8/15/2012	NA	NA	14	9.5	4.4	71	220	NA	12	**25**	ND(< 2)
	9/19/2012	NA	NA	12	ND (<20)	5.4	**150**	530	NA	19	**36**	ND(< 40)
WVGPS		N/A	N/A	N/A	N/A	N/A	75	600	N/A	N/A	N/A	6
VRP DMV		12	0.34	30	180	1800	75	600	0.32	730	0.14	6

Note: Only the detected compounds for the analysis have been reported
N/A: No standard was given in Appendix A for the specific compound
NA: Compound was not analyzed during the sampling event

Table 5

SUMMARY OF ANALYTICAL RESULTS FOR GROUNDWATER - SEMI-VOCs
FORMER QUALITY CARRIERS, INC. SITE
INSTITUTE, WEST VIRGINIA

Unless otherwise noted, all units are in micrograms per liter (ug/l)

Location	Sample Date	Aniline	4-Chloroaniline	2-Chlorophenol	3&4 Methylphenol (m&p-Cresol)	2-Methylphenol (o-Cresol)	1,4-Dichlorobenzene	1,2-Dichlorobenzene	Bis(2-chloroisopropyl) ether	2,4-Dimethylphenol	Naphthalene	Bis(2-ethylhexyl) phthalate
MW-105	9/5/1999	NA	NA	ND (<10)	NA	NA	ND (<10)	ND (<10)	ND (<10)	NA	ND (<10)	ND (<10)
	10/18/1999	ND (<10)	ND (<20)	ND (<10)	18	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	12/27/1999	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	3/28/2000	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<5)
	6/29/2000	NA	ND(<10)	ND(<10)	ND(<20)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)
	9/26/2000	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	10	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	12/21/2000	NA	ND(<10)	ND(<10)	ND(<20)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)
	6/25/2001	NA	ND(<10)	ND(<10)	ND(<20)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)
	12/13/2001	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	5/30/2002	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	12/23/2002	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	5/30/2003	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	11/11/2003	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	6/29/2004	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	11/22/2004	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<5)
	6/14/2005	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	12/2/2005	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	8/15/2012	NA	NA	ND (<0.19)	ND (<0.97)	ND (<0.97)	ND (<4)	ND (<4)	NA	ND (<0.97)	ND (<0.19)	ND (<1.9)
	9/19/2012	NA	NA	ND (<0.2)	ND (<0.98)	ND (<0.98)	ND (<2)	ND (<2)	NA	ND (<0.98)	ND (<0.2)	ND (<2)
MW-106	9/5/1999	NA	NA	ND (<10)	NA	NA	ND (<10)	ND (<10)	ND (<10)	NA	ND (<10)	ND (<10)
	10/18/1999	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	12/27/1999	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	**32**	ND (<10)	ND (<10)	ND (<10)
	3/28/2000	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	11	**39**	ND (<10)	ND (<10)	ND (<5)
	6/29/2000	NA	ND(<10)	11	ND(<20)	ND(<10)	ND(<10)	ND(<10)	**15**	ND(<10)	ND(<10)	ND(<10)
	9/26/2000	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	**15**	ND (<10)	ND (<10)	ND (<10)
	12/21/2000	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	13	**39**	ND (<10)	ND (<10)	ND (<10)
	6/25/2001	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	17	**42**	ND (<10)	ND (<10)	ND (<10)
	12/13/2001	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	5/30/2002	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	**15**	ND (<10)	ND (<10)	ND (<10)
	12/23/2002	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	**13**	ND (<10)	ND (<10)	ND (<10)
	5/30/2003	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	11/11/2003	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	6/29/2004	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	17	ND (<10)	12	ND (<10)	ND (<10)
	11/22/2004	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	**20**	ND (<10)	ND (<10)	ND (<5)
	6/14/2005	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	15	**29**	ND (<10)	ND (<10)	ND (<10)
	6/14/2005	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	14	**24**	ND (<10)	ND (<10)	ND (<10)
	8/15/2012	NA	NA	0.27	ND (<0.97)	ND (<0.97)	ND (<100)	ND(<100)	NA	ND (<0.97)	ND (<0.19)	ND (<1.9)
	9/19/2012	NA	NA	3.6	ND (<4.9)	ND (<4.9)	ND (<100)	23	NA	ND (<4.9)	ND (<0.97)	ND (<9.7)
WVGPS		N/A	N/A	N/A	N/A	N/A	75	600	N/A	N/A	N/A	6
VRP DMV		12	0.34	30	180	1800	75	600	0.32	730	0.14	6

Note: Only the detected compounds for the analysis have been reported
N/A: No standard was given in Appendix A for the specific compound
NA: Compound was not analyzed during the sampling event

Table 5

SUMMARY OF ANALYTICAL RESULTS FOR GROUNDWATER - SEMI-VOCs
FORMER QUALITY CARRIERS, INC. SITE
INSTITUTE, WEST VIRGINIA

Unless otherwise noted, all units are in micrograms per liter (ug/l)

Location	Sample Date	Aniline	4-Chloroaniline	2-Chlorophenol	3&4 Methylphenol (m&p-Cresol)	2-Methylphenol (o-Cresol)	1,4-Dichlorobenzene	1,2-Dichlorobenzene	Bis(2-chloroisopropyl) ether	2,4-Dimethylphenol	Naphthalene	Bis(2-ethylhexyl) phthalate
MW-107	9/26/2000	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	12/21/2000	NA	ND(<10)	ND(<10)	ND(<20)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)
	6/25/2001	NA	ND(<10)	ND(<10)	ND(<20)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)
	12/13/2001	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	5/31/2002	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	12/23/2002	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	5/30/2003	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	11/11/2003	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	6/29/2004	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	11/22/2004	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<5)
	6/14/2005	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	12/2/2005	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	8/15/2012	NA	NA	ND (<0.98)	ND (<0.98)	ND (<0.98)	ND (<1)	ND (<1)	NA	ND (<0.98)	ND (<0.2)	1.2
	9/19/2012	NA	NA	ND (<0.96)	ND (<0.96)	ND (<0.96)	ND (<1)	ND (<1)	NA	ND (<0.96)	0.022	3.0
MW-108	9/26/2000	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	12/21/2000	NA	ND(<10)	ND(<10)	ND(<20)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)
	6/25/2001	NA	ND(<10)	ND(<10)	ND(<20)	ND(<10)	ND(<10)	14	ND(<10)	ND(<10)	ND(<10)	ND(<10)
	12/13/2001	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	5/30/2002	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	12/23/2002	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	5/30/2003	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	11/11/2003	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	6/29/2004	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	11/22/2004	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<5)
	6/14/2005	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	12/2/2005	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	8/15/2012	NA	NA	ND (<0.96)	ND (<0.96)	ND (<0.96)	ND (<1)	ND (<1)	NA	ND (<0.96)	ND(<0.19)	ND(<1.9)
	9/19/2012	NA	NA	ND (<1)	ND (<1)	ND (<1)	ND (<1)	ND (<1)	NA	ND (<1)	ND(<0.2)	ND(<2)
WVGPS		N/A	N/A	N/A	N/A	N/A	75	600	N/A	N/A	N/A	6
VRP DMV		12	0.34	30	180	1800	75	600	0.32	730	0.14	6

Note: Only the detected compounds for the analysis have been reported
N/A: No standard was given in Appendix A for the specific compound
NA: Compound was not analyzed during the sampling event

Table 5

SUMMARY OF ANALYTICAL RESULTS FOR GROUNDWATER - SEMI-VOCs
FORMER QUALITY CARRIERS, INC. SITE
INSTITUTE, WEST VIRGINIA

Unless otherwise noted, all units are in micrograms per liter (ug/l)

Location	Sample Date	Aniline	4-Chloroaniline	2-Chlorophenol	3&4 Methylphenol (m&p-Cresol)	2-Methylphenol (o-Cresol)	1,4-Dichlorobenzene	1,2-Dichlorobenzene	Bis(2-chloroisopropyl) ether	2,4-Dimethylphenol	Naphthalene	Bis(2-ethylhexyl) phthalate
MW-109	9/26/2000	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	12/21/2000	NA	ND(<10)	ND(<10)	ND(<20)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)
	6/25/2001	NA	ND(<10)	ND(<10)	ND(<20)	ND(<10)	ND(<10)	16	ND(<10)	ND(<10)	ND(<10)	ND(<10)
	12/13/2001	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	5/30/2002	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	12/23/2002	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	5/30/2003	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	11/11/2003	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	6/29/2004	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	11/22/2004	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<5)
	6/14/2005	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	12/2/2005	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	8/15/2012	NA	NA	ND (<0.96)	ND (<0.96)	ND (<0.96)	ND (<1)	ND (<1)	NA	ND (<0.96)	ND(<0.19)	ND(<1.9)
	9/19/2012	NA	NA	ND (<0.99)	ND (<0.99)	ND (<0.99)	ND (<1)	ND (<1)	NA	ND (<0.99)	ND(<0.2)	ND(<2)
MW-110	9/26/2000	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	12/21/2000	NA	ND(<10)	ND(<10)	ND(<20)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)
	6/25/2001	NA	ND(<10)	ND(<10)	ND(<20)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)
	12/13/2001	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	5/31/2002	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	12/23/2002	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	5/30/2003	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	11/11/2003	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	6/29/2004	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	11/22/2004	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<5)
	6/14/2005	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	12/2/2005	NA	ND (<10)	ND (<10)	ND (<20)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)
	8/15/2012	NA	NA	ND (<0.96)	ND (<0.96)	ND (<0.96)	ND (<1)	ND (<1)	NA	ND (<0.96)	ND(<0.19)	ND(<1.9)
	9/19/2012	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
WVGPS		N/A	N/A	N/A	N/A	N/A	75	600	N/A	N/A	N/A	6
VRP DMV		12	0.34	30	180	1800	75	600	0.32	730	0.14	6

Note: Only the detected compounds for the analysis have been reported
N/A: No standard was given in Appendix A for the specific compound
NA: Compound was not analyzed during the sampling event

TABLE 6

SUMMARY OF PESTICIDES, HERBICIDES, DIOXINS, AND FURANS
GROUNDWATER SAMPLES COLLECTED OCTOBER 18-19, 1999
Quality Distribution Facility- Institute, WV
Monitoring Well Groundwater Analytical Data
Permit Number: WVR000001719

Unless otherwise noted, all units are in micrograms per liter (ug/l)

	Pesticides and Herbicides	Dioxins/Furans				
Location	beta-BHC	1,2,3,4,6,7,8,9-OCDD	TEQ (TEF=0.0003)	1,2,3,4,6,7,8,9-OCDF	TEQ (TEF=0.0003)	Sum of TEQs
MW-101	ND (<0.30)	ND (<0.000020)	0.0000000060	ND (<0.000017)	0.0000000051	0.0000000111
MW-102	ND (<0.30)	0.000834	0.0000002502	ND (<0.000034)	0.0000000102	0.0000002604
MW-103	ND (<0.30)	0.000595	0.0000001785	ND (<0.000012)	0.0000000036	0.0000001821
MW-104	ND (<0.30)	0.000284	0.0000000852	ND (<0.000018)	0.0000000054	0.0000000906
MW-105	ND (<0.30)	0.000093	0.0000000279	ND (<0.000030)	0.0000000090	0.0000000369
MW-106	0.65	0.000115	0.0000000345	0.000014	0.0000000042	0.0000000387
WVGPS	N/A	N/A		N/A		NA
VRP DMV	0.037	N/A	0.00003	N/A	0.00003	0.00003

N/A: There is no established WVGPS or VRP DMV.
Note: Only the detected compounds for the analysis have been reported

TABLE 7
GROUNDWATER ELEVATION MEASUREMENTS
QUALITY CARRIERS, INC. PROPERTY
INSTITUTE, WEST VIRGINIA

LOCATION	REFERENCE POINT ELEVATION (msl)	AUGUST 2012		SEPTEMBER 2012	
		Depth to Water (ft)	Groundwater Elevation (msl)	Depth to Water (ft)	Groundwater Elevation (msl)
MW-101	603.08	16.16	586.92	17.51	585.57
MW-102	598.05	19.38	578.67	19.71	578.34
MW-103	600.23	22.06	578.17	22.36	577.87
MW-104	599.95	9.04	590.91	9.99	589.96
MW-105	597.54	19.57	577.97	20.04	577.50
MW-106	598.12	20.10	578.02	20.37	577.75
MW-107	588.11	9.77	578.34	9.93	578.18
MW-109	596.49	19.40	577.09	19.80	576.69
MW-110	603.63	23.36	580.27	21.91	581.72
TMP-1	600.86	DRY		24.68	576.18
TMP-2	597.71	19.92	577.79	20.16	577.55
TMP-3	600.50	18.36	582.14	21.83	578.67
TMP-5	596.21	18.67	577.54	19.01	577.20
WWT-1	617.75	9.27	608.48	9.11	608.64
WWT-2	615.79	DRY		DRY	

TABLE 8
ANALYTICAL RESULTS FOR METALS IN SOIL SAMPLES
DBA SAMPLING LOCATIONS
QUALITY CARRIERS, INC. PROPERTY
INSTITUTE, WEST VIRGINIA

SAMPLE LOCATION	VRP DMV		USEPA RBSL		DBA-1				DBA-2		
DEPTH INTERVAL					0' - 2'	0' - 2'(DUP)	7' - 9'	10' - 11.3'	0' - 2'	6' - 8'	16' - 18'
DATE COLLECTED					8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012
ANALYTE	Industrial Soil	Migration to Groundwater	Industrial Soil	Migration to Groundwater							
Arsenic	27	5.8	1.6	0.29	**5.5**	**6.0**	**5.2**	**3.9**	**1.9**	**7.0**	**12**
Barium	360,000	1,600	190,000	82	**91**	**140**	**200**	**250**	22	**110**	**280**
Cadmium	800	7.5	800	0.38	<1.1	<1.1	<1.2	<1.2	0.36	<1.2	<1.1
Chromium	1,000,000	2,000,000,000	1,500,000	180,000	21	25	16	17	4.0	24	13
Lead	1,000	270	800	14	**15**	**16**	14	12	3.4	**18**	11
Mercury	610	2.1	43	0.1	<0.12	<0.11	<0.12	<0.12	<0.1	<0.12	0.11
Selenium	10,000	5.2	5,100	0.26	**3.4**	**3.6**	**3.7**	**2.3**	<2	**3.8**	**2.9**
Silver	10,000	31	5,100	0.6	<1.1	<1.1	<1.2	<1.2	<0.99	<1.2	<1.1
Vanadium	140	51	5,200	78	21	25	20	21	3.9	33	18

SAMPLE LOCATION	VRP DMV		USEPA RBSL		DBA-3			DBA-4			
DEPTH INTERVAL					0' - 2'	6' - 8'	10' - 11.2'	0' - 2'	0'-2'(DUP)	6' - 8'	16' - 18'
DATE COLLECTED					8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012
ANALYTE	Industrial Soil	Migration to Groundwater	Industrial Soil	Migration to Groundwater							
Arsenic	27	5.8	1.6	0.29	**9.5**	**4.2**	**5.8**	**5.2**	**7.3**	**6.9**	**1.7**
Barium	360,000	1,600	190,000	82	**190**	**460**	**230**	**130**	**110**	**140**	**120**
Cadmium	800	7.5	800	0.38	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	**7.2**
Chromium	1,000,000	2,000,000,000	1,500,000	180,000	24	24	7.7	25	18	18	14
Lead	1,000	270	800	14	**23**	**23**	14	**19**	**18**	**16**	**18**
Mercury	610	2.1	43	0.1	<0.11	0.046	0.082	0.043	<0.11	<0.11	<0.12
Selenium	10,000	5.2	5,100	0.26	**3.9**	**5.6**	**3.4**	**3.5**	**2.9**	**3.2**	<2.4
Silver	10,000	31	5,100	0.6	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.2
Vanadium	140	51	5,200	78	32	32	7.3	28	30	27	13

All results in mg/kg

TABLE 8
ANALYTICAL RESULTS FOR METALS IN SOIL SAMPLES
DBA SAMPLING LOCATIONS
QUALITY CARRIERS, INC. PROPERTY
INSTITUTE, WEST VIRGINIA

SAMPLE LOCATION	VRP DMV		USEPA RBSL		DBA-5			DBA-7			
DEPTH INTERVAL					0' - 2'	6' - 8'	16' - 18'	0' - 2'	0'-2'(DUP)	6' - 8'	16' - 18'
DATE COLLECTED					8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012
ANALYTE	Industrial Soil	Migration to Groundwater	Industrial Soil	Migration to Groundwater							
Arsenic	27	5.8	1.6	0.29	**8.8**	**8.9**	**4.0**	**6.6**	**7.3**	**9.3**	**4.6**
Barium	360,000	1,600	190,000	82	**150**	**100**	**90**	**160**	**200**	**180**	**120**
Cadmium	800	7.5	800	0.38	<1.1	<1.2	<1.1	<1.1	<1.2	<1.1	<1.2
Chromium	1,000,000	2,000,000,000	1,500,000	180,000	29	14	8.9	20	19	17	12
Lead	1,000	270	800	14	**19**	**19**	14	**18**	**19**	**27**	14
Mercury	610	2.1	43	0.1	<0.11	<0.11	<0.11	0.086	0.04	<0.11	0.036
Selenium	10,000	5.2	5,100	0.26	**3.9**	**1.8**	**1.6**	**2.6**	**2.2**	**1.8**	**1.7**
Silver	10,000	31	5,100	0.6	<1.1	<1.2	<1.1	<1.1	<1.2	<1.1	<1.2
Vanadium	140	51	5,200	78	35	26	16	26	27	31	20

SAMPLE LOCATION	VRP DMV		USEPA RBSL		DBA-8			
DEPTH INTERVAL					0' - 2'	0'-2'(DUP)	6' - 8'	16' - 18'
DATE COLLECTED					8/9/2012	8/9/2012	8/9/2012	8/9/2012
ANALYTE	Industrial Soil	Migration to Groundwater	Industrial Soil	Migration to Groundwater				
Arsenic	27	5.8	1.6	0.29	**8.6**	**7.1**	**5.5**	**6.5**
Barium	360,000	1,600	190,000	82	81	**87**	**130**	**110**
Cadmium	800	7.5	800	0.38	<1.1	<1.1	<1.2	<1.2
Chromium	1,000,000	2,000,000,000	1,500,000	180,000	18	16	16	13
Lead	1,000	270	800	14	**17**	**16**	**18**	13
Mercury	610	2.1	43	0.1	<0.11	<0.11	<0.12	<0.12
Selenium	10,000	5.2	5,100	0.26	**1.5**	**1.5**	**2.2**	**2.0**
Silver	10,000	31	5,100	0.6	<1.1	<1.1	<1.2	<1.2
Vanadium	140	51	5,200	78	25	23	25	21

All results in mg/kg

TABLE 9
ANALYTICAL RESULTS FOR VOCs IN SOIL SAMPLES
DBA SAMPLING LOCATIONS
QUALITY CARRIERS, INC. PROPERTY
INSTITUTE, WEST VIRGINIA

SAMPLE LOCATION	VRP DMV		USEPA RBSL		DBA-1				DBA-2		DBA-3			DBA-4				DBA-5			DBA-7				DBA-8			
DEPTH INTERVAL					0' - 2'	0'-2'(DUP)	7' - 9'	10' - 11.3'	0' - 2'	16' - 18'	0' - 2'	6' - 8'	10' - 11.2'	0' - 2'	0'-2'(DUP)	6' - 8'	16' - 18'	0' - 2'	6' - 8'	16' - 18'	0' - 2'	18' - 20'	6' - 8'	16' - 18'	0' - 2'	0'-2'(DUP)	6' - 8'	16' - 18'
DATE COLLECTED					8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012
ANALYTE	Industrial Soil	Migration to Groundwater	Industrial Soil	Migration to Groundwater																								
1,1,1-Trichloroethane	450,000	1,400	38,000,000	70	<1.7	<1.7	<1.8	<1.7	<2.2	<1.8	<1.9	<2.1	<1.8	<1.7	<3.5	<2	<2	<1.6	<1.7	<1.7	<1.8	<1.9	<1.6	<1.8	<1.8	<1.7	<1.8	<2
1,1,2,2-Tetrachloroethane	99,000	4.0	2,800	0.026	<1.7	<1.7	<1.8	<1.7	<2.2	<1.8	<1.9	<2.1	<1.8	<1.7	<3.5	<2	<2	<1.6	<1.7	<1.7	<1.8	<1.9	<1.6	<1.8	<1.8	<1.7	<1.8	<2
1,1,2-Trichloro-1,2,2-trifluoroethane	420,000	2,900,000	180,000,000	130,000	<1.7	<1.7	<1.8	<1.7	<2.2	<1.8	<1.9	<2.1	<1.8	<1.7	<3.5	<2	<2	<1.6	<1.7	<1.7	<1.8	<1.9	<1.6	<1.8	<1.8	<1.7	<1.8	<2
1,1,2-Trichloroethane	57,000	32	5,300	1.6	<4.2	<4.2	<4.6	<4.2	<5.4	<4.4	<4.8	<5.1	<4.6	<4.3	<8.8	<4.9	<4.9	<4	<4.3	**99**	<4.5	<4.6	<4.1	<4.6	<4.6	<4.3	<4.5	**7.0**
1,1-Dichloroethane	170,000	14	17,000	0.68	<1.7	<1.7	<1.8	<1.7	<2.2	<1.8	<1.9	<2.1	<1.8	<1.7	<3.5	<2	<2	<1.6	<1.7	**0.91**	<1.8	<1.9	<1.6	<1.8	<1.8	<1.7	<1.8	<2
1,1-Dichloroethene	860,000	50	1,100,000	2.5	<1.7	<1.7	<1.8	**3.5**	<2.2	<1.8	<1.9	<2.1	<1.8	<1.7	<3.5	<2	<2	<1.6	<1.7	**2.7**	<1.8	<1.9	<1.6	<1.8	<1.8	<1.7	<1.8	<2
1,2,4-Trichlorobenzene	290,000	4,100	99,000	200	0.91	0.89	<1.8	17	<2.2	<1.8	<1.9	<2.1	<1.8	<1.7	<3.5	<2	<2	<1.6	<1.7	<1.7	<1.8	<1.9	<1.6	<1.8	<1.8	<1.7	<1.8	<2
1,2-Dibromo-3-Chloropropane	71,000	1.7	69	0.086	<4.2	<4.2	<4.6	<4.2	<5.4	<4.4	<4.8	<5.1	<4.6	<4.3	<8.8	<4.9	<4.9	<4	<4.3	<4.2	<4.5	<4.6	<4.1	<4.6	<4.6	<4.3	<4.5	<5
1,2-Dibromoethane (EDB)	1,800	0.28	170	0.014	<1.7	<1.7	<1.8	<1.7	<2.2	<1.8	<1.9	<2.1	<1.8	<1.7	<3.5	<2	<2	<1.6	<1.7	<1.7	<1.8	<1.9	<1.6	<1.8	<1.8	<1.7	<1.8	<2
1,2-Dichlorobenzene	150,000	12,000	9,800,000	580	4	4.5	12	52	<2.2	2.4	<1.9	<2.1	<1.8	<1.7	<3.5	<2	<2	<1.6	<1.7	<1.7	<1.8	<1.9	<1.6	<1.8	<1.8	<1.7	1.8	<2
1,2-Dichloroethane	23,000	28	2,200	1.4	0.57	0.99	**4.8**	**1.5**	<2.2	<1.8	<1.9	<2.1	<1.8	<1.7	<3.5	<2	<2	<1.6	<1.7	**7.0**	<1.8	<1.9	<1.6	<1.8	<1.8	<1.7	<1.8	0.98
1,2-Dichloropropane	47,000	33	4,700	1.7	1.7	**2.2**	**9.5**	1.0	<2.2	<1.8	<1.9	<2.1	<1.8	<1.7	<3.5	<2	<2	<1.6	<1.7	1.7	<1.8	<1.9	<1.6	<1.8	<1.8	<1.7	1.4	<2
1,3-Dichlorobenzene	120,000	12,000	---	---	<1.7	<1.7	1.7	4.3	<2.2	<1.8	<1.9	<2.1	<1.8	<1.7	<3.5	<2	<2	<1.6	<1.7	<1.7	<1.8	<1.9	<1.6	<1.8	<1.8	<1.7	<1.8	<2
1,4-Dichlorobenzene	140,000	1,400	12,000	---	<1.7	<1.7	1.3	12	<2.2	0.63	<1.9	<2.1	<1.8	<1.7	<3.5	<2	<2	<1.6	<1.7	<1.7	<1.8	<1.9	<1.6	<1.8	<1.8	<1.7	<1.8	<2
1,4-Dioxane	250,000	2.8	17,000	0.14	<170	<170	<180	<170	<220	<180	<190	<210	<180	<170	<350	<200	<200	<160	<170	<170	<180	<190	<160	<180	<180	<170	<180	<200
2-Butanone (MEK)	47,000,000	30,000	200,000,000	1,000	<42	<42	<46	<42	<54	<44	<48	<51	<46	<43	<88	<49	<49	<40	<43	<42	<45	<46	<41	<46	<46	<43	<45	<50
2-Hexanone	---	---	1,400,000	7.9	<42	<42	<46	<42	<54	<44	<48	<51	<46	<43	<88	<49	<49	<40	<43	<42	<45	<46	<41	<46	<46	<43	<45	<50
4-Methyl-2-pentanone (MIBK)	430,000	9,500	53,000,000	230	<42	<42	<46	<42	<54	<44	<48	<51	<46	<43	<88	<49	<49	<40	<43	<42	<45	<46	<41	<46	<46	<43	<45	<50
Acetone	200,000,000	89,000	630,000,000	2,400	<42	<42	<46	<42	<54	<44	<48	<51	<46	<43	<88	<49	<49	<40	<43	<42	<45	<46	<41	<46	<46	<43	<45	<50
Benzene	58,000	51	5,400	2.6	**5.2**	**7.6**	**22**	**7.6**	<2.2	<1.8	<1.9	<2.1	<1.8	<1.7	<3.5	<2	<2	<1.6	<1.7	**22**	<1.8	<1.9	<1.6	<1.8	<1.8	<1.7	**10**	**8.6**
Bromodichloromethane	14,000	0.64	1,400	22	<1.7	<1.7	<1.8	<1.7	<2.2	<1.8	<1.9	<2.1	<1.8	<1.7	<3.5	<2	<2	<1.6	<1.7	<1.7	<1.8	<1.9	<1.6	<1.8	<1.8	<1.7	<1.8	<2
Bromoform	3,100,000	45	220,000	21	<1.7	<1.7	<1.8	<1.7	<2.2	<1.8	<1.9	<2.1	<1.8	<1.7	<3.5	<2	<2	<1.6	<1.7	<1.7	<1.8	<1.9	<1.6	<1.8	<1.8	<1.7	<1.8	<2
Bromomethane	33,000	44	32,000	1.8	<1.7	<1.7	<1.8	<1.7	<2.2	<1.8	<1.9	<2.1	<1.8	<1.7	<3.5	<2	<2	<1.6	<1.7	<1.7	<1.8	<1.9	<1.6	<1.8	<1.8	<1.7	<1.8	<2
Carbon disulfide	640,000	6,100	3,700,000	210	<4.2	<4.2	<4.6	<4.2	<5.4	<4.4	<4.8	<5.1	<4.6	<4.3	<8.8	<4.9	<4.9	<4	<4.3	<4.2	<4.5	<4.6	<4.1	<4.6	<4.6	<4.3	<4.5	<5
Carbon tetrachloride	32,000	39	3,000	1.9	<1.7	<1.7	<1.8	<1.7	<2.2	<1.8	<1.9	<2.1	<1.8	<1.7	<3.5	<2	<2	<1.6	<1.7	<1.7	<1.8	<1.9	<1.6	<1.8	<1.8	<1.7	<1.8	<2
Chlorobenzene	340,000	1,400	1,400,000	68	**1000**	**880**	**8500**	**6900**	<2.2	**690**	<1.9	<2.1	<1.8	<1.7	<3.5	0.79	<2	<1.6	<1.7	<1.7	<1.8	<1.9	<1.6	<1.8	<1.8	<1.7	2.0	<2
Chloroethane	1,900,000	120,000	---	---	<4.2	<4.2	<4.6	<4.2	<5.4	<4.4	<4.8	<5.1	<4.6	<4.3	<8.8	<4.9	<4.9	<4	<4.3	<4.2	<4.5	<4.6	<4.1	<4.6	<4.6	<4.3	<4.5	<5
Chloroform	15,000	1.1	1,500	22	<1.7	<1.7	<1.8	<1.7	<2.2	<1.8	<1.9	<2.1	<1.8	<1.7	<3.5	<2	<2	<1.6	1.1	**1.7**	<1.8	<1.9	<1.6	<1.8	<1.8	<1.7	<1.8	**2.9**
Chloromethane	510,000	980	500,000	49	<1.7	<1.7	<1.8	<1.7	<2.2	<1.8	<1.9	<2.1	<1.8	<1.7	<3.5	<2	<2	<1.6	<1.7	<1.7	<1.8	<1.9	<1.6	<1.8	<1.8	<1.7	<1.8	<2
cis-1,2-Dichloroethene	83,000	410	2,000,000	21	**230**	**190**	**560**	**51**	<2.2	<1.8	<1.9	<2.1	<1.8	<1.7	<3.5	<2	<2	<1.6	7	**130**	<1.8	<1.9	<1.6	<1.8	<1.8	<1.7	**39**	**56**
cis-1,3-Dichloropropene	96,000	3.1	20,000,000	99	<1.7	<1.7	<1.8	<1.7	<2.2	<1.8	<1.9	<2.1	<1.8	<1.7	<3.5	<2	<2	<1.6	<1.7	<1.7	<1.8	<1.9	<1.6	<1.8	<1.8	<1.7	<1.8	<2
Cyclohexane	56,000	250,000	29,000,000	13,000	<8.4	<8.4	<9.2	<8.4	<11	<8.9	<9.5	<10	<9.1	<8.6	<18	<9.8	<9.8	<8.1	<8.6	<8.3	<9	<9.3	<8.1	<9.2	<9.2	<8.6	<9	<10
Dibromochloromethane	290,000	4.3	3,300	21	<1.7	<1.7	<1.8	<1.7	<2.2	<1.8	<1.9	<2.1	<1.8	<1.7	<3.5	<2	<2	<1.6	<1.7	<1.7	<1.8	<1.9	<1.6	<1.8	<1.8	<1.7	<1.8	<2
Dichlorodifluoromethane	420,000	12,000	400,000	300	<1.7	<1.7	<1.8	<1.7	<2.2	<1.8	<1.9	<2.1	<1.8	<1.7	<3.5	<2	<2	<1.6	<1.7	<1.7	<1.8	<1.9	<1.6	<1.8	<1.8	<1.7	<1.8	<2
Ethylbenzene	190,000	16,000	27,000	780	<1.7	<1.7	<1.8	8.6	<2.2	0.9	<1.9	<2.1	<1.8	<1.7	<3.5	<2	<2	<1.6	<1.7	<1.7	<1.8	<1.9	<1.6	<1.8	<1.8	<1.7	0.63	<2
Isopropylbenzene	---	---	---	---	0.63	0.75	2.7	1.4	<2.2	<1.8	<1.9	<2.1	<1.8	<1.7	<3.5	<2	<2	<1.6	<1.7	<1.7	<1.8	<1.9	<1.6	<1.8	<1.8	<1.7	0.67	<2
Methyl acetate	50,000,000	25,000	1,000,000,000	3,200	<8.4	<8.4	<9.2	<8.4	<11	<8.9	<9.5	<10	<9.1	<8.6	<18	<9.8	<9.8	<8.1	<8.6	<8.3	<9	<9.3	<8.1	<9.2	<9.2	<8.6	<9	<10
Methyl tert-butyl ether	2,400,000	56	220,000	2.8	<1.7	<1.7	<1.8	<1.7	<2.2	<1.8	<1.9	<2.1	<1.8	<1.7	<3.5	<2	<2	<1.6	<1.7	<1.7	<1.8	<1.9	<1.6	<1.8	<1.8	<1.7	<1.8	<2
Methylcyclohexane	31,000	270,000	---	---	<8.4	<8.4	<9.2	<8.4	<11	<8.9	<9.5	<10	<9.1	<8.6	<18	<9.8	<9.8	<8.1	<8.6	<8.3	<9	<9.3	<8.1	<9.2	<9.2	<8.6	<9	<10
Methylene Chloride	580,000	25	960,000	1.3	<8.4	<8.4	<9.2	<8.4	<11	<8.9	<9.5	<10	<9.1	<8.6	<18	<9.8	<9.8	<8.1	<8.6	2.6	<9	<9.3	<8.1	**1.5**	<9.2	<8.6	<9	1.3
Naphthalene	180,000	9.4	18,000	0.47	**25**	**25**	<4.6	**13**	<5.4	<4.4	<4.8	<5.1	<4.6	<4.3	<8.8	<4.9	<4.9	<4	**12**	<4.2	<4.5	<4.6	<4.1	<4.6	<4.6	<4.3	**66**	**6.5**
Styrene	340,000	2,200	36,000,000	110	<1.7	<1.7	<1.8	<1.7	<2.2	<1.8	<1.9	<2.1	<1.8	<1.7	<3.5	<2	<2	<1.6	<1.7	<1.7	<1.8	<1.9	<1.6	<1.8	<1.8	<1.7	<1.8	<2
Tetrachloroethene	36,000	45	110,000	2.3	<1.7	<1.7	1.1	<1.7	<2.2	<1.8	<1.9	<2.1	<1.8	<1.7	<3.5	<2	<2	<1.6	<1.7	<1.7	<1.8	<1.9	<1.6	<1.8	<1.8	<1.7	<1.8	<2
Toluene	360,000	14,000	45,000,000	690	<1.7	<1.7	<1.8	0.9	<2.2	<1.8	<1.9	<2.1	<1.8	<1.7	<3.5	<2	<2	<1.6	<1.7	<1.7	<1.8	<1.9	<1.6	<1.8	<1.8	<1.7	<1.8	<2
trans-1,2-Dichloroethene	710,000	590	690,000	29	3.5	5.4	4.8	<1.7	<2.2	<1.8	<1.9	<2.1	<1.8	<1.7	<3.5	<2	<2	<1.6	<1.7	2.3	<1.8	<1.9	<1.6	<1.8	<1.8	<1.7	0.82	1.8
trans-1,3-Dichloropropene	96,000	3.1	20,000,000	99	<1.7	<1.7	<1.8	<1.7	<2.2	<1.8	<1.9	<2.1	<1.8	<1.7	<3.5	<2	<2	<1.6	<1.7	<1.7	<1.8	<1.9	<1.6	<1.8	<1.8	<1.7	<1.8	<2
Trichloroethene	21,000	36	6,400	1.8	**97**	**140**	**400**	<1.7	<2.2	<1.8	<1.9	<2.1	<1.8	<1.7	<3.5	<2	<2	1.0	**7.1**	**110**	<1.8	<1.9	<1.6	<1.8	<1.8	<1.7	**2.2**	**42**
Trichlorofluoromethane	700,000	16,000	3,400,000	690	<1.7	<1.7	0.98	<1.7	<2.2	<1.8	<1.9	<2.1	<1.8	<1.7	<3.5	<2	<2	2.4	4.3	83	<1.8	<1.9	<1.6	12	<1.8	<1.7	<1.8	26
Vinyl chloride	21,000	14	1,700	0.69	**10**	**23**	**29**	**72**	<2.2	<1.8	<1.9	<2.1	<1.8	<1.7	<3.5	<2	**9.4**	<1.6	**1.2**	**38**	<1.8	<1.9	<1.6	<1.8	<1.8	<1.7	**7.1**	**18**
Xylenes, Total	100,000	200,000	2,700,000	9,800	2.3	2.6	2	2.7	<5.4	<4.4	<4.8	<5.1	<4.6	<4.3	<8.8	<4.9	<4.9	<4	<4.3	<4.2	<4.5	<4.6	<4.1	<4.6	<4.6	<4.3	1.9	0.71

All results in ug/kg
--- not available

TABLE 10
ANALYTICAL RESULTS FOR SVOCs IN SOIL SAMPLES
DBA SAMPLING LOCATIONS
QUALITY CARRIERS, INC. PROPERTY
INSTITUTE, WEST VIRGINIA

SAMPLE LOCATION	VRP DMV		USEPA RBSL		DBA-1				DBA-2			DBA-3			DBA-4				DBA-5			DBA-7				DBA-8			
DEPTH INTERVAL					0' - 2'	0'-2'(DUP)	7' - 9'	10' - 11.3'	0' - 2'	6' - 8'	16' - 18'	0' - 2'	6' - 8'	10' - 11.2'	0' - 2'	0'-2'(DUP)	6' - 8'	16' - 18'	0' - 2'	6' - 8'	16' - 18'	0' - 2'	0'-2'(DUP)	6' - 8'	16' - 18'	0' - 2'	0'-2'(DUP)	6' - 8'	16' - 18'
DATE COLLECTED					8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012
ANALYTE	Industrial Soil	Migration to Groundwater	Industrial Soil	Soil to Groundwater																									
1,1'-Biphenyl	50,000,000	64,000	210,000	8.7	<330	<320	<330	<330	<320	<330	<320	<320	<330	<320	<320	<330	<320	<320	<330	<330	<330	<320	<320	<320	<330	<330	<310	<320	<320
1,4-Dioxane	250,000	2.8	17,000	0.14	<330	<320	<330	<330	<320	<330	<320	<320	<330	<320	<320	<330	<320	<320	<330	<330	<330	<320	<320	<320	<330	<330	<310	<320	<320
2,2'-oxybis[1-chloropropane]	---	---	---	---	<330	<320	<330	<330	<320	<330	<320	<320	<330	<320	<320	<330	<320	<320	<330	<330	<330	<320	<320	<320	<330	<330	<310	<320	<320
2,4,5-Trichlorophenol	8,800,000	270,000	62,000,000	3,300	<830	<810	<820	<820	<810	<830	<810	<810	<820	<810	<790	<830	<810	<800	<820	<820	<830	<790	<810	<800	<830	<820	<780	<810	<800
2,4,6-Trichlorophenol	2,200,000	460	160,000	13	<330	<320	<330	<330	<320	<330	<320	<320	<330	<320	<320	<330	<320	<320	<330	<330	<330	<320	<320	<320	<330	<330	<310	<320	<320
2,4-Dichlorophenol	2,600,000	2,600	1,800,000	41	<330	<320	<330	<330	<320	<330	<320	<320	<330	<320	<320	<330	<320	<320	<330	<330	<330	<320	<320	<320	<330	<330	<310	<320	<320
2,4-Dimethylphenol	18,000,000	17,000	12,000,000	320	<330	<320	<330	<330	<320	<330	<320	<320	<330	<320	<320	<330	<320	<320	<330	<330	<330	<320	<320	<320	<330	<330	<310	<320	<320
2,4-Dinitrophenol	1,800,000	1,600	1,200,000	34	<330	<320	<330	<330	<320	<330	<320	<320	<330	<320	<320	<330	<320	<320	<330	<330	<330	<320	<320	<320	<330	<330	<310	<320	<320
2,4-Dinitrotoluene	80,000	5.9	5,500	0.28	<330	<320	<330	<330	<320	<330	<320	<320	<330	<320	<320	<330	<320	<320	<330	<330	<330	<320	<320	<320	<330	<330	<310	<320	<320
2,6-Dinitrotoluene	890,000	1,000	620,000	20	<330	<320	<330	<330	<320	<330	<320	<320	<330	<320	<320	<330	<320	<320	<330	<330	<330	<320	<320	<320	<330	<330	<310	<320	<320
2-Chloronaphthalene	65,000,000	50,000	82,000,000	2,900	<330	<320	<330	<330	<320	<330	<320	<320	<330	<320	<320	<330	<320	<320	<330	<330	<330	<320	<320	<320	<330	<330	<310	<320	<320
2-Chlorophenol	5,200,000	500	5,100,000	57	<330	<320	<330	<330	<320	<330	<320	<320	<330	<320	<320	<330	<320	<320	<330	<330	<330	<320	<320	<320	<330	<330	<310	<320	<320
2-Methylnaphthalene	---	---	---	---	<67	<65	<66	<66	<65	<67	<65	<65	<66	<65	<64	<67	<65	<64	<66	<66	<66	<63	<65	<64	<67	<66	<63	36	<64
2-Methylphenol	44,000,000	30,000	---	---	<330	<320	<330	<330	<320	<330	<320	<320	<330	<320	<320	<330	<320	<320	<330	<330	<330	<320	<320	<320	<330	<330	<310	<320	<320
2-Nitroaniline	8,500,000	3,100	6,000,000	62	<830	<810	<820	<820	<810	<830	<810	<810	<820	<810	<790	<830	<810	<800	<820	<820	<830	<790	<810	<800	<830	<820	<780	<810	<800
2-Nitrophenol	---	---	---	---	<330	<320	<330	<330	<320	<330	<320	<320	<330	<320	<320	<330	<320	<320	<330	<330	<330	<320	<320	<320	<330	<330	<310	<320	<320
3,3'-Dichlorobenzidine	55,000	20	3,800	0.71	<660	<650	<660	<650	<650	<660	<650	<650	<660	<650	<630	<660	<650	<640	<650	<660	<660	<630	<650	<640	<670	<660	<620	<650	<640
3-Nitroaniline	---	---	---	---	<830	<810	<820	<820	<810	<830	<810	<810	<820	<810	<790	<830	<810	<800	<820	<820	<830	<790	<810	<800	<830	<820	<780	<810	<800
4,6-Dinitro-2-methylphenol	---	---	---	---	<330	<320	<330	<330	<320	<330	<320	<320	<330	<320	<320	<330	<320	<320	<330	<330	<330	<320	<320	<320	<330	<330	<310	<320	<320
4-Bromophenyl phenyl ether	---	---	---	---	<330	<320	<330	<330	<320	<330	<320	<320	<330	<320	<320	<330	<320	<320	<330	<330	<330	<320	<320	<320	<330	<330	<310	<320	<320
4-Chloro-3-methylphenol	---	---	---	---	<330	<320	<330	<330	<320	<330	<320	<320	<330	<320	<320	<330	<320	<320	<330	<330	<330	<320	<320	<320	<330	<330	<310	<320	<320
4-Chloroaniline	120,000	2.9	8,600	0.13	<330	<320	<330	<330	<320	<330	<320	<320	<330	<320	<320	<330	<320	<320	<330	<330	<330	<320	<320	<320	<330	<330	<310	<320	<320
4-Chlorophenyl phenyl ether	---	---	---	---	<330	<320	<330	<330	<320	<330	<320	<320	<330	<320	<320	<330	<320	<320	<330	<330	<330	<320	<320	<320	<330	<330	<310	<320	<320
4-Nitroaniline	---	---	86,000	1.4	<830	<810	<820	<820	<810	<830	<810	<810	<820	<810	<790	<830	<810	<800	<820	<820	<830	<790	<810	<800	<830	<820	<780	<810	<800
4-Nitrophenol	7,000,000	4,600	---	---	<330	<320	<330	<330	<320	<330	<320	<320	<330	<320	<320	<330	<320	<320	<330	<330	<330	<320	<320	<320	<330	<330	<310	<320	<320
Acenaphthene	66,000,000	75,000	33,000,000	4,100	<67	<65	<66	<66	<65	<67	<65	<65	<66	<65	<64	<67	<65	<64	<66	<66	<66	<63	<65	<64	<67	<66	<63	<65	<64
Acenaphthylene	75,000,000	75,000	---	---	<67	<65	<66	<66	<65	<67	<65	<65	<66	<65	<64	<67	<65	<64	<66	<66	<66	<63	<65	<64	<67	<66	<63	<65	<64
Acetophenone	200,000,000	22,000	100,000,000	450	<330	<320	<330	<330	<320	<330	<320	<320	<330	<320	<320	<330	<320	<320	<330	<330	<330	<320	<320	<320	<330	<330	<310	<320	<320
Anthracene	6,100,000,000	7,200,000	170,000,000	42,000	<67	<65	<66	<66	<65	<67	<65	<65	<66	<65	<64	<67	<65	<64	<66	<66	<66	<63	<65	<64	<67	<66	<63	<65	<64
Atrazine	110,000	39	7,500	1.9	<330	<320	<330	<330	<320	<330	<320	<320	<330	<320	<320	<330	<320	<320	<330	<330	<330	<320	<320	<320	<330	<330	<310	<320	<320
Benzaldehyde	1,500,000	2,700	100,000,000	330	<1700	<1600	<1600	<1600	<1600	<1700	<1600	<1600	<1700	<1600	<1600	<1700	<1600	<1600	<1600	<1600	<1700	<1600	<1600	<1600	<1700	<1600	<1600	<1600	<1600
Benzo[a]anthracene	29,000	210	2,100	10	<67	<65	<66	<66	<65	<67	<65	<65	<66	<65	<64	<67	<65	<64	<66	<66	<66	<63	<65	<64	<67	<66	<63	<65	<64
Benzo[a]pyrene	2,900	4,700	210	240	<67	<65	<66	<66	<65	<67	<65	<65	<66	<65	<64	<67	<65	<64	<66	<66	<66	<63	<65	<64	<67	<66	<63	<65	<64
Benzo[b]fluoranthene	29,000	710	2,100	35	<67	<65	<66	<66	<65	<67	<65	<65	<66	<65	<64	<67	<65	<64	<66	<66	<66	<63	<65	<64	<67	<66	<63	<65	<64
Benzo[g,h,i]perylene	23,000,000	85,000,000	---	---	<67	<65	<66	<66	<65	<67	<65	<65	<66	<65	<64	<67	<65	<64	<66	<66	<66	<63	<65	<64	<67	<66	<63	<65	<64
Benzo[k]fluoranthene	290,000	6,900	21,000	350	<67	<65	<66	<66	<65	<67	<65	<65	<66	<65	<64	<67	<65	<64	<66	<66	<66	<63	<65	<64	<67	<66	<63	<65	<64
Bis(2-chloroethoxy)methane	---	---	1,800,000	11	<330	<320	<330	<330	<320	<330	<320	<320	<330	<320	<320	<330	<320	<320	<330	<330	<330	<320	<320	<320	<330	<330	<310	<320	<320
Bis(2-chloroethyl)ether	13,000	0.063	1,000	0.0031	<330	<320	<330	<330	<320	<330	<320	<320	<330	<320	<320	<330	<320	<320	<330	<330	<330	<320	<320	<320	<330	<330	<310	<320	<320
Bis(2-ethylhexyl) phthalate	1,800,000	29,000	120,000	1,400	<330	35	<330	60	360	110	<320	<320	<330	<320	<320	<330	<320	<320	<330	<330	89	<320	43	34	<330	<330	33	590	840
Butyl benzyl phthalate	13,000,000	10,000	---	---	<330	<320	<330	<330	<320	<330	<320	<320	<330	<320	<320	<330	<320	<320	<330	<330	<330	<320	<320	<320	<330	<330	<310	<320	<320
Caprolactam	440,000,000	91,000	310,000,000	1,900	<330	<320	<330	<330	<320	<330	<320	<320	<330	<320	<320	<330	<320	<320	<330	<330	<330	<320	<320	<320	<330	<330	<310	<320	<320
Carbazole	1,200,000	1,200	---	---	<330	<320	<330	<330	<320	<330	<320	<320	<330	<320	<320	<330	<320	<320	<330	<330	<330	<320	<320	<320	<330	<330	<310	<320	<320
Chrysene	2,900,000	21,000	210,000	1,100	<67	<65	<66	<66	<65	<67	<65	<65	<66	<65	<64	<67	<65	<64	<66	<66	<66	<63	<65	<64	<67	<66	<63	<65	<64
Dibenz(a,h)anthracene	2,900	230	210	11	<67	<65	<66	<66	<65	<67	<65	<65	<66	<65	<64	<67	<65	<64	<66	<66	<66	<63	<65	<64	<67	<66	<63	<65	<64
Dibenzofuran	2,000,000	14,000	---	---	<330	<320	<330	<330	<320	<330	<320	<320	<330	<320	<320	<330	<320	<320	<330	<330	<330	<320	<320	<320	<330	<330	<310	<320	<320
Diethyl phthalate	700,000,000	240,000	490,000,000	4,700	<330	<320	<330	<330	<320	<330	<320	<320	<330	<320	<320	<330	<320	<320	<330	<330	<330	<320	<320	<320	<330	<330	<310	<320	<320
Dimethyl phthalate	1,000,000,000	1,900,000	---	---	<1700	<1600	<1600	<1600	<1600	<1700	<1600	<1600	<1700	<1600	<1600	<1700	<1600	<1600	<1600	<1600	<1700	<1600	<1600	<1600	<1700	<1600	<1600	<1600	<1600
Di-n-butyl phthalate	88,000,000	180,000	---	---	<330	<320	<330	<330	<320	<330	<320	<320	<330	<320	<320	<330	<320	<320	<330	<330	<330	<320	<320	<320	<330	<330	<310	<320	<320
Di-n-octyl phthalate	---	---	---	---	<330	<320	<330	<330	<320	<330	<320	<320	<330	<320	<320	<330	<320	<320	<330	<330	<330	<320	<320	<320	<330	<330	<310	<320	<320
Fluoranthene	30,000,000	3,200,000	22,000,000	70,000	<67	<65	<66	<66	<65	<67	<65	<65	<66	<65	<64	<67	<65	<64	<66	<66	<66	<63	<65	<64	<67	<66	<63	<65	<64
Fluorene	57,000,000	90,000	22,000,000	4,000	<67	<65	<66	<66	<65	<67	<65	<65	<66	<65	<64	<67	<65	<64	<66	<66	<66	<63	<65	<64	<67	<66	<63	<65	<64
Hexachlorobenzene	15,000	250	1,100	13	<330	<320	<330	<330	<320	<330	<320	<320	<330	<320	<320	<330	<320	<320	<330	<330	<330	<320	<320	<320	<330	<330	<310	<320	<320
Hexachlorobutadiene	320,000	33	22,000	0.5	<330	<320	<330	<330	<320	<330	<320	<320	<330	<320	<320	<330	<320	<320	<330	<330	<330	<320	<320	<320	<330	<330	<310	<320	<320
Hexachlorocyclopentadiene	5,300,000	3,100	3,700,000	160	<330	<320	<330	<330	<320	<330	<320	<320	<330	<320	<320	<330	<320	<320	<330	<330	<330	<320	<320	<320	<330	<330	<310	<320	<320
Hexachloroethane	620,000	20	43,000	0.48	<330	<320	<330	<330	<320	<330	<320	<320	<330	<320	<320	<330	<320	<320	<330	<330	<330	<320	<320	<320	<330	<330	<310	<320	<320
Indeno[1,2,3-cd]pyrene	29,000	2,300	2,100	120	<67	<65	<66	<66	<65	<67	<65	<65	<66	<65	<64	<67	<65	<64	<66	<66	<66	<63	<65	<64	<67	<66	<63	<65	<64
Isophorone	26,000,000	470	1,800,000	22	<330	<320	<330	<330	<320	<330	<320	<320	<330	<320	<320	<330	<320	<320	<330	<330	<330	<320	<320	<320	<330	<330	<310	<320	<320
Naphthalene	180,000	9.4	18,000	0.47	<67	<65	<66	<66	<65	<67	<65	<65	<66	<65	<64	<67	<65	<64	<66	<66	<66	<63	<65	<64	<67	<66	<63	**44**	<64
Nitrobenzene	250,000	1.6	24,000	0.079	<330	<320	<330	<330	<320	<330	<320	<320	<330	<320	<320	<330	<320	<320	<330	<330	<330	<320	<320	<320	<330	<330	<310	<320	<320
N-Nitrosodi-n-propylamine	3,500	0.14	250	0.007	<330	<320	<330	<330	<320	<330	<320	<320	<330	<320	<320	<330	<320	<320	<330	<330	<330	<320	<320	<320	<330	<330	<310	<320	<320
N-Nitrosodiphenylamine	5,000,000	1,500	350,000	57	<330	<320	<330	<330	<320	<330	<320	<320	<330	<320	<320	<330	<320	<320	<330	<330	<330	<320	<320	<320	<330	<330	<310	<320	<320
Pentachlorophenol	33,000	200	2,700	10	<830	<810	<820	<820	<810	<830	<810	<810	<820	<810	<790	<830	<810	<800	<820	<820	<830	<790	<810	<800	<830	<820	<780	<810	<800
Phenanthrene	610,000,000	7,400,000	---	---	<67	<65	<66	<66	<65	<67	<65	<65	<66	<65	<64	<67	<65	<64	<66	<66	<66	<63	<65	<64	<67	<66	<63	<65	<64
Phenol	260,000,000	130,000	180,000,000	2,600	<330	<320	<330	<330	<320	<330	<320	<320	<330	<320	<320	<330	<320	<320	<330	<330	<330	<320	<320	<320	<330	<330	<310	<320	<320
Pyrene	58,000,000	400,000	17,000,000	9,500	<67	<65	<66	<66	<65	<67	<65	<65	<66	<65	<64	<67	<65	<64	<66	<66	<66	<63	<65	<64	<67	<66	<63	<65	<64

All results in ug/kg
--- not available

TABLE 11
ANALYTICAL RESULTS FOR PESTICIDES/HERBICIDES IN SOIL SAMPLES
ALL SAMPLING LOCATIONS
QUALITY CARRIERS, INC. PROPERTY
INSTITUTE, WEST VIRGINIA

SAMPLE LOCATION	VRP DMV		USEPA RBSL		DBA-1	DBA-2	DBA-5	DBA-8		TSS-2	WTA-2	
DEPTH INTERVAL					7' - 9'	16' - 18'	6' - 8'	6' - 8'	16' - 18'	5' - 7'	3' - 5'	12' - 13'
DATE COLLECTED					8/2012	8/2012	8/2012	8/2012	8/2012	8/2012	8/2012	8/2012
ANALYTE	Industrial Soil	Migration to Groundwater	Industrial Soil	Soil to Groundwater								
4,4'-DDD	100	1.3	7,200	66	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	<0.002	<0.0021	<0.002
4,4'-DDE	73	0.93	5,100	46	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	<0.002	<0.0021	<0.002
4,4'-DDT	120	1.3	7,000	67	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	<0.002	<0.0021	<0.002
Aldrin	1.5	0.013	100	0.034	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	<0.002	<0.0021	<0.002
alpha-BHC	3.9	0.011	270	0.036	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	**0.013**	**0.013**	**0.018**
alpha-Chlordane	110	2.7	6,500	140	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	<0.002	<0.0021	<0.002
beta-BHC	14	0.0043	960	0.13	<0.0033	<0.0033	<0.0032	<0.0033	<0.0032	**0.02**	<0.0041	<0.0039
Chlordane (technical)	---	---	---	---	<0.067	<0.066	<0.065	<0.066	<0.065	<0.079	<0.083	<0.078
delta-BHC	---	---	---	---	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	<0.002	<0.0021	<0.002
Dieldrin	1.5	0.0034	110	0.061	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	<0.002	<0.0021	<0.002
Endosulfan I	5,300	0.6	3,700,000	1100	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	<0.002	<0.0021	<0.002
Endosulfan II	5,300	0.6	3,700,000	1100	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	<0.002	<0.0021	<0.002
Endosulfan sulfate	---	---	---	---	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	<0.002	<0.0021	<0.002
Endrin	260	1.6	180,000	81	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	<0.002	<0.0021	<0.002
Endrin aldehyde	---	---	---	---	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	<0.002	<0.0021	<0.002
Endrin ketone	---	---	---	---	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	<0.002	<0.0021	<0.002
gamma-BHC (Lindane)	34	0.023	2,100	1.2	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	<0.002	<0.0021	<0.002
gamma-Chlordane	---	---	---	---	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	<0.002	<0.0021	<0.002
Heptachlor	5.5	0.66	380	33	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	<0.002	<0.0021	<0.002
Heptachlor epoxide	2.7	.082	190	4.1	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	<0.002	<0.0021	<0.002
Methoxychlor	4400	43	3,100,000	2,200	<0.0033	<0.0033	<0.0032	<0.0033	<0.0032	<0.0039	<0.0041	<0.0039
Toxaphene	22	9.3	1,600	460	<0.067	<0.066	<0.065	<0.066	<0.065	<0.079	<0.083	<0.078
2,4,5-T	12,000	0.360	7,700,000	18	<0.04	<0.036	<0.038	<0.039	<0.04	<0.04	<0.041	<0.039
2,4-D	8.8	3.0	6,200,000	52	<0.085	<0.076	<0.08	<0.083	<0.085	<0.085	<0.088	<0.083
Silvex (2,4,5-TP)	7,000	0.55	4,900,000	28	<0.04	<0.036	<0.038	<0.039	<0.04	<0.04	<0.041	<0.039

All values in mg/kg.

TABLE 12
ANALYTICAL RESULTS FOR PCBs IN SOIL SAMPLES
ALL SAMPLING LOCATIONS
QUALITY CARRIERS, INC. PROPERTY
INSTITUTE, WEST VIRGINIA

SAMPLE LOCATION	VRP DMV		USEPA RBSL		DBA-1	DBA-2	DBA-5	DBA-8	
DEPTH INTERVAL					7' - 9'	16' - 18'	6' - 8'	6' - 8'	16' - 18'
DATE COLLECTED					8/2012	8/2012	8/2012	8/2012	8/2012
ANALYTE	Industrial Soil	Migration to Groundwater	Industrial Soil	Soil to Groundwater					
PCB-1016	50	1.8	21,000	92	<0.033	<0.033	<0.033	<0.033	<0.033
PCB-1221	12	0.0023	540	0.074	<0.033	<0.033	<0.033	<0.033	<0.033
PCB-1232	12	0.0023	540	0.074	<0.033	<0.033	<0.033	<0.033	<0.033
PCB-1242	10	0.11	740	5.3	<0.033	<0.033	<0.033	<0.033	<0.033
PCB-1248	10	0.1	740	5.2	<0.033	<0.033	<0.033	<0.033	<0.033
PCB-1254	10	0.18	740	8.8	<0.033	<0.033	<0.033	<0.033	<0.033
PCB-1260	10	0.47	740	24	<0.033	<0.033	<0.033	<0.033	<0.033

SAMPLE LOCATION	VRP DMV		USEPA RBSL		TSS-2	WTA-2	
DEPTH INTERVAL					5' - 7'	3' - 5'	12' - 13'
DATE COLLECTED					8/2012	8/2012	8/2012
ANALYTE	Industrial Soil	Migration to Groundwater	Industrial Soil	Soil to Groundwater			
PCB-1016	50	1.8	21,000	92	<0.04	<0.041	<0.038
PCB-1221	12	0.0023	540	0.074	<0.04	<0.041	<0.038
PCB-1232	12	0.0023	540	0.074	<0.04	<0.041	<0.038
PCB-1242	10	0.11	740	5.3	<0.04	<0.041	<0.038
PCB-1248	10	0.1	740	5.2	<0.04	<0.041	<0.038
PCB-1254	10	0.18	740	8.8	<0.04	<0.041	<0.038
PCB-1260	10	0.47	740	24	<0.04	<0.041	<0.038

All results in mg/kg
--- not available

TABLE 13
ANALYTICAL RESULTS FOR DIOXINS/FURANS IN SOIL SAMPLES
ALL SAMPLING LOCATIONS
QUALITY CARRIERS, INC. PROPERTY
INSTITUTE, WEST VIRGINIA

SAMPLE LOCATION	VRP DMV*		USEPA RBSL*		DBA-1(7-9)		DBA-2(16-18)		DBA-5(6-8)		DBA-8(16-18)	
						Flag		Flag		Flag		Flag
DATE COLLECTED					8/9/2012		8/9/2012		8/9/2012		8/9/2012	
ANALYTE	Industrial Soil	Migration to Groundwater	Industrial Soil	Migration to Groundwater								
1,2,3,4,6,7,8-HpCDD	320	300	18	15	0.49	Q B J	0.16	Q B J	2.2	B J	0.54	B J
1,2,3,4,6,7,8-HpCDF	320	300	18	15	0.076	Q B J	0.055	Q B J	0.023	Q B J	0.063	Q B J
1,2,3,4,7,8,9-HpCDF	320	300	18	15	<0.029		<0.023		<0.027		<0.023	
1,2,3,4,7,8-HxCDD	320	300	18	15	<0.045		<0.031		<0.042		<0.051	
1,2,3,4,7,8-HxCDF	320	300	18	15	<0.048		<0.027		<0.047		<0.045	
1,2,3,6,7,8-HxCDD	320	300	18	15	<0.044		<0.033		<0.041		<0.047	
1,2,3,6,7,8-HxCDF	320	300	18	15	0.052	Q B J	<0.025		0.035	Q B J	<0.043	
1,2,3,7,8,9-HxCDD	320	300	18	15	<0.041		<0.029		0.12	Q B J	<0.046	
1,2,3,7,8,9-HxCDF	320	300	18	15	<0.063		<0.034		<0.056		<0.058	
1,2,3,7,8-PeCDD	320	300	18	15	<0.046		<0.027		<0.03		<0.046	
1,2,3,7,8-PeCDF	320	300	18	15	<0.036		<0.03		<0.039		<0.04	
2,3,4,6,7,8-HxCDF	320	300	18	15	<0.052		<0.029		<0.045		<0.043	
2,3,4,7,8-PeCDF	320	300	18	15	<0.04		<0.023		<0.041		<0.034	
2,3,7,8-TCDD	320	300	18	15	<0.04		<0.019		<0.031		<0.049	
2,3,7,8-TCDF	320	300	18	15	<0.085		0.018	Q B J	0.1	Q B J	0.093	Q B J
OCDD	320	300	18	15	17	B	6.8	B J	290	B	14	B
OCDF	320	300	18	15	0.086	Q B J	0.098	Q B J	0.044	Q B J	0.044	Q B J

TABLE 13
ANALYTICAL RESULTS FOR DIOXINS/FURANS IN SOIL SAMPLES
ALL SAMPLING LOCATIONS
QUALITY CARRIERS, INC. PROPERTY
INSTITUTE, WEST VIRGINIA

SAMPLE LOCATION	VRP DMV*		USEPA RBSL*		DBA-8(6-8)		TSS-2(5-7)		WTA-2(12-13)		WTA-2(3-5)	
						Flag		Flag		Flag		Flag
DATE COLLECTED					8/9/2012		8/9/2012		8/9/2012		8/9/2012	
ANALYTE	Industrial Soil	Migration to Groundwater	Industrial Soil	Migration to Groundwater								
1,2,3,4,6,7,8-HpCDD	320	300	18	15	4.1	B J	70	B	6.1	B	18	B
1,2,3,4,6,7,8-HpCDF	320	300	18	15	3.4	Q B J	11	Q B	140	B	14	B
1,2,3,4,7,8,9-HpCDF	320	300	18	15	0.25	Q J	0.6	Q J	5.8		0.41	J
1,2,3,4,7,8-HxCDD	320	300	18	15	<0.066		0.24	Q J	0.34	J	0.4	J
1,2,3,4,7,8-HxCDF	320	300	18	15	0.8	J	2.4	J	49	Q	3.7	C J
1,2,3,6,7,8-HxCDD	320	300	18	15	<0.067		1.6	J	1.1	J	0.52	J
1,2,3,6,7,8-HxCDF	320	300	18	15	0.28	Q B J	1	Q B J	14	Q B	1.2	Q B J
1,2,3,7,8,9-HxCDD	320	300	18	15	<0.062		0.75	Q B J	0.74	Q B J	0.6	C B J
1,2,3,7,8,9-HxCDF	320	300	18	15	<0.076		<0.067		0.15	B J	<0.049	
1,2,3,7,8-PeCDD	320	300	18	15	0.047	Q J	0.14	Q J	0.53	J	0.17	Q J
1,2,3,7,8-PeCDF	320	300	18	15	0.3	J	0.34	J	3.3	J	0.39	Q J
2,3,4,6,7,8-HxCDF	320	300	18	15	0.23	B J	0.56	B J	3.9	B J	0.47	Q B J
2,3,4,7,8-PeCDF	320	300	18	15	<0.072		0.3	B J	4.5	B J	0.6	B J
2,3,7,8-TCDD	320	300	18	15	0.043	Q J	0.069	Q J	0.35	J	1.8	
2,3,7,8-TCDF	320	300	18	15	0.43	B J	0.9	Q B J	0.68	B J	1.1	Q B J
OCDD	320	300	18	15	230	B	**830**	B	140	B	**640**	B
OCDF	320	300	18	15	5.3	B J	8.8	B J	79	B	6.2	B J

Notes:
All results in pg/g. * - Based on total 2,3,7,8-TCDD toxicity equivalents.
B : Method blank contamination. The associated method blank contains the target analyte at a reportable level.
J : Estimated Result.
Q : Estimated maximum possible concentration (EMPC).

TABLE 14
ANALYTICAL RESULTS FOR METALS IN SOIL SAMPLES
TSS SAMPLING LOCATIONS
QUALITY CARRIERS, INC. PROPERTY
INSTITUTE, WEST VIRGINIA

SAMPLE LOCATION	VRP DMV		USEPA RBSL		TSS-1		TSS-2		TSS-3		TSS-4	
DEPTH INTERVAL					4' - 6'	6' - 8'	5' - 7'	7.2' - 8.9'	4.5' - 5.5'	6' - 8'	4' - 6'	6' - 8'
DATE COLLECTED					8/8/2012	8/8/2012	8/8/2012	8/8/2012	8/8/2012	8/8/2012	8/8/2012	8/8/2012
ANALYTE	Industrial Soil	Migration to Groundwater	Industrial Soil	Migration to Groundwater								
Arsenic	27	5.8	1.6	0.29	**3.7**	**7.4**	**10**	**7.0**	**7.1**	**8.2**	**4.4**	**6.6**
Barium	360,000	1,600	190,000	82	**130**	**120**	**230**	**160**	**140**	**140**	**110**	**130**
Cadmium	800	7.5	800	0.38	<1.1	<1.1	<1.2	<1.2	<1.2	<1.1	<1.2	<1.2
Chromium	1,000,000	2,000,000,000	1,500,000	180,000	16	15	22	23	17	20	14	21
Lead	1,000	270	800	14	12	**15**	**21**	**22**	**17**	**20**	**15**	**15**
Mercury	610	2.1	43	0.1	<0.11	0.035	0.039	0.049	0.035	0.043	0.037	<0.12
Selenium	10,000	5.2	5,100	0.26	**2.8**	**2.5**	**3.6**	**3.0**	**1.6**	**2.8**	**2.3**	**3.4**
Silver	10,000	31	5,100	0.6	<1.1	<1.1	<1.2	<1.2	<1.2	<1.1	<1.2	<1.2
Vanadium	140	51	5,200	78	21	18	30	32	25	27	20	27

SAMPLE LOCATION	VRP DMV		USEPA RBSL		TSS-5		TSS-6		TSS-7	
DEPTH INTERVAL					5' - 7'	7' - 9'	3.8' - 5.8'	10' - 12'	4' - 6'	10' - 12'
DATE COLLECTED					8/8/2012	8/8/2012	8/8/2012	8/8/2012	8/8/2012	8/8/2012
ANALYTE	Industrial Soil	Migration to Groundwater	Industrial Soil	Migration to Groundwater						
Arsenic	27	5.8	1.6	0.29	**6.1**	**8.3**	**7.8**	**6.1**	**6.6**	**7.6**
Barium	360,000	1,600	190,000	82	**120**	**140**	**110**	**99**	**140**	**36**
Cadmium	800	7.5	800	0.38	<1.2	<1.2	<1.2	<1.2	<1.3	<1.2
Chromium	1,000,000	2,000,000,000	1,500,000	180,000	21	24	21	19	23	24
Lead	1,000	270	800	14	**19**	**20**	**20**	**15**	**23**	**17**
Mercury	610	2.1	43	0.1	0.054	0.055	0.055	<0.12	<0.12	<0.00071
Selenium	10,000	5.2	5,100	0.26	**2.8**	**2.7**	**2.9**	**2.0**	**3.3**	**4.3**
Silver	10,000	31	5,100	0.6	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2
Vanadium	140	51	5,200	78	27	30	32	27	36	40

All results in mg/kg

TABLE 14
ANALYTICAL RESULTS FOR METALS IN SOIL SAMPLES
TSS SAMPLING LOCATIONS
QUALITY CARRIERS, INC. PROPERTY
INSTITUTE, WEST VIRGINIA

SAMPLE LOCATION	VRP DMV		USEPA RBSL		TSS-8			TSS-9		
DEPTH INTERVAL					4' - 6'	4'-6'(DUP)	10' - 12'	4' - 6'	4'-6'(DUP)	6.5' - 8.5'
DATE COLLECTED					8/8/2012	8/8/2012	8/8/2012	8/8/2012	8/8/2012	8/8/2012
ANALYTE	Industrial Soil	Migration to Groundwater	Industrial Soil	Migration to Groundwater						
Arsenic	27	5.8	1.6	0.29	**5.7**	**9.7**	**6.9**	**8.5**	**11**	**7.5**
Barium	360,000	1,600	190,000	82	76	49	30	**140**	**150**	**130**
Cadmium	800	7.5	800	0.38	<1.2	<1.3	<1.1	<1.3	<1.3	<1.3
Chromium	1,000,000	2,000,000,000	1,500,000	180,000	29	28	21	23	25	20
Lead	1,000	270	800	14	**18**	**19**	**16**	**20**	**23**	**21**
Mercury	610	2.1	43	0.1	<0.13	<0.13	<0.12	0.047	0.054	0.042
Selenium	10,000	5.2	5,100	0.26	**2.2**	**3.0**	**2.7**	**2.9**	**3.5**	**2.5**
Silver	10,000	31	5,100	0.6	<1.2	<1.3	<1.1	<1.3	<1.3	<1.3
Vanadium	140	51	5,200	78	47	42	31	30	37	31

All results in mg/kg

TABLE 15
ANALYTICAL RESULTS FOR VOCs IN SOIL SAMPLES
TSS SAMPLING LOCATIONS
QUALITY CARRIERS, INC. PROPERTY
INSTITUTE, WEST VIRGINIA

SAMPLE LOCATION	VRP DMV		USEPA RBSL		TSS-1		TSS-2		TSS-3		TSS-4		TSS-5		TSS-6		TSS-7		TSS-8			TSS-9		
DEPTH INTERVAL					4' - 6'	6' - 8'	5' - 7'	7.2 - 8.9	4.5 - 5.5	6' - 8'	4' - 6'	6' - 8'	5' - 7'	7' - 9'	3.8' - 5.8'	10' - 12'	4' - 6'	10' - 12'	4' - 6'	4'-6'(DUP)	10' - 12'	4' - 6'	4'-6'(DUP)	6.5 - 8.5
DATE COLLECTED					8/8/2012	8/8/2012	8/8/2012	8/8/2012	8/8/2012	8/8/2012	8/8/2012	8/8/2012	8/8/2012	8/8/2012	8/8/2012	8/8/2012	8/8/2012	8/8/2012	8/8/2012	8/8/2012	8/8/2012	8/8/2012	8/8/2012	8/8/2012
ANALYTE	Industrial Soil	Migration to Groundwater	Industrial Soil	Migration to Groundwater																				
1,1,1-Trichloroethane	450,000	1,400	38,000,000	70	<1.8	<2.2	<1.8	<1.8	<1.9	<1.8	<1.9	<1.7	<2.1	<2	<1.7	<1.8	<1.8	<1.8	<2	<2	<1.8	<1.8	<1.7	<3.1
1,1,2,2-Tetrachloroethane	99,000	4.0	2,800	0.026	<1.8	<2.2	<1.8	<1.8	<1.9	<1.8	<1.9	<1.7	<2.1	<2	<1.7	<1.8	<1.8	<1.8	<2	<2	<1.8	<1.8	<1.7	<3.1
1,1,2-Trichloro-1,2,2-trifluoroethane	420,000	2,900,000	180,000,000	130,000	<1.8	<2.2	<1.8	<1.8	<1.9	<1.8	<1.9	<1.7	<2.1	<2	<1.7	<1.8	<1.8	<1.8	<2	<2	<1.8	<1.8	<1.7	<3.1
1,1,2-Trichloroethane	57,000	32	5,300	1.6	<4.5	<5.4	<4.5	<4.5	<4.7	<4.5	<4.7	<4.4	<5.2	<5.1	<4.3	<4.5	<4.6	<4.4	<5	<4.9	<4.6	<4.4	<4.4	<7.8
1,1-Dichloroethane	170,000	14	17,000	0.68	<1.8	<2.2	<1.8	<1.8	<1.9	<1.8	<1.9	<1.7	<2.1	<2	<1.7	<1.8	<1.8	<1.8	<2	<2	<1.8	<1.8	<1.7	<3.1
1,1-Dichloroethene	860,000	50	1,100,000	2.5	<1.8	<2.2	<1.8	<1.8	<1.9	<1.8	<1.9	<1.7	<2.1	<2	<1.7	<1.8	<1.8	<1.8	<2	<2	<1.8	<1.8	<1.7	<3.1
1,2,4-Trichlorobenzene	290,000	4,100	99,000	200	<1.8	11	30	17	10	120	1.0	19	19	19	24 J	<1.8	3.1	<1.8	<2	<2	<1.8	<1.8	<1.7	<3.1
1,2-Dibromo-3-Chloropropane	71,000	1.7	69	0.086	<4.5	<5.4	<4.5	<4.5	<4.7	<4.5	<4.7	<4.4	<5.2	<5.1	<4.3	<4.5	<4.6	<4.4	<5	<4.9	<4.6	<4.4	<4.4	<7.8
1,2-Dibromoethane (EDB)	1,800	0.28	170	0.014	<1.8	<2.2	<1.8	<1.8	<1.9	<1.8	<1.9	<1.7	<2.1	<2	<1.7	<1.8	<1.8	<1.8	<2	<2	<1.8	<1.8	<1.7	<3.1
1,2-Dichlorobenzene	150,000	12,000	9,800,000	580	<1.8	5.2	16	49	23	160	<1.9	95	7.6	27	65 J	<1.8	5.6	<1.8	<2	<2	<1.8	<1.8	<1.7	2.3
1,2-Dichloroethane	23,000	28	2,200	1.4	<1.8	<2.2	<1.8	<1.8	<1.9	<1.8	<1.9	<1.7	<2.1	<2	<1.7	<1.8	<1.8	<1.8	<2	<2	<1.8	<1.8	<1.7	<3.1
1,2-Dichloropropane	47,000	33	4,700	1.7	<1.8	<2.2	<1.8	<1.8	<1.9	<1.8	<1.9	<1.7	<2.1	<2	<1.7	<1.8	<1.8	<1.8	<2	<2	<1.8	<1.8	<1.7	<3.1
1,3-Dichlorobenzene	120,000	12,000	---	---	<1.8	1.2	7.4	4.9	6.6	42	<1.9	6.2	1.7	4.6	8.4 J	<1.8	<1.8	<1.8	<2	<2	<1.8	<1.8	<1.7	<3.1
1,4-Dichlorobenzene	140,000	1,400	12,000	---	<1.8	<2.2	3.8	5.9	5.1	35	<1.9	9.7	1.4	4.6	7.3 J	<1.8	<1.8	<1.8	<2	<2	<1.8	<1.8	<1.7	<3.1
1,4-Dioxane	250,000	2.8	17,000	0.14	<180	<220	<180	<180	<190	<180	<190	<170	<210	<200	<170	<180	<180	<180	<200	<200	<180	<180	<170	<310
2-Butanone (MEK)	47,000,000	30,000	200,000,000	1,000	<45	<54	<45	8.0	6.5	<45	<47	5.0	<52	<51	7.4 J	<45	9.2	<44	7.8	16	<46	<44	<44	15
2-Hexanone	---	---	1,400,000	7.9	<45	<54	<45	<45	<47	<45	<47	<44	<52	<51	<43	<45	<46	<44	<50	<49	<46	<44	<44	<78
4-Methyl-2-pentanone (MIBK)	430,000	9,500	53,000,000	230	<45	<54	<45	<45	<47	<45	<47	<44	<52	<51	<43	<45	<46	<44	<50	<49	<46	<44	<44	<78
Acetone	200,000,000	89,000	630,000,000	2,400	<45	<54	68	84	73	84	<47	71	44	80	73 J	<45	72	<44	60	110	<46	<44	<44	150
Benzene	58,000	51	5,400	2.6	<1.8	<2.2	<1.8	**9.4**	<1.9	**6.1**	<1.9	2.5	<2.1	0.71	<1.7	<1.8	<1.8	<1.8	<2	<2	<1.8	<1.8	<1.7	<3.1
Bromodichloromethane	14,000	0.64	1,400	22	<1.8	<2.2	<1.8	<1.8	<1.9	<1.8	<1.9	<1.7	<2.1	<2	<1.7	<1.8	<1.8	<1.8	<2	<2	<1.8	<1.8	<1.7	<3.1
Bromoform	3,100,000	45	220,000	21	<1.8	<2.2	<1.8	<1.8	<1.9	<1.8	<1.9	<1.7	<2.1	<2	<1.7	<1.8	<1.8	<1.8	<2	<2	<1.8	<1.8	<1.7	<3.1
Bromomethane	33,000	44	32,000	1.8	<1.8	<2.2	<1.8	<1.8	<1.9	<1.8	<1.9	<1.7	<2.1	<2	<1.7	<1.8	<1.8	<1.8	<2	<2	<1.8	<1.8	<1.7	<3.1
Carbon disulfide	640,000	6,100	3,700,000	210	<4.5	<5.4	<4.5	<4.5	<4.7	<4.5	<4.7	<4.4	<5.2	<5.1	<4.3	<4.5	<4.6	<4.4	<5	<4.9	<4.6	<4.4	<4.4	<7.8
Carbon tetrachloride	32,000	39	3,000	1.9	<1.8	<2.2	<1.8	<1.8	<1.9	<1.8	<1.9	<1.7	<2.1	<2	<1.7	<1.8	<1.8	<1.8	<2	<2	<1.8	<1.8	<1.7	<3.1
Chlorobenzene	340,000	1,400	1,400,000	68	<1.8	2.8	5.8	**95**	20	**88**	<1.9	55	3.5	36	12 J	<1.8	2.9	<1.8	<2	<2	<1.8	<1.8	<1.7	1.7
Chloroethane	1,900,000	120,000	---	---	<4.5	<5.4	<4.5	<4.5	<4.7	<4.5	<4.7	<4.4	<5.2	<5.1	<4.3	<4.5	<4.6	<4.4	<5	<4.9	<4.6	<4.4	<4.4	<7.8
Chloroform	15,000	1.1	1,500	22	<1.8	<2.2	<1.8	<1.8	<1.9	<1.8	<1.9	<1.7	<2.1	<2	<1.7	<1.8	<1.8	<1.8	<2	<2	<1.8	<1.8	<1.7	<3.1
Chloromethane	510,000	980	500,000	49	<1.8	<2.2	<1.8	<1.8	<1.9	<1.8	<1.9	<1.7	<2.1	<2	<1.7	<1.8	<1.8	<1.8	<2	<2	<1.8	<1.8	<1.7	<3.1
cis-1,2-Dichloroethene	83,000	410	2,000,000	21	<1.8	<2.2	<1.8	<1.8	<1.9	<1.8	<1.9	<1.7	<2.1	<2	1.9 J	<1.8	<1.8	<1.8	<2	<2	<1.8	<1.8	<1.7	<3.1
cis-1,3-Dichloropropene	96,000	3.1	20,000,000	99	<1.8	<2.2	<1.8	<1.8	<1.9	<1.8	<1.9	<1.7	<2.1	<2	<1.7	<1.8	<1.8	<1.8	<2	<2	<1.8	<1.8	<1.7	<3.1
Cyclohexane	56,000	250,000	29,000,000	13,000	<9	<11	<8.9	<9	<9.3	<9.1	<9.5	3.1	<10	<10	<8.6	<9.1	<9.2	<8.8	<10	<9.9	<9.2	<8.9	<8.7	<16
Dibromochloromethane	290,000	4.3	3,300	21	<1.8	<2.2	<1.8	<1.8	<1.9	<1.8	<1.9	<1.7	<2.1	<2	<1.7	<1.8	<1.8	<1.8	<2	<2	<1.8	<1.8	<1.7	<3.1
Dichlorodifluoromethane	420,000	12,000	400,000	300	<1.8	<2.2	<1.8	<1.8	<1.9	<1.8	<1.9	<1.7	<2.1	<2	<1.7	<1.8	<1.8	<1.8	<2	<2	<1.8	<1.8	<1.7	<3.1
Ethylbenzene	190,000	16,000	27,000	780	<1.8	1.2	15	**1100**	9.6	**3500**	0.79	**11000**	<2.1	1.1	58 J	<1.8	<1.8	<1.8	<2	0.87	<1.8	<1.8	<1.7	1.0
Isopropylbenzene	---	---	---	---	<1.8	<2.2	<1.8	3.8	2.0	26	<1.9	9.2	<2.1	1.9	14 J	<1.8	<1.8	<1.8	<2	<2	<1.8	<1.8	<1.7	0.86
Methyl acetate	50,000,000	25,000	1,000,000,000	3,200	<9	<11	<8.9	5.2	<9.3	15	<9.5	<8.7	<10	3.4	3.4 J	<9.1	<9.2	<8.8	<10	<9.9	<9.2	<8.9	<8.7	<16
Methyl tert-butyl ether	2,400,000	56	220,000	2.8	<1.8	<2.2	<1.8	<1.8	<1.9	<1.8	<1.9	<1.7	<2.1	<2	<1.7	<1.8	<1.8	<1.8	<2	<2	<1.8	<1.8	<1.7	<3.1
Methylcyclohexane	31,000	270,000	---	---	<9	<11	<8.9	3	<9.3	3.3	<9.5	<8.7	<10	<10	<8.6	<9.1	<9.2	<8.8	<10	<9.9	<9.2	<8.9	<8.7	<16
Methylene Chloride	580,000	25	960,000	1.3	<9	<11	<8.9	<9	**1.5**	**2.1**	<9.5	<8.7	<10	<10	<8.6	<9.1	<9.2	<8.8	<10	<9.9	<9.2	<8.9	<8.7	<16
Naphthalene	180,000	9.4	18,000	0.47	<4.5	**1700**	**7400**	**4900**	**7.3**	**4300**	**1.6**	**26000**	**4.8**	**2.2**	**3200**	**2.4**	**130**	**2.1**	<5	<4.9	<4.6	<4.4	<4.4	**6.1**
Styrene	340,000	2,200	36,000,000	110	<1.8	<2.2	1.2	<1.8	<1.9	<1.8	<1.9	<1.7	<2.1	<2	4.2 J	<1.8	<1.8	<1.8	<2	<2	<1.8	<1.8	<1.7	<3.1
Tetrachloroethene	36,000	45	110,000	2.3	<1.8	<2.2	<1.8	<1.8	<1.9	<1.8	<1.9	<1.7	<2.1	<2	<1.7	<1.8	<1.8	<1.8	<2	<2	<1.8	<1.8	<1.7	<3.1
Toluene	360,000	14,000	45,000,000	690	<1.8	<2.2	<1.8	9.3	<1.9	22	<1.9	23	<2.1	<2	<1.7	<1.8	<1.8	<1.8	<2	<2	<1.8	<1.8	<1.7	<3.1
trans-1,2-Dichloroethene	710,000	590	690,000	29	<1.8	<2.2	<1.8	<1.8	<1.9	<1.8	<1.9	<1.7	<2.1	<2	<1.7	<1.8	<1.8	<1.8	<2	<2	<1.8	<1.8	<1.7	<3.1
trans-1,3-Dichloropropene	96,000	3.1	20,000,000	99	<1.8	<2.2	<1.8	<1.8	<1.9	<1.8	<1.9	<1.7	<2.1	<2	<1.7	<1.8	<1.8	<1.8	<2	<2	<1.8	<1.8	<1.7	<3.1
Trichloroethene	21,000	36	6,400	1.8	1.2	<2.2	**2.7**	1.3	1.6	1.2	1.7	<1.7	**2.2**	**3.0**	0.6 J	<1.8	<1.8	<1.8	<2	**2.1**	<1.8	<1.8	<1.7	**6.2**
Trichlorofluoromethane	700,000	16,000	3,400,000	690	<1.8	<2.2	<1.8	<1.8	<1.9	<1.8	<1.9	<1.7	<2.1	<2	<1.7	<1.8	<1.8	<1.8	<2	<2	<1.8	<1.8	<1.7	<3.1
Vinyl chloride	21,000	14	1,700	0.69	<1.8	<2.1	<1.8	<1.8	<1.9	<1.8	<1.9	<1.7	<2.1	<2	<1.7	<1.8	<1.8	<1.8	<2	<2	<1.8	<1.8	<1.7	<3.1
Xylenes, Total	100,000	200,000	2,700,000	9,800	<4.5	<5.4	4.2	22	2.1	120	<4.7	82	<5.2	1.3	4.2 J	<4.5	0.64	<4.4	<5	2.4	<4.6	<4.4	<4.4	<7.8

All results in ug/kg
--- not available

TABLE 16
ANALYTICAL RESULTS FOR SVOCs IN SOIL SAMPLES
TSS SAMPLING LOCATIONS
QUALITY CARRIERS, INC. PROPERTY
INSTITUTE, WEST VIRGINIA

SAMPLE LOCATION	VRP DMV		USEPA RBSL		TSS-1		TSS-2		TSS-3		TSS-4		TSS-5		TSS-6		TSS-7		TSS-8			TSS-9		
DEPTH INTERVAL					4' - 6'	6' - 8'	5' - 7'	7.2 - 8.9	4.5 - 5.5	6' - 8'	4' - 6'	6' - 8'	5' - 7'	7' - 9'	3.8' - 5.8'	10' - 12'	4' - 6'	10' - 12'	4' - 6'	4'-6'(DUP)	10' - 12'	4' - 6'	4'-6'(DUP)	6.5 - 8.5
DATE COLLECTED					8/8/2012	8/8/2012	8/8/2012	8/8/2012	8/8/2012	8/8/2012	8/8/2012	8/8/2012	8/8/2012	8/8/2012	8/8/2012	8/8/2012	8/8/2012	8/8/2012	8/8/2012	8/8/2012	8/8/2012	8/8/2012	8/8/2012	8/8/2012
ANALYTE	Industrial Soil	Migration to Groundwater	Industrial Soil	Soil to Groundwater																				
1,1'-Biphenyl	50,000,000	64,000	210,000	8.7	<390	<370	<400	<420	<400	<400	<390	<400	<400	<400	<410	<400	<390	<380	<430	<440	<390	<420	<430	<410
1,4-Dioxane	250,000	2.8	17,000	0.14	<390	<370	<400	<420	<400	<400	<390	<400	<400	<400	<410	<400	<390	<380	<430	<440	<390	<420	<430	<410
2,2'-oxybis[1-chloropropane]	---	---	---	---	<390	<370	<400	<420	<400	<400	<390	<400	<400	<400	<410	<400	<390	<380	<430	<440	<390	<420	<430	<410
2,4,5-Trichlorophenol	8,800,000	270,000	62,000,000	3,300	<980	<920	<990	<1000	<990	<990	<980	<1000	<1000	<1000	<1000	<1000	<980	<960	<1100	<1100	<970	<1100	<1100	<1000
2,4,6-Trichlorophenol	2,200,000	460	160,000	13	<390	<370	<400	<420	<400	<400	<390	<400	<400	<400	<410	<400	<390	<380	<430	<440	<390	<420	<430	<410
2,4-Dichlorophenol	2,600,000	2,600	1,800,000	41	<390	<370	<400	<420	<400	<400	<390	<400	<400	<400	<410	<400	<390	<380	<430	<440	<390	<420	<430	<410
2,4-Dimethylphenol	18,000,000	17,000	12,000,000	320	<390	<370	<400	<420	<400	<400	<390	<400	<400	<400	<410	<400	<390	<380	<430	<440	<390	<420	<430	<410
2,4-Dinitrophenol	1,800,000	1,600	1,200,000	34	<390	<370	<400	<420	<400	<400	<390	<400	<400	<400	<410	<400	<390	<380	<430	<440	<390	<420	<430	<410
2,4-Dinitrotoluene	80,000	5.9	5,500	0.28	<390	<370	<400	<420	<400	<400	<390	<400	<400	<400	<410	<400	<390	<380	<430	<440	<390	<420	<430	<410
2,6-Dinitrotoluene	890,000	1,000	620,000	20	<390	<370	<400	<420	<400	<400	<390	<400	<400	<400	<410	<400	<390	<380	<430	<440	<390	<420	<430	<410
2-Chloronaphthalene	65,000,000	50,000	82,000,000	2,900	<390	<370	<400	<420	<400	<400	<390	<400	<400	<400	<410	<400	<390	<380	<430	<440	<390	<420	<430	<410
2-Chlorophenol	5,200,000	500	5,100,000	57	<390	<370	<400	<420	<400	<400	<390	<400	<400	<400	<410	<400	<390	<380	<430	<440	<390	<420	<430	<410
2-Methylnaphthalene	---	---	---	---	<79	<74	70	<84	70	89	<79	<80	<80	<81	100	<80	<78	<77	<86	<89	<78	<85	<86	<82
2-Methylphenol	44,000,000	30,000	---	---	<390	<370	<400	<420	<400	<400	<390	<400	<400	<400	<410	<400	<390	<380	<430	<440	<390	<420	<430	<410
2-Nitroaniline	8,500,000	3,100	6,000,000	62	<980	<920	<990	<1000	<990	<990	<980	<1000	<1000	<1000	<1000	<1000	<980	<960	<1100	<1100	<970	<1100	<1100	<1000
2-Nitrophenol	---	---	---	---	<390	<370	<400	<420	<400	<400	<390	<400	<400	<400	<410	<400	<390	<380	<430	<440	<390	<420	<430	<410
3,3'-Dichlorobenzidine	55,000	20	3,800	0.71	<790	<740	<790	<840	<790	<790	<780	<800	<800	<810	<820	<800	<780	<770	<860	<880	<780	<840	<860	<820
3-Nitroaniline	---	---	---	---	<980	<920	<990	<1000	<990	<990	<980	<1000	<1000	<1000	<1000	<1000	<980	<960	<1100	<1100	<970	<1100	<1100	<1000
4,6-Dinitro-2-methylphenol	---	---	---	---	<390	<370	<400	<420	<400	<400	<390	<400	<400	<400	<410	<400	<390	<380	<430	<440	<390	<420	<430	<410
4-Bromophenyl phenyl ether	---	---	---	---	<390	<370	<400	<420	<400	<400	<390	<400	<400	<400	<410	<400	<390	<380	<430	<440	<390	<420	<430	<410
4-Chloro-3-methylphenol	---	---	---	---	<390	<370	<400	<420	<400	<400	<390	<400	<400	<400	<410	<400	<390	<380	<430	<440	<390	<420	<430	<410
4-Chloroaniline	120,000	2.9	8,600	0.13	<390	<370	<400	<420	<400	<400	<390	<400	<400	<400	<410	<400	<390	<380	<430	<440	<390	<420	<430	<410
4-Chlorophenyl phenyl ether	---	---	---	---	<390	<370	<400	<420	<400	<400	<390	<400	<400	<400	<410	<400	<390	<380	<430	<440	<390	<420	<430	<410
4-Nitroaniline	---	---	86,000	1.4	<980	<920	<990	<1000	<990	<990	<980	<1000	<1000	<1000	<1000	<1000	<980	<960	<1100	<1100	<970	<1100	<1100	<1000
4-Nitrophenol	7,000,000	4,600	---	---	<390	<370	<400	<420	<400	<400	<390	<400	<400	<400	<410	<400	<390	<380	<430	<440	<390	<420	<430	<410
Acenaphthene	66,000,000	75,000	33,000,000	4,100	<79	<74	<80	<84	<80	<80	<79	<80	<80	<81	<82	<80	<78	<77	<86	<89	<78	<85	<86	<82
Acenaphthylene	75,000,000	75,000	---	---	<79	<74	<80	<84	<80	<80	<79	<80	<80	<81	<82	<80	<78	<77	<86	<89	<78	<85	<86	<82
Acetophenone	200,000,000	22,000	100,000,000	450	<390	<370	<400	<420	<400	<400	<390	<400	<400	<400	<410	<400	<390	<380	<430	<440	<390	<420	<430	<410
Anthracene	6,100,000,000	7,200,000	170,000,000	42,000	<79	<74	<80	<84	<80	<80	<79	<80	<80	<81	<82	<80	<78	<77	<86	<89	<78	<85	<86	<82
Atrazine	110,000	39	7,500	1.9	<390	<370	<400	<420	<400	<400	<390	<400	<400	<400	<410	<400	<390	<380	<430	<440	<390	<420	<430	<410
Benzaldehyde	1,500,000	2,700	100,000,000	330	<2000	<1800	<2000	<2100	<2000	<2000	<2000	<2000	<2000	<2000	<2000	<2000	<2000	<1900	<2200	<2200	<2000	<2100	<2100	<2000
Benzo[a]anthracene	29,000	210	2,100	10	<79	<74	<80	<84	<80	<80	<79	<80	<80	<81	<82	<80	<78	<77	<86	<89	<78	<85	<86	<82
Benzo[a]pyrene	2,900	4,700	210	240	<79	<74	<80	<84	<80	<80	<79	<80	<80	<81	<82	<80	<78	<77	<86	<89	<78	<85	<86	<82
Benzo[b]fluoranthene	29,000	710	2,100	35	<79	<74	<80	<84	<80	<80	<79	<80	<80	<81	<82	<80	<78	<77	<86	<89	<78	<85	<86	<82
Benzo[g,h,i]perylene	23,000,000	85,000,000	---	---	<79	<74	<80	<84	<80	<80	<79	<80	<80	<81	<82	<80	<78	<77	<86	<89	<78	<85	<86	<82
Benzo[k]fluoranthene	290,000	6,900	21,000	350	<79	<74	<80	<84	<80	<80	<79	<80	<80	<81	<82	<80	<78	<77	<86	<89	<78	<85	<86	<82
Bis(2-chloroethoxy)methane	---	---	1,800,000	11	<390	<370	<400	<420	<400	<400	<390	<400	<400	<400	<410	<400	<390	<380	<430	<440	<390	<420	<430	<410
Bis(2-chloroethyl)ether	13,000	0.063	1,000	0.0031	<390	<370	<400	<420	<400	<400	<390	<400	<400	<400	<410	<400	<390	<380	<430	<440	<390	<420	<430	<410
Bis(2-ethylhexyl) phthalate	1,800,000	29,000	120,000	1,400	450	360	**2400**	480	400	**3300**	640	790	**3300**	300	**5300**	79	70	<380	<430	<440	<390	**3700**	1200	1100
Butyl benzyl phthalate	13,000,000	10,000	---	---	<390	<370	<400	<420	<400	<400	<390	<400	<400	<400	<410	<400	<390	<380	<430	<440	<390	<420	<430	<410
Caprolactam	440,000,000	91,000	310,000,000	1,900	<390	<370	<400	<420	<400	<400	<390	<400	<400	<400	<410	<400	<390	<380	<430	<440	<390	<420	<430	<410
Carbazole	1,200,000	1,200	---	---	<390	<370	<400	<420	<400	<400	<390	<400	<400	<400	<410	<400	<390	<380	<430	<440	<390	<420	<430	<410
Chrysene	2,900,000	21,000	210,000	1,100	<79	<74	<80	<84	<80	<80	<79	<80	<80	<81	<82	<80	<78	<77	<86	<89	<78	<85	<86	<82
Dibenz(a,h)anthracene	2,900	230	210	11	<79	<74	<80	<84	<80	<80	<79	<80	<80	<81	<82	<80	<78	<77	<86	<89	<78	<85	<86	<82
Dibenzofuran	2,000,000	14,000	---	---	<390	<370	<400	<420	<400	<400	<390	<400	<400	<400	<410	<400	<390	<380	<430	<440	<390	<420	<430	<410
Diethyl phthalate	700,000,000	240,000	490,000,000	4,700	<390	<370	<400	<420	<400	<400	<390	<400	<400	<400	<410	<400	<390	<380	<430	<440	<390	<420	<430	<410
Dimethyl phthalate	1,000,000,000	1,900,000	---	---	<2000	<1800	<2000	<2100	<2000	<2000	<2000	<2000	<2000	<2000	<2000	<2000	<2000	<1900	<2200	<2200	<2000	<2100	<2100	<2000
Di-n-butyl phthalate	88,000,000	180,000	---	---	<390	<370	<400	<420	<400	<400	<390	<400	<400	<400	98	<400	<390	<380	<430	<440	<390	<420	<430	<410
Di-n-octyl phthalate	---	---	---	---	<390	<370	<400	<420	<400	<400	<390	<400	<400	<400	<410	<400	<390	<380	<430	<440	<390	<420	<430	<410
Fluoranthene	30,000,000	3,200,000	22,000,000	70,000	<79	<74	<80	<84	<80	<80	60	<80	<80	<81	<82	<80	<78	<77	<86	<89	<78	<85	<86	<82
Fluorene	57,000,000	90,000	22,000,000	4,000	<79	<74	<80	<84	<80	<80	<79	<80	<80	<81	<82	<80	<78	<77	<86	<89	<78	<85	<86	<82
Hexachlorobenzene	15,000	250	1,100	13	<390	<370	<400	<420	<400	<400	<390	<400	<400	<400	<410	<400	<390	<380	<430	<440	<390	<420	<430	<410
Hexachlorobutadiene	320,000	33	22,000	0.5	<390	<370	<400	<420	<400	<400	<390	<400	<400	<400	<410	<400	<390	<380	<430	<440	<390	<420	<430	<410
Hexachlorocyclopentadiene	5,300,000	3,100	3,700,000	160	<390	<370	<400	<420	<400	<400	<390	<400	<400	<400	<410	<400	<390	<380	<430	<440	<390	<420	<430	<410
Hexachloroethane	620,000	20	43,000	0.48	<390	<370	<400	<420	<400	<400	<390	<400	<400	<400	<410	<400	<390	<380	<430	<440	<390	<420	<430	<410
Indeno[1,2,3-cd]pyrene	29,000	2,300	2,100	120	<79	<74	<80	<84	<80	<80	<79	<80	<80	<81	<82	<80	<78	<77	<86	<89	<78	<85	<86	<82
Isophorone	26,000,000	470	1,800,000	22	<390	<370	<400	<420	<400	<400	<390	<400	<400	<400	<410	<400	<390	<380	<430	<440	<390	<420	<430	<410
Naphthalene	180,000	9.4	18,000	0.47	<79	**130**	**490**	<84	**44**	**88**	**54**	**240**	<80	<81	**47**	<80	<78	<77	<86	<89	<78	<85	<86	<82
Nitrobenzene	250,000	1.6	24,000	0.079	<390	<370	<400	<420	<400	<400	<390	<400	<400	<400	<410	<400	<390	<380	<430	<440	<390	<420	<430	<410
N-Nitrosodi-n-propylamine	3,500	0.14	250	0.007	<390	<370	<400	<420	<400	<400	<390	<400	<400	<400	<410	<400	<390	<380	<430	<440	<390	<420	<430	<410
N-Nitrosodiphenylamine	5,000,000	1,500	350,000	57	<390	<370	47	<420	<400	45	<390	<400	54	<400	<410	<400	<390	<380	<430	<440	<390	<420	<430	<410
Pentachlorophenol	33,000	200	2,700	10	<980	<920	<990	<1000	<990	<990	<980	<1000	<1000	<1000	<1000	<1000	<980	<960	<1100	<1100	<970	<1100	<1100	<1000
Phenanthrene	610,000,000	7,400,000	---	---	<79	<74	<80	<84	<80	<80	61	<80	<80	<81	<82	<80	<78	<77	<86	<89	<78	<85	<86	<82
Phenol	260,000,000	130,000	180,000,000	2,600	<390	<370	<400	<420	<400	<400	<390	<400	<400	<400	<410	<400	<390	<380	<430	<440	<390	<420	<430	<410
Pyrene	58,000,000	400,000	17,000,000	9,500	<79	<74	<80	<84	<80	<80	59	<80	<80	<81	<82	<80	<78	<77	<86	<89	<78	<85	<86	<82

All results in ug/kg
--- not available

TABLE 17
ANALYTICAL RESULTS FOR METALS IN SOIL SAMPLES
PSA SAMPLING LOCATIONS
QUALITY CARRIERS, INC. PROPERTY
INSTITUTE, WEST VIRGINIA

SAMPLE LOCATION	VRP DMV		USEPA RBSL		PSA-1			PSA-2	
DEPTH INTERVAL					0' - 2'	6' - 8'	6'-8'(DUP)	0' - 2'	6' - 8'
DATE COLLECTED					8/7/2012	8/7/2012	8/7/2012	8/7/2012	8/7/2012
ANALYTE	Industrial Soil	Migration to Groundwater	Industrial Soil	Migration to Groundwater					
Arsenic	27	5.8	1.6	0.29	**6.0**	**6.8**	**5.2**	**2.9**	**4.8**
Barium	360,000	1,600	190,000	82	**110**	**110**	**160**	**190**	**130**
Cadmium	800	7.5	800	0.38	<1.3	<1.2	<1.3	<1.1	<1.2
Chromium	1,000,000	2,000,000,000	1,500,000	180,000	24	24	21	12	25
Lead	1,000	270	800	14	**19**	**17**	**28**	13	**21**
Mercury	610	2.1	43	0.1	<0.13	<0.12	<0.00078	0.044	<0.12
Selenium	10,000	5.2	5,100	0.26	**3.5**	**3.9**	**3.7**	<2.3	**2.9**
Silver	10,000	31	5,100	0.6	<1.3	<1.2	<1.3	**1.1**	<1.2
Vanadium	140	51	5,200	78	34	34	29	9.8	32

All results in mg/kg

TABLE 18
ANALYTICAL RESULTS FOR VOCs IN SOIL SAMPLES
PSA SAMPLING LOCATIONS
QUALITY CARRIERS, INC. PROPERTY
INSTITUTE, WEST VIRGINIA

SAMPLE LOCATION	VRP DMV		USEPA RBSL		PSA-1			PSA-2	
DEPTH INTERVAL					0' - 2'	6' - 8'	6'-8'(DUP)	0' - 2'	6' - 8'
DATE COLLECTED					8/7/2012	8/7/2012	8/7/2012	8/7/2012	8/7/2012
ANALYTE	Industrial Soil	Migration to Groundwater	Industrial Soil	Migration to Groundwater					
1,1,1-Trichloroethane	450,000	1,400	38,000,000	70	<0.33	<0.28	<0.33	<0.28	<0.29
1,1,2,2-Tetrachloroethane	99,000	4.0	2,800	0.026	<0.33	<0.28	<0.33	<0.28	<0.29
1,1,2-Trichloro-1,2,2-trifluoroethane	420,000	2,900,000	180,000,000	130,000	<0.33	<0.28	<0.33	<0.28	<0.29
1,1,2-Trichloroethane	57,000	32	5,300	1.6	<0.83	<0.69	<0.82	<0.7	<0.72
1,1-Dichloroethane	170,000	14	17,000	0.68	<0.33	<0.28	<0.33	<0.28	<0.29
1,1-Dichloroethene	860,000	50	1,100,000	2.5	<0.33	<0.28	<0.33	<0.28	<0.29
1,2,4-Trichlorobenzene	290,000	4,100	99,000	200	<0.33	<0.28	<0.33	<0.28	<0.29
1,2-Dibromo-3-Chloropropane	71,000	1.7	69	0.086	<0.83	<0.69	<0.82	<0.7	<0.72
1,2-Dibromoethane (EDB)	1,800	0.28	170	0.014	<0.33	<0.28	<0.33	<0.28	<0.29
1,2-Dichlorobenzene	150,000	12,000	9,800,000	580	<0.33	<0.28	<0.33	<0.28	<0.29
1,2-Dichloroethane	23,000	28	2,200	1.4	<0.33	<0.28	<0.33	<0.28	<0.29
1,2-Dichloropropane	47,000	33	4,700	1.7	<0.33	<0.28	<0.33	<0.28	<0.29
1,3-Dichlorobenzene	120,000	12,000	---	---	<0.33	<0.28	<0.33	<0.28	<0.29
1,4-Dichlorobenzene	140,000	1,400	12,000	---	<0.33	<0.28	<0.33	<0.28	<0.29
1,4-Dioxane	250,000	2.8	17,000	0.14	<33	<28	<33	<28	<29
2-Butanone (MEK)	47,000,000	30,000	200,000,000	1,000	<8.3	<6.9	<8.2	<7	<7.2
2-Hexanone	---	---	1,400,000	7.9	<8.3	<6.9	<8.2	<7	<7.2
4-Methyl-2-pentanone (MIBK)	430,000	9,500	53,000,000	230	<8.3	<6.9	<8.2	<7	<7.2
Acetone	200,000,000	89,000	630,000,000	2,400	<8.3	<6.9	22	<7	20
Benzene	58,000	51	5,400	2.6	<0.33	<0.28	<0.33	<0.28	<0.29
Bromodichloromethane	14,000	0.64	1,400	22	<0.33	<0.28	<0.33	<0.28	<0.29
Bromoform	3,100,000	45	220,000	21	<0.33	<0.28	<0.33	<0.28	<0.29
Bromomethane	33,000	44	32,000	1.8	<0.33	<0.28	<0.33	<0.28	<0.29
Carbon disulfide	640,000	6,100	3,700,000	210	<0.83	<0.69	<0.82	<0.7	<0.72
Carbon tetrachloride	32,000	39	3,000	1.9	<0.33	<0.28	<0.33	<0.28	<0.29
Chlorobenzene	340,000	1,400	1,400,000	68	<0.33	<0.28	<0.33	<0.28	<0.29
Chloroethane	1,900,000	120,000	---	---	<0.83	<0.69	<0.82	<0.7	<0.72
Chloroform	15,000	1.1	1,500	22	<0.33	<0.28	<0.33	<0.28	<0.29
Chloromethane	510,000	980	500,000	49	<0.33	<0.28	<0.33	<0.28	<0.29
cis-1,2-Dichloroethene	83,000	410	2,000,000	21	<0.33	<0.28	5.1	<0.28	1.3
cis-1,3-Dichloropropene	96,000	3.1	20,000,000	99	<0.33	<0.28	<0.33	<0.28	<0.29
Cyclohexane	56,000	250,000	29,000,000	13,000	<1.7	<1.4	<1.6	<1.4	<1.4
Dibromochloromethane	290,000	4.3	3,300	21	<0.33	<0.28	<0.33	<0.28	<0.29
Dichlorodifluoromethane	420,000	12,000	400,000	300	<0.33	<0.28	<0.33	<0.28	<0.29
Ethylbenzene	190,000	16,000	27,000	780	<0.33	<0.28	<0.33	<0.28	<0.29
Isopropylbenzene	---	---	---	---	<0.33	<0.28	<0.33	<0.28	<0.29
Methyl acetate	50,000,000	25,000	1,000,000,000	3,200	<1.7	<1.4	<1.6	<1.4	<1.4
Methyl tert-butyl ether	2,400,000	56	220,000	2.8	<0.33	<0.28	<0.33	<0.28	<0.29
Methylcyclohexane	31,000	270,000	---	---	<1.7	<1.4	<1.6	<1.4	<1.4
Methylene Chloride	580,000	25	960,000	1.3	0.25	<1.4	<1.6	0.16	<1.4
Naphthalene	180,000	9.4	18,000	0.47	<0.83	<0.69	<0.82	<0.7	<0.72
Styrene	340,000	2,200	36,000,000	110	<0.33	<0.28	<0.33	<0.28	<0.29
Tetrachloroethene	36,000	45	110,000	2.3	<0.33	<0.28	<0.33	<0.28	<0.29
Toluene	360,000	14,000	45,000,000	690	<0.33	<0.28	<0.33	<0.28	<0.29
trans-1,2-Dichloroethene	710,000	590	690,000	29	<0.33	<0.28	0.21	<0.28	<0.29
trans-1,3-Dichloropropene	96,000	3.1	20,000,000	99	<0.33	<0.28	<0.33	<0.28	<0.29
Trichloroethene	21,000	36	6,400	1.8	<0.33	0.29	0.6	<0.28	<0.29
Trichlorofluoromethane	700,000	16,000	3,400,000	690	<0.33	<0.28	<0.33	<0.28	<0.29
Vinyl chloride	21,000	14	1,700	0.69	<0.33	<0.28	<0.33	<0.28	<0.29
Xylenes, Total	100,000	200,000	2,700,000	9,800	0.13	0.12	0.16	0.17	<0.72

All results in ug/kg
--- not available

TABLE 19
ANALYTICAL RESULTS FOR SVOCs IN SOIL SAMPLES
PSA SAMPLING LOCATIONS
QUALITY CARRIERS, INC. PROPERTY
INSTITUTE, WEST VIRGINIA

SAMPLE LOCATION	VRP DMV		USEPA RBSL		PSA-1			PSA-2	
DEPTH INTERVAL					0' - 2'	6' - 8'	6'-8'(DUP)	0' - 2'	6' - 8'
DATE COLLECTED					8/7/2012	8/7/2012	8/7/2012	8/7/2012	8/7/2012
ANALYTE	Industrial Soil	Migration to Groundwater	Industrial Soil	Soil to Groundwater					
1,1'-Biphenyl	50,000,000	64,000	210,000	8.7	<420	<400	<420	<380	<400
1,4-Dioxane	250,000	2.8	17,000	0.14	<420	<400	<420	<380	<400
2,2'-oxybis[1-chloropropane]	---	---	---	---	<420	<400	<420	<380	<400
2,4,5-Trichlorophenol	8,800,000	270,000	62,000,000	3,300	<1100	<1000	<1100	<940	<1000
2,4,6-Trichlorophenol	2,200,000	460	160,000	13	<420	<400	<420	<380	<400
2,4-Dichlorophenol	2,600,000	2,600	1,800,000	41	<420	<400	<420	<380	<400
2,4-Dimethylphenol	18,000,000	17,000	12,000,000	320	<420	<400	<420	<380	<400
2,4-Dinitrophenol	1,800,000	1,600	1,200,000	34	<420	<400	<420	<380	<400
2,4-Dinitrotoluene	80,000	5.9	5,500	0.28	<420	<400	<420	<380	<400
2,6-Dinitrotoluene	890,000	1,000	620,000	20	<420	<400	<420	<380	<400
2-Chloronaphthalene	65,000,000	50,000	82,000,000	2,900	<420	<400	<420	<380	<400
2-Chlorophenol	5,200,000	500	5,100,000	57	<420	<400	<420	<380	<400
2-Methylnaphthalene	---	---	---	---	<85	<80	<85	<76	<81
2-Methylphenol	44,000,000	30,000	---	---	<420	<400	<420	<380	<400
2-Nitroaniline	8,500,000	3,100	6,000,000	62	<1100	<1000	<1100	<940	<1000
2-Nitrophenol	---	---	---	---	<420	<400	<420	<380	<400
3,3'-Dichlorobenzidine	55,000	20	3,800	0.71	<850	<800	<850	<760	<800
3-Nitroaniline	---	---	---	---	<1100	<1000	<1100	<940	<1000
4,6-Dinitro-2-methylphenol	---	---	---	---	<420	<400	<420	<380	<400
4-Bromophenyl phenyl ether	---	---	---	---	<420	<400	<420	<380	<400
4-Chloro-3-methylphenol	---	---	---	---	<420	<400	<420	<380	<400
4-Chloroaniline	120,000	2.9	8,600	0.13	<420	<400	<420	<380	<400
4-Chlorophenyl phenyl ether	---	---	---	---	<420	<400	<420	<380	<400
4-Nitroaniline	---	---	86,000	1.4	<1100	<1000	<1100	<940	<1000
4-Nitrophenol	7,000,000	4,600	---	---	<420	<400	<420	<380	<400
Acenaphthene	66,000,000	75,000	33,000,000	4,100	<85	<80	<85	<76	<81
Acenaphthylene	75,000,000	75,000	---	---	<85	<80	<85	<76	<81
Acetophenone	200,000,000	22,000	100,000,000	450	<420	<400	<420	83	<400
Anthracene	6,100,000,000	7,200,000	170,000,000	42,000	<85	<80	<85	<76	<81
Atrazine	110,000	39	7,500	1.9	<420	<400	<420	<380	<400
Benzaldehyde	1,500,000	2,700	100,000,000	330	<2100	<2000	<2100	<1900	<2000
Benzo[a]anthracene	29,000	210	2,100	10	<85	<80	<85	<76	<81
Benzo[a]pyrene	2,900	4,700	210	240	<85	<80	<85	<76	<81
Benzo[b]fluoranthene	29,000	710	2,100	35	<85	<80	<85	<76	<81
Benzo[g,h,i]perylene	23,000,000	85,000,000	---	---	<85	<80	<85	48	<81
Benzo[k]fluoranthene	290,000	6,900	21,000	350	<85	<80	<85	<76	<81
Bis(2-chloroethoxy)methane	---	---	1,800,000	11	<420	<400	<420	<380	<400
Bis(2-chloroethyl)ether	13,000	0.063	1,000	0.0031	<420	<400	<420	<380	<400
Bis(2-ethylhexyl) phthalate	1,800,000	29,000	120,000	1,400	<420	<400	79	720	<400
Butyl benzyl phthalate	13,000,000	10,000	---	---	<420	<400	<420	<380	<400
Caprolactam	440,000,000	91,000	310,000,000	1,900	<420	<400	<420	<380	<400
Carbazole	1,200,000	1,200	---	---	<420	<400	<420	<380	<400
Chrysene	2,900,000	21,000	210,000	1,100	<85	<80	<85	<76	<81
Dibenz(a,h)anthracene	2,900	230	210	11	<85	<80	<85	<76	<81
Dibenzofuran	2,000,000	14,000	---	---	<420	<400	<420	<380	<400
Diethyl phthalate	700,000,000	240,000	490,000,000	4,700	<420	<400	<420	<380	<400
Dimethyl phthalate	1,000,000,000	1,900,000	---	---	<2100	<2000	<2100	<1900	<2000
Di-n-butyl phthalate	88,000,000	180,000	---	---	<420	<400	<420	<380	<400
Di-n-octyl phthalate	---	---	---	---	<420	<400	<420	<380	<400
Fluoranthene	30,000,000	3,200,000	22,000,000	70,000	<85	<80	<85	41	<81
Fluorene	57,000,000	90,000	22,000,000	4,000	<85	<80	<85	<76	<81
Hexachlorobenzene	15,000	250	1,100	13	<420	<400	<420	<380	<400
Hexachlorobutadiene	320,000	33	22,000	0.5	<420	<400	<420	<380	<400
Hexachlorocyclopentadiene	5,300,000	3,100	3,700,000	160	<420	<400	<420	<380	<400
Hexachloroethane	620,000	20	43,000	0.48	<420	<400	<420	<380	<400
Indeno[1,2,3-cd]pyrene	29,000	2,300	2,100	120	<85	<80	<85	<76	<81
Isophorone	26,000,000	470	1,800,000	22	<420	<400	<420	<380	<400
Naphthalene	180,000	9.4	18,000	0.47	<85	<80	<85	<76	<81
Nitrobenzene	250,000	1.6	24,000	0.079	<420	<400	<420	<380	<400
N-Nitrosodi-n-propylamine	3,500	0.14	250	0.007	<420	<400	<420	<380	<400
N-Nitrosodiphenylamine	5,000,000	1,500	350,000	57	<420	<400	<420	<380	<400
Pentachlorophenol	33,000	200	2,700	10	<1100	<1000	<1100	<940	<1000
Phenanthrene	610,000,000	7,400,000	---	---	<85	<80	<85	<76	<81
Phenol	260,000,000	130,000	180,000,000	2,600	<420	<400	<420	<380	<400
Pyrene	58,000,000	400,000	17,000,000	9,500	<85	<80	<85	43	<81

All results in ug/kg
--- not available

TABLE 20
ANALYTICAL RESULTS FOR METALS IN SOIL SAMPLES
WWTP SAMPLING LOCATIONS
QUALITY CARRIERS, INC. PROPERTY
INSTITUTE, WEST VIRGINIA

SAMPLE LOCATION	VRP DMV		USEPA RBSL		WWTP-1	WWTP-2
DEPTH INTERVAL						
DATE COLLECTED					8/7/2012	8/7/2012
ANALYTE	Industrial Soil	Migration to Groundwater	Industrial Soil	Migration to Groundwater		
Arsenic	27	5.8	1.6	0.29	**11**	**4.4**
Barium	360,000	1,600	190,000	82	**150**	74
Cadmium	800	7.5	800	0.38	<1.3	<1.2
Chromium	1,000,000	2,000,000,000	1,500,000	180,000	32	14
Lead	1,000	270	800	14	**29**	**17**
Mercury	610	2.1	43	0.1	0.044	**1.5**
Selenium	10,000	5.2	5,100	0.26	**2.6**	**2.1**
Silver	10,000	31	5,100	0.6	<1.3	<1.2
Vanadium	140	51	5,200	78	32	16

All results in mg/kg

TABLE 21
ANALYTICAL RESULTS FOR VOCs IN SOIL SAMPLES
WWTP SAMPLING LOCATIONS
QUALITY CARRIERS, INC. PROPERTY
INSTITUTE, WEST VIRGINIA

SAMPLE LOCATION	VRP DMV		USEPA RBSL		WWTP-1	WWTP-2
DEPTH INTERVAL						
DATE COLLECTED					8/7/2012	8/7/2012
ANALYTE	Industrial Soil	Migration to Groundwater	Industrial Soil	Migration to Groundwater		
1,1,1-Trichloroethane	450,000	1,400	38,000,000	70	<0.32	<0.3
1,1,2,2-Tetrachloroethane	99,000	4.0	2,800	0.026	<0.32	<0.3
1,1,2-Trichloro-1,2,2-trifluoroethane	420,000	2,900,000	180,000,000	130,000	<0.32	<0.3
1,1,2-Trichloroethane	57,000	32	5,300	1.6	<0.81	<0.75
1,1-Dichloroethane	170,000	14	17,000	0.68	<0.32	<0.3
1,1-Dichloroethene	860,000	50	1,100,000	2.5	<0.32	<0.3
1,2,4-Trichlorobenzene	290,000	4,100	99,000	200	<0.32	<0.3
1,2-Dibromo-3-Chloropropane	71,000	1.7	69	0.086	<0.81	<0.75
1,2-Dibromoethane (EDB)	1,800	0.28	170	0.014	<0.32	<0.3
1,2-Dichlorobenzene	150,000	12,000	9,800,000	580	<0.32	<0.3
1,2-Dichloroethane	23,000	28	2,200	1.4	<0.32	<0.3
1,2-Dichloropropane	47,000	33	4,700	1.7	<0.32	<0.3
1,3-Dichlorobenzene	120,000	12,000	---	---	<0.32	<0.3
1,4-Dichlorobenzene	140,000	1,400	12,000	---	<0.32	<0.3
1,4-Dioxane	250,000	2.8	17,000	0.14	<32	<30
2-Butanone (MEK)	47,000,000	30,000	200,000,000	1,000	<8.1	<7.5
2-Hexanone	---	---	1,400,000	7.9	<8.1	<7.5
4-Methyl-2-pentanone (MIBK)	430,000	9,500	53,000,000	230	<8.1	<7.5
Acetone	200,000,000	89,000	630,000,000	2,400	<8.1	<7.5
Benzene	58,000	51	5,400	2.6	<0.32	<0.3
Bromodichloromethane	14,000	0.64	1,400	22	<0.32	<0.3
Bromoform	3,100,000	45	220,000	21	<0.32	<0.3
Bromomethane	33,000	44	32,000	1.8	<0.32	<0.3
Carbon disulfide	640,000	6,100	3,700,000	210	<0.81	<0.75
Carbon tetrachloride	32,000	39	3,000	1.9	<0.32	<0.3
Chlorobenzene	340,000	1,400	1,400,000	68	<0.32	<0.3
Chloroethane	1,900,000	120,000	---	---	<0.81	<0.75
Chloroform	15,000	1.1	1,500	22	<0.32	<0.3
Chloromethane	510,000	980	500,000	49	<0.32	<0.3
cis-1,2-Dichloroethene	83,000	410	2,000,000	21	<0.32	<0.3
cis-1,3-Dichloropropene	96,000	3.1	20,000,000	99	<0.32	<0.3
Cyclohexane	56,000	250,000	29,000,000	13,000	<1.6	<1.5
Dibromochloromethane	290,000	4.3	3,300	21	<0.32	<0.3
Dichlorodifluoromethane	420,000	12,000	400,000	300	<0.32	<0.3
Ethylbenzene	190,000	16,000	27,000	780	<0.32	<0.3
Isopropylbenzene	---	---	---	---	<0.32	<0.3
Methyl acetate	50,000,000	25,000	1,000,000,000	3,200	<1.6	<1.5
Methyl tert-butyl ether	2,400,000	56	220,000	2.8	<0.32	<0.3
Methylcyclohexane	31,000	270,000	---	---	<1.6	<1.5
Methylene Chloride	580,000	25	960,000	1.3	<1.6	<1.5
Naphthalene	180,000	9.4	18,000	0.47	<0.81	<0.75
Styrene	340,000	2,200	36,000,000	110	<0.32	<0.3
Tetrachloroethene	36,000	45	110,000	2.3	<0.32	<0.3
Toluene	360,000	14,000	45,000,000	690	<0.32	<0.3
trans-1,2-Dichloroethene	710,000	590	690,000	29	<0.32	<0.3
trans-1,3-Dichloropropene	96,000	3.1	20,000,000	99	<0.32	<0.3
Trichloroethene	21,000	36	6,400	1.8	<0.32	<0.3
Trichlorofluoromethane	700,000	16,000	3,400,000	690	<0.32	<0.3
Vinyl chloride	21,000	14	1,700	0.69	<0.32	<0.3
Xylenes, Total	100,000	200,000	2,700,000	9,800	<0.81	0.11

All results in ug/kg
--- not available

TABLE 22
ANALYTICAL RESULTS FOR SVOCs IN SOIL SAMPLES
WWTP SAMPLING LOCATIONS
QUALITY CARRIERS, INC. PROPERTY
INSTITUTE, WEST VIRGINIA

SAMPLE LOCATION	VRP DMV		USEPA RBSL		WWTP-1	WWTP-2
DEPTH INTERVAL						
DATE COLLECTED					8/7/2012	8/7/2012
ANALYTE	Industrial Soil	Migration to Groundwater	Industrial Soil	Soil to Groundwater		
1,1'-Biphenyl	50,000,000	64,000	210,000	8.7	<430	<410
1,4-Dioxane	250,000	2.8	17,000	0.14	<430	<410
2,2'-oxybis[1-chloropropane]	---	---	---	---	<430	<410
2,4,5-Trichlorophenol	8,800,000	270,000	62,000,000	3,300	<1100	<1000
2,4,6-Trichlorophenol	2,200,000	460	160,000	13	<430	<410
2,4-Dichlorophenol	2,600,000	2,600	1,800,000	41	<430	<410
2,4-Dimethylphenol	18,000,000	17,000	12,000,000	320	<430	<410
2,4-Dinitrophenol	1,800,000	1,600	1,200,000	34	<430	<410
2,4-Dinitrotoluene	80,000	5.9	5,500	0.28	<430	<410
2,6-Dinitrotoluene	890,000	1,000	620,000	20	<430	<410
2-Chloronaphthalene	65,000,000	50,000	82,000,000	2,900	<430	<410
2-Chlorophenol	5,200,000	500	5,100,000	57	<430	<410
2-Methylnaphthalene	---	---	---	---	<87	49
2-Methylphenol	44,000,000	30,000	---	---	<430	<410
2-Nitroaniline	8,500,000	3,100	6,000,000	62	<1100	<1000
2-Nitrophenol	---	---	---	---	<430	<410
3,3'-Dichlorobenzidine	55,000	20	3,800	0.71	<860	<820
3-Nitroaniline	---	---	---	---	<1100	<1000
4,6-Dinitro-2-methylphenol	---	---	---	---	<430	<410
4-Bromophenyl phenyl ether	---	---	---	---	<430	<410
4-Chloro-3-methylphenol	---	---	---	---	<430	<410
4-Chloroaniline	120,000	2.9	8,600	0.13	<430	<410
4-Chlorophenyl phenyl ether	---	---	---	---	<430	<410
4-Nitroaniline	---	---	86,000	1.4	<1100	<1000
4-Nitrophenol	7,000,000	4,600	---	---	<430	<410
Acenaphthene	66,000,000	75,000	33,000,000	4,100	<87	<83
Acenaphthylene	75,000,000	75,000	---	---	<87	<83
Acetophenone	200,000,000	22,000	100,000,000	450	<430	<410
Anthracene	6,100,000,000	7,200,000	170,000,000	42,000	<87	<83
Atrazine	110,000	39	7,500	1.9	<430	<410
Benzaldehyde	1,500,000	2,700	100,000,000	330	<2200	<2100
Benzo[a]anthracene	29,000	210	2,100	10	<87	**110**
Benzo[a]pyrene	2,900	4,700	210	240	<87	120
Benzo[b]fluoranthene	29,000	710	2,100	35	<87	**110**
Benzo[g,h,i]perylene	23,000,000	85,000,000	---	---	<87	67
Benzo[k]fluoranthene	290,000	6,900	21,000	350	<87	95
Bis(2-chloroethoxy)methane	---	---	1,800,000	11	<430	<410
Bis(2-chloroethyl)ether	13,000	0.063	1,000	0.0031	<430	<410
Bis(2-ethylhexyl) phthalate	1,800,000	29,000	120,000	1,400	180	330
Butyl benzyl phthalate	13,000,000	10,000	---	---	<430	<410
Caprolactam	440,000,000	91,000	310,000,000	1,900	<430	<410
Carbazole	1,200,000	1,200	---	---	<430	<410
Chrysene	2,900,000	21,000	210,000	1,100	<87	140
Dibenz(a,h)anthracene	2,900	230	210	11	<87	<83
Dibenzofuran	2,000,000	14,000	---	---	<430	<410
Diethyl phthalate	700,000,000	240,000	490,000,000	4,700	<430	<410
Dimethyl phthalate	1,000,000,000	1,900,000	---	---	<2200	<2100
Di-n-butyl phthalate	88,000,000	180,000	---	---	<430	<410
Di-n-octyl phthalate	---	---	---	---	<430	<410
Fluoranthene	30,000,000	3,200,000	22,000,000	70,000	<87	220
Fluorene	57,000,000	90,000	22,000,000	4,000	<87	<83
Hexachlorobenzene	15,000	250	1,100	13	<430	<410
Hexachlorobutadiene	320,000	33	22,000	0.5	<430	<410
Hexachlorocyclopentadiene	5,300,000	3,100	3,700,000	160	<430	<410
Hexachloroethane	620,000	20	43,000	0.48	<430	<410
Indeno[1,2,3-cd]pyrene	29,000	2,300	2,100	120	<87	51
Isophorone	26,000,000	470	1,800,000	22	<430	<410
Naphthalene	180,000	9.4	18,000	0.47	<87	<83
Nitrobenzene	250,000	1.6	24,000	0.079	<430	<410
N-Nitrosodi-n-propylamine	3,500	0.14	250	0.007	<430	<410
N-Nitrosodiphenylamine	5,000,000	1,500	350,000	57	<430	<410
Pentachlorophenol	33,000	200	2,700	10	<1100	<1000
Phenanthrene	610,000,000	7,400,000	---	---	<87	130
Phenol	260,000,000	130,000	180,000,000	2,600	<430	<410
Pyrene	58,000,000	400,000	17,000,000	9,500	<87	210

All results in ug/kg
--- not available

TABLE 23
ANALYTICAL RESULTS FOR METALS IN SOIL SAMPLES
AOC NO. 1 SAMPLING LOCATIONS
QUALITY CARRIERS, INC. PROPERTY
INSTITUTE, WEST VIRGINIA

SAMPLE LOCATION	VRP DMV		USEPA RBSL		WTA-1				WTA-2		
DEPTH INTERVAL					1' - 2'	1'-2'(DUP)	7' - 9'	11' - 13'	3' - 5'	5' - 7'	12' - 13'
DATE COLLECTED					8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012
ANALYTE	Industrial Soil	Migration to Groundwater	Industrial Soil	Migration to Groundwater							
Arsenic	27	5.8	1.6	0.29	**8.8**	**6.5**	**7.0**	**6.2**	**6.9**	**4.5**	**7.4**
Barium	360,000	1,600	190,000	82	**130**	**120**	72	**120**	**150**	**140**	**170**
Cadmium	800	7.5	800	0.38	<1.1	<1.1	<1.1	<1.1	<1.2	<1.2	<1.1
Chromium	1,000,000	2,000,000,000	1,500,000	180,000	16	16	15	17	20	18	16
Lead	1,000	270	800	14	**21**	**16**	**17**	**19**	**17**	13	**19**
Mercury	610	2.1	43	0.1	0.05	0.04	<0.11	<0.11	<0.12	0.035	<0.12
Selenium	10,000	5.2	5,100	0.26	**1.8**	**2.3**	**2.2**	**1.9**	**1.8**	**2.9**	**2.8**
Silver	10,000	31	5,100	0.6	<1.1	<1.1	<1.1	<1.1	<1.2	<1.2	<1.1
Vanadium	140	51	5,200	78	23	22	27	25	29	23	26

All results in mg/kg

TABLE 24
ANALYTICAL RESULTS FOR VOCs IN SOIL SAMPLES
AOC NO. 1 SAMPLING LOCATIONS
QUALITY CARRIERS, INC. PROPERTY
INSTITUTE, WEST VIRGINIA

SAMPLE LOCATION	VRP DMV		USEPA RBSL		WTA-1				WTA-2		
DEPTH INTERVAL					1' - 2'	1'-2'(DUP)	7' - 9'	11' - 13'	3' - 5'	5' - 7'	12' - 13'
DATE COLLECTED					8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012
ANALYTE	Industrial Soil	Migration to Groundwater	Industrial Soil	Migration to Groundwater							
1,1,1-Trichloroethane	450,000	1,400	38,000,000	70	<1.8	<1.7	<1.9	<2.2	<2	<1.9	<1.8
1,1,2,2-Tetrachloroethane	99,000	4.0	2,800	0.026	<1.8	<1.7	<1.9	<2.2	<2	<1.9	<1.8
1,1,2-Trichloro-1,2,2-trifluoroethane	420,000	2,900,000	180,000,000	130,000	<1.8	<1.7	<1.9	<2.2	<2	<1.9	400
1,1,2-Trichloroethane	57,000	32	5,300	1.6	<4.4	<4.4	<4.8	<5.4	<4.9	<4.7	**28**
1,1-Dichloroethane	170,000	14	17,000	0.68	<1.8	<1.7	<1.9	<2.2	1.2	<1.9	<1.8
1,1-Dichloroethene	860,000	50	1,100,000	2.5	<1.8	<1.7	<1.9	<2.2	<2	<1.9	**12**
1,2,4-Trichlorobenzene	290,000	4,100	99,000	200	<1.8	<1.7	<1.9	<2.2	17	<1.9	<1.8
1,2-Dibromo-3-Chloropropane	71,000	1.7	69	0.086	<4.4	<4.4	<4.8	<5.4	<4.9	<4.7	<4.4
1,2-Dibromoethane (EDB)	1,800	0.28	170	0.014	<1.8	<1.7	<1.9	<2.2	<2	<1.9	<1.8
1,2-Dichlorobenzene	150,000	12,000	9,800,000	580	<1.8	<1.7	<1.9	<2.2	49	<1.9	**1100**
1,2-Dichloroethane	23,000	28	2,200	1.4	<1.8	<1.7	<1.9	<2.2	**9.4**	**3.5**	**32**
1,2-Dichloropropane	47,000	33	4,700	1.7	<1.8	<1.7	<1.9	<2.2	**15**	**7.1**	**470**
1,3-Dichlorobenzene	120,000	12,000	---	---	<1.8	<1.7	<1.9	<2.2	1.2	<1.9	6.9
1,4-Dichlorobenzene	140,000	1,400	12,000	---	<1.8	<1.7	<1.9	<2.2	8	<1.9	66
1,4-Dioxane	250,000	2.8	17,000	0.14	<180	<170	<190	<220	<200	<190	<180
2-Butanone (MEK)	47,000,000	30,000	200,000,000	1,000	<44	<44	<48	<54	74	<47	<44
2-Hexanone	---	---	1,400,000	7.9	<44	<44	<48	<54	<49	<47	<44
4-Methyl-2-pentanone (MIBK)	430,000	9,500	53,000,000	230	<44	<44	<48	<54	<67	<47	<44
Acetone	200,000,000	89,000	630,000,000	2,400	<44	<44	<48	<54	400	66	630
Benzene	58,000	51	5,400	2.6	<1.8	<1.7	<1.9	<2.2	**110**	**60**	**290**
Bromodichloromethane	14,000	0.64	1,400	22	<1.8	<1.7	<1.9	<2.2	<2	<1.9	<1.8
Bromoform	3,100,000	45	220,000	21	<1.8	<1.7	<1.9	<2.2	<2	<1.9	<1.8
Bromomethane	33,000	44	32,000	1.8	<1.8	<1.7	<1.9	<2.2	<2	<1.9	<1.8
Carbon disulfide	640,000	6,100	3,700,000	210	<4.4	<4.4	<4.8	<5.4	<4.9	<4.7	<4.4
Carbon tetrachloride	32,000	39	3,000	1.9	<1.8	<1.7	<1.9	<2.2	<2	<1.9	<1.8
Chlorobenzene	340,000	1,400	1,400,000	68	<1.8	<1.7	<1.9	<2.2	**710**	13	**1800**
Chloroethane	1,900,000	120,000	---	---	<4.4	<4.4	<4.8	<5.4	<4.9	<4.7	<4.4
Chloroform	15,000	1.1	1,500	22	<1.8	<1.7	<1.9	<2.2	**100**	<1.9	**14**
Chloromethane	510,000	980	500,000	49	<1.8	<1.7	<1.9	<2.2	5.0	4.6	6.2
cis-1,2-Dichloroethene	83,000	410	2,000,000	21	<1.8	<1.7	<1.9	<2.2	**25**	**29**	**5600**
cis-1,3-Dichloropropene	96,000	3.1	20,000,000	99	<1.8	<1.7	<1.9	<2.2	<2	<1.9	<1.8
Cyclohexane	56,000	250,000	29,000,000	13,000	<8.9	<8.7	<9.6	<11	41	3.3	16
Dibromochloromethane	290,000	4.3	3,300	21	<1.8	<1.7	<1.9	<2.2	<2	<1.9	<1.8
Dichlorodifluoromethane	420,000	12,000	400,000	300	<1.8	<1.7	<1.9	<2.2	9.4	<1.9	<1.8
Ethylbenzene	190,000	16,000	27,000	780	<1.8	<1.7	<1.9	<2.2	**2200**	29	**4600**
Isopropylbenzene	---	---	---	---	<1.8	<1.7	<1.9	<2.2	9	0.76	83
Methyl acetate	50,000,000	25,000	1,000,000,000	3,200	<8.9 J	<8.7	<9.6	<11	<9.8	<9.4	<8.8
Methyl tert-butyl ether	2,400,000	56	220,000	2.8	<1.8	<1.7	<1.9	<2.2	<2	<1.9	<1.8
Methylcyclohexane	31,000	270,000	---	---	<8.9	<8.7	<9.6	<11	<9.8	<9.4	<8.8
Methylene Chloride	580,000	25	960,000	1.3	<8.9	<8.7	<9.6	<11	1.0	**24**	**16**
Naphthalene	180,000	9.4	18,000	0.47	2.5	<4.4	<4.8	<5.4	**22000**	**630**	**54000**
Styrene	340,000	2,200	36,000,000	110	<1.8	<1.7	<1.9	<2.2	<2	<1.9	<1.8
Tetrachloroethene	36,000	45	110,000	2.3	<1.8	<1.7	<1.9	<2.2	**6.7**	<1.9	**51**
Toluene	360,000	14,000	45,000,000	690	<1.8	<1.7	<1.9	<2.2	**2000**	45	**1500**
trans-1,2-Dichloroethene	710,000	590	690,000	29	<1.8	<1.7	<1.9	<2.2	<2	<1.9	8.2
trans-1,3-Dichloropropene	96,000	3.1	20,000,000	99	<1.8	<1.7	<1.9	<2.2	<2	<1.9	<1.8
Trichloroethene	21,000	36	6,400	1.8	<1.8	<1.7	<1.9	<2.2	**23**	**2.2**	**2400**
Trichlorofluoromethane	700,000	16,000	3,400,000	690	<1.8	<1.7	<1.9	<2.2	<2	<1.9	750
Vinyl chloride	21,000	14	1,700	0.69	<1.8	<1.7	<1.9	<2.2	<2.7	<2.1	**240**
Xylenes, Total	100,000	200,000	2,700,000	9,800	<4.4	<4.4	<4.8	<5.4	230	21	3300

All results in ug/kg
--- not available

TABLE 25
ANALYTICAL RESULTS FOR SVOCs IN SOIL SAMPLES
AOC NO. 1 SAMPLING LOCATIONS
QUALITY CARRIERS, INC. PROPERTY
INSTITUTE, WEST VIRGINIA

SAMPLE LOCATION	VRP DMV		USEPA RBSL		WTA-1				WTA-2		
DEPTH INTERVAL					1' - 2'	1'-2'(DUP)	7' - 9'	11' - 13'	3' - 5'	5' - 7'	12' - 13'
DATE COLLECTED					8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012	8/9/2012
ANALYTE	Industrial Soil	Migration to Groundwater	Industrial Soil	Soil to Groundwater							
1,1'-Biphenyl	50,000,000	64,000	210,000	8.7	<380	<380	<370	<370	<410	<390	930
1,4-Dioxane	250,000	2.8	17,000	0.14	<380	<380	<370	<370	<410	<390	<390
2,2'-oxybis[1-chloropropane]	---	---	---	---	<380	<380	<370	<370	<410	<390	<390
2,4,5-Trichlorophenol	8,800,000	270,000	62,000,000	3,300	<950	<940	<940	<920	<1000	<970	<980
2,4,6-Trichlorophenol	2,200,000	460	160,000	13	<380	<380	<370	<370	<410	<390	<390
2,4-Dichlorophenol	2,600,000	2,600	1,800,000	41	<380	<380	<370	<370	<410	<390	<390
2,4-Dimethylphenol	18,000,000	17,000	12,000,000	320	<380	<380	<370	<370	<410	<390	360
2,4-Dinitrophenol	1,800,000	1,600	1,200,000	34	<380	<380	<370	<370	<410	<390	<390
2,4-Dinitrotoluene	80,000	5.9	5,500	0.28	<380	<380	<370	<370	<410	<390	<390
2,6-Dinitrotoluene	890,000	1,000	620,000	20	<380	<380	<370	<370	<410	<390	<390
2-Chloronaphthalene	65,000,000	50,000	82,000,000	2,900	<380	<380	<370	<370	<410	<390	<390
2-Chlorophenol	5,200,000	500	5,100,000	57	<380	<380	<370	<370	<410	<390	<390
2-Methylnaphthalene	---	---	---	---	<76	<76	<75	<74	61	<78	3,500
2-Methylphenol	44,000,000	30,000	---	---	<380	<380	<370	<370	<410	<390	<390
2-Nitroaniline	8,500,000	3,100	6,000,000	62	<950	<940	<940	<920	<1000	<970	<980
2-Nitrophenol	---	---	---	---	<380	<380	<370	<370	<410	<390	<390
3,3'-Dichlorobenzidine	55,000	20	3,800	0.71	<760	<750	<750	<730	<830	<770	<780
3-Nitroaniline	---	---	---	---	<950	<940	<940	<920	<1000	<970	<980
4,6-Dinitro-2-methylphenol	---	---	---	---	<380	<380	<370	<370	<410	<390	<390
4-Bromophenyl phenyl ether	---	---	---	---	<380	<380	<370	<370	<410	<390	<390
4-Chloro-3-methylphenol	---	---	---	---	<380	<380	<370	<370	<410	<390	<390
4-Chloroaniline	120,000	2.9	8,600	0.13	<380	<380	<370	<370	<410	<390	<390
4-Chlorophenyl phenyl ether	---	---	---	---	<380	<380	<370	<370	<410	<390	<390
4-Nitroaniline	---	---	86,000	1.4	<950	<940	<940	<920	<1000	<970	<980
4-Nitrophenol	7,000,000	4,600	---	---	<380	<380	<370	<370	<410	<390	<390
Acenaphthene	66,000,000	75,000	33,000,000	4,100	<76	<76	<75	<74	<83	<78	210
Acenaphthylene	75,000,000	75,000	---	---	<76	<76	<75	<74	<83	<78	300
Acetophenone	200,000,000	22,000	100,000,000	450	<380	<380	<370	<370	<410	<390	<390
Anthracene	6,100,000,000	7,200,000	170,000,000	42,000	<76	<76	<75	<74	<83	<78	240
Atrazine	110,000	39	7,500	1.9	<380	<380	<370	<370	<410	<390	<390
Benzaldehyde	1,500,000	2,700	100,000,000	330	<1900	<1900	<1900	<1800	<2100	<1900	<2000
Benzo[a]anthracene	29,000	210	2,100	10	<76	<76	<75	<74	<83	<78	**70**
Benzo[a]pyrene	2,900	4,700	210	240	<76	<76	<75	<74	<83	<78	<79
Benzo[b]fluoranthene	29,000	710	2,100	35	<76	<76	<75	<74	<83	<78	<79
Benzo[g,h,i]perylene	23,000,000	85,000,000	---	---	<76	<76	<75	<74	<83	<78	<79
Benzo[k]fluoranthene	290,000	6,900	21,000	350	<76	<76	<75	<74	<83	<78	<79
Bis(2-chloroethoxy)methane	---	---	1,800,000	11	<380	<380	<370	<370	<410	<390	<390
Bis(2-chloroethyl)ether	13,000	0.063	1,000	0.0031	<380	<380	<370	<370	<410	<390	<390
Bis(2-ethylhexyl) phthalate	1,800,000	29,000	120,000	1,400	<380	<380	63	<370	1,100	210	**100,000**
Butyl benzyl phthalate	13,000,000	10,000	---	---	<380	<380	<370	<370	<410	<390	540
Caprolactam	440,000,000	91,000	310,000,000	1,900	<380	<380	<370	<370	<410	<390	<390
Carbazole	1,200,000	1,200	---	---	<380	<380	<370	<370	<410	<390	<390
Chrysene	2,900,000	21,000	210,000	1,100	<76	<76	<75	<74	<83	<78	72
Dibenz(a,h)anthracene	2,900	230	210	11	<76	<76	<75	<74	<83	<78	<79
Dibenzofuran	2,000,000	14,000	---	---	<380	<380	<370	<370	<410	<390	<390
Diethyl phthalate	700,000,000	240,000	490,000,000	4,700	<380	<380	<370	<370	<410	<390	<390
Dimethyl phthalate	1,000,000,000	1,900,000	---	---	<1900	<1900	<1900	<1800	<2100	<1900	<2000
Di-n-butyl phthalate	88,000,000	180,000	---	---	<380	<380	<370	<370	<410	<390	13,000
Di-n-octyl phthalate	---	---	---	---	<380	<380	<370	<370	<410	<390	<390
Fluoranthene	30,000,000	3,200,000	22,000,000	70,000	<76	<76	<75	<74	<83	<78	150
Fluorene	57,000,000	90,000	22,000,000	4,000	<76	<76	<75	<74	<83	<78	440
Hexachlorobenzene	15,000	250	1,100	13	<380	<380	<370	<370	<410	<390	<390
Hexachlorobutadiene	320,000	33	22,000	0.5	<380	<380	<370	<370	<410	<390	<390
Hexachlorocyclopentadiene	5,300,000	3,100	3,700,000	160	<380	<380	<370	<370	<410	<390	<390
Hexachloroethane	620,000	20	43,000	0.48	<380	<380	<370	<370	<410	<390	<390
Indeno[1,2,3-cd]pyrene	29,000	2,300	2,100	120	<76	<76	<75	<74	<83	<78	<79
Isophorone	26,000,000	470	1,800,000	22	<380	<380	<370	<370	<410	<390	<390
Naphthalene	180,000	9.4	18,000	0.47	<76	<76	<75	<74	**880**	<78	**6,900**
Nitrobenzene	250,000	1.6	24,000	0.079	<380	<380	<370	<370	<410	<390	<390
N-Nitrosodi-n-propylamine	3,500	0.14	250	0.007	<380	<380	<370	<370	<410	<390	<390
N-Nitrosodiphenylamine	5,000,000	1,500	350,000	57	<380	<380	<370	<370	<410	<390	**2,300**
Pentachlorophenol	33,000	200	2,700	10	<950	<940	<940	<920	<1000	<970	<980
Phenanthrene	610,000,000	7,400,000	---	---	<76	<76	<75	<74	<83	<78	1300
Phenol	260,000,000	130,000	180,000,000	2,600	<380	<380	<370	<370	<410	<390	48
Pyrene	58,000,000	400,000	17,000,000	9,500	<76	<76	<75	<74	<83	<78	320

All results in ug/kg
--- not available

TABLE 26
ANALYTICAL RESULTS FOR METALS IN GROUNDWATER SAMPLES
QUALITY CARRIERS, INC. PROPERTY
INSTITUTE, WEST VIRGINIA

SAMPLE LOCATION	VRP DE MINIMIS VALUE	USEPA RBSL	MW-101						MW-102					
				Flag		Flag		Flag		Flag		Flag		Flag
DATE COLLECTED			10/1999		8/2012		9/2012		10/1999		8/2012		9/2012	
ANALYTE														
Arsenic (Filtered)	10	10	NA		2.0		0.4	J	NA		0.49	J	0.37	J
Arsenic (Unfiltered)			NA		**11**		1.7		NA		3.9		2.8	
Barium (Filtered)	2,000	2,000	NA		88	B	110		NA		110	B	120	
Barium (Unfiltered)			300		370		140		120		180		160	
Iron (Filtered)	26,000	11,000	NA		210		1,900	B	NA		29	J	280	B
Iron (Unfiltered)			3,800		**110,000**		**12,000**	B	360		**13,000**		**19,000**	B
Lead (Filtered)	15	15	NA		0.069	J B	0.47	J B	NA		0.1	J B	0.094	J B
Lead (Unfiltered)			< 100		**45**	B	4.0	B	< 100		5.7	B	4.2	B
Manganese (Filtered)	1,700	NA	NA		110	B	100	B	NA		140	B	130	B
Manganese (Unfiltered)			550		730	B	190	B	**3,200**		280	B	550	B
Vanadium (Filtered)	2.6	78	NA		**4.3**		**3.6**	B	NA		**5.8**		<1	
Vanadium (Unfiltered)			< 20		**87**	B	**10**	B	< 20		**20**	B	**17**	B

SAMPLE LOCATION	VRP DE MINIMIS VALUE	USEPA RBSL	MW-103						MW-104									
				Flag		Flag		Flag		Flag		Flag		Flag		Flag		Flag
DATE COLLECTED			10/1999		8/2012		9/2012		10/1999		8/2012		8/2012 (DUP)		9/2012		9/2012 (DUP)	
ANALYTE																		
Arsenic (Filtered)	10	10	NA		2.1		2.1		NA		**57**		**60**		**32**		**33**	
Arsenic (Unfiltered)			NA		6.8		2.8		NA		**60**		**56**		**33**		**34**	
Barium (Filtered)	2,000	2,000	NA		33	B	72		NA		600	B	620		700		710	
Barium (Unfiltered)			100		93		93		1,200		620		590	B	720		700	
Iron (Filtered)	26,000	11,000	NA		10	J	8,500	B	NA		**13,000**		**14,000**		11,000	B	11,000	B
Iron (Unfiltered)			1200		**15,000**		**18,000**		27,000		**14,000**		**13,000**		**13,000**	B	**13,000**	B
Lead (Filtered)	15	15	NA		0.11	J B	4.3	B	NA		0.68	J B	0.39	J B	0.043	J B	0.028	J B
Lead (Unfiltered)			< 100		5.7	B	7.2		< 100		0.38	J B	0.28	J B	0.62	J B	0.57	J B
Manganese (Filtered)	1,700	NA	NA		15	B	130	B	NA		1,700	B	**1,800**	B	**1,900**	B	**1,900**	B
Manganese (Unfiltered)			630		220	B	190	B	2,500		**1,800**	B	1,700	B	**1,900**	B	**1,900**	B
Vanadium (Filtered)	2.6	78	NA		**6.7**		**15**	B	NA		**5.0**		**4.7**	B	2.6	B	1.5	B
Vanadium (Unfiltered)			< 20		**22**	B	**23**		**36**		**6.1**	B	**4.5**		**2.8**	B	1.4	B

All results in ug/L
J - Result < RL, but ≥ MDL. Concentration is approximate.
B - Reported in one or more blanks.

TABLE 26
ANALYTICAL RESULTS FOR METALS IN GROUNDWATER SAMPLES
QUALITY CARRIERS, INC. PROPERTY
INSTITUTE, WEST VIRGINIA

SAMPLE LOCATION	VRP DE MINIMIS VALUE	USEPA RBSL	MW-105						MW-106					
				Flag		Flag		Flag		Flag		Flag		Flag
DATE COLLECTED			10/1999		8/2012		9/2012		10/1999		8/2012		9/2012	
ANALYTE														
Arsenic (Filtered)	10	10	NA		**25**		**26**		NA		3.4		3.5	
Arsenic (Unfiltered)			NA		**32**		**41**		NA		3.2		5.5	
Barium (Filtered)	2,000	2,000	NA		140	B	170		NA		410	B	460	
Barium (Unfiltered)			**2,200**		150		270		700		410		1,200	
Iron (Filtered)	26,000	11,000	NA		**75,000**		**95,000**	B	NA		290		1,700	B
Iron (Unfiltered)			**77,000**		**90,000**		**140,000**	B	1,800		2,300		**25,000**	B
Lead (Filtered)	15	15	NA		0.21	J B	0.45	J B	NA		0.14	J B	1.1	B
Lead (Unfiltered)			**120**		1.4	B	10	B	< 100		1.8	B	**44**	B
Manganese (Filtered)	1,700	NA	NA		**3,900**	B	**4,400**	B	NA		**4,700**	B	**5,100**	B
Manganese (Unfiltered)			**3,500**		**3,900**	B	**4,300**	B	6,600		**4,500**	B	**4,900**	B
Vanadium (Filtered)	2.6	78	NA		**3.6**		2.3	B	NA		**5.7**		**2.9**	B
Vanadium (Unfiltered)			**40**		**5.3**	B	**13**	B	< 20		**5.6**	B	**56**	B

SAMPLE LOCATION	VRP DE MINIMIS VALUE	USEPA RBSL	MW-107								MW-109				MW-110			
				Flag		Flag		Flag		Flag		Flag		Flag		Flag		Flag
DATE COLLECTED			8/2012		8/2012 (DUP)		9/2012		9/2012 (DUP)		8/2012		9/2012		8/2012		9/2012	
ANALYTE																		
Arsenic (Filtered)	10	10	2.4		0.89	J	1.6		1.0		1.9		<1		2.5		2.2	
Arsenic (Unfiltered)			2.2		1.1		<1		<1		4.5		<1		4.1		1.4	
Barium (Filtered)	2,000	2,000	53	B	55	B	99		73		130	B	140		370	B	410	
Barium (Unfiltered)			59		57		53		54		180		140		310		510	
Iron (Filtered)	26,000	11,000	<50		<50		11,000	B	5,000	B	87		120	B	360		670	B
Iron (Unfiltered)			140		150		170		170		10,000		280	B	1,500		2,600	B
Lead (Filtered)	15	15	0.15	J B	0.14	J B	4.8	B	2.4	B	0.15	J B	0.033	J B	0.11	J B	0.42	J B
Lead (Unfiltered)			0.17	J B	0.12	J B	0.06	J	0.044	J	6.0	B	0.18	J B	0.98	J B	1.4	B
Manganese (Filtered)	1,700	NA	**5,000**	B	**4,600**	B	**4,700**	B	**4,900**	B	240	B	250	B	490	B	970	B
Manganese (Unfiltered)			**5,500**	B	**5,200**	B	**5,000**	B	**5,200**	B	350	B	260	B	1,200	B	900	B
Vanadium (Filtered)	2.6	78	**5.3**		**5.6**		0.36	J B	<1		**6.3**		<1		**4.4**		**4.4**	B
Vanadium (Unfiltered)			**4.3**	B	**3.9**	B	1.6		1.3		**18**	B	<1		**9.6**	B	**5.8**	B

All results in ug/L
J - Result < RL, but ≥ MDL. Concentration is approximate.
B - Reported in one or more blanks.

TABLE 26
ANALYTICAL RESULTS FOR METALS IN GROUNDWATER SAMPLES
QUALITY CARRIERS, INC. PROPERTY
INSTITUTE, WEST VIRGINIA

SAMPLE LOCATION	VRP DE MINIMIS VALUE	USEPA RBSL	TMP-2				TMP-3				TMP-5			
				Flag		Flag		Flag		Flag		Flag		Flag
DATE COLLECTED			8/2012		9/2012		8/2012		9/2012		8/2012		9/2012	
ANALYTE														
Arsenic (Filtered)	10	10	2.4		3.2		1.7		<1		1.5		1.8	
Arsenic (Unfiltered)			5.2		<1		3.6		2.3		6.1		2.4	
Barium (Filtered)	2,000	2,000	180	B	200		180	B	190		100	B	91	
Barium (Unfiltered)			250		170		200		180		370		190	
Iron (Filtered)	26,000	11,000	28	J	8,900	B	19	J	700	B	19	J	59	B
Iron (Unfiltered)			**14,000**		220		8,000		4,200	B	**16,000**		5,500	B
Lead (Filtered)	15	15	0.17	J B	6.5	B	0.1	J B	0.38	J B	0.22	J B	0.043	J B
Lead (Unfiltered)			9.4	B	0.18	J	3.6	B	1.9	B	11	B	4.3	B
Manganese (Filtered)	1,700	NA	**2,000**	B	1,400	B	1,400	B	1,600	B	**2,400**	B	**2,400**	B
Manganese (Unfiltered)			**2,200**	B	1,300	B	1,400	B	1,400	B	**3,800**	B	**3,000**	B
Vanadium (Filtered)	2.6	78	**6.2**		**12**	B	**4.4**		<1		**6.0**		**2.8**	B
Vanadium (Unfiltered)			**21**	B	2.2		**12**	B	**5.1**	B	**22**	B	**6.3**	B

All results in ug/L
J - Result < RL, but ≥ MDL. Concentration is approximate.
B - Reported in one or more blanks.

TABLE 27
ANALYTICAL RESULTS FOR VOCs IN GROUNDWATER SAMPLES
QUALITY CARRIERS, INC. PROPERTY
INSTITUTE, WEST VIRGINIA

SAMPLE LOCATION	VRP DE MINIMIS VALUE	USEPA RBSL	MW-101				MW-102				MW-103				MW-104								MW-105				MW-106				MW-107							
				Flag		Flag		Flag		Flag		Flag		Flag		Flag	(DUP)	Flag		Flag	(DUP)	Flag		Flag		Flag		Flag		Flag		Flag	(DUP)	Flag		Flag	(DUP)	Flag
DATE COLLECTED			8/2012		9/2012		8/2012		9/2012		8/2012		9/2012		8/2012		8/2012		9/2012		9/2012		8/2012		9/2012		8/2012		9/2012		8/2012		8/2012		9/2012		9/2012	
ANALYTE																																						
1,1,1-Trichloroethane	200	200	<1		<1		<1		<1		<1		<1		<250		<250		<250		<150		<4		<2		<100		<100		<1		<1		<1		<1	
1,1,2,2-Tetrachloroethane	0.067	0.066	<1		<1		<1		<1		<1		<1		<250		<250		<250		<150		<4		<2		<100		<100		<1		<1		<1		<1	
1,1,2-Trichloro-1,2,2-trifluoroethane	59,000	53,000	<1		<1		<1		<1		<1		<1		<250		<250		<250		<150		<4		<2		<100		<100		<1		<1		<1		<1	
1,1,2-Trichloroethane	5	5	<1		<1		0.25		<1		<1		<1		<250		<250		<250		<150		<4		<2		**24**	J	**25**	J	<1		<1		<1		<1	
1,1-Dichloroethane	2.4	2.4	<1		<1		<1		<1		<1		<1		<250		<250		<250		<150		<4		<2		<100		<100		<1		<1		<1		<1	
1,1-Dichloroethene	7	7	<1		<1		<1		<1		<1		<1		<250		<250		<250		<150		<4		<2		<100		<100		<1		<1		<1		<1	
1,2,4-Trichlorobenzene	70	70	<1		<1		<1		<1		<1		<1		<250		<250		<250		<150		<4		<2		<100		<100		<1		<1		<1		<1	
1,2-Dibromo-3-Chloropropane	0.2	0.2	<1		<1		<1	J	<1		<1		<1		<250		<250		<250		<150		<4		<2		<100		<100		<1		<1		<1		<1	
1,2-Dibromoethane (EDB)	0.05	0.05	<1		<1		<1		<1		<1		<1		<250		<250		<250		<150		<4		<2		<100		<100		<1		<1		<1		<1	
1,2-Dichlorobenzene	600	600	<1		<1		<1		<1		<1		<1		220	J	220	J	530		480		<4		<2		<100		23	J	<1		<1		<1		<1	
1,2-Dichloroethane	5	5	<1		<1		0.32		0.29	J	<1		<1		<250		<250		<250		<150		<4		<2		<100		<100		<1		<1		<1		<1	
1,2-Dichloropropane	5	5	<1		<1		**6.5**		**7.9**		<1		<1		<250		<250		<250		<150		<4		<2		<100		<100		<1		<1		<1		<1	
1,3-Dichlorobenzene			<1		<1		<1		<1		<1		<1		<250		<250		<250		<150		<4		<2		<100		<100		<1		<1		<1		<1	
1,4-Dichlorobenzene	370	75	<1		<1		<1		<1		<1		<1		71	J	67	J	**150**	J	**150**		<4		<2		<100		<100		<1		<1		<1		<1	
1,4-Dioxane	0.67	0.67	<200		<200		<200		<200		<200		<200		<50000		<50000		<50000		<30000		**390**	J	280	J	<20000		<20000		<200		<200		<200		<200	
2-Butanone (MEK)	7,100	4,900	<5		<5		<5		<5		<5		<5		<1300		<1300		<1300		<750		<20		<10		<500		<500		<5		<5		<5		<5	
2-Hexanone		34	<5		<5		<5		<5		<5		<5		<1300		<1300		<1300		<750		<20		<10		<500		<500		<5		<5		<5		<5	
4-Methyl-2-pentanone (MIBK)	2,000	1,000	<5		<5		<5		<5		<5		<5		<1300		<1300		<1300		<750		<20		<10		<500		<500		<5		<5		<5		<5	
Acetone	22,000	12,000	<5		<5		<5		<5		<5		4.9	J	<1300		<1300		<1300		<750		<20		<10		<500		<500		2.8		2.5		3.1	J	4.1	J
Benzene	5	5	<1		<1		<1		<1		<1		<1		**100**	J	**100**	J	**120**	J	**110**	J	**5.2**		2.7		**23**	J	**22**	J	<1		<1		<1		<1	
Bromodichloromethane	0.12	80	<1		<1		<1		<1		<1		<1		<250		<250		<250		<150		<4		<2		<100		<100		<1		<1		<1		<1	
Bromoform	8.5	80	<1		<1		<1		<1		<1		<1		<250		<250		<250		<150		<4		<2		<100		<100		<1		<1		<1		<1	
Bromomethane	8.7	7.0	<1		<1		<1		<1		<1		<1		<250		<250		<250		<150		<4		<2		<100		<100		<1		<1		<1		<1	
Carbon disulfide	1,000	720	<1		0.52	J B	<1		0.49	J B	<1		<1		<250		<250		130	J B	74	J B	<4		1	J B	<100		46	J B	<1		<1		<1		<1	
Carbon tetrachloride	5	5	<1		<1		<1		<1		<1		<1		<250		<250		<250		<150		<4		<2		<100		<100		<1		<1		<1		<1	
Chlorobenzene	100	100	<1		<1		<1		<1		0.68	J	<1		**4100**		**4100**		**3900**		**3600**		1.8	J	1.8	J	**1500**		**1600**		<1		<1		<1		<1	
Chloroethane	21,000		<1		<1		<1		<1		<1		<1	*	<250		<250		<250		<150		<4		<2		<100		<100		<1		<1		<1	*	<1	*
Chloroform	0.19	80	<1		<1		<1		<1		<1		<1		<250		<250		<250		<150		<4		<2		<100		<100		<1		<1		<1		<1	
Chloromethane	190	190	<1	B	<1		<1	J B	<1		<1		<1		<250		<250		<250		<150		<4		<2		<100		<100		<1	J B	<1	J B	<1		<1	
cis-1,2-Dichloroethene	70	70	<1	T J N	<1		<1		0.25	J	<1		<1		**100**	J	**120**	J	<250		<150		<4		0.49	J	67	J	**71**	J	<1		<1	T J N	<1		<1	
cis-1,3-Dichloropropene	0.43	0.41	<1		<1		<1		<1		<1		<1		<250		<250		<250		<150		<4		<2		<100		<100		<1		<1		<1		<1	
Cyclohexane	12,000	13,000	<1		<1		<1		<1		<1		<1		<250		<250		<250		<150		<4		<2		<100		<100		<1		<1		<1		<1	
Dibromochloromethane	0.8	80	<1		<1		<1		<1		<1		<1		<250		<250		<250		<150		<4		<2		<100		<100		<1		<1		<1		<1	
Dichlorodifluoromethane	390	190	<1		<1		<1		<1		<1		<1		<250		<250		<250		<150		<4		<2		<100		<100		<1		<1		<1		<1	
Diisopropyl ether		1,500																					210	T J N	140	T J N												
Ethylbenzene	700	700	<1		<1		<1		<1		<1		<1		170	J	170	J	490		460		<4		<2		<100		<100		<1		<1		<1		<1	
Hexanal													1.4	T J N																								
Isopropylbenzene	680	390	<1		<1		<1		<1		<1		<1		<250		<250		<250		<150		<4		<2		<100		<100		<1		<1	J	<1		<1	
Methane, dichlorofluoro-																							24	T J N	22	T J N												
Methyl acetate	6,100	16,000	<1		<1		<1		<1		<1		<1		<250		<250		<250		<150		<4		<2		<100		<100		<1		<1		<1		<1	
Methyl tert-butyl ether	12	12	<1		<1		<1		<1		<1		<1		<250		<250		<250		<150		<4		<2		<100		<100		<1		<1		<1		<1	
Methylcyclohexane			<1		<1		<1		<1		<1		<1		<250		<250		<250		<150		<4		<2		<100		<100		<1		<1		<1		<1	
Methylene Chloride	5	5	0.51		0.26	J	0.32		<1		<1		0.16	J	<250		<250		<250		<150		<4		<2		<100		<100		0.37		0.39		<1		0.15	J
Nonanal													4.1	T J N																								
Octanal																																						
Silanol, trimethyl-			1.3				1.3																															
Silanol, trimethyl-, propanoate											2.2	T J N																										
Styrene	100	100	<1		<1		<1		<1		<1		<1		<250		<250		<250		<150		<4		<2		<100		<100		<1		<1		<1		<1	
Tetrachloroethene	5	5	<1		<1		<1		<1		<1		<1		<250		<250		<250		<150		<4		<2		<100		<100		<1		<1		<1		<1	
Toluene	1,000	1,000	<1		<1		<1		<1		<1		<1		<250		<250		74	J	78	J	<4		<2		<100		<100		<1		<1		<1		<1	
trans-1,2-Dichloroethene	100	100	<1		<1		<1		<1		<1		<1		<250		<250		<250		<150		<4		<2		<100		<100		<1		<1		<1		<1	
trans-1,3-Dichloropropene	0.43	0.41	<1		<1		<1		<1		<1		<1		<250		<250		<250		<150		<4		<2		<100		<100		<1		<1		<1		<1	
Trichloroethene	5	5	<1		<1		0.15		0.22	J	<1		<1		**59**	J	**49**	J	<250		<150		<4		<2		**150**		**170**		<1		<1		<1		<1	
Trichlorofluoromethane	1,300	1,100	<1		<1		<1		<1		<1		<1		<250		<250		<250		<150		<4		<2		<100		<100		<1		<1		<1		<1	
Vinyl chloride	2	2	<1		<1		<1		<1		<1		<1		<250		<250		<250		<150		**5.2**		5.6		<100		<100		<1		<1		<1		<1	
Xylenes, Total	10,000	10,000	<3		<3		<3		<3		<3		<3		<750		<750		<750		<450		<12		<6		<300		<300		<3		<3		<3		<3	

All results in ug/L.
* - LCS or LCSD exceeds control limits.
B - Compound reported in one or more blanks.
E - Result exceeds calibration range.
J - Result < RL, but ≥ MDL. Concentration is approximate.
N - Presumptive evidence of material.
T - Tentatively Identified Compound.
Estimated concentration.

TABLE 27
ANALYTICAL RESULTS FOR VOCs IN GROUNDWATER SAMPLES
QUALITY CARRIERS, INC. PROPERTY
INSTITUTE, WEST VIRGINIA

SAMPLE LOCATION	VRP DE MINIMIS VALUE	USEPA RBSL	MW-109				MW-110				TMP-1		TMP-2				TMP-3				TMP-5				WWT-1	
				Flag		Flag		Flag		Flag		Flag		Flag		Flag		Flag		Flag		Flag		Flag		Flag
DATE COLLECTED			8/2012		9/2012		8/2012		9/2012		9/2012		8/2012		9/2012		8/2012		9/2012		8/2012		9/2012		9/2012	
ANALYTE																										
1,1,1-Trichloroethane	200		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1	
1,1,2,2-Tetrachloroethane	0.067		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1	
1,1,2-Trichloro-1,2,2-trifluoroethane	59,000		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1	
1,1,2-Trichloroethane	5		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1	
1,1-Dichloroethane	2.4		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1	
1,1-Dichloroethene	7		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1	
1,2,4-Trichlorobenzene	70		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1	
1,2-Dibromo-3-Chloropropane	0.2		<1		<1		<1	J	<1		<1		<1		<1		<1		<1		<1		<1		<1	
1,2-Dibromoethane (EDB)	0.05		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1	
1,2-Dichlorobenzene	600		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1	
1,2-Dichloroethane	5		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		0.41	J
1,2-Dichloropropane	5		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		0.91	J
1,3-Dichlorobenzene			<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1	
1,4-Dichlorobenzene	370		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1	
1,4-Dioxane	0.67		<200		<200		<200		<200		<200		<200		<200		<200		<200		<200		<200		<200	
2-Butanone (MEK)	7,100		<5		<5		<5		<5		<5		<5		2.6	J	<5		0.91	J	<5		<5		<5	
2-Hexanone			<5		<5		<5		<5		<5		<5		0.31	J	<5		<5		<5		<5		<5	
4-Methyl-2-pentanone (MIBK)	2,000		<5		<5		<5		<5		<5		<5		<5		<5		<5		<5		<5		<5	
Acetone	22,000		4.2	J	<5		<5		5.3	*	11		<5		15		<5		6.7		<5		<5		5.8	
Benzene	5		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		0.59	J
Bromodichloromethane	0.12		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1	
Bromoform	8.5		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1	
Bromomethane	8.7		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1	
Carbon disulfide	1,000		<1		0.58	J B	<1		<1		0.85	J B	<1		0.21	J	<1		0.49	J B	<1		0.43	J B	0.3	J
Carbon tetrachloride	5		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1	
Chlorobenzene	100		0.17	J	0.59	J	<1		0.2	J	<1		<1		<1		<1		<1		<1		<1		0.22	J
Chloroethane	21,000		<1		<1		<1		<1		<1		<1		<1	*	<1		<1		<1		<1		<1	*
Chloroform	0.19		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1	
Chloromethane	190		<1		<1		<1	J B	<1		<1		<1		<1		<1		<1		<1		<1		<1	
cis-1,2-Dichloroethene	70		0.55	J	0.5	J	<1		<1		2.2		<1		<1		<1		<1		<1		<1		3.9	
cis-1,3-Dichloropropene	0.43		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1	
Cyclohexane	12,000		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1	
Dibromochloromethane	0.8		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1	
Dichlorodifluoromethane	390		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1	
Diisopropyl ether																										
Ethylbenzene	700		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1	
Hexanal																										
Isopropylbenzene	680		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1	
Methane, dichlorofluoro-																										
Methyl acetate	6,100		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1	
Methyl tert-butyl ether	12		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1	
Methylcyclohexane			<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1	
Methylene Chloride	5		<1		<1		0.24		0.16	J	0.29	J	<1		0.19	J	<1		<1		<1		<1		0.38	J
Nonanal																										
Octanal																							1.2	T J N		
Silanol, trimethyl-			9.8	T J N									1.8	T J N												
Silanol, trimethyl-, propanoate																										
Styrene	100		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1	
Tetrachloroethene	5		<1		<1		<1	J	<1		<1		<1		<1		<1		<1		<1		<1		0.18	J
Toluene	1,000		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1	
trans-1,2-Dichloroethene	100		<1		<1		<1		<1		0.21	J	<1		<1		<1		<1		<1		<1		<1	
trans-1,3-Dichloropropene	0.43		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1	
Trichloroethene	5		<1		<1		<1		<1		1.8		<1		<1		<1		<1		<1		<1		5	
Trichlorofluoromethane	1,300		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		3.3	
Vinyl chloride	2		2.0		0.84	J	<1		<1		<1		<1		<1		<1		<1		<1		<1		1.9	
Xylenes, Total	10,000		<3		<3		<3	J	<3		<3		<3		<3		<3		<3		<3		<3		<3	
Tentatively Identified Compound					None																					

All results in ug/L.
* - LCS or LCSD exceeds control limits.
B - Compound reported in one or more blanks.
E - Result exceeds calibration range.
J - Result < RL, but ≥ MDL. Concentration is approximate.
N - Presumptive evidence of material.
T - Tentatively Identified Compound.
Estimated concentration.

TABLE 28
ANALYTICAL RESULTS FOR SVOCs IN GROUNDWATER SAMPLES
QUALITY CARRIERS, INC. PROPERTY
INSTITUTE, WEST VIRGINIA

SAMPLE LOCATION	VRP	USEPA	MW-101				MW-102				MW-103				MW-104								MW-105						MW-106				MW-107								MW-109			
DEPTH INTERVAL				Flag		Flag		Flag		Flag		Flag		Flag		Flag	(DUP)	Flag		Flag	(DUP)	Flag		Flag		Flag		Flag		Flag		Flag		Flag	(DUP)	Flag		Flag	(DUP)	Flag		Flag		Flag
DATE COLLECTED	DE MINIMIS	RBSL	8/2012		9/2012		8/2012		9/2012		8/2012		9/2012		8/2012		8/2012		9/2012		9/2012		8/2012		9/2012		9/2012		8/2012		9/2012		8/2012		8/2012		9/2012		9/2012		8/2012		9/2012	
ANALYTE	VALUE																																											
1,1'-Biphenyl	300	0.83	<0.96		<0.96		<0.99		<1		<1		<0.96		**1.2**		**1.1**		**1.7**	J	**1.7**	J	<0.97		<0.98		<9.8		<0.97		<4.9		<0.98		<0.98		<0.96		<0.96		<0.96		<0.99	
1,4-Dioxane	0.67	0.67	<1.9		<1.9		<2		**0.92**	J	<2		**0.92**	J	**31**		**34**		**40**	J	**36**	J	**190**		**170**	E	**170**		**16**		**24**		<2		<2		<1.9		<1.9		<1.9		<2	
2,2'-oxybis[1-chloropropane]			<0.19		<0.19		<0.2		<0.2		<0.2		<0.19		70	E	87		81		79		6		7.4		3		20		24		<0.2		<0.2		<0.19		<0.19		<0.19		<0.2	
2,4,5-Trichlorophenol	3,700	890	<0.96		<0.96		<0.99		<1		<1		<0.96		<0.99		<0.98		<25		<20		<0.97		<0.98		<9.8		<0.97		<4.9		<0.98		<0.98		<0.96		<0.96		<0.96		<0.99	
2,4,6-Tribromophenol																																												
2,4,6-Trichlorophenol	6.1	3.5	<0.96		<0.96		<0.99		<1		<1		<0.96		<0.99		<0.98		<25		<20		<0.97		<0.98		<9.8		<0.97		<4.9		<0.98		<0.98		<0.96		<0.96		<0.96		<0.99	
2,4-Dichlorophenol	110	35	<0.19		<0.19		<0.2		<0.2		<0.2		<0.19		0.66		0.72		<4.9		<4		<0.19		<0.2		<2		<0.19		<0.97		<0.2		<0.2		<0.19		<0.19		<0.19		<0.2	
2,4-Dimethylphenol	730	270	<0.96		<0.96		<0.99		<1		<1		<0.96		12		12		19	J	18	J	<0.97		<0.98		<9.8		<0.97		<4.9		<0.98		<0.98		<0.96		<0.96		<0.96		<0.99	
2,4-Dinitrophenol	73	30	<4.8		<4.8		<5		<5		<5.1		<4.8		<5		<4.9		<120		<99		<4.9		<4.9		<49		<4.9		<24		<4.9		<4.9		<4.8		<4.8		<4.8		<5	
2,4-Dinitrotoluene	0.22	0.2	<0.96		<0.96		<0.99		<1		<1		<0.96		<0.99		<0.98		<25		<20		<0.97		<0.98		<9.8		<0.97		<4.9		<0.98		<0.98		<0.96		<0.96		<0.96		<0.99	
2,6-Dinitrotoluene	37	15	<0.96		<0.96		<0.99		<1		<1		<0.96		<0.99		<0.98		<25		<20		<0.97		<0.98		<9.8		<0.97		<4.9		<0.98		<0.98		<0.96		<0.96		<0.96		<0.99	
2-Chloronaphthalene		550	<0.19		<0.19		<0.2		<0.2		<0.2		<0.19		<0.2		<0.2		<4.9		<4		<0.19		<0.2		<2		<0.19		<0.97		<0.2		<0.2		<0.19		<0.19		<0.19		<0.2	
2-Chlorophenol	30	71	<0.96		<0.96		<0.99		<1		<1		<0.96		13		14		12	J	11	J	<0.97		<0.98		<9.8		0.27	J	3.6	J	<0.98		<0.98		<0.96		<0.96		<0.96		<0.99	
2-Fluorobiphenyl																																												
2-Fluorophenol																																												
2-Methylnaphthalene		---	<0.19		<0.19		<0.2		<0.2		<0.2		<0.19		0.15	J	<0.2		<4.9		<4		<0.19		<0.2		<2		<0.19		<0.97		<0.2		<0.2		0.041	J	<0.19		<0.19		<0.2	
2-Methylphenol	1,800	---	<0.96		<0.96		<0.99		<1		<1		<0.96		4.4		4.3		5.4	J	5.3	J	<0.97		<0.98		<9.8		<0.97		<4.9		<0.98		<0.98		<0.96		<0.96		<0.96		<0.99	
2-Nitroaniline	370	150	<4.8		<4.8		<5		<5		<5.1		<4.8		<5		<4.9		<120		<99		<4.9		<4.9		<49		<4.9		<24		<4.9		<4.9		<4.8		<4.8		<4.8		<5	
2-Nitrophenol		---	<0.96		<0.96		<0.99		<1		<1		<0.96		<0.99		<0.98		<25		<20		<0.97		<0.98		<9.8		<0.97		<4.9		<0.98		<0.98		<0.96		<0.96		<0.96		<0.99	
3,3'-Dichlorobenzidine	0.15	0.11	<0.96		<0.96		<0.99		<1		<1		<0.96		<0.99		<0.98		<25		<20		<0.97		<0.98		<9.8		<0.97		<4.9		<0.98		<0.98		<0.96		<0.96		<0.96		<0.99	
3-Nitroaniline		---	<4.8		<4.8		<5		<5		<5.1		<4.8		<5		<4.9		<120		<99		<4.9		<4.9		<49		<4.9		<24		<4.9		<4.9		<4.8		<4.8		<4.8		<5	
4,6-Dinitro-2-methylphenol		---	<4.8		<4.8		<5		<5		<5.1		<4.8		<5		<4.9		<120		<99		<4.9		<4.9		<49		<4.9		<24		<4.9		<4.9		<4.8		<4.8		<4.8		<5	
4-Bromophenyl phenyl ether		---	<0.96		<0.96		<0.99		<1		<1		<0.96		<0.99		<0.98		<25		<20		<0.97		<0.98		<9.8		<0.97		<4.9		<0.98		<0.98		<0.96		<0.96		<0.96		<0.99	
4-Chloro-3-methylphenol		---	<0.96		<0.96		<0.99		<1		<1		<0.96		<0.99		<0.98		<25		<20		<0.97		<0.98		<9.8		<0.97		<4.9		<0.98		<0.98		<0.96		<0.96		<0.96		<0.99	
4-Chloroaniline	0.34	0.32	<0.96		<0.96		<0.99		<1		<1		<0.96		<0.99		<0.98		<25		<20		<0.97		<0.98		<9.8		<0.97		<4.9		<0.98		<0.98		<0.96		<0.96		<0.96		<0.99	
4-Chlorophenyl phenyl ether		---	<0.96		<0.96		<0.99		<1		<1		<0.96		<0.99		<0.98		<25		<20		<0.97		<0.98		<9.8		<0.97		<4.9		<0.98		<0.98		<0.96		<0.96		<0.96		<0.99	
4-Nitroaniline		3.3	<4.8		<4.8		<5		<5		<5.1		<4.8		<5		<4.9		<120		<99		<4.9		<4.9		<49		<4.9		<24		<4.9		<4.9		<4.8		<4.8		<4.8		<5	
4-Nitrophenol		---	<4.8		<4.8		<5		<5		<5.1		<4.8		<5		<4.9		<120		<99		<4.9		<4.9		<49		<4.9		<24		<4.9		<4.9		<4.8		<4.8		<4.8		<5	
Acenaphthene	370	400	<0.19		<0.19		<0.2		<0.2		<0.2		<0.19		<0.2		<0.2		<4.9		<4		<0.19		<0.2		<2		<0.19		<0.97		<0.2		<0.2		<0.19		<0.19		<0.19		<0.2	
Acenaphthylene	370		<0.19		<0.19		<0.2		<0.2		<0.2		<0.19		<0.2		<0.2		<4.9		<4		<0.19		<0.2		<2		<0.19		<0.97		<0.2		<0.2		<0.19		<0.19		<0.19		<0.2	
Acetophenone	3,700	1,500	<0.96		<0.96		<0.99		<1		<1		<0.96		<0.99		<0.98		<25		<20		<0.97		<0.98		<9.8		<0.97		<4.9		<0.98		<0.98		<0.96		<0.96		<0.96		<0.99	
Anthracene	11,000	1,300	<0.19		<0.19		<0.2		<0.2		<0.2		<0.19		<0.2		<0.2		<4.9		<4		<0.19		<0.2		<2		<0.19		<0.97		<0.2		<0.2		<0.19		<0.19		<0.19		<0.2	
Atrazine	3.0	3.0	<0.96		<0.96		<0.99		<1		<1		<0.96		<0.99		<0.98		<25		<20		<0.97		<0.98		<9.8		<0.97		<4.9		<0.98		<0.98		<0.96		<0.96		<0.96		<0.99	
Benzaldehyde	610	1,500	<0.96		<0.96		<0.99		<1		<1		<0.96		<0.99		<0.98		<25		<20		<0.97		<0.98		<9.8		<0.97		<4.9		<0.98		<0.98		<0.96		<0.96		<0.96		<0.99	
Benzo[a]anthracene	0.029	0.029	<0.19		<0.19		0.02	J	<0.2		<0.2		<0.19		<0.2		<0.2		<4.9		<4		<0.19		<0.2		<2		<0.19		<0.97		**1.1**		0.026	J	<0.19		<0.19		**0.052**	J	<0.2	
Benzo[a]pyrene	0.2	0.2	<0.19		<0.19		<0.2		<0.2		<0.2		<0.19		<0.2		<0.2		<4.9		<4		<0.19		<0.2		<2		<0.19		<0.97		**0.8**		<0.2		<0.19		<0.19		0.021	J	<0.2	
Benzo[b]fluoranthene	0.029	0.029	<0.19		<0.19		<0.2		<0.2		<0.2		<0.19		<0.2		<0.2		<4.9		<4		<0.19		<0.2		<2		<0.19		<0.97		**1.1**		0.029	J	<0.19		<0.19		**0.066**	J	<0.2	
Benzo[g,h,i]perylene	1,100		<0.19		<0.19		<0.2		<0.2		<0.2		<0.19		<0.2		<0.2		<4.9		<4		<0.19		<0.2		<2		<0.19		<0.97		1.3		0.043	J	<0.19		<0.19		0.048	J	<0.2	
Benzo[k]fluoranthene	0.29	0.29	<0.19		<0.19		<0.2		<0.2		<0.2		<0.19		<0.2		<0.2		<4.9		<4		<0.19		<0.2		<2		<0.19		<0.97		**1.2**		<0.2		<0.19		<0.19		0.081	J	<0.2	
Bis(2-chloroethoxy)methane		47	<0.96		<0.96		<0.99		<1		<1		<0.96		<0.99		<0.98		<25		<20		<0.97		<0.98		<9.8		<0.97		<4.9		<0.98		<0.98		<0.96		<0.96		<0.96		<0.99	
Bis(2-chloroethyl)ether	0.012	0.012	<0.19		<0.19		<0.2		<0.2		<0.2		<0.19		**6.0**		**6.4**		**6.9**		**6.5**		<0.19		<0.2		<2		**3.3**		**3.8**		<0.2		<0.2		<0.19		<0.19		<0.19		<0.2	
Bis(2-ethylhexyl) phthalate	6.0	6	<1.9		<1.9		<2		<2		<2		<1.9		<2		<2		<49		<40		<1.9		<2		<20		<1.9		<9.7		1.2	J	<2		3		<1.9		<1.9		<2	
Butyl benzyl phthalate	3.5	14	<0.96		<0.96		<0.99		0.17	J	<1		<0.96		<0.99		<0.98		<25		<20		<0.97		<0.98		<9.8		<0.97		<4.9		0.37	J	<0.98		<0.96		<0.96		<0.96		<0.99	
Caprolactam		7,700	<4.8		<4.8		<5		<5		<5.1		<4.8		<5		<4.9		<120		<99		<4.9		<4.9		<49		<4.9		<24		<4.9		<4.9		<4.8		<4.8		<4.8		<5	
Carbazole	3.4	---	<0.19		<0.19		<0.2		<0.2		<0.2		<0.19		<0.2		<0.2		<4.9		<4		<0.19		<0.2		<2		<0.19		<0.97		<0.2		<0.2		<0.19		<0.19		<0.19		<0.2	
Chrysene	2.9	2.9	<0.19		<0.19		0.016	J	<0.2		<0.2		<0.19		<0.2		<0.2		<4.9		<4		<0.19		<0.2		<2		<0.19		<0.97		1.2		0.037	J	<0.19		<0.19		0.11	J	<0.2	
Dibenz(a,h)anthracene	0.0029	0.0029	<0.19		<0.19		<0.2		<0.2		<0.2		<0.19		<0.2		<0.2		<4.9		<4		<0.19		<0.2		<2		<0.19		<0.97		**1.2**		**0.037**	J	<0.19		<0.19		**0.059**	J	<0.2	
Dibenzofuran	37	220	<0.96		<0.96		<0.99		<1		<1		<0.96		<0.99		<0.98		<25		<20		<0.97		<0.98		<9.8		<0.97		<4.9		<0.98		<0.98		<0.96		<0.96		<0.96		<0.99	
Diethyl phthalate	29,000	11,000	<0.96		<0.96		<0.99		<1		0.55	J	0.14	J	0.71	J	0.81	J	7.8	J	7.3	J	<0.97		<0.98		<9.8		0.27	J	<4.9		<0.98		<0.98		<0.96		<0.96		0.48	J	<0.99	
Dimethyl phthalate		---	<0.96		<0.96		<0.99		<1		<1		<0.96		<0.99		<0.98		<25		<20		<0.97		<0.98		<9.8		<0.97		<4.9		<0.98		<0.98		<0.96		<0.96		<0.96		<0.99	
Di-n-butyl phthalate	3,700	670	<0.96		<0.96		<0.99		<1		<1		<0.96		<0.99		<0.98		<25		<20		<0.97		<0.98		<9.8		<0.97		<4.9		<0.98		<0.98		<0.96		<0.96		<0.96		<0.99	
Di-n-octyl phthalate		---	<0.96		<0.96		<0.99		<1		<1		<0.96		<0.99		<0.98		<25		<20		<0.97		<0.98		<9.8		<0.97		<4.9		1.1		<0.98		<0.96		<0.96		<0.96		<0.99	
Fluoranthene	1,500	630	<0.19		<0.19		<0.2		<0.2		<0.2		<0.19		<0.2		<0.2		<4.9		<4		<0.19		<0.2		<2		<0.19		<0.97		0.54		<0.2		<0.19		<0.19		<0.19		<0.2	
Fluorene	240	220	<0.19		<0.19		<0.2		<0.2		<0.2		<0.19		<0.2		<0.2		<4.9		<4		<0.19		<0.2		<2		<0.19		<0.97		<0.2		<0.2		<0.19		<0.19		<0.19		<0.2	
Hexachlorobenzene	1.0	1	<0.19		<0.19		<0.2		<0.2		<0.2		<0.19		<0.2		<0.2		<4.9		<4		<0.19		<0.2		<2		<0.19		<0.97		0.1	J	<0.2		<0.19		<0.19		<0.19		<0.2	
Hexachlorobutadiene	0.86	0.26	<0.19		<0.19		**1.2**		0.22		**0.34**		<0.19		**0.32**		**0.39**		<4.9		<4		**0.3**		<0.2		<2		<0.19		<0.97		0.092	J	0.086	J	<0.19		<0.19		0.13	J	<0.2	
Hexachlorocyclopentadiene	50	50	<0.96	R	<0.96		<0.99	*	<1		<1	*	<0.96		<0.99	*	<0.98	*	<25		<20		<0.97	R	<0.98		<9.8		<0.97	*	<4.9		<0.98	*	<0.98	*	<0.96		<0.96		<0.96	*	<0.99	
Hexachloroethane	1.7	0.79	<0.96		<0.96		0.14	J	<1		0.068	J	<0.96		<0.99		<0.98		<25		<20		<0.97		<0.98		<9.8		<0.97		<4.9		<0.98		<0.98		<0.96		<0.96		<0.96		<0.99	
Indeno[1,2,3-cd]pyrene	0.29	0.029	<0.19		<0.19		<0.2		<0.2		<0.2		<0.19		<0.2		<0.2		<4.9		<4		<0.19		<0.2		<2		<0.19		<0.97		**1.2**		**0.036**	J	<0.19		<0.19		**0.058**	J	<0.2	
Isophorone	71	67	<0.96		<0.96		<0.99		<1		<1		<0.96		<0.99		<0.98		<25		<20		<0.97		<0.98		<9.8		<0.97		<4.9		<0.98		<0.98		<0.96		<0.96		<0.96		<0.99	
Methylphenol, 3 & 4	180		<0.96		<0.96		<0.99		<1		<1		<0.96		9.5		<0.98		<25		<20		<0.97		<0.98		<9.8		<0.97		<4.9		<0.98		<0.98		<0.96		<0.96		<0.96		<0.99	
Naphthalene	0.14	0.14	<0.19		<0.19		<0.2		<0.2		<0.2		<0.19		**25**		**23**		**35**		**36**		<0.19		<0.2		<2		<0.19		<0.97		<0.2		<0.2		0.022	J	<0.19		<0.19		<0.2	
Nitrobenzene	0.12	0.12	<1.9		<1.9		<2		<2		<2		<1.9		<2		<2		<49		<40		<1.9		<2		<20		<1.9		<9.7		<2		<2		<1.9		<1.9		<1.9		<2	
N-Nitrosodi-n-propylamine	0.0096	0.0093	<0.19		<0.19		<0.2		<0.2		<0.2		<0.19		<0.2		<0.2		<4.9		<4		<0.19		<0.2		<2		<0.19		<0.97		<0.2		<0.2		<0.19		<0.19		<0.19		<0.2	
N-Nitrosodiphenylamine	14	10	<0.96		<0.96		<0.99		<1		<1		<0.96		<0.99		<0.98		<25		<20		<0.97		<0.98		<9.8		<0.97		<4.9		<0.98		<0.98		<0.96		<0.96		<0.96		<0.99	
Pentachlorophenol	1.0	1.0	<0.96		<0.96		<0.99		<1		<1		<0.96		<0.99		<0.98		<25		<20		<0.97		<0.98		<9.8		<0.97		<4.9		<0.98		<0.98		<0.96		<0.96		<0.96		<0.99	
Phenanthrene	11,000	---	<0.19		<0.19		0.042	J	0.052	J	<0.2		<0.19		<0.2		<0.2		<4.9		<4		<0.19		<0.2		<2		<0.19		<0.97		<0.2		<0.2		0.058	J	<0.19		<0.19		<0.2	
Phenol	11,000	4,500	<0.19		<0.19		<0.2		<0.2		<0.2		<0.19		<0.2		<0.2		<4.9		4.9		<0.19		<0.2		<2		<0.19		0.44	J	<0.2		<0.2		<0.19		<0.19		<0.19		<0.2	
Pyrene	180	87	<0.19		<0.19		<0.2		<0.2		<0.2		<0.19		<0.2		<0.2		<4.9		<4		<0.19		<0.2		<2		<0.19		<0.97		0.45		<0.2		0.031	J	<0.19		<0.19		<0.2	

All results in ug/L.
* - LCS or LCSD exceeds control limits.
J - Result < RL, but ≥ MDL. Concentration is approximate.
R - Result rejected due to low LCS recovery.

TABLE 28
ANALYTICAL RESULTS FOR SVOCs IN GROUNDWATER SAMPLES
QUALITY CARRIERS, INC. PROPERTY
INSTITUTE, WEST VIRGINIA

SAMPLE LOCATION	VRP DE MINIMIS VALUE	USEPA RBSL	MW-110		TMP-2				TMP-3				TMP-5			
DEPTH INTERVAL				Flag		Flag		Flag		Flag		Flag		Flag		Flag
DATE COLLECTED			8/2012		8/2012		9/2012		8/2012		9/2012		8/2012		9/2012	
ANALYTE																
1,1'-Biphenyl	300	0.83	<0.96		<0.96		<0.96		<0.99		<0.99		<0.96		<1	
1,4-Dioxane	0.67	0.67	<1.9		<1.9		<1.9		<2		<2		<1.9		<2	
2,2'-oxybis[1-chloropropane]			<0.19		<0.19		<0.19		<0.2		<0.2		<0.19		<0.2	
2,4,5-Trichlorophenol	3,700	890	<0.96		<0.96		<0.96		<0.99		<0.99		<0.96		<1	
2,4,6-Tribromophenol																
2,4,6-Trichlorophenol	6.1	3.5	<0.96		<0.96		<0.96		<0.99		<0.99		<0.96		<1	
2,4-Dichlorophenol	110	35	<0.19		<0.19		<0.19		<0.2		<0.2		<0.19		<0.2	
2,4-Dimethylphenol	730	270	<0.96		<0.96		<0.96		<0.99		<0.99		<0.96		<1	
2,4-Dinitrophenol	73	30	<4.8		<4.8		<4.8		<5		<5		<4.8		<5	
2,4-Dinitrotoluene	0.22	0.2	<0.96		<0.96		<0.96		<0.99		<0.99		<0.96		<1	
2,6-Dinitrotoluene	37	15	<0.96		<0.96		<0.96		<0.99		<0.99		<0.96		<1	
2-Chloronaphthalene		550	<0.19		<0.19		<0.19		<0.2		<0.2		<0.19		<0.2	
2-Chlorophenol	30	71	<0.96		<0.96		<0.96		<0.99		<0.99		<0.96		<1	
2-Fluorobiphenyl																
2-Fluorophenol																
2-Methylnaphthalene		---	<0.19		<0.19		<0.19		<0.2		<0.2		<0.19		<0.2	
2-Methylphenol	1,800	---	<0.96		<0.96		<0.96		<0.99		<0.99		<0.96		<1	
2-Nitroaniline	370	150	<4.8		<4.8		<4.8		<5		<5		<4.8		<5	
2-Nitrophenol		---	<0.96		<0.96		<0.96		<0.99		<0.99		<0.96		<1	
3,3'-Dichlorobenzidine	0.15	0.11	<0.96		<0.96		<0.96		<0.99		<0.99		<0.96		<1	
3-Nitroaniline		---	<4.8		<4.8		<4.8		<5		<5		<4.8		<5	
4,6-Dinitro-2-methylphenol		---	<4.8		<4.8		<4.8		<5		<5		<4.8		<5	
4-Bromophenyl phenyl ether		---	<0.96		<0.96		<0.96		<0.99		<0.99		<0.96		<1	
4-Chloro-3-methylphenol		---	<0.96		<0.96		<0.96		<0.99		<0.99		<0.96		<1	
4-Chloroaniline	0.34	0.32	<0.96		<0.96		<0.96		<0.99		<0.99		<0.96		<1	
4-Chlorophenyl phenyl ether		---	<0.96		<0.96		<0.96		<0.99		<0.99		<0.96		<1	
4-Nitroaniline		3.3	<4.8		<4.8		<4.8		<5		<5		<4.8		<5	
4-Nitrophenol		---	<4.8		<4.8		<4.8		<5		<5		<4.8		<5	
Acenaphthene	370	400	<0.19		<0.19		<0.19		<0.2		<0.2		<0.19		<0.2	
Acenaphthylene	370		<0.19		<0.19		<0.19		<0.2		<0.2		<0.19		<0.2	
Acetophenone	3,700	1,500	<0.96		<0.96		<0.96		0.11	J	<0.99		0.09	J	0.095	J
Anthracene	11,000	1,300	<0.19		<0.19		<0.19		<0.2		<0.2		<0.19		<0.2	
Atrazine	3.0	3.0	<0.96		<0.96		<0.96		<0.99		<0.99		<0.96		<1	
Benzaldehyde	610	1,500	<0.96		<0.96		<0.96		<0.99		<0.99		<0.96		<1	
Benzo[a]anthracene	0.029	0.029	<0.19		**0.038**	J	<0.19		<0.2		<0.2		<0.19		<0.2	
Benzo[a]pyrene	0.2	0.2	<0.19		0.02	J	<0.19		<0.2		<0.2		<0.19		<0.2	
Benzo[b]fluoranthene	0.029	0.029	<0.19		**0.061**	J	<0.19		<0.2		<0.2		<0.19		<0.2	
Benzo[g,h,i]perylene	1,100		<0.19		0.037	J	<0.19		<0.2		<0.2		<0.19		<0.2	
Benzo[k]fluoranthene	0.29	0.29	<0.19		0.058	J	<0.19		<0.2		<0.2		<0.19		<0.2	
Bis(2-chloroethoxy)methane		47	<0.96		<0.96		<0.96		<0.99		<0.99		<0.96		<1	
Bis(2-chloroethyl)ether	0.012	0.012	<0.19		<0.19		<0.19		<0.2		<0.2		<0.19		<0.2	
Bis(2-ethylhexyl) phthalate	6.0	6	<1.9		<1.9		1.3	J	<2		<2		<1.9		<2	
Butyl benzyl phthalate	3.5	14	<0.96		<0.96		<0.96		<0.99		<0.99		<0.96		<1	
Caprolactam		7,700	<4.8		<4.8		<4.8		<5		<5		<4.8		<5	
Carbazole	3.4	---	<0.19		<0.19		<0.19		<0.2		<0.2		<0.19		<0.2	
Chrysene	2.9	2.9	<0.19		0.062	J	<0.19		<0.2		<0.2		<0.19		<0.2	
Dibenz(a,h)anthracene	0.0029	0.0029	<0.19		**0.052**	J	<0.19		<0.2		<0.2		<0.19		<0.2	
Dibenzofuran	37	220	<0.96		<0.96		<0.96		<0.99		<0.99		<0.96		<1	
Diethyl phthalate	29,000	11,000	<0.96		0.29	J	<0.96		0.5	J	<0.99		0.37	J	<1	
Dimethyl phthalate		---	<0.96		<0.96		<0.96		<0.99		<0.99		<0.96		<1	
Di-n-butyl phthalate	3,700	670	<0.96		<0.96		<0.96		<0.99		<0.99		<0.96		<1	
Di-n-octyl phthalate		---	<0.96		<0.96		<0.96		<0.99		<0.99		<0.96		<1	
Fluoranthene	1,500	630	<0.19		<0.19		<0.19		<0.2		<0.2		<0.19		<0.2	
Fluorene	240	220	<0.19		<0.19		<0.19		<0.2		<0.2		<0.19		<0.2	
Hexachlorobenzene	1.0	1	<0.19		<0.19		<0.19		<0.2		<0.2		<0.19		<0.2	
Hexachlorobutadiene	0.86	0.26	<0.19		<0.19		<0.19		<0.2		<0.2		<0.19		<0.2	
Hexachlorocyclopentadiene	50	50	<0.96	*	<0.96	*	<0.96		<0.99	*	<0.99		<0.96	*	<1	
Hexachloroethane	1.7	0.79	<0.96		<0.96		<0.96		<0.99		<0.99		<0.96		<1	
Indeno[1,2,3-cd]pyrene	0.29	0.029	<0.19		**0.05**	J	<0.19		<0.2		<0.2		<0.19		<0.2	
Isophorone	71	67	<0.96		<0.96		<0.96		<0.99		<0.99		<0.96		<1	
Methylphenol, 3 & 4	180		<0.96		<0.96		<0.96		<0.99		<0.99		<0.96		<1	
Naphthalene	0.14	0.14	<0.19		<0.19		<0.19		<0.2		<0.2		<0.19		<0.2	
Nitrobenzene	0.12	0.12	<1.9		<1.9		<1.9		<2		<2		<1.9		<2	
N-Nitrosodi-n-propylamine	0.0096	0.0093	<0.19		<0.19		<0.19		<0.2		<0.2		<0.19		<0.2	
N-Nitrosodiphenylamine	14	10	<0.96		<0.96		<0.96		<0.99		<0.99		<0.96		<1	
Pentachlorophenol	1.0	1.0	<0.96		<0.96		<0.96		<0.99		<0.99		<0.96		<1	
Phenanthrene	11,000	---	<0.19		<0.19		<0.19		<0.2		<0.2		<0.19		<0.2	
Phenol	11,000	4,500	<0.19		<0.19		<0.19		<0.2		<0.2		<0.19		<0.2	
Pyrene	180	87	<0.19		<0.19		<0.19		<0.2		<0.2		<0.19		<0.2	

All results in ug/L.
* - LCS or LCSD exceeds control limits.
J - Result < RL, but ≥ MDL. Concentration is approximate.
R - Result rejected due to low LCS recovery.

TABLE 29
ANALYTICAL RESULTS FOR PESTICIDES/HERBICIDES IN GROUNDWATER SAMPLES
QUALITY CARRIERS, INC. PROPERTY
INSTITUTE, WEST VIRGINIA

SAMPLE LOCATION	VRP DE MINIMIS VALUE	USEPA RBSL	MW-101		MW-102		MW-103		MW-104				MW-105		MW-106		MW-107				MW-109		MW-110		TMP-2		TMP-3		TMP-5	
				Flag		Flag		Flag		Flag	(DUP)	Flag		Flag		Flag		Flag		Flag		Flag		Flag		Flag		Flag		Flag
DATE COLLECTED			8/2012		8/2012		8/2012		8/2012		8/2012		8/2012		8/2012		8/2012		8/2012		8/2012		8/2012		8/2012		8/2012		8/2012	
ANALYTE																														
4,4'-DDD	0.28	0.28	<0.0012	J	<0.0012		<0.0013		<0.0012		<0.0013		<0.0012		<0.0013		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012	
4,4'-DDE	0.2	0.2	<0.0012	J	<0.0012		<0.0013		<0.0012		<0.0013		<0.0012		<0.0013		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012	
4,4'-DDT	0.2	0.2	<0.0012	J	<0.0012	*	<0.0013		<0.0012		<0.0013		<0.0012		<0.0013		<0.0012	*	<0.0012	*	<0.0012		<0.0012	*	<0.0012		<0.0012		<0.0012	
Aldrin	0.004	0.00021	<0.0012	J	**0.0008**	J p	<0.0013		<0.0012		<0.0013		<0.0012		<0.0013		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012	
alpha-BHC	0.011	0.0062	<0.0012	J	<0.0012		<0.0013		0.0022	p	0.0023	p	<0.0012		<0.0013		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012	
alpha-Chlordane			<0.0012	J	<0.0012		<0.0013		<0.0012		<0.0013		<0.0012		<0.0013		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012	
beta-BHC	0.037	0.022	<0.0012	J	<0.0012		<0.0013		0.0016	p	0.0025		<0.0012		<0.0013		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012	
delta-BHC			<0.0012	J	0.00041	J p	<0.0013		0.00092	J p	0.0011	J p	<0.0012		<0.0013		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012	
Dieldrin	0.0042	0.0015	<0.0012	J	0.00099	J p	<0.0013		<0.0012		<0.0013		<0.0012		<0.0013		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012	
Endosulfan I	220	78	<0.0012	J	<0.0012		<0.0013		0.0013	p	<0.0013		<0.0012		<0.0013		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012	
Endosulfan II			<0.0012	J	0.0017	p	<0.0013		<0.0012		<0.0013		<0.0012		<0.0013		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012	
Endosulfan sulfate			<0.0012	J	0.00078	J p	<0.0013		<0.0012		<0.0013		<0.0012		<0.0013		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012	
Endrin	2.0	2.0	<0.0012	J	0.0013	p	<0.0013		<0.0012		<0.0013		<0.0012		<0.0013		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012	
Endrin aldehyde			<0.0012	J	<0.0012		<0.0013		0.00087	J p	<0.0013		<0.0012		<0.0013		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012	
Endrin ketone			<0.0012	J	0.0098		<0.0013		<0.0012		<0.0013		<0.0012		<0.0013		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012	
gamma-BHC (Lindane)	0.2	0.2	<0.0012	J	<0.0012		<0.0013		0.0058		0.0067		<0.0012		<0.0013		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012	
gamma-Chlordane			<0.0012	J	0.0011	J p	<0.0013		0.0028	p	<0.0013		<0.0012		<0.0013		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012	
Heptachlor	0.4	0.4	<0.0012	J	<0.0012		<0.0013		<0.0012		<0.0013		<0.0012		<0.0013		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012	
Heptachlor epoxide	0.2	0.2	<0.0012	J	0.00092	J p	<0.0013		<0.0012		<0.0013		<0.0012		<0.0013		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012		<0.0012	
Methoxychlor	40	40	<0.0024	J	0.0025	p	<0.0024		<0.0024		<0.0024		<0.0024		<0.0024		<0.0024		<0.0024		<0.0024		<0.0024		<0.0024		<0.0024		<0.0024	
Toxaphene	3.0	3.0	<0.095	J	<0.095		<0.096		0.31	p	<0.096		<0.095		<0.096		<0.095		<0.095		<0.095		<0.094		<0.095		<0.094		<0.095	
2,4-D	70	70	<3.8		<3.8		<3.8		<3.8		<3.8		<3.8		<3.8		<3.8		<3.8		<3.8		<3.8		<3.8		<3.8			
2,4,5-T	370	120	<0.94	*	<0.95	*	<0.95		<0.95		<0.96		<0.95		<0.96		<0.95	*	<0.94	*	<0.95		<0.94	*	<0.95		<0.95			
Silvex (2,4,5-TP)	50	50	<0.94	*	<0.95	*	<0.95		<0.95		<0.96		<0.95		<0.96		<0.95	*	<0.94	*	<0.95		<0.94	*	<0.95		<0.95			

All results in ug/L.

* - LCS or LCSD exceeds control limits.
J - Result < RL, but > MDL. Concentration estimated.
p - %RPD between primary and confirmation column > 40%.
Lower value has been reported.

TABLE 30
ANALYTICAL RESULTS FOR PCBs IN GROUNDWATER SAMPLES
QUALITY CARRIERS, INC. PROPERTY
INSTITUTE, WEST VIRGINIA

SAMPLE LOCATION	VRP DE MINIMIS VALUE	USEPA RBSL	MW-101		MW-102		MW-103		MW-104				MW-105		MW-106	
				Flag		Flag		Flag		Flag	(DUP)	Flag		Flag		Flag
DATE COLLECTED			8/2012		8/2012		8/2012		8/2012		8/2012		8/2012		8/2012	
ANALYTE																
PCB-1016	0.96	0.96	<0.0095		<0.0095		<0.0096		<0.0095		<0.0096		<0.0095		<0.0096	
PCB-1221	0.0068	0.0068	<0.0095		<0.0095		<0.0096		<0.0095		<0.0096		<0.0095		<0.0096	
PCB-1232	0.0068	0.0068	<0.0095		<0.0095		<0.0096		<0.0095		<0.0096		<0.0095		<0.0096	
PCB-1242	0.034	0.034	<0.0095		<0.0095		<0.0096		<0.0095		<0.0096		<0.0095		<0.0096	
PCB-1248	0.034	0.034	<0.0095		<0.0095		<0.0096		<0.0095		<0.0096		<0.0095		<0.0096	
PCB-1254	0.034	0.034	<0.0095		<0.0095		<0.0096		<0.0095		<0.0096		<0.0095		<0.0096	
PCB-1260	0.034	0.034	<0.0095		**0.16**		<0.0096		<0.0095		<0.0096		<0.0095		<0.0096	

SAMPLE LOCATION	VRP DE MINIMIS VALUE	USEPA RBSL	MW-107				MW-109		MW-110		TMP-2		TMP-3		TMP-5	
				Flag	(DUP)	Flag		Flag		Flag		Flag		Flag		Flag
DATE COLLECTED			8/2012		8/2012		8/2012		8/2012		8/2012		8/2012		8/2012	
ANALYTE																
PCB-1016	0.96	0.96	<0.0095		<0.0095		<0.0095		<0.0094		<0.0095		<0.0094		<0.0095	
PCB-1221	0.0068	0.0068	<0.0095		<0.0095		<0.0095		<0.0094		<0.0095		<0.0094		<0.0095	
PCB-1232	0.0068	0.0068	<0.0095		<0.0095		<0.0095		<0.0094		<0.0095		<0.0094		<0.0095	
PCB-1242	0.034	0.034	<0.0095		<0.0095		<0.0095		<0.0094		<0.0095		<0.0094		<0.0095	
PCB-1248	0.034	0.034	<0.0095		<0.0095		<0.0095		<0.0094		<0.0095		<0.0094		<0.0095	
PCB-1254	0.034	0.034	<0.0095		<0.0095		<0.0095		<0.0094		<0.0095		<0.0094		<0.0095	
PCB-1260	0.034	0.034	<0.0095		<0.0095		<0.0095		<0.0094		<0.0095		<0.0094		<0.0095	

All results in ug/L.

TABLE 31
SCREENING OF CONSTITUENTS IN GROUNDWATER VERSUS WEST VIRGINIA SURFACE-WATER QUALITY STANDARDS
QUALITY CARRIERS, INC. SITE
INSTITUTE, WEST VIRGINIA

	WV WATER QUALITY STANDARDS				HIGHEST GROUNDWATER CONCENTRATION	CARRIED TO NEXT SCREENING?	CONCENTRATION AFTER DILUTION FACTOR	EXCEEDS LOWEST WQS?
	AQUATIC LIFE		HUMAN HEALTH					
	ACUTE[1]	CHRONIC[2]	C[3]	A[4]				
Arsenic	340[5]	150[5]	10	10	60	Yes	0.003191	No
Barium			1,000		710	No		No
Iron		1,500		1,500	95,000	Yes	5.053191	No
Lead				50	4.8	No		No
Manganese				1,000	5,100	Yes	0.271277	No
Aldrin	0.003		0.000071	0.000071	0.0008	Yes	0.00000004	No
PCB		0.014	0.000045	0.000044	0.16	Yes	0.000009	No
Benzene			51	0.66	120	Yes	0.006383	No
1,2-Dichlorobenzene			17	2.7	530	Yes	0.028191	No
1,4-Dichlorobenzene			2.6	0.4	150	Yes	0.007979	No
Methylene Chloride			590	4.6	0.51	No		No
1,2-Dichloroethane			99	0.035	0.41	Yes	0.000022	No
Trichloroethene			81	2.7	170	Yes	0.009043	No
Toluene			200	6.8	78	Yes	0.004149	No
Benzo(a)anthracene			0.018	0.0038	1.1	Yes	0.000059	No
Benzo(a)pyrene			0.018	0.0038	0.8	Yes	0.000043	No
Benzo(b)fluoranthene			0.018	0.0038	1.1	Yes	0.000059	No
Benzo(k)fluoranthene			0.018	0.0038	1.2	Yes	0.000064	No
Chrysene			0.018	0.0038	1.2	Yes	0.000064	No
Dibenzo(a,h)anthracene			0.018	0.0038	1.2	Yes	0.000064	No
Indeno(1,2,3-cd)pyrene			0.018	0.0038	1.2	Yes	0.000064	No
Pyrene			4000	830	0.45	No		No
Phthalate Esters[6]		3.0			9.27	Yes	0.000493	No
Vinyl Chloride			525	2.0	5.6	Yes	0.000298	No
Chlorobenzene			21	0.68	4,100	Yes	0.218085	No
Ethylbenzene			29	3.1	490	Yes	0.026064	No
Fluoranthene			370	300	0.54	No		No
Phenol			4,600,000	21,000	4.9	No		No
2-Chlorophenol			400	120	14	No		No
2,4-Dimethylphenol			2,300	540	19	No		No

All values given in µg/L.

1 - One-hour average

2 - Four-day average

3 - Based on fish consumption

4 - Based on fish and water consumption

5 - Dissolved tri-valent arsenic

6 - Summation of butylbenzyl phthalate, diethyl phthalate, dimethylphthalate, di-n-butylphthalate, di-n-octyl phthalate

TABLE 32
SUMMARY OF CONSTITUENTS OF INTEREST SCREENING FOR SOIL
QUALITY CARRIERS, INC. SITE
INSTITUTE, WEST VIRGINIA

	DBA	TSS	PSA	WTP	WTA	TOTALS	#	#	
	SAMPLES=21	SAMPLES=18	SAMPLES=4	SAMPLES=2	SAMPLES=6	SAMPLES=51	EXCEED	EXCEED	
METALS	DETECTS	DETECTS	DETECTS	DETECTS	DETECTS	DETECTS	DMV/RSL	B-G	COI?
Arsenic	21	18	4	2	6	51	51	0	N
Barium	19	18	4	2	6	49	43	0	N
Cadmium	2	0	0	0	0	2	1	NA	N
Chromium	21	18	4	2	6	51	0	0	N
Lead	21	18	4	2	6	51	40	12	**Y**
Mercury	7	12	1	2	3	25	0	1	N
Selenium	19	18	3	2	6	48	45	48	**Y**
Silver	0	0	1	0	0	1	1	NA	N
Vanadium	21	18	4	2	6	51	0	0	N
VOCS									
1,1,2-Trichloro-1,2,2-trifluoroethane	0	0	0	0	1	1	0	N/A	N
1,1,2-Trichloroethane	2	0	0	0	1	3	2	N/A	N
1,1-Dichloroethane	1	0	0	0	1	2	0	N/A	N
1,1-Dichloroethene	2	0	0	0	1	3	3	N/A	N
1,2,4-Trichlorobenzene	3	11	0	0	1	15	0	N/A	**Y**
1,2-Dichlorobenzene	5	11	0	0	2	18	1	N/A	**Y**
1,2-Dichloroethane	5	0	0	0	3	8	6	N/A	**Y**
1,2-Dichloropropane	4	0	0	0	3	7	5	N/A	**Y**
1,3-Dichlorobenzene	2	9	0	0	2	13	2	N/A	**Y**
1,4-Dichlorobenzene	2	8	0	0	2	12	0	N/A	**Y**
2-Butanone (MEK)	0	7	0	0	1	8	0	N/A	**Y**
Acetone	0	11	2	0	3	16	0	N/A	**Y**
Benzene	6	4	0	0	3	13	10	N/A	**Y**
Chlorobenzene	6	11	0	0	3	20	8	N/A	**Y**
Chloroform	3	0	0	0	2	5	4	N/A	**Y**
Chloromethane	0	0	0	0	3	3	0	N/A	N
cis-1,2-Dichloroethene	7	0	2	0	3	12	9	N/A	**Y**
Cyclohexane	0	0	0	0	3	3	0	N/A	N
Dichlorodifluoromethane	0	0	0	0	1	1	0	N/A	N
Ethylbenzene	3	11	0	0	3	17	5	N/A	**Y**
Isopropylbenzene	4	7	0	0	3	14	NA	N/A	**Y**
Methylcyclohexane	0	2	0	0	0	2	0	N/A	N
Methylene Chloride	3	2	0	0	3	8	5	N/A	**Y**
Naphthalene	5	14	0	0	3	22	16	N/A	**Y**
Styrene	0	2	0	0	0	2	0	N/A	N
Tetrachloroethene	1	0	0	0	2	3	2	N/A	N
Toluene	1	3	0	0	3	7	2	N/A	**Y**
trans-1,2-Dichloroethene	5	0	1	0	1	7	0	N/A	**Y**
Trichloroethene	7	11	1	0	3	22	13	N/A	**Y**
Trichlorofluoromethane	5	0	0	0	1	6	0	N/A	**Y**
Vinyl chloride	8	0	0	0	1	9	9	N/A	**Y**
Xylenes, Total	5	9	3	1	3	21	0	N/A	**Y**
SEMI-VOCS									
1,1'-Biphenyl	0	0	0	0	1	1	1	N/A	N
2,4-Dimethylphenol	0	0	0	0	1	1	1	N/A	N
2-Methylnaphthalene	1	4	0	1	2	8	NA	N/A	**Y**
Acenaphthene	0	0	0	0	1	1	0	N/A	N
Acenaphthylene	0	0	0	0	1	1	0	N/A	N
Acetophenone	0	0	1	0	0	1	0	N/A	N
Anthracene	0	0	0	0	1	1	0	N/A	N
Benzo[a]anthracene	0	0	0	1	1	2	2	N/A	N
Benzo[a]pyrene	0	0	0	1	0	1	0	N/A	N
Benzo[b]fluoranthene	0	0	0	1	0	1	1	N/A	N
Benzo[g,h,i]perylene	0	0	1	1	0	2	0	N/A	N
Benzo[k]fluoranthene	0	0	0	1	0	1	0	N/A	N
Bis(2-ethylhexyl) phthalate	10	16	2	2	2	32	3	N/A	**Y**
Chrysene	0	0	0	1	1	2	0	N/A	N
Di-n-butyl phthalate	0	1	0	0	1	2	0	N/A	N
Fluoranthene	0	1	1	1	1	4	0	N/A	N
Fluorene	0	0	0	0	1	1	0	N/A	N
Indeno[1,2,3-cd]pyrene	0	0	0	1	0	1	0	N/A	N
Naphthalene	1	7	0	0	2	10	10	N/A	**Y**
N-Nitrosodiphenylamine	0	3	0	0	1	4	1	N/A	N
Phenanthrene	0	0	0	1	1	2	0	N/A	N
Phenol	0	0	0	0	1	1	0	N/A	N
Pyrene	0	0	1	1	1	3	0	N/A	N

APPENDIX A

Survey Description

Zoning Information

STATUS	CURRENT, ZONING DATED – NONE		DISTRICT	none
ITEM	REQUIRED	OBSERVED	SOURCE INFORMATION	Kanawha County
PERMITTED USE	n/a	See Survey	ADDRESS	n/a
MINIMUM LOT AREA	n/a	See Survey	PERSON CONTACTED	John Luoni
MINIMUM FRONTAGE	n/a	See Survey	DATE CONDUCTED	12/5/07
MINIMUM LOT WIDTH	n/a	See Survey	PHONE/FAX NUMBER	304.357.0570
MAX. BUILDING COVERAGE	n/a	See Survey	EMAIL ADDRESS	n/a
MINIMUM SETBACKS FRONT	n/a	See Survey		
MINIMUM SETBACKS SIDE	n/a	See Survey		
MINIMUM SETBACKS REAR	n/a	See Survey		
MAX. BUILDING HEIGHT	n/a	See Survey		
PARKING REGULAR	–	5		
PARKING HANDICAP	–	0		
PARKING TOTAL	–	5		

NOTES:

Per John Luoni with the Kanawha County Planning Department no current zoning regulations exist.

Utility Notes

UN1 THE LOCATION OF UTILITIES SHOWN HEREON ARE FROM OBSERVED EVIDENCE OF ABOVE GROUND APPURTENANCES ONLY. THE SURVEYOR WAS NOT PROVIDED WITH UNDERGROUND PLANS OR SURFACE GROUND MARKINGS TO DETERMINE THE LOCATION OF ANY SUBTERRANEAN USES.

UN2 BEFORE DIGGING IN THIS AREA, CALL "MISS UTILITY OF WEST VIRGINIA" 1-800-245-4848 FOR FIELD LOCATIONS (REQUEST FOR GROUND MARKINGS) OF UNDERGROUND UTILITY LINES.

Statement of Encroachments

A CONCRETE BLOCK BUILDING ENCROACHES OVER THE RIGHT OF WAY LINE OF FIRST AVENUE SOUTH BY ±3'.

B SUBJECT PROPERTY'S SIGN ENCROACHES OVER THE RIGHT OF WAY LINE OF FIRST AVENUE SOUTH BY ±2.5'.

Miscellaneous Notes

MN1 BEARINGS SHOWN ON THIS SURVEY ARE BASED ON THE INFORMATION OBTAINED FROM THE VESTING DEED.

MN2 ALL FIELD MEASUREMENTS MATCHED RECORD DIMENSIONS WITHIN THE PRECISION REQUIREMENTS OF ALTA/ACSM SPECIFICATIONS, UNLESS OTHERWISE NOTED.

MN3 AT THE TIME OF THIS ALTA/ACSM LAND TITLE SURVEY THERE WAS NO EVIDENCE OF EARTH MOVING, BUILDING CONSTRUCTION OR BUILDING ADDITIONS ON THE SUBJECT PROPERTY.

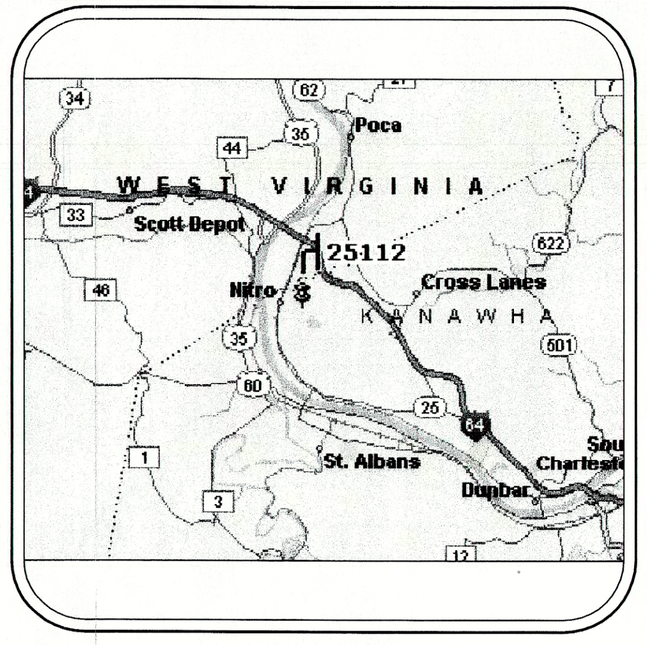
MN4 AT THE TIME OF THIS ALTA/ACSM LAND TITLE SURVEY THERE WERE NO CHANGES IN RIGHT OF WAY LINES EITHER COMPLETED OR PROPOSED BY ANY CONTROLLING JURISDICTION.

MN5 AT THE TIME OF THIS ALTA/ACSM LAND TITLE SURVEY THERE WAS NO EVIDENCE THAT THE SUBJECT PROPERTY WAS BEING USED AS A SOLID WASTE DUMP, SUMP OR LANDFILL.

MN6 AT THE TIME OF THIS ALTA/ACSM LAND TITLE SURVEY THERE WAS NO EVIDENCE OF ANY CEMETERIES ON THE SUBJECT PROPERTY.

MN7 AT THE TIME OF THIS ALTA/ACSM LAND TITLE SURVEY THERE WAS EVIDENCE OF AN ADDRESS POSTED ON THE SUBJECT PROPERTY.

Vicinity Map



As-Surveyed Description

Parcel 1

BEING all that certain parcel of land situate on the north side of West Virginia State Route No. 25, Kanawha County, West Virginia being more particularly described as follows,

Beginning at the eastern side of Old County Road (Unimproved) and the northern right-of-way line of First Avenue South (a.k.a. W.V. S.R.– 0025) Thence extending North 09°50' 00" East a distance of 183.00' to a point; Thence South 86°05'00" East a distance of 119.97' to a point; Thence South 09°50'00" West a distance of 182.80' to a point along the northern right-of way line of S.R. 0025; Thence with a line curving to the right and having a radius of 2,844.90' and an arc length of 60.00' and a chord of North 87°04'00" West a distance of 60.00'; Thence with a line curving ot the right and having a radius of 2,844.90' and an arc length of 60.00' and a chord of 60.00' to the point and place of beginning and containing ±21,881 sq.ft. or 0.502 acres more or less.

Parcel 2

BEING all that certain parcel of land situate on the north side of West Virginia State Route No. 25, Kanawha County, West Virginia being more particularly described as follows,

Beginning at the western side of Old County Road (Unimproved) and the northern right-of-way line of First Avenue South (a.k.a. W.V. S.R.– 0025) Thence with a line curving to the right and having a radius of 2,844.90' and an arc length of 50.00' and a chord of North 83°38'00" West a distance of 50.00'; Thence with a line curving ot the right and having a radius of 2,844.90' and an arc length of 50.00' and a chord of North 81°24'00" West a distance of 50.00' to a point; Thence northerly along Parcel 4 North 09°44'00" East a distance of 180.00' to a point; Thence South 82°31'00" East a distance of 150.00' to a point along Old Country Road (Unimproved); Thence South 09°44'00" West a distance of 180.00' to the point and place of beginning and containing ±27,092 sq.ft. or 0.622 acres more or less.

Parcel 3

BEING all that certain parcel of land situate on the north side of West Virginia State Route No. 25, Kanawha County, West Virginia being more particularly described as follows,

Beginning at the line of division of Lot 8 and Lot 7 of the Sarah F. Hedrick Estate plan recorded in P.M.B 11, Pg. 33 and the northerly right of way line of First Avenue South (a.k.a. S.R.–0025) Thence North 09°50'00" East a distance of 182.80' to a point along Old County Road (Unimproved); Thence South 86°55'00" East a distance of 59.60' to a point; Thence South 08°33'00" West a distance of 177.80' along the line of division of Lot 7 and Lot 6 of the aforesaid Sarah F Hedrick Estate; Thence along the northerly right-of-way line of First Avenue South with a line curving to the right and having a radius of 2,844.90' and an arc length of 60.00' and a chord of North 87°04'00" West to the point and place of beginning and containing ±11,070 sq.ft. or 0.254 acres more or less.

Parcel 4

BEING all that certain parcel of land situate on the north side of West Virginia State Route No. 25, Kanawha County, West Virginia being more particularly described as follows,

Beginning at the western line of division of a lot of land containing 0.62 acres of the Sarah F. Hedrick Estate plan recorded in P.M.B 11, Pg. 33 and the northerly right of way line of First Avenue South (a.k.a. S.R.–0025) Thence with a line curving to the right having a radius of 2,844.90' an arc length of 50.00' and a chord of North 80°15'00" West a distance of 50.00' to a point; thence with a line curving to the right having a radius of 2,844.90' and an arc length of 50.00' and a chord of North 79°48'00" West a distance of 50.00' to a point; Thence with a line curving to the right having a radius of 2,844.90' and an arc distance of 41.43' and a chord of North 78°38'00" West a distance of 41.43' to a point; Thence North 77°44'00" West a distance of 320.14' to a point; Thence North 77°43'00" West a distance of 603.35' to a point; Thence North 71°57'00" West a distance of 100.46' to a point; Thence North 77°43'00" West a distance of 767.55' to a point; Thence North 77°48'00" West a distance of 287.07' to a concrete monument; Thence leaving the northerly right of way line of First Avenue South and along the lands now or formerly of Union Carbide and Carbon Corporation North 12°12'00" East a distance of 506.60' to a point; Thence North 49°51'00" East a distance of 3,121.40' to a point; Thence South 59°22'00" East a distance of 894.01' to a point; Thence southwardly South 21°07'00" West a distance of 2,540.29' to a point along Old County Road; Thence South 09°44'00" West a distance of 1.61' to a point; Thence along the aforesaid 0.62 acres parcel North 82°31'00" West a distance of 150.00' to a point; Thence South 09°44'00" West a distance of 180.00' to the point and place of beginning and containing ±5,148,354 sq.ft. or 118.19 acres moe or less.

As-Surveyed Description

Parcel 5

BEING all that certain parcel of land situate on the north side of West Virginia State Route No. 25, Kanawha County, West Virginia being more particularly described as follows,

Commencing at the western side of Old County Road (Unimproved) Thence northeasterly with a line North 21°07'00" East a distance of 31.40' to the point and place of beginning; Thence North 21°07'00" East a distance of 2,505.60' to a point; Thence South 63°24'00" East a distance of 363.20' to a point along lands now or formerly of Harold G. Lee; Thence South 19°37'00" West a distance of 2,356.40' to the northern line of Old County Road; Thence North 84°42'00" West a distance of 161.40' to a point; Thence North 82°42'00" West a distance of 71.80'; Thence North 84°10'01" West a distance of 205.48' to the point and place of beginning and containing ±955,127 sq.ft. or 21.93 acres more or less.

Parcel 6

BEING all that certain parcel of land situate on the north side of West Virginia State Route No. 25, Kanawha County, West Virginia being more particularly described as follows,

Beginning at a point on the northern right-of-way line of First Avenue South and the line of division between Lot 7 and Lot 6 of the Plan of the Sarah F. Hedrick Estate recorded in P.M.B. 11, Pg. 33; Thence North 08°33'00" East a distance of 177.80' to the southern line of Old Country Road (Unimproved); Thence South 83°30'00" East a distance of 71.80' to a point; Thence South 85°30'00" East a distance of 154.20' to a point; Thence along lands of Harold G. Lee South 18°49'00" West a distance of 160.60' to the northern right-of-way line of First Avenue South; Thence South 87°53'00" West a distance of 52.00' to a point; Thence with a line curving to the right having a radius of 2,844.90' and an arc length of 147.50' and a chord of South 89°22'07" West a distance of 147.48' to the point and place of beginning and containing ±35,136 sq.ft. or 0.807 acres more or less.

THIS DESCRIPTION DESCRIBES ALL THAT PROPERTY DESCRIBED IN THE TITLE COMMITMENT IDENTIFIED AS CHICAGO TITLE INSURANCE COMPANY COMMITMENT No. 19–490 BEARING AN EFFECTIVE DATE OF NOVEMBER 13, 2007

Parcel 1 – ±21,881 sq.ft.
Parcel 2 – ±27,092 sq.ft.
Parcel 3 – ±11,070 sq.ft.
Parcel 4 – ±5,148,354 sq.ft.
Parcel 5 – ±955,127 sq.ft.
Parcel 6 – ±35,136 sq.ft.
Gross Area – ±6,198,660 sq.ft. or 142.30 acres

Items Corresponding to Schedule B

6. Subject to the following:

Rogers Cartage Co., an Illinois corporation DB 1611–0698 4/21/1970 WV Dpt of Highways temporary construction easement for necessary cuts and fills, upon completion of construction shall terminate, 300 sq.ft.

Chemical Leasing Corp., a Pennsylvania corporation DB 1627–0125 5/25/1971 WV Dpt of Highways

0.03 ac for non-controlled access (ref 1480–665, 1480–648) ITEM DOES NOT AFFECT SUBJECT PROPERTY.

1 1) Lts 8 & 9 Hedrick Est and 0.62 ac:

Subject to certain rights of way of record to Appalachian Power Company and C & P Telephone Company; and further subject to certain unsurrendered oil and gas leases to Union Carbon Company, Lease Bk 73–32, and to L.C. McKim, Lease Bk 42–38. ITEM LEASE BOOK 73–32 DOES AFFECT SUBJECT PROPERTY BUT CONTAINS NO PLOTTABLE INFORMATION. ITEM LEASE BOOK 42–38 DOES AFFECT SUBJECT PROPERTY BUT CONTAINS NO PLOTTABLE INFORMATION. THESE ITEMS AFFECT THE SUBJECT PROPERTY AS LONG AS OIL OR GAS IS BEING PRODUCED FROM THE LEASED PARCELS.

2 2)1/4 ac being Lt 7 Hedrick Est:

Further grant and convey all right, title, and interest in and to all roads, alleys and right of ways on the map of the partition of Sarah F. Hedrick Est. ITEM DOES AFFECT SUBJECT PROPERTY AND IS BLANKET IN NATURE TO LOT 7 OF THE SARAH F HEDRICK ESTATE.

3 3) 118.1917ac:

By acceptance of this deed, second party covenants and agrees that the property hereby conveyed shall not be used for residential purposes.

Subject to all leases, rights, right of ways,, easements, and reservations binding on the property hereby conveyed. NO SUPPORTIVE DOCUMENTATION HAS BEEN SUPPLIED TO THE SURVEYOR.

4 4) 21.86 ac being Lt 10 Hedrick Estate:

Further grant, convey, remise, release and quit claim all their undivided right, title and interest in and to all roads, alleys, and right of ways as shown on the map of the partition of the Sarah F. Hedrick Estate. ITEM DOES AFFECT SUBJECT PROPERTY AND IS BLANKET IN NATURE TO LOT 7 OF THE SARAH F. HEDRICK ESTATE.

Subject to easements, rights and right of ways acquired by AEPCO in that certain eminent domain proceeding as set out in decree entered 8/23/55 DB 1145–50. ITEM DOES AFFECT PARCEL 5 OF THE SUBJECT PROPERTY AND IS PLOTTED AND SHOWN HEREON.

LEGAL DESCRIPTION

Parcels 1 and 2:

That certain parcel of land conveyed unto Chemical Properties, Inc., by Superior Carriers, Inc., by deed dated March 30, 1987, and recorded in the aforesaid Clerk's Office in Deed Book 2159, at page 315;

Parcel 3:

That certain parcel of land conveyed unto Chemical Leasing Corp., by Anna B. Thomas, Helen Thomas Gorman and Logan E. Gorman, and Mildred Thomas Glass and Dennis E. Glass, by deed dated November 29, 1966, and recorded in the aforesaid Clerk's Office in Deed Book 1480, at page 648.

Parcel 4:

That certain parcel of land conveyed unto Chemical Leasing Corporation, by Union Carbide Corporation, by deed dated November 19, 1968, and recorded in the aforesaid Clerk's Office in Deed Book 1542, at page 445.

Parcel 5:

That certain parcel of land conveyed unto Chemical Leasing Corp., by Anna B. Thomas, Single, Helen Thomas Gorman and Logan E. Gorman, her husband, Mildred Thomas Glass and Dennis E. Glass, her husband, and Juanita Bryant Utt and James M. Utt, here husband, and Paul M. Bryant, single, by deed dated November 29, 1966, and recorded in the aforesaid Clerk's Office in Deed Book 1480, at page 643

Parcel 6

That certain parcel of land conveyed unto Chemical Leasing Corp., by Elsie C. Alderson, by deed dated October 29, 1966, and recorded in the aforesaid Clerk's Office in Deed Book 1480, at page 665.

THIS DESCRIPTION DESCRIBES ALL THAT PROPERTY DESCRIBED IN THE TITLE COMMITMENT IDENTIFIED AS CHICAGO TITLE INSURANCE COMPANY COMMITMENT No. 19–490 BEARING AN EFFECTIVE DATE OF NOVEMBER 13, 2007.

ALTA/ACSM Land Title Survey

Project Trucking Project

B&C Project No. 20071791, 0022
QDI Institute
1580 First Avenue S, Institute, WV, 25112

To: Quality Distribution, Inc.; White and Case LLP; O'Melveny & Myers LLP; Credit Suisse, Cayman Islands Branch, as Administrative Agent; General Electric Capital Corporation, as Collateral Agent; Chicago Title Insurance Company and Bock & Clark Corporation.

The undersigned certifies that to the best of his professional knowledge, information and belief, this map or plat and the Survey on which it is based were made on the date shown below of the premises specifically described in Commitment No. 19–490 dated 11/13/07 and were made: (i) in accordance with "Minimum Standard Detail Requirements for ALTA/ACSM Land Title Surveys," jointly established and adopted by ALTA and NSPS in 2005; (ii) in accordance with the "Survey Requirements for Project Trucking Surveys dated 10/30/2007 , and" includes Items 1, 2, 3, 4, 6, 7a, 7b(1) 7c, 8, 9, 10, 11a, 13, 16 & 18 of Table A specifically defined therein, and (iii) Pursuant to the Accuracy Standards as adopted by ALTA and NSPS and in effect on the date of this certification, undersigned further certifies that in my professional opinion, as a land surveyor registered in the State of West Virginia, the Relative Positional Accuracy of this survey does not exceed that which is specified therein.

Date of Survey: 11/27/07
Date of Last Revision: 12/17/07
Network Project No. 20071791–22
Pittsburgh Project No. 4200700831A
Survey Performed By:
Bock & Clark Corporation
11676 Perry Highway
Wexford, PA 15090
Phone: 800–787–8394
Fax: 724-934–0062
Email: ddvidp@1800surveys.com

BYRON D. HOWELL LICENSED No. 1944 STATE OF WEST VIRGINIA PROFESSIONAL SURVEYOR

Byron D. Howell (Seal)

Bock & Clark's National Surveyors Network
National Coordinators of ALTA/ACSM Land Title Surveys
537 North Cleveland–Massillon Road Akron, Ohio 44333
Phone: (800) Surveys, Fax: (330) 666–3608 www.1800surveys.com

BOCK & CLARK 1-800-SURVEYS National Coordinators of ALTA/ACSM Land Title Surveys

Drawn By: BUS	Surveyed By: PM/RA
Approved By: B.D.H.	Date Drawn: 11/29/07
Job No: 4200700831A	Sheet: 1 of 3

Revisions

No.	Date	Description	By
1	12/14/07	Network Comments	BUS
2	12/17/07	Client Comments	S.H.

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Project Trucking Project

Legend of Symbols & Abbreviations

- Bollard
- Cable Box
- Catch Basin Round
- Catch Basin Square
- Clean Out
- Electric Box
- Electric Manhole
- Electric Meter
- Unknown Manhole
- Curb Storm Inlet
- Fire Hydrant
- Gas Box
- Gas Meter
- Gas Valve
- Handicapped
- Light Pole
- Monitoring Well
- Gas Manhole
- Gas Marker
- Transformer
- Flag Pole
- Power Pole
- Sanitary Manhole
- Satellite Dish
- Sign
- Storm Manhole
- Telephone Manhole
- Water Box
- Water Manhole
- Traffic Pole
- Storm Pipe
- Guy Wire
- Well
- Water Meter
- Water Meter Pit
- Water Valve
- Vault
- Vent
- Monumentation
- Iron Pin To Be Set
- Air Conditioner Unit
- Sprinkler Head
- Ground Light
- Easement Line
- Fence Line
- Overhead Wires
- Gas Line
- Water Line
- Underground Utility
- Sanitary Line
- Storm Line
- Property Line
- Building Line
- Centerline
- Right of Way Line

N. North
S. South
E. East
W. West
° Degrees
' Feet or Minutes
'' Inches or Seconds
Sq. Square
Ft. Feet
Vol. Volume
Pg. Page
O.R. Official Record
Calc. Calculated
Rec. Record
R/W Right of Way
℄ Centerline

FLOOD NOTE:

BY GRAPHIC PLOTTING ONLY, THIS PROPERTY IS IN ZONE "C" OF THE FLOOD INSURANCE RATE MAP, COMMUNITY PANEL No. 540070013B, WHICH BEARS AN EFFECTIVE DATE OF 3/18/85 AND IS NOT IN A SPECIAL FLOOD HAZARD AREA, BY CONTACT DATED12/4/07 TO THE NATIONAL FLOOD INSURANCE PROGRAM http://www.fema.gov/ WE HAVE LEARNED THIS COMMUNITY DOES CURRENTLY PARTICIPATE IN THE PROGRAM. NO FIELD SURVEYING WAS PERFORMED TO DETERMINE THIS ZONE AND AN ELEVATION CERTIFICATE MAY BE NEEDED TO VERIFY THIS DETERMINATION OR APPLY FOR A VARIANCE FROM THE FEDERAL EMERGENCY MANAGEMENT AGENCY.

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APPENDIX B

APPENDIX B-1

Historic Aerial Photographs

Historical Aerial Photo
2011

QDI STATE ROUTE 25
INSTITUTE, WV 25112

FIRSTSEARCH

Target Site: 38.3945 -81.7958; Job Number: 4501020069

N
W E
S

1 inch equals 500 feet

Historical Aerial Photo
1996

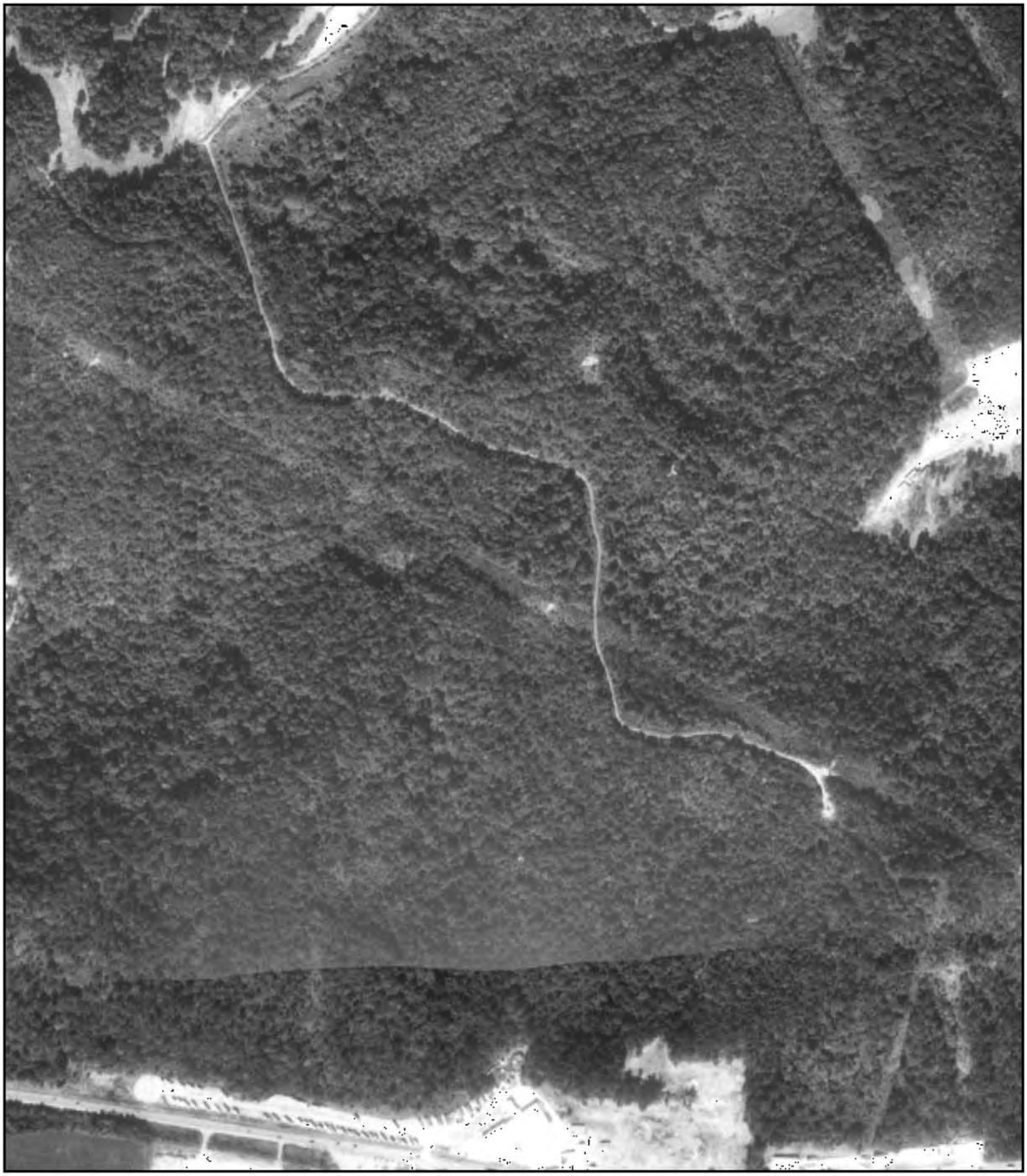
QDI STATE ROUTE 25
INSTITUTE, WV 25112

FIRSTSEARCH

Target Site: 38.3945 -81.7958; Job Number: 4501020069

N
W E
S

1 inch equals 500 feet



Historical Aerial Photo
1990

QDI STATE ROUTE 25
INSTITUTE, WV 25112

Target Site: 38.3945 -81.7958; Job Number: 4501020069

N
W E
S

1 inch equals 500 feet

Historical Aerial Photo
1971

QDI STATE ROUTE 25
INSTITUTE, WV 25112

Target Site: 38.3945 -81.7958; Job Number: 4501020069

N
W E
S

1 inch equals 500 feet

Historical Aerial Photo
1957

QDI STATE ROUTE 25
INSTITUTE, WV 25112

FIRSTSEARCH

Target Site: 38.3945 -81.7958; Job Number: 4501020069

N
W E
S

1 inch equals 500 feet

APPENDIX B-2

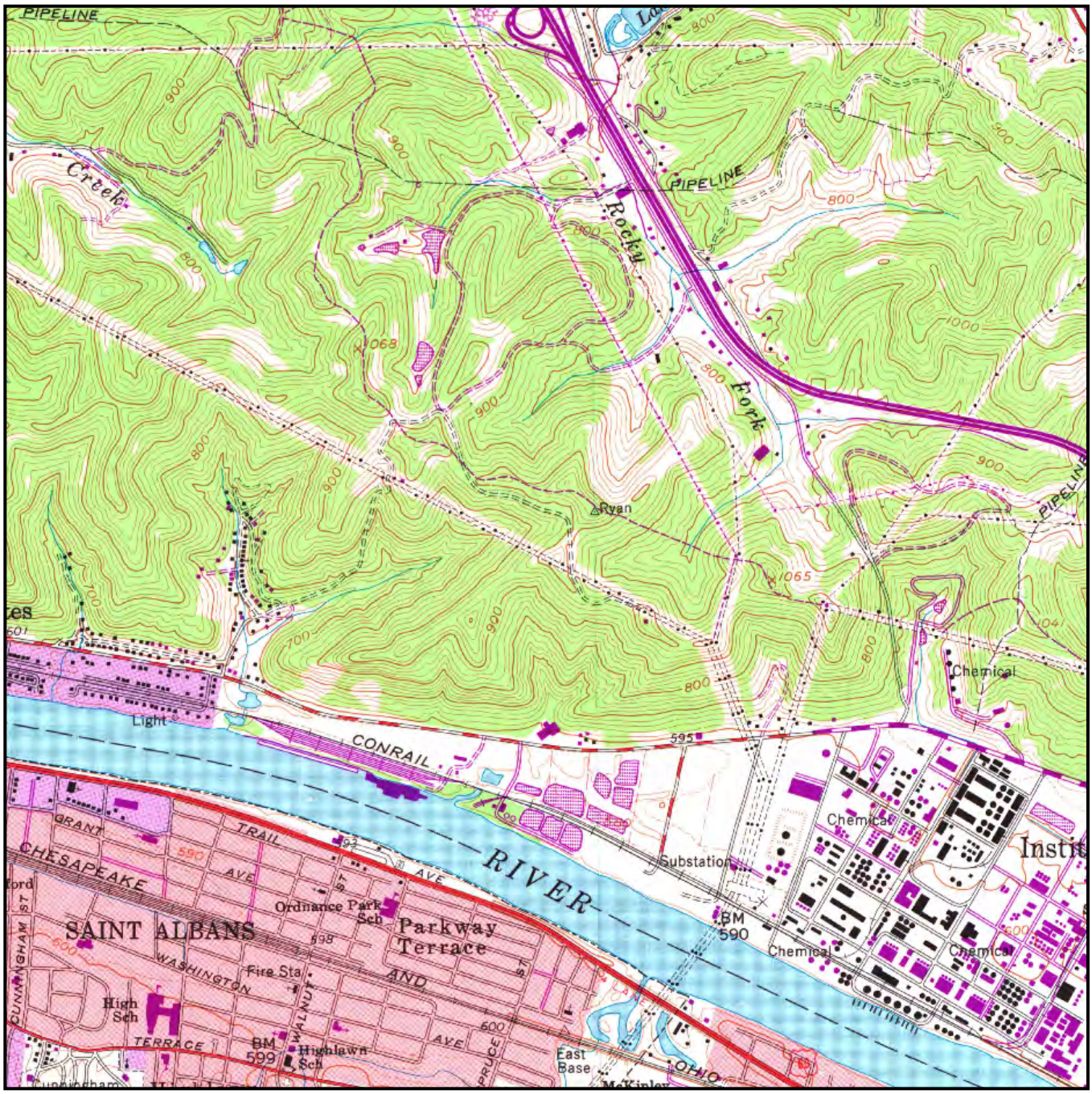
Historic Topographic Maps

FIRSTSEARCH

Historical Topographic Map

Quad Name: Saint Albans, WV
Year: 1958 (Revised 1971, 1976) Original Map Scale: 1: 24000

QDI STATE ROUTE 25, INSTITUTE, WV



Job Number: 4501020069
Target Site: -81.795800, 38.394500

0 miles 0.625 1.25

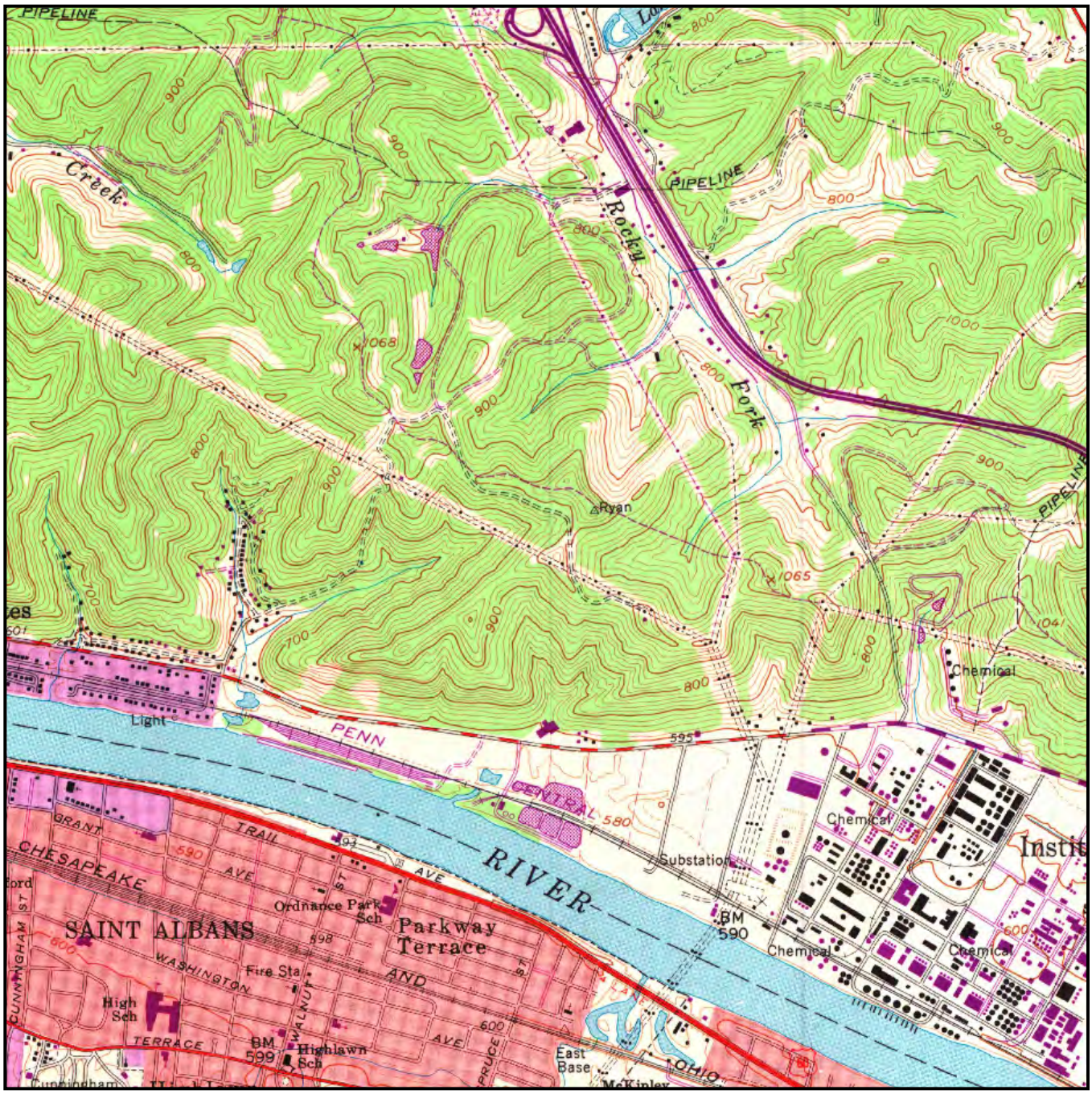
Building
Topo Contour
Depression
Quarry or Open Pit Mine
Railroad
Tanks
Primary Highway
Trail

FIRSTSEARCH

Historical Topographic Map

Quad Name: Saint Albans, WV
Year: 1958 (Revised 1971) Original Map Scale: 1: 24000

QDI STATE ROUTE 25, INSTITUTE, WV



Job Number: 4501020069
Target Site: -81.795800, 38.394500

0 miles 0.625 1.25

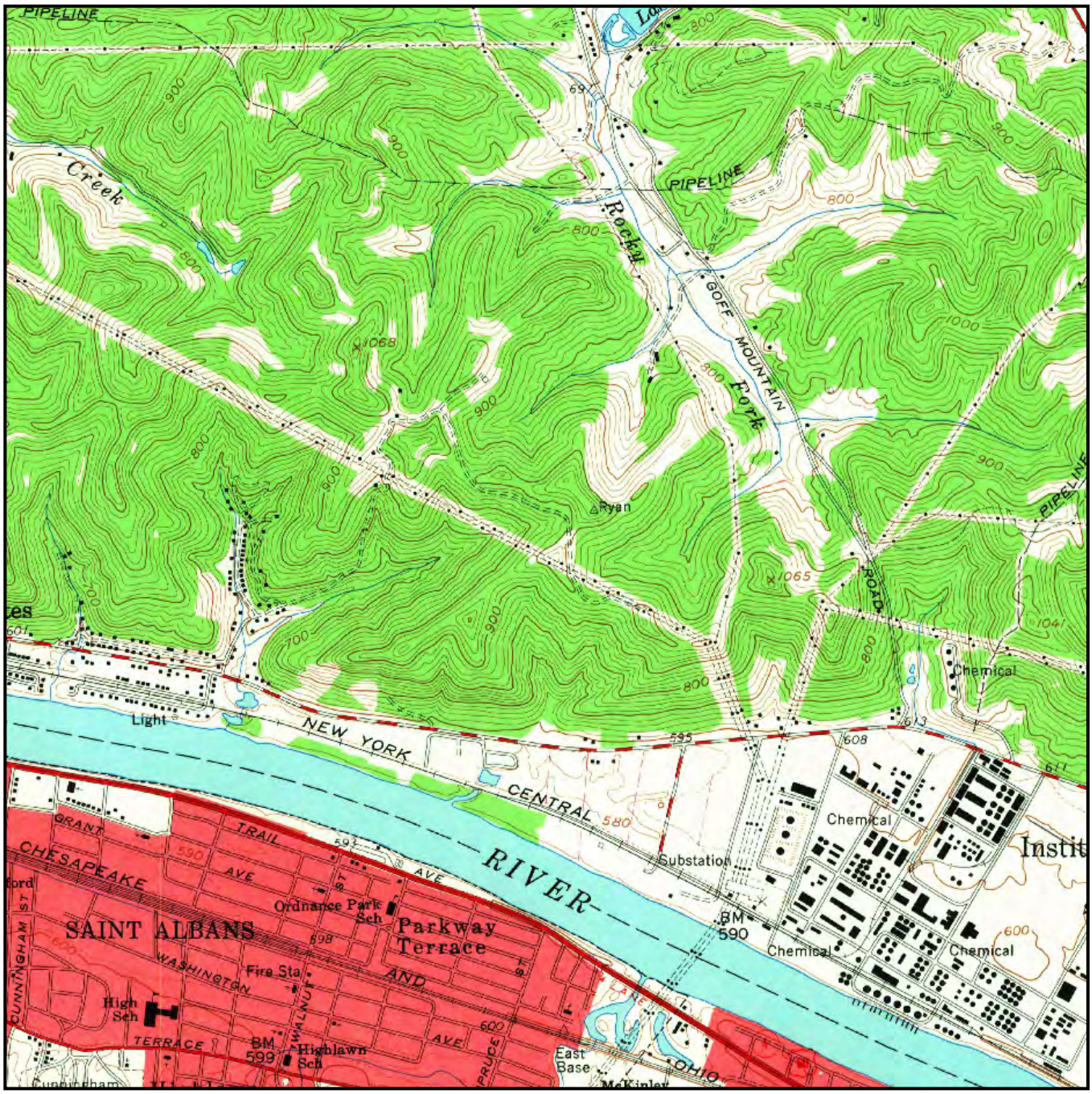
Building
Topo Contour
Depression
Quarry or Open Pit Mine
Railroad
Tanks
Primary Highway
Trail

FIRSTSEARCH

Historical Topographic Map

Quad Name: Saint Albans, WV
Year: 1958 Original Map Scale: 1: 24000

QDI STATE ROUTE 25, INSTITUTE, WV



Job Number: 4501020069
Target Site: -81.795800, 38.394500

0 miles 0.625 1.25

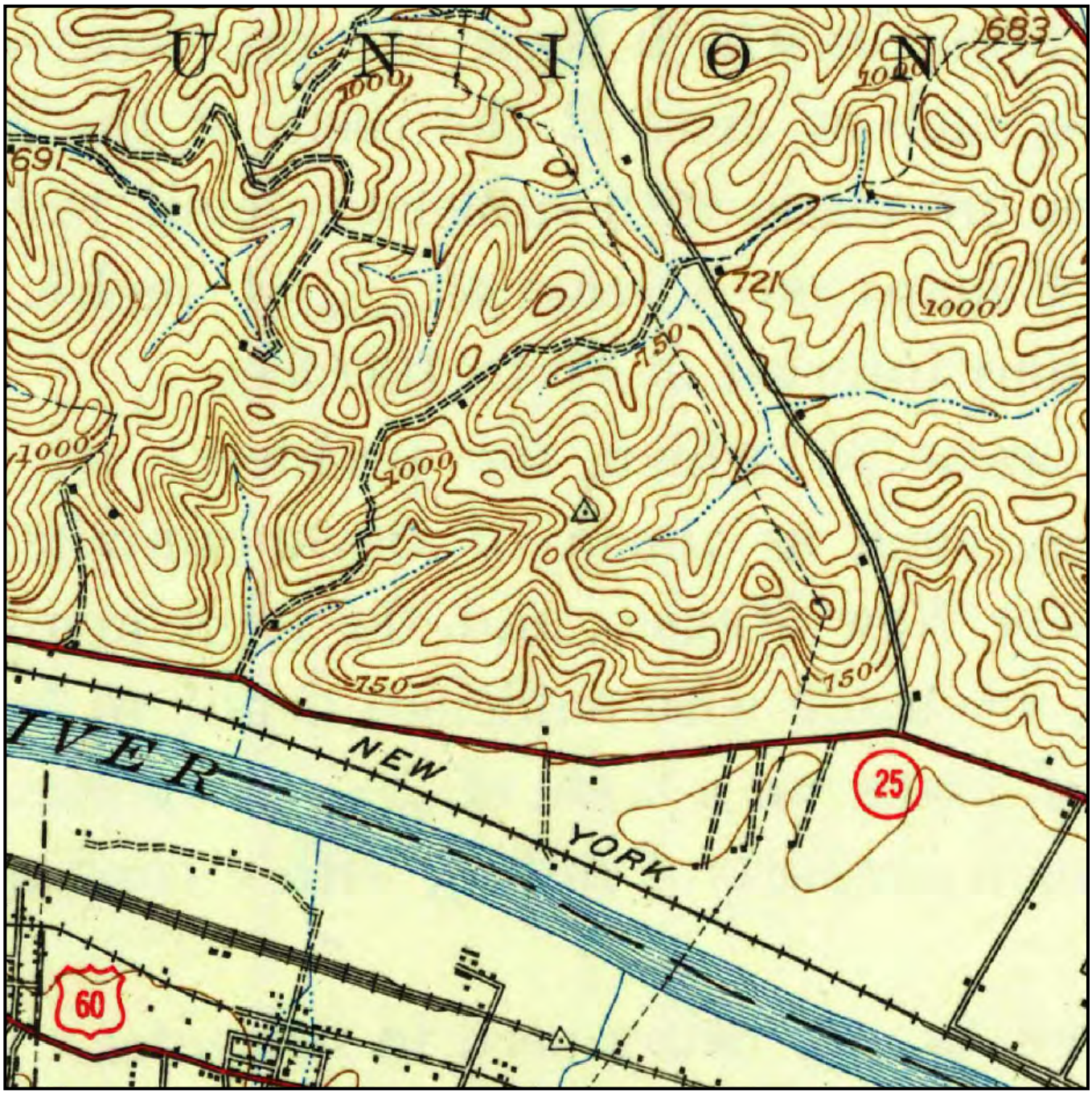
Building
Railroad
Topo Contour
Tanks
Depression
Primary Highway
Quarry or Open Pit Mine
Trail

FIRSTSEARCH

Historical Topographic Map

Quad Name: Saint Albans, WV
Year: 1933 (Reprinted 1939) Original Map Scale: 1: 62500

QDI STATE ROUTE 25, INSTITUTE, WV



Job Number: 4501020069
Target Site: -81.795800, 38.394500

0 miles 0.625 1.25

Building
Topo Contour
Depression
Quarry or Open Pit Mine
Railroad
Tanks
Primary Highway
Trail

FIRSTSEARCH

Historical Topographic Map

Quad Name: Saint Albans, WV
Year: 1933 Original Map Scale: 1: 62500

QDI STATE ROUTE 25, INSTITUTE, WV

Job Number: 4501020069
Target Site: -81.795800, 38.394500

0 miles 0.625 1.25

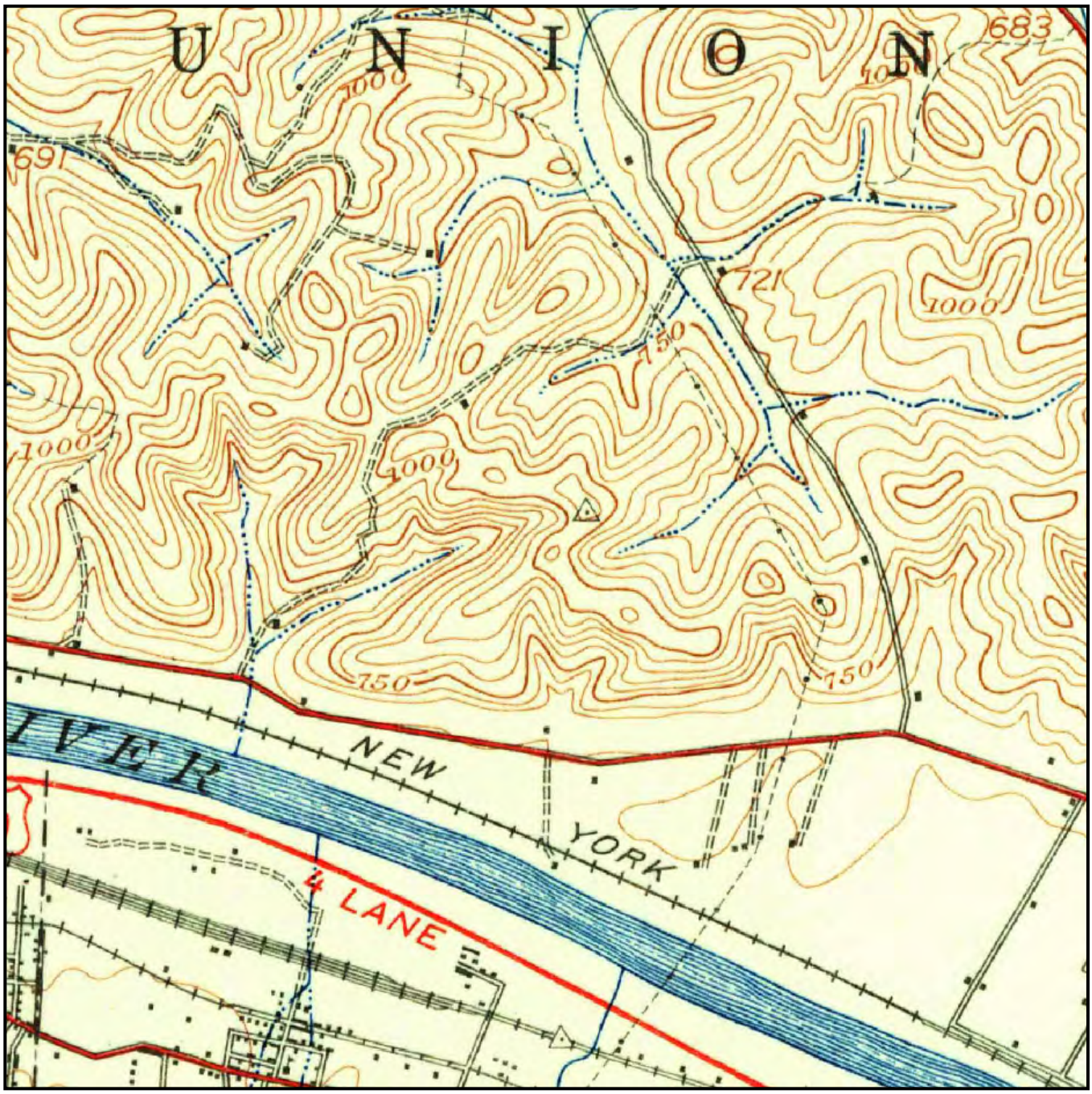
Building
Railroad
Topo Contour
Tanks
Depression
Primary Highway
Quarry or Open Pit Mine
Trail

FIRSTSEARCH

Historical Topographic Map

Quad Name: Saint Albans, WV
Year: 1931 Original Map Scale: 1: 62500

QDI STATE ROUTE 25, INSTITUTE, WV



Job Number: 4501020069
Target Site: -81.795800, 38.394500

0 miles 0.625 1.25

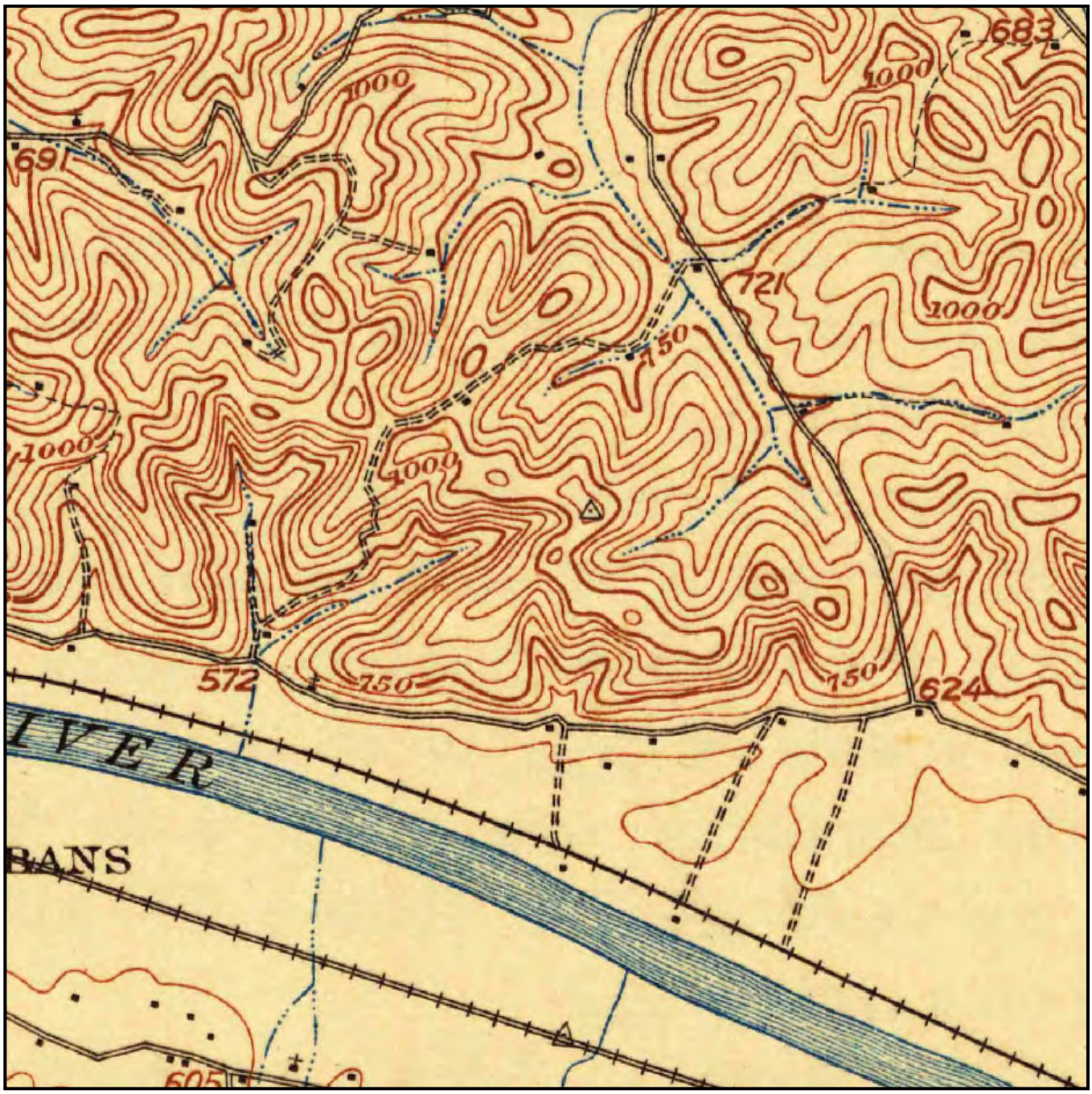
Building
Topo Contour
Depression
Quarry or Open Pit Mine
Railroad
Tanks
Primary Highway
Trail

FIRSTSEARCH

Historical Topographic Map

Quad Name: Saint Albans, WV
Year: 1909 (Reprinted 1920) Original Map Scale: 1: 62500

QDI STATE ROUTE 25, INSTITUTE, WV



Job Number: 4501020069
Target Site: -81.795800, 38.394500

0 miles 0.625 1.25

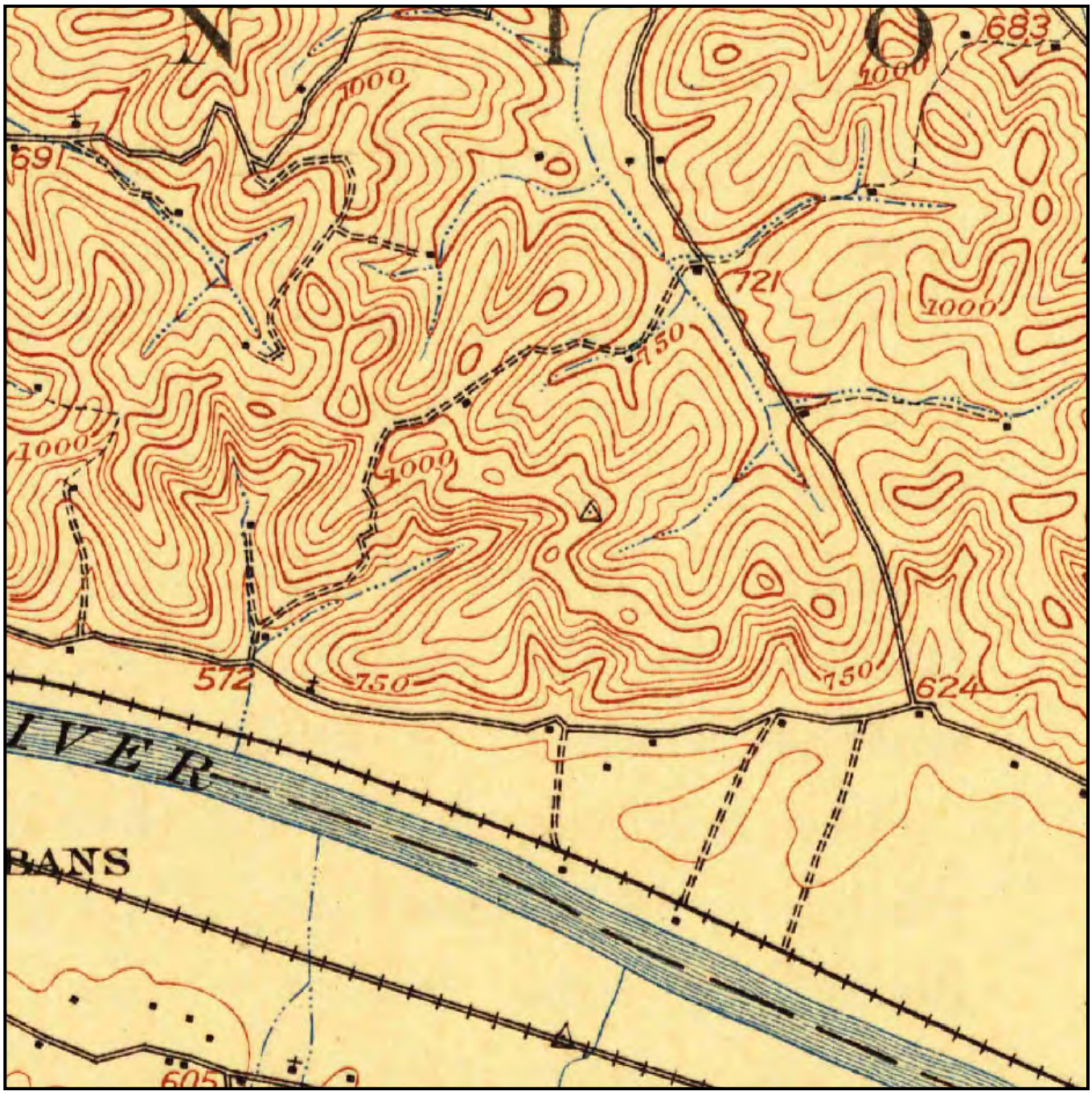
Building
Topo Contour
Depression
Quarry or Open Pit Mine
Railroad
Tanks
Primary Highway
Trail

FIRSTSEARCH

Historical Topographic Map

Quad Name: Saint Albans, WV
Year: 1909 Original Map Scale: 1: 62500

QDI STATE ROUTE 25, INSTITUTE, WV



Job Number: 4501020069
Target Site: -81.795800, 38.394500

0 miles 0.625 1.25

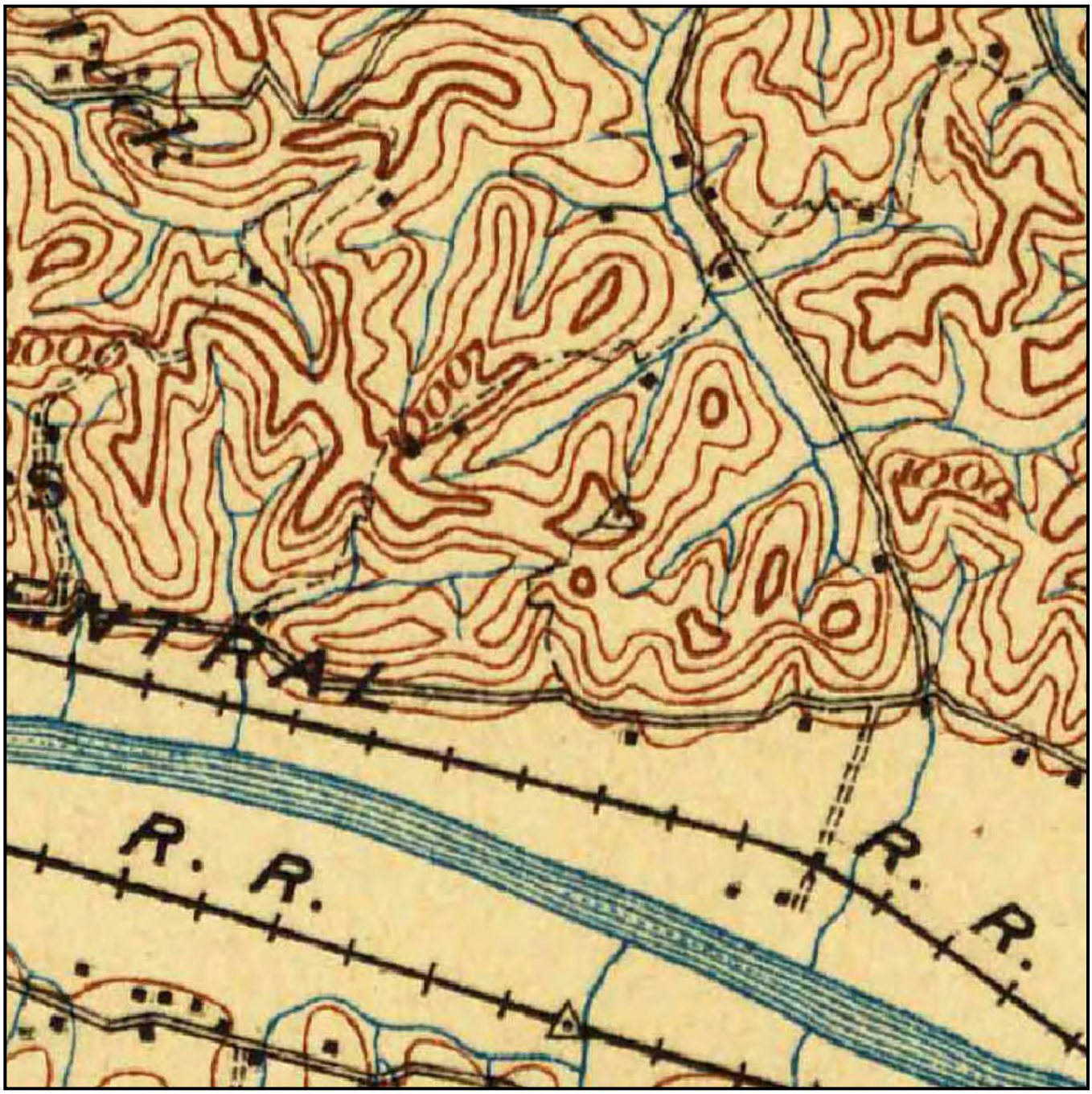
Building
Topo Contour
Depression
Quarry or Open Pit Mine
Railroad
Tanks
Primary Highway
Trail

FIRSTSEARCH

Historical Topographic Map

Quad Name: Charleston, WV
Year: 1899 Original Map Scale: 1: 125000

QDI STATE ROUTE 25, INSTITUTE, WV



Job Number: 4501020069
Target Site: -81.795800, 38.394500

0 miles 0.625 1.25

Building
Topo Contour
Depression
Quarry or Open Pit Mine
Railroad
Tanks
Primary Highway
Trail

APPENDIX C

APPENDIX C-1

DBA Boring Logs

Boring Log

Project Name:	**Project No:**	**Boring No:** DBA-1
Location:	State Plane Coords.: X= Y=	**Well No:**
Drilling Contractor:	Water Table Depth:	Date Started: 8/9/12
Geologist: BAS	Drilling Equip.:	Date Comp.: 8/9/12
Sampling Method:	Size/Type of Bit:	Weather Cond.: Humid
FID/PID Used:	Development Method:	Hammer Weight/Fall:
Soil Class System:		Total Depth:
	Well Yield:	Ref. Elevation:
Screen Length/Type:	Riser Stickup:	Notes:
Sand Pack Amount/Type:	Riser Length/Type:	
Screen Slot Size:	Permit No.:	Sump Installed/Length:

Depth (ft.)	Sample No.	Blows per 6 in.	Penetration/ Recovery	FID/PID Reading (ppm)	Sample Description	Well Construction	Remarks
0					0-0.5 Organic matter		
				0.0	0.5-5 Gravelly clay, dry to 3.3, then moist		
				1.1	3.3-5. Mottled, high plastic, stiff		
			5/5	1.0	DYB 10YR 3/6 to Reddish-brn		
				1.4			
				3.6			
				4.2	5-7.7 Gravelly clay, dry, high plasticity,		
				4.6	mottled, layer of silt from 6-6.1		
			5/5		stiff throughout. Reddish brn		
				7.1	7.7-9 Clay, stiff to med. stiff, moist,		
				12.7	high plastic, Reddish brn, no odors		
				11.1	9-10 Same as above, soft, more moist,		
				5.2	10-10.4 Same as 7.7-9		
				6.8	10.4-11.3 Clay, moist, mottled, green staining		
				6.6	throughout, gravels begin 10.9,		
				3.5	high plastic.		
					Refusal 13' BGS		
					13'		

(0.9 1015) 1015 @ → ① Dup (20-22) @ 1050

(7.1) @ 1030

(10-11.3) @ 1050

Boring Log

Project Name: QDI	**Project No:**	**Boring No:** DBA-2
Location:	State Plane Coords.: X= Y=	**Well No:**
Drilling Contractor:	Water Table Depth:	Date Started: 8/9/12
Geologist: BAS	Drilling Equip.:	Date Comp.: 8/9/12
Sampling Method:	Size/Type of Bit:	Weather Cond.: Humid
FID/PID Used:	Development Method:	Hammer Weight/Fall:
Soil Class System:		Total Depth:
	Well Yield:	Ref. Elevation:
Screen Length/Type:	Riser Stickup:	Notes:
Sand Pack Amount/Type:	Riser Length/Type:	
Screen Slot Size:	Permit No.:	Sump Installed/Length:

Depth (ft.)	Sample No.	Blows per 6 in.	Penetration/ Recovery	FID/PID Reading (ppm)	Sample Description	Well Construction	Remarks
				BG 0.3	0-0.9 Rocks, gravel + fill material		
				7.9	0.9- Clay, dry to moist, mottled, micaceous,		
				0.9	3.0 some gravel (20%), med. plastic, reddish-brn, stiff 2.5YR 5/3		
			4.5/5	1.2	3.0-4.5 Gravelly clay, dry to moist, high plastic mottled, micaceous - weathered rock layer from 4.0-4.1; yell-brn 10YR 5/6 to reddish brn 2.5YR 5/3		
				1.0			
					5-10		
				0.4	Same as above, no weathered rock, dry to moist, soft		
			5/5	0.3			
				0.7			
				0.7			
			0.2		10-12 - Same as above, med. stiff		
				1.2	12-12.6 Band of weathered rock / gravel		
			5/5	0.7	12.6-15 Clay, moist, high plast, [illegible] some gravel (5%) red brn 2.5YR 5/3		
				0.2			
				0.2			
					15-15.6 Same as above		
				6.7			
			5/5	11.4	15.6-18.2 Clay, dry, some gravel; fine beige to green, chemical odor. low plastic,		
				9.2			
				6.1			
				0.3			

(0-2) @ 0910
(6-8) @ 0925
(16-18) @ 0950

U

Boring Log

Project Name: QOI	**Project No:**	**Boring No:** DBA-3
Location:	State Plane Coords.: X= Y=	**Well No:**
Drilling Contractor:	Water Table Depth:	Date Started: 8/9/12
Geologist: BAS	Drilling Equip.:	Date Comp.: 8/9/12
Sampling Method:	Size/Type of Bit:	Weather Cond.: Humid
FID/PID Used:	Development Method:	Hammer Weight/Fall:
Soil Class System:		Total Depth:
	Well Yield:	Ref. Elevation:
Screen Length/Type:	Riser Stickup:	Notes:
Sand Pack Amount/Type:	Riser Length/Type:	
Screen Slot Size:	Permit No.:	Sump Installed/Length:

Depth (ft.)	Sample No.	Blows per 6 in.	Penetration/ Recovery	FID/PID Reading (ppm)	Sample Description	Well Construction	Remarks
				BG=0.3	0-2.7 Organic material, gravel, silty sand		
				0.3	2.7-4.8 Silty sand, dry, loose, with rocks + gravel, no odors, some organic matter and trace clay. Dusky yellow 5YR 4/4		
				0.3			
				0.3			
			4.8/5	0.3			
				0.3	5-6.2 Clayey silt, with gravel, dry, no odors		
				0.3	6.2-9.0 Same as above; higher gravel %, dry to moist, Grayish-olive 10Y 4/2 weathered shale from 8-8.3'.		
				0.3			
			5/5	0.3			
				0.2	9.0-10.0 Clayey silt, dry, loose, low plasticity, some small bands of weathered shale at 9.5 and 9.9. Mod ~~[illegible]~~ brn 5YR 3/4		
				0.0	10-11.2 Same as above, no weathered shale.		
					Refusal @ 11.2' BGS.		

(0-2) @ 0820

(6-8) @ 0830

(10-11.2) @ 0855

Boring Log

Project Name:	**Project No:**	**Boring No:** D/3A-4
Location:	State Plane Coords.: X= Y=	**Well No:**
Drilling Contractor:	Water Table Depth:	Date Started: 8/9/12
Geologist: BAS	Drilling Equip.:	Date Comp.: 8/9/12
Sampling Method:	Size/Type of Bit:	Weather Cond.: Humid
FID/PID Used:	Development Method:	Hammer Weight/Fall:
Soil Class System:		Total Depth:
	Well Yield:	Ref. Elevation:
Screen Length/Type:	Riser Stickup:	Notes:
Sand Pack Amount/Type:	Riser Length/Type:	
Screen Slot Size:	Permit No.:	Sump Installed/Length:

Depth (ft.)	Sample No.	Blows per 6 in.	Penetration/ Recovery	FID/PID Reading (ppm) BG=0.1	Sample Description	Well Construction	Remarks
				0.0	0-5 Silty clay, dry, mottled, low plasticity,		
				0.0	Band of weathered rock from 3.3-3.		
				0.0	No odors, Reddish-brn,		
			5/5	0.0			
					5-9.1		
				0.0	Clay, dry mottled w/ gravel throughout.		
			5/5	0.0	low plastic, weathered, no staining		
				0.0	no odor, 10YR 10YR 5/6, stiff		
				0.0	9.1-10 Clay, moist, soft, mottled, high plastic		
				0.0	no odor, sheens, reddish-brn.		
				0.0			
			5/5	0.0	10-15 Same as above, a little more		
				0.0	gravelly from 13.6-14.3, soft		
				0.0	moist,		
				0.0	15-20 Clay, very soft, with reddish brown		
				0.0	banding, mottled, moist to wet,		
				0.0	no odors, staining brown/clay		
				0.0			
				0.0			

(0-2) @ 1115 → ② Dup (19-21) 1150

(6-8) @ 1141

(16-18) @ 1150

Boring Log

Project Name:	**Project No:**	**Boring No:** D/3/4-5
Location:	State Plane Coords.: X= Y=	**Well No:**
Drilling Contractor:	Water Table Depth:	Date Started: 8/9/12
Geologist: BAS	Drilling Equip.:	Date Comp.: 8/9/12
Sampling Method:	Size/Type of Bit:	Weather Cond.:
FID/PID Used:	Development Method:	Hammer Weight/Fall:
Soil Class System:		Total Depth:
	Well Yield:	Ref. Elevation:
Screen Length/Type:	Riser Stickup:	Notes:
Sand Pack Amount/Type:	Riser Length/Type:	
Screen Slot Size:	Permit No.:	Sump Installed/Length:

Depth (ft.)	Sample No.	Blows per 6 in.	Penetration/ Recovery	FID/PID Reading (ppm)	Sample Description	Well Construction	Remarks
				0.0	0-1.6 Gravel + organic material		
				0.0	1.6-3 Clay, dry to moist, mottled w/ gravel		
			4.5/5	0.0	med. plasticity, med. stiff,		
				0.0	Dusky red 10R 3/4.		
				0.0	3-5 Same as above, but soft + more		
					moist; few gravel.		
				1.9	5-6.9 Clay, moist to dry, some small Fe staining		
			5/5	2.6	low plastic, stiff, Dusky red 10R 3/4		
				7.9	6.9-8 Clay w/ silt, softer, moist, some gravel		
				3.3	and mottling, med. stiff DR 10R 3/4		
					7.8-10 Same as above, no gravel.		
				0.4			
			5/5	0.4	10-10.9 Clay, stiff w/ some weathered rock,		
				0.2	dry to moist, high plastic DR 10R 3/4		
				0.0			
				0.0	10.9-15 Clay med. soft, no gravel or rock,		
					high plastic, Dark reddish brn 2.5YR 3/3		
				0.6	15-18 Clay, soft w/ some mica, high plastic		
				0.6	moist to 17.2, then wet 17.2-19.		
				0.6	Dk brn 7.5YR 3/2.		
				0.5			

(0-2) @ 1235
(6-8) @ 1255
(16-18) @ 1310

Boring Log

Project Name:	**Project No:**	**Boring No:** DBA-7
Location:	State Plane Coords.: X= Y=	**Well No:**
Drilling Contractor:	Water Table Depth:	Date Started: 8/9/12
Geologist: BH	Drilling Equip.:	Date Comp.: 8/9/12
Sampling Method:	Size/Type of Bit:	Weather Cond.: Humid 90+
FID/PID Used:	Development Method:	Hammer Weight/Fall:
Soil Class System:		Total Depth:
	Well Yield:	Ref. Elevation:
Screen Length/Type:	Riser Stickup:	Notes:
Sand Pack Amount/Type:	Riser Length/Type:	
Screen Slot Size:	Permit No.:	Sump Installed/Length:

Depth (ft.)	Sample No.	Blows per 6 in.	Penetration/ Recovery	FID/PID Reading (ppm)	Sample Description	Well Construction	Remarks
0				0.0	0-1, gravel, cobbles, organic matter		
2				0.0	1-4.8 clay, dry, micacous, gravely, low plasicity, drb 2.5YR 3/3		
4			4.8/5	0.0			
6				0.0	5-7.3 silty clay, dry, mottled, low plasicity, micacous, gravely red brown 5YR 4/4		
8				0.0			
10			5/5	0.0			
12				0.0	7.3-7.6 gravel ~~dense~~ ends ~~7~~ BH 8/9/12 BH 8/9/12		
14				0.0	7.6-7.9 same as 5-7.3		
16					7.6-10.0 - clay, micacous, dry to moist, med plasicity, stiff red brown 5YR 4/4		
18							
			5/5	0.0	10-13.9 Clay, dry, micaceous, gravelly stiff, low plastic RBrn 5YR 4/4		
				0.0			
				0.0	13.9-15 Same as above, but soft + moist.		
				0.0			
				0.0	15-18. clay, micacous, mottled dry to moist, med stiff medium plascity, rb 5YR 4/4		
			5/5	0.0			
				0.0			
				0.0	18-20 same as above, more moist, softer		
				0.0			
				0.0			

(0-2) @ 1500 → Dup (~~1600~~ 18-20) @ 1600

(6-8) @ 1515

(16-18) @ 1535

Boring Log

Project Name:	**Project No:**	**Boring No:** D34-8
Location:	State Plane Coords.: X= Y=	**Well No:**
Drilling Contractor:	Water Table Depth:	Date Started: 8/9/12
Geologist: BAS / BH	Drilling Equip.:	Date Comp.: 8/9/12
Sampling Method:	Size/Type of Bit:	Weather Cond.:
FID/PID Used:	Development Method:	Hammer Weight/Fall:
Soil Class System:		Total Depth:
	Well Yield:	Ref. Elevation:
Screen Length/Type:	Riser Stickup:	Notes:
Sand Pack Amount/Type:	Riser Length/Type:	
Screen Slot Size:	Permit No.:	Sump Installed/Length:

Depth (ft.)	Sample No.	Blows per 6 in.	Penetration/ Recovery	FID/PID Readings (ppm)	Sample Description	Well Construction	Remarks
				BG=0.2			
				0.0	0-1 Gravel, rock, organic, fill material		
				0.0	1-3 Clay, dry, low plastic, small gravels, stiff		
			5/5	2.4	Red-brn 5YR 4/3		
				0.8	3-5 Clay, dry to moist, low plastic		
				0.7	low mica, stiff		
				....	Red brn 5YR 4/3		
				1.3	5-6.3 Clay, gravelly, dry, low plastic		
			3.5/5	1.4	med to stiff, Drk Red Brn 5YR 5/3		
				2.5	6.3-10 Clay, no gravel, dry, low plastic, med. stiff.		
				0.7	Redsh Brn 5YR 4/4.		
				1.2	10-12 Clay, moist, soft, low mica, med. high		
				0.8	plastic, reddish brn 5YR 4/4		
			4.2/5	0.4	gravelly		
				0.8	12-15 Clay, dry, soft med stiff, low to med		
				0.0	plastic, micaceous, slight mottling		
					~~Reddish~~ yellowish red 5YR 4/4.		
				0.4	15-18 Clay, moist, med plastic, soft, micaceous,		
				0.7	some black laminations		
			3.0/3.0	0.6			
				2.6	Red. brn 5YR 4/4.		
				...	17-17.3 Same as above, soft.		

(0-2) @ 1535 → DUP (7-9) @ 1605
(6-8) @ 1555
(16-18) @ 1615

APPENDIX C-2

TSS Boring Logs

Boring Log

Project Name:	**Project No:**	**Boring No:** TSS-1
Location:	State Plane Coords.: X= Y=	**Well No:**
Drilling Contractor:	Water Table Depth:	Date Started: 8/8/12
Geologist: BMS	Drilling Equip.:	Date Comp.: 8/8/12
Sampling Method:	Size/Type of Bit:	Weather Cond.:
FID/PID Used:	Development Method:	Hammer Weight/Fall:
Soil Class System:		Total Depth:
	Well Yield:	Ref. Elevation:
Screen Length/Type:	Riser Stickup:	Notes:
Sand Pack Amount/Type:	Riser Length/Type:	
Screen Slot Size:	Permit No.:	Sump Installed/Length:

Depth (ft.)	Sample No.	Blows per 6 in.	Penetration/ Recovery	FID/PID Reading (ppm)	Sample Description	Well Construction	Remarks
				0.0	0-1.6 Gravel, rocks, fill and organic matter.		
				0.1			
			5/5	0.1	1.6-4.2, Silty clay, med. stiff, dry to slightly moist, micaceous, gravelly some mottling. Dark reddish brown 5YR 3/4, low plastic,		HC odor at 4'.
				0.1			
				0.3	4.2-5 Same as above, more gravel content, slightly more moist.		
				3.3	5-8.2 Clay, soft to stiff, dry, with gravels, low plasticity, some/trace organic matter, micaceous, DMB 10YR 4/4, HC odor @ 6.2'.		
			5/5	2.9			
				0.6			
				0.3	8.2-10 Same as above, slightly more gravels and more micaceous. Dry to moist no odors		
				0.2			
				0.1	10-15 Silty clay, stiff, dry, heavy gravel (15%) some mottling, some mica DMB 10YR 3/6 to 10YR 4/4		
			5/5	0.0			
				0.0			

Sample (4-6) @ 1530

Sample (6-8) @ 1550

Boring Log

Project Name:	**Project No:**	**Boring No:** TSS-2
Location:	State Plane Coords.: X= Y=	**Well No:**
Drilling Contractor:	Water Table Depth:	Date Started: 8/8/12
Geologist: MS	Drilling Equip.:	Date Comp.: 8/8/12
Sampling Method:	Size/Type of Bit:	Weather Cond.: Humid 80F
FID/PID Used:	Development Method:	Hammer Weight/Fall:
Soil Class System:		Total Depth:
	Well Yield:	Ref. Elevation:
Screen Length/Type:	Riser Stickup:	Notes:
Sand Pack Amount/Type:	Riser Length/Type:	
Screen Slot Size:	Permit No.:	Sump Installed/Length:

Depth (ft.)	Sample No.	Blows per 6 in.	Penetration/ Recovery	FID/PID Reading (ppm)	Sample Description	Well Construction	Remarks
0				0.0	0 - 1.2 Rocks, gravel + organic matter		
				0.0	1.2 - 4.6 Silty clay, micaceous with gravel		
				0.0	and rock, dry to 4.3, then dry		
			4.6/5	0.1	to moist 4.3 - 4.6, low plasticity,		
				0.0	no odor Yell-brn 10YR 5/6		
				2.0	5 - 6.3 Clay, micaceous, moist, high plastic, w/ gravel, Drk yell-brn 10YR 4/4		No odor
				1.9	6.3 - 8.4 Same as above, dry to moist,		
			4.8/5	1.2	med. plastic, more gravel (15%)	DYB 10YR 4/4	
				0.6	8.4 - 10 Clay, stiff, dry to moist, med. plastic		
				0.2	w/ gravel, DYB 10YR 4/6 mottled.		
				0.1	10 - 15 Clay, silty clay, med. stiff, high		
			5/5	0.1	plasticity, dry to moist, mottling		
				0.0	w/ gravel appearing @ 13.6',		
				0.0	DYB 10YR 3/4.		

Sampled (5-7) @ 1120

Sampled (7.2-8.9) @ 1135

Boring Log

Project Name:	**Project No:**	**Boring No:** TSS-3
Location:	State Plane Coords.: X= Y=	**Well No:**
Drilling Contractor:	Water Table Depth:	Date Started: 8/8/12
Geologist: BAS	Drilling Equip.:	Date Comp.: 8/8/12
Sampling Method:	Size/Type of Bit:	Weather Cond.: 90
FID/PID Used:	Development Method:	Hammer Weight/Fall:
Soil Class System:		Total Depth:
	Well Yield:	Ref. Elevation:
Screen Length/Type:	Riser Stickup:	Notes:
Sand Pack Amount/Type:	Riser Length/Type:	
Screen Slot Size:	Permit No.:	Sump Installed/Length:

Depth (ft.)	Sample No.	Blows per 6 in.	Penetration/ Recovery	FID/PID Reading (ppm)	Sample Description	Well Construction	Remarks
				0.0	0-1.9 Gravel, rocks + fill material.		
				0.0	1.9-3.1 Silty clay, mottled, dry, with		
			4.2/5	0.0	gravel, low to med. plastic		
				0.0	dark reddish brn 5YR 3/4		
					3.1-4.2 Same as above, dry to moist		
					with greater % gravel (20%),		
					less mottling, and plastic		
				0.5	5-7.2 - Clay, soft with <5% gravel,		
				0.4	high plasticity, moist to wet w/		
			3.5/5		some areas of black staining (slight)		
				1.6	dark yel-brn 10YR 3/4, slight HC odor		
				0.2	7.2-8.5 Clay, stiff w/ little gravel,		
					low plastic, dry to moist, no odor		
					dark yel-brn 10YR 3/4		
				0.0	10-13.2 Clay w/ silt and gravel, high plastic		
			5/5	0.1	moist, no odor, med-soft, dark-yel-brn		
				0.0	10YR 3/6		
				0.0	13.2-13.5 Gravel w/ silty clay		
				0.0			
					13.5-15 Same as 10-13.2, mottling,		
					dry to moist.		

Sampled (6-8) @ 1030

Sampled (4.5-5.5) @ 1045

Boring Log

Project Name:	**Project No:**	**Boring No:** TSS-4
Location:	State Plane Coords.: X= Y=	**Well No:**
Drilling Contractor:	Water Table Depth:	Date Started: 8/5/12
Geologist:	Drilling Equip.:	Date Comp.: 8/5/12
Sampling Method:	Size/Type of Bit:	Weather Cond.: Humid 95 F
FID/PID Used:	Development Method:	Hammer Weight/Fall:
Soil Class System:		Total Depth:
	Well Yield:	Ref. Elevation:
Screen Length/Type:	Riser Stickup:	Notes:
Sand Pack Amount/Type:	Riser Length/Type:	
Screen Slot Size:	Permit No.:	Sump Installed/Length:

Depth (ft.)	Sample No.	Blows per 6 in.	Penetration/ Recovery	FID/PID Reading (ppm)	Sample Description	Well Construction	Remarks
				0.0	0-2.9 Gravel, fill, organic matter		
				1.9	2.9-4.1 Silty clay, low to med. plastic,		
			4.6/5	2.0	dry to slight moist, mottled,		
				2.0	medium stiff, DYB 10YR 4/4 to DYB 10YR 3/6. Gravel throughout (~10%)		
					4.1-4.6 Clay, stiff, much more gravel ~20% dry, mottled, DYB 10YR 3/6.		
					5.0-8.9		
				2.3	Clay, stiff (hand), HC odor, dry		
				2.9	to moist, no gravel, DYB 10YR 4/4		
			5/5	1.3	to 10YR 3/6		
				1.6	8.9-10 Same as above, more micaceous, moist, HC odor, DYB 10YR 3/6		
				0.2	10+ Recovery 0.8/5		
					Clay, same as 5-8.9		

Sample (4-6) @ 1445

Sample (6-8) @ 1505

Boring Log

Project Name:	**Project No:**	**Boring No:** TSS-5
Location:	State Plane Coords.: X= Y=	**Well No:**
Drilling Contractor:	Water Table Depth:	Date Started: 8/8/12
Geologist:	Drilling Equip.:	Date Comp.: 8/8/12
Sampling Method:	Size/Type of Bit:	Weather Cond.:
FID/PID Used:	Development Method:	Hammer Weight/Fall:
Soil Class System:		Total Depth:
	Well Yield:	Ref. Elevation:
Screen Length/Type:	Riser Stickup:	Notes:
Sand Pack Amount/Type:	Riser Length/Type:	
Screen Slot Size:	Permit No.:	Sump Installed/Length:

Depth (ft.)	Sample No.	Blows per 6 in.	Penetration/ Recovery	FID/PID Reading (ppm)	Sample Description	Well Construction	Remarks
				0.0	0-2.6 Gravel, rocks, organic material and silt.		
				0.1			
			4/5	0.0	2.6-4.0 Silty clay, dry to moist, low to med plasticity, mottled throughout, micaceous with consistent gravel (15%) DYB 10YR 3/6		
				0.0			
				0.5			
				0.7	5-10 - Same as above, HC odor and black staining 5-9' BGS, med to high plastic, gravels.		
				1.7			
				1.8	Refusal 10.4' BGS.		
				1.3			
					10+ No recovery		

Sampled (5-7) @ 1230

Sampled (7-9) @ 1245

Boring Log

Project Name:	**Project No:**	**Boring No:** TSS-6
Location:	State Plane Coords.: X= Y=	**Well No:**
Drilling Contractor:	Water Table Depth:	Date Started: 8/8/12
Geologist:	Drilling Equip.:	Date Comp.: 8/8/12
Sampling Method:	Size/Type of Bit:	Weather Cond.: 95F
FID/PID Used:	Development Method:	Hammer Weight/Fall:
Soil Class System:		Total Depth:
	Well Yield:	Ref. Elevation:
Screen Length/Type:	Riser Stickup:	Notes:
Sand Pack Amount/Type:	Riser Length/Type:	
Screen Slot Size:	Permit No.:	Sump Installed/Length:

Depth (ft.)	Sample No.	Blows per 6 in.	Penetration/ Recovery	FID/PID Reading (ppm)	Sample Description	Well Construction	Remarks
0					0-0.4 Grass + organic material		
				0.0	0.4-3.8 Clayey silt, v. low plasticity, dry, with		
				0.0	gravel and some organic matter		
			4/5	0.1	dark-yel-brn 10YR 4/4		
				0.2	3.8-4.0 Silty clay, micaceous, high plasticity, dry to moist with some gravel, dark-yel-brn 10YR 3/4. med-soft		
			1.9/5	0.8	4.0-5.1 clay, micaceous, high plastic, moist w/ some small gravel. Dark		
				0.3	yel-brn 10YR 3/4.		
				0.0	5.1-5.9 Same as above, mottling, low plastic, dry to moist, stiff		
			5/5	0.5	10-12.4 Clay, high plastic, moist		
				0.2	with gravel, dark-olive-brn		
				0.0	2.5Y 3/3, stiff		
				0.0	12.4-15 Same as above, soft to med-stiff		
				0.0	w/ mottling.		

Sampled (3.8-5.8) @ 0945

Sampled (10-12) @ 1000

Boring Log

Project Name:	**Project No:**	**Boring No:** TSS-#7
Location:	State Plane Coords.: X= Y=	**Well No:**
Drilling Contractor:	Water Table Depth:	Date Started: 8/8/12
Geologist:	Drilling Equip.:	Date Comp.: 8/8/12
Sampling Method:	Size/Type of Bit:	Weather Cond.: 95F
FID/PID Used:	Development Method:	Hammer Weight/Fall:
Soil Class System:		Total Depth:
	Well Yield:	Ref. Elevation:
Screen Length/Type:	Riser Stickup:	Notes:
Sand Pack Amount/Type:	Riser Length/Type:	
Screen Slot Size:	Permit No.:	Sump Installed/Length:

Depth (ft.)	Sample No.	Blows per 6 in.	Penetration/ Recovery	FID/PID Reading (ppm)	Sample Description	Well Construction	Remarks
0				0.0	0-4 Gravel, rocks, fill material w/ organics; v. dry silty clay, stiff yellowish-brn 10YR 5/6		
			4/5	0.0			
				0.0			
				0.0			
			---	0.3	5-7.7 Silty clay, dry to moist, low to med. plastic, slightly micaceous, some gravel; stiff, DYB 10YR 3/6		
				0.2			
			3.3/5	0.2			
				0.1	7.7-8.3 Same as above, but moist, some mottling, no colors		

				0.1	10-13.6 Clay, stiff, dry to slightly moist, some gravel (10%), micaceous, no staining. DYB 10YR 4/4		
			5/5	0.1			
				0.1			
				0.0	13.6-15 Same as above, less mica and a little more stiff than 10-13.6. DYB 10YR 3/6 to DYB 10YR 4/6		

Sampled (4-6) @ 1420
Sampled (10-12) @ 1430

Boring Log

Project Name:	**Project No:**	**Boring No:** TSS-8
Location:	State Plane Coords.: X= Y=	**Well No:**
Drilling Contractor:	Water Table Depth:	Date Started: 8/8/12
Geologist: BAS	Drilling Equip.:	Date Comp.: 8/8/12
Sampling Method:	Size/Type of Bit:	Weather Cond.: 95F
FID/PID Used:	Development Method:	Hammer Weight/Fall:
Soil Class System:		Total Depth:
	Well Yield:	Ref. Elevation:
Screen Length/Type:	Riser Stickup:	Notes:
Sand Pack Amount/Type:	Riser Length/Type:	
Screen Slot Size:	Permit No.:	Sump Installed/Length:

Depth (ft.)	Sample No.	Blows per 6 in.	Penetration/ Recovery	FID/PID Reading (ppm)	Sample Description	Well Construction	Remarks
0				0.0	0-2.3 Gravel, fill and plastic debris		
				0.0	2.3-4 Silty clay, micaceous, low to		
			4/5	0.0	med plasticity, dry to moist		
				0.0	no odor, gravel (15%) DYB 10YR 4/4		
					to DYR 3/4		
				0.2	4-5.1 Clay, med stiff, dry, low plastic,		
				0.3	no odor, gravel (5%), mottled		
			5/5	0.2	DYB 10YR 3/4		
				0.1	5.1-10.0 Same as above, but dry to moist		
					med. plastic, fewer gravel. DYB10YR4/4		
				0.3	no mottling.		
				0.2			
			4.6/5	0.2			
				0.1			
				0.0			

Sample (4-6) @ 1315 Dup (13-15) @ 1400

Sample (10-12) @ 1335

Boring Log

Project Name:	QDI	Project No:		Boring No:	TSS-9
Location:		State Plane Coords.:	X= Y=	Well No:	
Drilling Contractor:		Water Table Depth:		Date Started:	8/8/12
Geologist:	MAS	Drilling Equip.:		Date Comp.:	8/8/12
Sampling Method:		Size/Type of Bit:		Weather Cond.:	Sunny 80
FID/PID Used:		Development Method:		Hammer Weight/Fall:	
Soil Class System:				Total Depth:	
		Well Yield:		Ref. Elevation:	
Screen Length/Type:		Riser Stickup:		Notes:	
Sand Pack Amount/Type:		Riser Length/Type:			
Screen Slot Size:		Permit No.:		Sump Installed/Length:	

Depth (ft.)	Sample No.	Blows per 6 in.	Penetration/ Recovery	FID/PID Reading (ppm)	Sample Description	Well Construction	Remarks
0				0.2	0-1.2' Organic matter, straw, grass w/ gravel		
			5/5	0.1 0.2	1.2-3.5 Silty clay, loose, dry, with gravel and organic matter dark yellowish brn 10YR 4/4 - low plasticity		
				0.1 0.1	3.5-5 Same as above, but w/ fewer gravel and organic matter.		
			5/5	0.3 0.3	5-6.6 Clay, soft to med. stiff, dry to moist w/ gravel, dark yel-brn 10YR 3/6, low plasticity		
				0.3 0.5 0.2	6.6-7.6 Same as above, some plastic garbage fragments, moist, dark yel-brn 10YR 3/6 also some black staining		
			5/5	0.0 0.0 0.0 0.0	7.6-10 Silty clay, trace gravels, moist, slightly micaceous, drk-yell-brn 10YR 3/4 10-11.9 Clay, med. stiff, high plasticity, moist, 10YR 4/3 brown, w/ trace gravel 11.9-15 Same as above - no gravel.		
		Pile stops ~12'					

Sampled 6.5-8.5 ~~[illegible]~~ 0915
Sampled 4-6 + Duplicate (17-19)
0900 0930

APPENDIX C-3

PSA Boring Logs

Boring Log

Project Name: ADI- Institute NV	**Project No:**	**Boring No:** PSA-1
Location: Polymer Spill Area	State Plane Coords.: X= Y=	**Well No:**
Drilling Contractor: SAIC	Water Table Depth:	Date Started: 8/7/12
Geologist: B. Sattler	Drilling Equip.: Geoprobe 7822	Date Comp.: 8/7/12
Sampling Method: Macrocore	Size/Type of Bit:	Weather Cond.: Humid, 80F
FID/PID Used: Rae 3000 # 904743	Development Method: NA	Hammer Weight/Fall: —
Soil Class System: USCS	Well Yield: NA	Total Depth: 8' BGS
Screen Length/Type: NA	Riser Stickup: NA	Ref. Elevation: GS
Sand Pack Amount/Type: NA	Riser Length/Type: NA	Notes:
Screen Slot Size: NA	Permit No.: NA	Sump Installed/Length:

Depth (ft.)	Sample No.	Blows per 6 in.	Penetration/ Recovery	FID/PID Reading (ppm)	Sample Description	Well Construction	Remarks
0					0-1 Rocks and cobbles with organic matter		
				0.0			
				0.0	1-2.8 CLAY, med. stiff, dark-red-brn 5YR 3/4, dry, low-med plasticity		
				0.0			
2			3.7/4	0.0			
				0.0	2.8-3.7 Same as above, dry to moist		
3				0.0			
				0.0			
4					4-6.5 no recovery		
5							
6			1.5/4				
				0.0	6.5-7.5 clay, med[redacted] stiff, reddish brn, 5YR 4/4, [redacted] dry, low-med plasticity		
7							
				0.0	7.5-8, clay, medium stiff 5YR 3/2 dark reddish brown, low moist medium-high plasticity		
8							

Sampled 0-2

Sampled ~6.3-8 - Collected dup

Boring Log

Project Name:	QDI - Institute	**Project No:**	—	**Boring No:**	PSA-2
Location:	PSA-2	State Plane Coords.:	X= — Y= —	**Well No:**	
Drilling Contractor:	SAIC	Water Table Depth:	—	Date Started:	8/7/12
Geologist:	BAS	Drilling Equip.:	7780	Date Comp.:	8/7/12
Sampling Method:	Macro core	Size/Type of Bit:	2"	Weather Cond.:	Hum. 8, Sunny, 50°F
FID/PID Used:	Rae 3000	Development Method:	—	Hammer Weight/Fall:	
Soil Class System:	USGS			Total Depth:	
		Well Yield:	—	Ref. Elevation:	
Screen Length/Type:	—	Riser Stickup:	—	Notes:	
Sand Pack Amount/Type:	—	Riser Length/Type:	—		
Screen Slot Size:	—	Permit No.:	—	Sump Installed/Length:	

Depth (ft.)	Sample No.	Blows per 6 in.	Penetration/ Recovery	FID/PID Reading (ppm)	Sample Description	Well Construction	Remarks
0					0-2 cobble, rocks, organic matter		
				0.0			
1				0.0			
				0.0			
2			3.7/4	0.0	2-3.2 clay, dry, 5YR 4/4 reddish brown, low plasicity, stiff		
				0.0			
3				0.0	3.2-4 clay, low moisture, 5YR 3/3 dark reddish brown, med-high plasicity		
				0.0			
4					4-5.2 no recovery		
5					5.2-7 clay, low moisture 5YR 3/4 dark, reddish brown, med-high plasicity, medium stiff		
				0.0			
6			2.10/4	0.0			
				0.0			
7				0.0	7-8 clay, low moisture 5YR 3/2 dark, reddish brown, med-high plasicity, medium stiff		
				0.0			
8							

Sampled 0-2
Sampled 6-8

APPENDIX C-4

WWTP Boring Logs

Boring Log

Project Name:	**Project No:**	**Boring No:** WLOTP-1
Location:	State Plane Coords.: X= Y=	**Well No:**
Drilling Contractor:	Water Table Depth:	Date Started: 8/7/12
Geologist: BAS	Drilling Equip.:	Date Comp.: 8/7/12
Sampling Method:	Size/Type of Bit:	Weather Cond.: Sunny 95 & Humid
FID/PID Used:	Development Method:	Hammer Weight/Fall:
Soil Class System:		Total Depth:
	Well Yield:	Ref. Elevation:
Screen Length/Type:	Riser Stickup:	Notes:
Sand Pack Amount/Type:	Riser Length/Type:	
Screen Slot Size:	Permit No.:	Sump Installed/Length:

Depth (ft.)	Sample No.	Blows per 6 in.	Penetration/ Recovery	FID/PID Reading (ppm)	Sample Description	Well Construction	Remarks
					Max PID = 3.2 Dug 13" BGS 0-13" Reddish brn clay 5YR 4/4 dry to moist w/ organic matter.		

Boring Log

Project Name: QDI	**Project No:**	**Boring No:** WWTP-2
Location:	State Plane Coords.: X= Y=	**Well No:**
Drilling Contractor:	Water Table Depth:	Date Started: 8/7/12
Geologist: BAS	Drilling Equip.:	Date Comp.: 8/7/12
Sampling Method:	Size/Type of Bit:	Weather Cond.: 95F
FID/PID Used:	Development Method:	Hammer Weight/Fall:
Soil Class System:		Total Depth:
	Well Yield:	Ref. Elevation:
Screen Length/Type:	Riser Stickup:	Notes:
Sand Pack Amount/Type:	Riser Length/Type:	
Screen Slot Size:	Permit No.:	Sump Installed/Length:

Depth (ft.)	Sample No.	Blows per 6 in.	Penetration/ Recovery	FID/PID Reading (ppm)	Sample Description	Well Construction	Remarks
					Dug down 12"		
					Grabbed VOCs		
					Composite PAH, SVOC		
					MAX PID = 0.9		
					Cobbles + rocks and fine to med SAND, dry, reddish-brn 5YR 4/4		

APPENDIX C-5

WTA Boring Logs

Boring Log

Project Name:	**Project No:**	**Boring No:** WTA-1
Location:	State Plane Coords.: X= Y=	**Well No:**
Drilling Contractor:	Water Table Depth:	Date Started: 8/9/12
Geologist: BAS	Drilling Equip.:	Date Comp.: 8/9/12
Sampling Method:	Size/Type of Bit:	Weather Cond.: Humid 90F
FID/PID Used:	Development Method:	Hammer Weight/Fall:
Soil Class System:		Total Depth:
	Well Yield:	Ref. Elevation:
Screen Length/Type:	Riser Stickup:	Notes:
Sand Pack Amount/Type:	Riser Length/Type:	
Screen Slot Size:	Permit No.:	Sump Installed/Length:

Depth (ft.)	Sample No.	Blows per 6 in.	Penetration/ Recovery	FID/PID Reading (ppm)	Sample Description	Well Construction	Remarks
				0.0	0-1.1 Organic matter + gravel		
				0.7	1.3-3.6 Clay, stiff, low plastic, mottled,		
				0.2	micaceous, dry - Strong brown 7.5YR 4/6		
				0.9	3.6-5 Same as above; much more		
				0.5	gravel, stiffer.		
				0.2	5-6.8 Clay, stiff, low to med. plastic		
				0.6	micaceous, dry - strong brown 7.5YR 4/6		
				0.2	weathered rock 6.8-7.0		
				0.7	7.0-10 Same as 5-6.8, less mica and		
				0.1	a little more moist.		
				0.2	10-13 Clay, stiff, low plastic, gravelly, dry		
				0.1	strong brown 7.5YR 4/6		
				0.1	13' Complete Refusal		

(3-5) @ 1700 Dup (1-2) @ 1650
(7-9) @ 1720
(11-13) @ 1730

Boring Log

Project Name:	**Project No:**	**Boring No:** WTA-2
Location:	State Plane Coords.: X= Y=	**Well No:**
Drilling Contractor:	Water Table Depth:	Date Started: 8/9/12
Geologist: BAS	Drilling Equip.:	Date Comp.: 8/9/12
Sampling Method:	Size/Type of Bit:	Weather Cond.:
FID/PID Used:	Development Method:	Hammer Weight/Fall:
Soil Class System:		Total Depth:
	Well Yield:	Ref. Elevation:
Screen Length/Type:	Riser Stickup:	Notes:
Sand Pack Amount/Type:	Riser Length/Type:	
Screen Slot Size:	Permit No.:	Sump Installed/Length:

Depth (ft.)	Sample No.	Blows per 6 in.	Penetration/ Recovery	FID/PID Reading (ppm)	Sample Description	Well Construction	Remarks
					0-0.4 - Organics		
				0.2	0.4-0.7 weathered rock + gravel		
					0.7-1.3 clay, stiff to med-soft, high plasticity		
					HC odor (reddish-brown) 5YR 4/4. some mica, dry to moist		
			4/5				
				20.6	1.3-1.6 Same as above, chemical staining HC odor		
				23.9	1.6-4 Same as 0.7-1.3		
				3.9			
					5-6 Clay, soft to med soft, some black striations, moist, gravelly, DRB 5YR 3/4		
				0.8			
			5/5	0.6	6-8.3 Same as above, no striations, more gravelly		
				0.4	8.3-10 Same as above, moist to wet, fewer gravels		
				0.4			
				0.3			
					Clay, soft to med. stiff, moist, gravelly		
				0.4	10-11 DRB 5YR 3/4,		
				1.0			
				17.5	11-13 Same as above, HC odor, green staining		
				96.4			
				130.1			

(3-5) @ 1800

(5-7) @ 1815

(12-13) @ 1830

APPENDIX D

TMP Logs

Boring Log

Project Name: QDI	**Project No:**	**Boring No:** TMP 1
Location:	State Plane Coords.: X= Y=	**Well No:**
Drilling Contractor: SAIC	Water Table Depth:	Date Started: 8/7/12
Geologist: BAS	Drilling Equip.: Geoprobe	Date Comp.: 8/7/12
Sampling Method:	Size/Type of Bit: 3" DP	Weather Cond.: Hot 90F
FID/PID Used: RAE 3000	Development Method:	Hammer Weight/Fall:
Soil Class System:		Total Depth:
	Well Yield: No Yield	Ref. Elevation:
Screen Length/Type: 5'	Riser Stickup: 12.5"	Notes:
Sand Pack Amount/Type:	Riser Length/Type: 21'	
Screen Slot Size:	Permit No.:	Sump Installed/Length:

Depth (ft.)	Sample No.	Blows per 6 in.	Penetration/ Recovery	FID/PID Reading (ppm)	Sample Description	Well Construction	Remarks
					PID BZ = 0.0		
					No soil samples / descriptions		
					5' Prepack Screen		
							1" Sch 40 PVC Riser 21-0
							3/8 bentonite pellet to 0'
							#0 sand to 18'
					21		5' Screen 0.010 Slot Prepack #0
					26		

Polymer Spill Area

Boring Log

Project Name: QDI-WU	**Project No:**	**Boring No:** TMP-2
Location:	State Plane Coords.: X= Y=	**Well No:**
Drilling Contractor: SAIC	Water Table Depth:	Date Started: 8/7/12
Geologist: BAS	Drilling Equip.: Geoprobe	Date Comp.: 8/7/12
Sampling Method:	Size/Type of Bit: 3" DP	Weather Cond.: Hot 90F
FID/PID Used: Rae 3000	Development Method: Peristaltic	Hammer Weight/Fall:
Soil Class System:		Total Depth: 28
	Well Yield:	Ref. Elevation:
Screen Length/Type: 0.010 Slot Sch 40 PVC	Riser Stickup: 12"	Notes:
Sand Pack Amount/Type: Prepack #0	Riser Length/Type: 1" Sch 40 PVC 23'	
Screen Slot Size:	Permit No.:	Sump Installed/Length:

Depth (ft.)	Sample No.	Blows per 6 in.	Penetration/ Recovery	FID/PID Reading (ppm)	Sample Description	Well Construction	Remarks
					PID BZ=0 BG=0.0		
					No soil samples/descriptions		
					5' Prepack screen		
					#0 Sand to		
							1" Sch 40 Riser
							23-0
							5/8" bentonite pellet to surface
							#0 sand to 21' BGS
						23	5' Screen 0.010 Slot Prepack #0
					End of boring 28'	28	

Roughly mid point between MW103 & TMP-5

Boring Log

Project Name: QDI - WV	**Project No:**	**Boring No:** TMP-3
Location:	**State Plane Coords.:** X= Y=	**Well No:**
Drilling Contractor: SAIC	**Water Table Depth:**	**Date Started:** 8/7/12
Geologist: BAS	**Drilling Equip.:** Geoprobe	**Date Comp.:** 8/7/12
Sampling Method:	**Size/Type of Bit:** 3" DP Rods	**Weather Cond.:** Humid 85F
FID/PID Used: Rae 3000	**Development Method:** Peristaltic	**Hammer Weight/Fall:**
Soil Class System:		**Total Depth:** 25'
	Well Yield:	**Ref. Elevation:**
Screen Length/Type: 5' PVC 0.010	**Riser Stickup:** 7"	**Notes:**
Sand Pack Amount/Type:	**Riser Length/Type:** 20'	
Screen Slot Size: 0.010 slot prepack	**Permit No.:**	**Sump Installed/Length:**

Depth (ft.)	Sample No.	Blows per 6 in.	Penetration/ Recovery	FID/PID Reading (ppm)	Sample Description	Well Construction	Remarks
0					No soil descriptions or samples collected here.		
					PID BZ = 0.0 BG = 0.0 Refusal @ 25' BGS		
							1" Sch 40 PVC Riser 20-0
							3/8" bentonite pellet to 0'
					Materials used 5' screen		50 sand to 17'
						20	sand pack to
							5' 0.0 Slot PVC prepack screen 20
25					End of boring 25'	25	

Just west of TSS mid point between Rte 25 & TSS.

Boring Log

Project Name: QDI	**Project No:**	**Boring No:** TMP-5
Location:	State Plane Coords.: X= Y=	**Well No:**
Drilling Contractor: SAIC	Water Table Depth:	Date Started: 8/7/12
Geologist: BHoffm	Drilling Equip.: Geoprobe	Date Comp.: 8/7/12
Sampling Method:	Size/Type of Bit: 3" DP	Weather Cond.: Hum 85F
FID/PID Used: Rae 3000	Development Method: Peristaltic	Hammer Weight/Fall:
Soil Class System:		Total Depth: 24.6
	Well Yield:	Ref. Elevation:
Screen Length/Type: 15'	Riser Stickup: 6"	Notes:
Sand Pack Amount/Type:	Riser Length/Type: 10	
Screen Slot Size:	Permit No.:	Sump Installed/Length:

Depth (ft.)	Sample No.	Blows per 6 in.	Penetration/ Recovery	FID/PID Reading (ppm)	Sample Description	Well Construction	Remarks
					No soil descriptions or samples collected.		
					PID BZ = 0.0		
					BG = 0.0		
							1" Sch 40 Riser 10-0
							← 3/8" bentonite pellet to 0'
							#0 sand ← to 6'
						10	
							15' of Sch 40 0.010 prepack screen #0
					End of boring 25'	25	

MW-108 temporary replacement

APPENDIX E

APPENDIX E-1

Groundwater Sample Logs
August 2012

SAIC®

GROUNDWATER SAMPLE LOG

Project Name: QDI INSTITUTE, WV
Event: Groundwater Sampling

Project #: 4501020069

Purged/Sampled By: BAS

Date: 8/15/12

Well Identification: MW-109

Circle the diameter of well for (K) : 2 inches K = 0.163; (4 inches K) = 0.653; 6 inches K = 1.469 , 8 inches K = 2.6112

Purge Volume Calculation

Soft Bottom

[**Total Depth (** 27.94 feet) - **Depth to Water (** 19.40 feet)] = feet of water = 8.54

[Feet of w.c. x (**k**) = 5.57 gallons (**1 well volume**)] x 3 = 16.72 gallons (**3 well volumes**)

Purge Information:	**Sampling Information:**
Purge Method: Stainless Steel Submersible Pump	Sample Description: GROUNDWATER
Purge Start Time: 1103	Date / Time Sampled: 8/15/12 - 1200
Purge Rate (gpm): ~0.5	Sampled By: BAS
Purge End Time: 1150	Sample Method: Bailer for VOCs, Pump for all others.
Purged Volume (gallons): 17	No. of Bottles Collected :
Did well purge dry? (Y/N):	Analysis:
Time % Recovered D-W-L	VOCs, SVOCs. Total and dissolved metals (As, Ba, Pb, Fe, Mn, V, pesticides, herbicides, PCBs.

Field Parameter Measurements:

TIME	Turbidity (NTU)	D.O (mg/l)	SPC (umhos) (ms/cm)	TEMP (°c)	PH (s.u.)	~~DTW~~ ORP	Purged Volume
1106	916	6.03	1.02	16.64	6.52	-32	Initial gallons= 1
1116	229	0.66	1.01	16.21	6.29	34	1 well volume gallons= 6
1129	54.7	0.43	1.01	16.24	6.24	62	2 well volumes gallons= 12
1148	41.7	0.35	1.01	16.19	6.25	67	3 well volumes gallons= 17

CURRENT WEATHER CONDITIONS: Humid, overcast 80F

Pump Type / Asset #: 55 Hurricane Water Quality Meter Type / Asset#: U-52 13181

Notes: (odors, sheens, pumping conditions etc...) Initial water dark brown.
Drive-over bolts sheared off inside collar.

SAIC®

GROUNDWATER SAMPLE LOG

Project Name: QDI INSTITUTE, WV
Event: Groundwater Sampling

Project #: 4501020069

Purged/Sampled By: BAS

Date: 8/15/12

Well Identification: MW-105

Circle the diameter of well for (K) : 2 inches K = 0.163; 4 inches K = 0.653; 6 inches K = 1.469 , 8 inches K = 2.6112

Purge Volume Calculation

[**Total Depth** (23.46 feet) - **Depth to Water** (19.57 feet)] = feet of water = 3.89

[Feet of w.c. x (k) = 2.54 gallons (**1 well volume**)] x 3 = 7.62 gallons (**3 well volumes**)

Purge Information:	**Sampling Information:**
Purge Method: Stainless Steel Submersible Pump	Sample Description: GROUNDWATER
Purge Start Time: 0948	Date / Time Sampled: 8/15/12 - 1030
Purge Rate (gpm): 0.5	Sampled By: BAS
Purge End Time: 1022	Sample Method: Bailer for VOCs, Pump for all others.
Purged Volume (gallons): 0.5 gpm / 7.6 gal	No. of Bottles Collected :
Did well purge dry? (Y/N):	Analysis:
Time % Recovered D-W-L	VOCs, SVOCs. Total and dissolved metals (As, Ba, Pb, Fe, Mn, V, pesticides, herbicides, PCBs.

Field Parameter Measurements:

TIME	Turbidity (NTU)	D.O (mg/l)	SPC (umhos) (ms/cm)	TEMP (°c)	PH (s.u.)	DTW ORP	Purged Volume
0949	861	6.29	2.58	17.62	6.63	-130	Initial gallons= 1
0956	269	1.02	2.07	16.96	6.40	-132	1 well volume gallons= 2.5
1010	267	0.55	1.84	17.15	6.30	-133	2 well volumes gallons= 5
1020	180	0.47	1.72	17.27	6.28	-133	3 well volumes gallons= 7.5+

CURRENT WEATHER CONDITIONS: Humid 80F

Pump Type / Asset #: SS Hurricane Water Quality Meter Type / Asset#: U-52 13181

Notes: (odors, sheens, pumping conditions etc...) Water brown, v. slight H2S odor
Diss met. field filtered.

SAIC®

GROUNDWATER SAMPLE LOG

Project Name: QDI INSTITUTE, WV
Event: Groundwater Sampling
Purged/Sampled By: BAS

Project #: 4501020069
Date: 8/15/12

Well Identification: MW-104

Circle the diameter of well for (K) : 2 inches K = 0.163; 4 inches K = 0.653; 6 inches K = 1.469 , 8 inches K = 2.6112

Purge Volume Calculation

[**Total Depth (** 21.93 feet) - **Depth to Water (** 9.04 feet)] = feet of water = 12.89

[Feet of w.c. x (**k**) = 8.41 gallons (**1 well volume**)] x 3 = 25.25 gallons (**3 well volumes**)

Purge Information:	**Sampling Information:**
Purge Method: Stainless Steel Submersible Pump	Sample Description: GROUNDWATER
Purge Start Time: 0808	Date / Time Sampled: 8/15/12 - 0900
Purge Rate (gpm): 1 gpm	Sampled By: BAS
Purge End Time: 0843	Sample Method: Bailer for VOCs, Pump for all others.
Purged Volume (gallons): ~27	No. of Bottles Collected :
Did well purge dry? (Y/N):	Analysis:
Time % Recovered D-W-L	VOCs, SVOCs. Total and dissolved metals (As, Ba, Pb, Fe, Mn, V, pesticides, herbicides, PCBs.

Field Parameter Measurements:

TIME	Turbidity (NTU)	D.O (mg/l)	SPC (umhos) (ms/cm)	TEMP (°c)	PH (s.u.)	DTW ORP	Purged Volume
0811	206	6.08	1.23	18.13	6.75	-184	Initial gallons= 3
0820	47.0	1.19	1.16	18.41	6.74	-179	1 well volume gallons= 8
0829	48.0	1.22	1.08	18.66	6.73	-177	2 well volumes gallons= 18
0838	41.2	0.79	1.06	18.87	6.72	-175	3 well volumes gallons= 27

CURRENT WEATHER CONDITIONS:

Pump Type / Asset #: SS Hurricane Water Quality Meter Type / Asset#: U-52 13181

Notes: (odors, sheens, pumping conditions etc...) Dup ID: MW-112 @ 1300

Overcast, humid 80F HC odor, no sheen - Diss met. field filtered.

SAIC®

GROUNDWATER SAMPLE LOG

Project Name: QDI INSTITUTE, WV
Event: Groundwater Sampling

Project #: 4501020069

Purged/Sampled By: BAS

Date: 8/15/12

Well Identification: MW-103

Circle the diameter of well for (K) : 2 inches K = 0.163; (4 inches) K = 0.653; 6 inches K = 1.469 , 8 inches K = 2.6112

Purge Volume Calculation

[**Total Depth (** 27.73 feet) - **Depth to Water (** 22.06 feet)] = feet of water = 5.67

[Feet of w.c. x (k) = 3.70 gallons (**1 well volume**)] x 3 = 11.10 gallons (**3 well volumes**)

Purge Information:	**Sampling Information:**
Purge Method: Stainless Steel Submersible Pump	Sample Description: GROUNDWATER
Purge Start Time: 1327	Date / Time Sampled: 8/15/12 - 1445
Purge Rate (gpm): 0.5	Sampled By: BAS
Purge End Time: 1358	Sample Method: Bailer for VOCs, Pump for all others.
Purged Volume (gallons): 7	No. of Bottles Collected :
Did well purge dry? (Y/N):	Analysis:
Time 1445 / % Recovered / D-W-L 25.11	VOCs, SVOCs. Total and dissolved metals (As, Ba, Pb, Fe, Mn, V, pesticides, herbicides, PCBs.

Field Parameter Measurements:

TIME	Turbidity (NTU)	D.O (mg/l)	SPC (umhos) (ms/cm)	TEMP (°c)	PH (s.u.)	~~DTW~~ ORP	Purged Volume
1329	966	9.13	0.475	17.03	6.46	37	Initial gallons= 1
1345	46.7	7.41	0.459	16.20	5.74	144	1 well volume gallons= 4
							2 well volumes gallons= 8
							3 well volumes gallons= 12

CURRENT WEATHER CONDITIONS: Humid 85F

Pump Type / Asset #: SS Hurricane Water Quality Meter Type / Asset#: U-52 13181

Notes: (odors, sheens, pumping conditions etc...) Initial water brown / very turbid.
well dry @ 7 gallons.

SAIC

GROUNDWATER SAMPLE LOG

Project Name: QDI INSTITUTE, WV
Event: Groundwater Sampling

Project #: 4501020069

Purged/Sampled By: BH

Date: 8/15/12

Well Identification: ~~WWTP-01~~ 2 8/15/12 WWT-1

Circle the diameter of well for (K) : 2 inches K = 0.163; 4 inches K = 0.653; 6 inches K = 1.469 , 8 inches K = 2.6112

(1 inches = 0.041)

Purge Volume Calculation

[Total Depth (10.08 feet) - Depth to Water (9.27 feet)] = feet of water = 0.81 ft

[Feet of w.c. x (k) = ~~0.61~~ 0.033 gallons (1 well volume)] x 3 = 0.09 gallons (3 well volumes)

Purge Information:	Sampling Information:
Purge Method: ~~Stainless Steel Submersible Pump~~ Geopump	Sample Description: GROUNDWATER
Purge Start Time: 0816	Date / Time Sampled: —
Purge Rate (gpm): < 0.25 gpm	Sampled By: —
Purge End Time: 0821	Sample Method: Bailer for VOCs, Pump for all others.
Purged Volume (gallons): < 0.25 gallons	No. of Bottles Collected :
Did well purge dry? (Y/N): DRY	Analysis:
Time / % Recovered / D-W-L	VOCs, SVOCs. Total and dissolved metals (As, Ba, Pb, Fe, Mn, V, pesticides, herbicides, PCBs.

Field Parameter Measurements:

TIME	Turbidity (NTU)	D.O (mg/l)	SPC (umhos) (ms/cm)	TEMP (°c)	PH (s.u.)	DTW	Purged Volume
0819	113	10.54	0.017	21.60	7.91	—	Initial gallons= <0.09
							1 well volume gallons=
							2 well volumes gallons=
							3 well volumes gallons=

CURRENT WEATHER CONDITIONS: 71°F Overcast

Pump Type / Asset #: geopump US4348x Water Quality Meter Type / Asset#: Horiba 6027U

Notes: (odors, sheens, pumping conditions etc...) water dark brown

No sample collected due to insufficient water

SAIC.

GROUNDWATER SAMPLE LOG

Project Name: QDI INSTITUTE, WV
Event: Groundwater Sampling

Project #: 4501020069

Purged/Sampled By: RA

Date: 8/15/12

Well Identification: ~~WWT-02~~ 8/15/12 WWT-02

Circle the diameter of well for (K) : 2 inches K = 0.163; ~~4 inches K = 0.653;~~ 6 inches K = 1.469 , **8 inches K = 2.6112**

1 inch = 0.041

Purge Volume Calculation

[Total Depth (10.21 **feet) - Depth to Water (** _____ feet)] = feet of water =

[Feet of w.c. x (k) = _____ **gallons (1 well volume)]** x 3 = _____ gallons **(3 well volumes)**

Purge Information:	**Sampling Information:**
Purge Method: Stainless Steel Submersible Pump	Sample Description: GROUNDWATER
Purge Start Time:	Date / Time Sampled:
Purge Rate (gpm):	Sampled By:
Purge End Time:	Sample Method: Bailer for VOCs, Pump for all others.
Purged Volume (gallons):	No. of Bottles Collected :
Did well purge dry? (Y/N):	Analysis:
Time % Recovered D-W-L	VOCs, SVOCs. Total and dissolved metals (As, Ba, Pb, Fe, Mn, V, pesticides, herbicides, PCBs.

Field Parameter Measurements:

TIME	Turbidity (NTU)	D.O (mg/l)	SPC (umhos) (ms/cm)	TEMP (°c)	PH (s.u.)	DTW	Purged Volume
							Initial gallons=
							1 well volume gallons=
							2 well volumes gallons=
							3 well volumes gallons=

CURRENT WEATHER CONDITIONS:

Pump Type / Asset #: Water Quality Meter Type / Asset#:

Notes: (odors, sheens, pumping conditions etc...)

well dry.

SAIC

GROUNDWATER SAMPLE LOG

Project Name: QDI INSTITUTE, WV
Event: Groundwater Sampling

Project #: 4501020069

Purged/Sampled By: BH

Date: 8/15/12

Well Identification: TMP-1

Circle the diameter of well for (K) : 2 inches K = 0.163; 4 inches K = 0.653; 6 inches K = 1.469 , 8 inches K = 2.6112

Purge Volume Calculation

[Total Depth (25.12 feet) - **Depth to Water (** feet)] = feet of water =

[Feet of w.c. x (k) = gallons **(1 well volume)]** x 3 = gallons **(3 well volumes)**

Purge Information:	**Sampling Information:**
Purge Method: Stainless Steel Submersible Pump	Sample Description: GROUNDWATER
Purge Start Time:	Date / Time Sampled:
Purge Rate (gpm):	Sampled By:
Purge End Time:	Sample Method: Bailer for VOCs, Pump for all others.
Purged Volume (gallons):	No. of Bottles Collected :
Did well purge dry? (Y/N):	Analysis:
Time **% Recovered** D-W-L	VOCs, SVOCs. Total and dissolved metals (As, Ba, Pb, Fe, Mn, V, pesticides, herbicides, PCBs.

Field Parameter Measurements:

TIME	**Turbidity (NTU)**	**D.O (mg/l)**	**SPC (umhos) (us/cm)**	**TEMP (°c)**	**PH (s.u.)**	**DTW**	**Purged Volume**
							Initial gallons=
							1 well volume gallons=
							2 well volumes gallons=
							3 well volumes gallons=

CURRENT WEATHER CONDITIONS:

Pump Type / Asset #: Water Quality Meter Type / Asset#:

Notes: (odors, sheens, pumping conditions etc...)

No sample due to insufficient water.

SAIC®

GROUNDWATER SAMPLE LOG

Project Name: QDI INSTITUTE, WV
Event: Groundwater Sampling

Project #: 4501020069

Purged/Sampled By: [illegible]

Date: 8/15/12

Well Identification: TMP-~~02~~ 2 8/15/12

Circle the diameter of well for (K) : 2 inches K = 0.163; 4 inches K = 0.653; 6 inches K = 1.469 , 8 inches K = 2.6112

1 inches = 0.041

Purge Volume Calculation

[Total Depth (30.01 **feet) - Depth to Water (** 19.92 **feet)]** = feet of water = 10.09

[Feet of w.c. x (k) = 0.42 gallons (1 well volume)] x 3 = 1.25 gallons **(3 well volumes)**

Purge Information:	**Sampling Information:**
Purge Method: ~~Stainless Steel Submersible Pump~~ geopump	Sample Description: GROUNDWATER
Purge Start Time: 1035	Date / Time Sampled: 8/15/12 1100
Purge Rate (gpm): < 0.25 gpm	Sampled By: [illegible]
Purge End Time: 1053	Sample Method: Bailer for VOCs, Pump for all others.
Purged Volume (gallons): 1.5	No. of Bottles Collected : 14
Did well purge dry? (Y/N): N	Analysis:
Time / % Recovered / D-W-L	VOCs, SVOCs. Total and dissolved metals (As, Ba, Pb, Fe, Mn, V, pesticides, herbicides, PCBs.

Field Parameter Measurements:

TIME	Turbidity (NTU)	D.O (mg/l)	SPC (umhos) (ms/cm)	TEMP (°c)	PH (s.u.)	~~DTW~~ ORP	Purged Volume
1037	>800	10.19	1.33	17.41	7.79	72	Initial gallons= 0
1042	>800	8.76	1.35	15.99	7.73	77	1 well volume gallons= 0.5
1047	>800	1.45	1.34	15.71	7.62	85	2 well volumes gallons= 1.0
1050	358	1.70	1.35	15.27	7.49	85	3 well volumes gallons= 1.5

CURRENT WEATHER CONDITIONS: overcast 70°F

Pump Type / Asset #: geopump Water Quality Meter Type / Asset#: [illegible]

Notes: (odors, sheens, pumping conditions etc...) overcast 70°F

brown to clear water

SAIC

GROUNDWATER SAMPLE LOG

Project Name: QDI INSTITUTE, WV
Event: Groundwater Sampling

Project #: 4501020069

Purged/Sampled By: BH

Date: 8/15/12

Well Identification: TMP-3

Circle the diameter of well for (K) : 2 inches K = 0.163; 4 inches K = 0.653; 6 inches K = 1.469 , 8 inches K = 2.6112
1 inch = 0.041

Purge Volume Calculation

[**Total Depth (** 26.98 feet) - **Depth to Water (** 18.36 feet)] = feet of water = 8.62

[Feet of w.c. x (k) = 0.35 gallons (**1 well volume**)] x 3 = 1.06 gallons (**3 well volumes**)

Purge Information:	**Sampling Information:**
Purge Method: ~~Stainless Steel Submersible Pump~~ geopump	Sample Description: GROUNDWATER
Purge Start Time: 1248	Date / Time Sampled: 8/15/12 1315
Purge Rate (gpm): < 0.25 gpm	Sampled By: BH
Purge End Time: 1307	Sample Method: Bailer for VOCs, Pump for all others.
Purged Volume (gallons): 1.5 ~~+.25~~ 8/15/12 gallons	No. of Bottles Collected : 14
Did well purge dry? (Y/N):	Analysis:
Time % Recovered D-W-L	VOCs, SVOCs. Total and dissolved metals (As, Ba, Pb, Fe, Mn, V, pesticides, herbicides, PCBs.

Field Parameter Measurements:

TIME	Turbidity (NTU)	D.O (mg/l)	SPC (umhos) (ms/cm)	TEMP (°c)	PH (s.u.)	~~DTW~~ ORP	Purged Volume
1250	178	4.95	1.35	18.35	7.62	-152	Initial gallons=
1255	>800	1.86	1.34	15.07	7.63	-113	1 well volume gallons= 0.5
1300	>800	1.47	1.36	15.37	7.73	-63	2 well volumes gallons= 1.00
1305	292	3.24	1.36	15.05	7.72	-84	3 well volumes gallons= 1.5

CURRENT WEATHER CONDITIONS:

Pump Type / Asset #: geopump Water Quality Meter Type / Asset#: horiba

Notes: (odors, sheens, pumping conditions etc...) Clear to brown to clear

SAIC.

GROUNDWATER SAMPLE LOG

Project Name: QDI INSTITUTE, WV
Event: Groundwater Sampling

Project #: 4501020069

Purged/Sampled By: BH

Date: 8/15/12

Well Identification: TMP-5 8/15/12

Circle the diameter of well for (K) : 2 inches K = 0.163; 4 inches K = 0.653; 6 inches K = 1.469 , 8 inches K = 2.6112

1 inches = 0.041

Purge Volume Calculation

[Total Depth (25.95 feet) - **Depth to Water (** 18.67 feet)] = feet of water = 7.28

[Feet of w.c. x (k) = 0.30 **gallons (1 well volume)]** x 3 = 0.90 **gallons (3 well volumes)**

Purge Information:	Sampling Information:
Purge Method: ~~Stainless Steel Submersible Pump~~ geopump	Sample Description: GROUNDWATER
Purge Start Time: 0911	Date / Time Sampled: 8/15/12 0930
Purge Rate (gpm): < 0.1 gallons per min	Sampled By: TSH
Purge End Time: 0924	Sample Method: Bailer for VOCs, Pump for all others.
Purged Volume (gallons): ≈ 1 gallon	No. of Bottles Collected : 14
Did well purge dry? (Y/N): N	Analysis:
Time / % Recovered / D-W-L	VOCs, SVOCs. Total and dissolved metals (As, Ba, Pb, Fe, Mn, V, pesticides, herbicides, PCBs.

Field Parameter Measurements:

TIME	Turbidity (NTU)	D.O (mg/l)	SPC (umhos) (ms/cm)	TEMP (°c)	PH (s.u.)	DTW	Purged Volume
0911	>800	2.30	1.63	17.40	9.43	-	Initial gallons=
0917	>800	0.83	1.40	16.22	8.92	19.42ft	1 well volume gallons= 0.3
0919	>800	1.19	1.30	16.18	8.33	19.63ft	2 well volumes gallons= 0.6
0922	>800	0.06	1.23	15.79	8.03	19.68ft	3 well volumes gallons= 1.0

CURRENT WEATHER CONDITIONS: overcast 70°F

Pump Type / Asset #: geopump Water Quality Meter Type / Asset#: horiba

Notes: (odors, sheens, pumping conditions etc...) brown ~~to clear~~ to clear 8/15/12

SAIC

GROUNDWATER SAMPLE LOG

Project Name: QDI INSTITUTE, WV
Event: Groundwater Sampling

Project #: 4501020069

Purged/Sampled By: BAS

Date: 8/15/12

Well Identification: mw-106

Circle the diameter of well for (K) : 2 inches K = 0.163; 4 inches K = 0.653; 6 inches K = 1.469 , 8 inches K = 2.6112

Purge Volume Calculation

[**Total Depth (** 34.04 **feet) - Depth to Water (** 20.10 feet)] = feet of water = 13.94

[Feet of w.c. x (k) = 9.10 **gallons (1 well volume)**] x 3 = 27.30 gallons **(3 well volumes)**

Purge Information:	**Sampling Information:**
Purge Method: Stainless Steel Submersible Pump	Sample Description: GROUNDWATER
Purge Start Time: 1537	Date / Time Sampled: 8/15/12 1640
Purge Rate (gpm): <1.0 gpm	Sampled By: ~~BAS~~ BH
Purge End Time: 1631	Sample Method: Bailer for VOCs, Pump for all others.
Purged Volume (gallons): 27.	No. of Bottles Collected : 14
Did well purge dry? (Y/N): N	Analysis:
Time / % Recovered / D-W-L	VOCs, SVOCs. Total and dissolved metals (As, Ba, Pb, Fe, Mn, V, pesticides, herbicides, PCBs.

Field Parameter Measurements:

TIME	Turbidity (NTU)	D.O (mg/l)	SPC (umhos) (ms/cm)	TEMP (°c)	PH (s.u.)	~~DTW~~ ORP	Purged Volume
1543	346	9.52	0.949	16.50	6.59	-21	Initial gallons= 3
1555	~~24~~ 942	0.75	0.947	16.36	6.60	-5	1 well volume gallons= 9
1610	26.3	0.48	0.945	16.02	6.56	6	2 well volumes gallons= 18
1630	34.9	0.30	0.942	16.15	6.57	-7	3 well volumes gallons= 27

CURRENT WEATHER CONDITIONS: Sunny 75°F

Pump Type / Asset #: SS Hurricane

Water Quality Meter Type / Asset#: Horiba

Notes: (odors, sheens, pumping conditions etc...)

water clear during pumping

SAIC.

GROUNDWATER SAMPLE LOG

Project Name: QDI INSTITUTE, WV **Project #: 4501020069**
Event: Groundwater Sampling

Purged/Sampled By: Bit **Date:** 8/16/12

Well Identification: MW-101

Circle the diameter of well for (K) : 2 inches K = 0.163; (4 inches K = 0.653;) 6 inches K = 1.469 , 8 inches K = 2.6112

Purge Volume Calculation

[Total Depth (20.54 feet) - **Depth to Water (** 16.16 feet)] = feet of water = 4.38

[Feet of w.c. x (k) = 2.86 gallons (**1 well volume**)] x 3 = 8.58 gallons (**3 well volumes**)

Purge Information:	**Sampling Information:**
Purge Method: Stainless Steel Submersible Pump	Sample Description: GROUNDWATER
Purge Start Time: 0739	Date / Time Sampled: 8/16/12 0815
Purge Rate (gpm): < 1 gpm	Sampled By: ~~TT~~ BM
Purge End Time: 0803	Sample Method: Bailer for VOCs, Pump for all others.
Purged Volume (gallons): 9 +	No. of Bottles Collected : 14
Did well purge dry? (Y/N): N	Analysis:
Time % Recovered D-W-L	VOCs, SVOCs. Total and dissolved metals (As, Ba, Pb, Fe, Mn, V, pesticides, herbicides, PCBs.

Field Parameter Measurements:

TIME	Turbidity (NTU)	D.O (mg/l)	SPC (umhos) (ms/cm)	TEMP (°c)	PH (s.u.)	ORP ~~DTW~~ ~~OPK~~	Purged Volume
0744	141	0.00	0.842	15.40	5.53	-125	Initial gallons= 1
0748	4.0	0.00	0.853	15.57	5.66	-129	1 well volume gallons= 3
0754	14.7	0.00	0.855	15.49	5.73	-128	2 well volumes gallons= 6
0802	0.0	0.00	0.851	15.45	5.82	-120	3 well volumes gallons= 9

CURRENT WEATHER CONDITIONS: 63°F partly cloudy

Pump Type / Asset #: SS Hurricane Water Quality Meter Type / Asset#: Horiba

Notes: (odors, sheens, pumping conditions etc...) dark brown, water

SAIC®

GROUNDWATER SAMPLE LOG

Project Name: QDI INSTITUTE, WV
Event: Groundwater Sampling

Project #: 4501020069

Purged/Sampled By: :H

Date: 8/16/12

Well Identification: MW-110

Circle the diameter of well for (K) : 2 inches K = 0.163; 4 inches K = 0.653; 6 inches K = 1.469 , 8 inches K = 2.6112

Purge Volume Calculation

[Total Depth (35.45 feet) - **Depth to Water (** 23.36 feet)] = feet of water = 12.09

[Feet of w.c. x (k) = 7.9 gallons **(1 well volume)]** x 3 = 23.7 gallons **(3 well volumes)**

Purge Information:	**Sampling Information:**
Purge Method: Stainless Steel Submersible Pump	Sample Description: GROUNDWATER
Purge Start Time: 1040	Date / Time Sampled: 8/16/12 1140
Purge Rate (gpm): <1 gpm	Sampled By: BH
Purge End Time: 1132	Sample Method: Bailer for VOCs, Pump for all others.
Purged Volume (gallons): 24+	No. of Bottles Collected : 14
Did well purge dry? (Y/N): N	Analysis:
Time % Recovered D-W-L	VOCs, SVOCs. Total and dissolved metals (As, Ba, Pb, Fe, Mn, V, pesticides, herbicides, PCBs.

Field Parameter Measurements:

TIME	Turbidity (NTU)	D.O (mg/l)	SPC (umhos) (ms/cm)	TEMP (°c)	PH (s.u.)	~~DTW~~ ORP	Purged Volume
1048	13.2	1.80	0.838	15.13	5.89	68	Initial gallons= 4
1053	12.6	1.46	0.843	14.87	5.78	82	1 well volume gallons= 6
1113	18.0	0.00	0.852	14.89	5.57	62	2 well volumes gallons= 16
1130	48.1	2.19	0.831	15.16	5.51	71	3 well volumes gallons= 24

CURRENT WEATHER CONDITIONS: Sunny 72°F

Pump Type / Asset #: SS hurricane **Water Quality Meter Type / Asset#:** Horiba

Notes: (odors, sheens, pumping conditions etc…)

SAIC®

GROUNDWATER SAMPLE LOG

Project Name: QDI INSTITUTE, WV
Event: Groundwater Sampling

Project #: 4501020069

Purged/Sampled By: BAS

Date: 8/16/12

Well Identification: MW-102

Circle the diameter of well for (K) : 2 inches K = 0.163; (4 inches) K = 0.653; 6 inches K = 1.469 , 8 inches K = 2.6112

Purge Volume Calculation

[**Total Depth (** 27.10 feet) - **Depth to Water (** 19.38 feet)] = feet of water = 7.72

[Feet of w.c. x (**k**) = 5.04 gallons (**1 well volume**)] x 3 = 15.12 gallons (**3 well volumes**)

Purge Information:	**Sampling Information:**
Purge Method: Stainless Steel Submersible Pump	Sample Description: GROUNDWATER
Purge Start Time: 0941	Date / Time Sampled: 8/16/12 - 1200
Purge Rate (gpm): 0.5	Sampled By: BAS
Purge End Time: 0957	Sample Method: Bailer for VOCs, Pump for all others.
Purged Volume (gallons): 8.5	No. of Bottles Collected :
Did well purge dry? (Y/N):	Analysis:
Time % Recovered D-W-L	VOCs, SVOCs. Total and dissolved metals (As, Ba, Pb, Fe, Mn, V, pesticides, herbicides, PCBs.

Field Parameter Measurements:

TIME	Turbidity (NTU)	D.O (mg/l)	SPC (umhos) (ms/cm)	TEMP (°c)	PH (s.u.)	~~DTW~~ ORP	Purged Volume
0942	>999	7.70	2.38	15.24	6.57	90	Initial gallons= 1
0952	163	4.91	2.36	15.14	6.48	92	1 well volume gallons= 5
							2 well volumes gallons= 10
							3 well volumes gallons= 15

CURRENT WEATHER CONDITIONS: Humid, 80F

Pump Type / Asset #: SS Hurricane Water Quality Meter Type / Asset#: U-52 13181

Notes: (odors, sheens, pumping conditions etc...)

Well dry @ 8.5 gal.

SAIC®

GROUNDWATER SAMPLE LOG

Project Name: QDI INSTITUTE, WV
Event: Groundwater Sampling

Project #: 4501020069

Purged/Sampled By: BAS

Date: 8/16/12

Well Identification: MW-107

Circle the diameter of well for (K) : 2 inches K = 0.163; 4 inches K = 0.653; 6 inches K = 1.469 , 8 inches K = 2.6112

Purge Volume Calculation

[Total Depth (22.35 feet) - **Depth to Water (** 9.77 feet)] = feet of water = 12.58

[Feet of w.c. x **(k)** = 8.21 gallons **(1 well volume)**] x 3 = 24.64 gallons **(3 well volumes)**

Purge Information:	**Sampling Information:**
Purge Method: Stainless Steel Submersible Pump	Sample Description: GROUNDWATER
Purge Start Time: 0740	Date / Time Sampled: 8/16/12 0900
Purge Rate (gpm): 1	Sampled By: BAS
Purge End Time: 0826	Sample Method: Bailer for VOCs, Pump for all others.
Purged Volume (gallons): 27	No. of Bottles Collected :
Did well purge dry? (Y/N): N	Analysis:
Time % Recovered D-W-L	VOCs, SVOCs. Total and dissolved metals (As, Ba, Pb, Fe, Mn, V, pesticides, herbicides, PCBs.

Field Parameter Measurements:

TIME	Turbidity (NTU)	D.O (mg/l)	SPC (umhos) (ms/cm)	TEMP (°c)	PH (s.u.)	DTW	Purged Volume
0743	50.1	5.21	2.30	15.90	6.20	149	Initial gallons= 3
0750	9.7	0.84	2.04	15.53	6.08	170	1 well volume gallons= 9
0815	2.6	0.54	2.01	15.47	6.06	179	2 well volumes gallons= 18
0825	0.7	0.40	2.00	15.44	6.05	185	3 well volumes gallons= 27

CURRENT WEATHER CONDITIONS: Sunny 75F

Pump Type / Asset #: SS Hurricane Water Quality Meter Type / Asset#: U-52 13181

Notes: (odors, sheens, pumping conditions etc...) Dup (MW-113) @ 0930
* Had to stop pump to leave for water xfer. @ 15 gallon

APPENDIX E-2

Groundwater Sample Logs
September 2012

SAIC®

GROUNDWATER SAMPLE LOG

Project Name: QDI INSTITUTE, WV
Event: Groundwater Sampling

Project #: 4501020069

Purged/Sampled By: BH

Date: 9/19/12

Well Identification: MW-102

Circle the diameter of well for (K) : 2 inches K = 0.163; 4 inches K = 0.653; 6 inches K = 1.469 , 8 inches K = 2.6112

Purge Volume Calculation

[Total Depth (27.04 feet) - **Depth to Water (** 19.71 feet)] = feet of water = 7.33

[Feet of w.c. x (k) = 4.79 gallons **(1 well volume)]** x 3 = 14.35 gallons **(3 well volumes)**

Purge Information:	**Sampling Information:**
Purge Method: Stainless Steel Submersible Pump	Sample Description: GROUNDWATER
Purge Start Time: 0738	Date / Time Sampled: 9/19/12 1045
Purge Rate (gpm): < 1gpm	Sampled By: BH
Purge End Time: 0757	Sample Method: Bailer for VOCs, Pump for all others.
Purged Volume (gallons):	No. of Bottles Collected : 7
Did well purge dry? (Y/N): 0757/	Analysis:
Time % Recovered D-W-L	VOCs, SVOCs. Total and dissolved metals (As, Ba, Pb, Fe, Mn, V, pesticides, herbicides, PCBs.

Field Parameter Measurements:

TIME	Turbidity (NTU)	D.O (mg/l)	SPC (umhos) (ms/cm)	TEMP (°c)	PH (s.u.)	~~DTW~~ ORP	Purged Volume
0740	>999	6.61	2.40	16.18	6.52	73	Initial gallons= 2
0757	631	4.02	2.31	16.20	6.60	90	1 well volume gallons= 5
							2 well volumes gallons=
							3 well volumes gallons=

CURRENT WEATHER CONDITIONS:

Pump Type / Asset #: SS Hurricane Water Quality Meter Type / Asset#: 18931

Notes: (odors, sheens, pumping conditions etc...)

well run dry at 0757, after 11 gallons pumped

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GROUNDWATER SAMPLE LOG

Project Name: QDI INSTITUTE, WV
Event: Groundwater Sampling

Project #: 4501020069

Purged/Sampled By: BH

Date: 9/19/12

Well Identification: MW-101

Circle the diameter of well for (K) : 2 inches K = 0.163; (4 inches K = 0.653) 6 inches K = 1.469 , 8 inches K = 2.6112

Purge Volume Calculation

[Total Depth (20.51 feet) - **Depth to Water (** 17.51 feet)] = feet of water = 3 ft

[Feet of w.c. x (k) = 1.959 gallons **(1 well volume)**] x 3 = 5.88 gallons **(3 well volumes)**

Purge Information:	**Sampling Information:**
Purge Method: Stainless Steel Submersible Pump	Sample Description: GROUNDWATER
Purge Start Time: 0800	Date / Time Sampled: 9/19/12 0820
Purge Rate (gpm): 0812	Sampled By: BH
Purge End Time: < 1 gpm	Sample Method: Bailer for VOCs, Pump for all others.
Purged Volume (gallons): 7	No. of Bottles Collected : 7
Did well purge dry? (Y/N):	Analysis:
Time % Recovered D-W-L	VOCs, SVOCs. Total and dissolved metals (As, Ba, Pb, Fe, Mn, V, pesticides, herbicides, PCBs.

Field Parameter Measurements:

TIME	Turbidity (NTU)	D.O (mg/l)	SPC (umhos) (ms/cm)	TEMP (°c)	PH (s.u.)	~~DTW~~ ORP	Purged Volume
0801	312	0.61	0.881	16.12	5.77	-120	Initial gallons= 1
0803	6.9	0.22	0.877	16.18	5.79	-122	1 well volume gallons= 3
0807	13.8	0.20	0.877	16.20	5.82	-130	2 well volumes gallons= 5
0812	20.0	0.16	0.876	16.20	5.90	-131	3 well volumes gallons= 7

CURRENT WEATHER CONDITIONS: Sunny 60°F

Pump Type / Asset #: SS Hurricane Water Quality Meter Type / Asset#: 18831

Notes: (odors, sheens, pumping conditions etc...)

water brown through out purge

SAIC.

GROUNDWATER SAMPLE LOG

Project Name: QDI INSTITUTE, WV **Project #: 4501020069**
Event: Groundwater Sampling

Purged/Sampled By: BAS **Date:** 9/19/12

Well Identification: TMP-1

Circle the diameter of well for (K) : 2 inches K = 0.163; 4 inches K = 0.653; 6 inches K = 1.469 , 8 inches K = 2.6112

1" ***Purge Volume Calculation***

[Total Depth (**feet) - Depth to Water (** 24.68 feet)] = feet of water =

[Feet of w.c. x (k) = **gallons (1 well volume)]** x 3 = gallons **(3 well volumes)**

Purge Information:	**Sampling Information:**
Purge Method: ~~Stainless Steel Submersible Pump~~ Bailer	Sample Description: GROUNDWATER
Purge Start Time: 1140	Date / Time Sampled: 9/19/12 ~~1245~~ 1205
Purge Rate (gpm): —	Sampled By: BAS
Purge End Time:	Sample Method: Bailer for VOCs, Pump for all others.
Purged Volume (gallons):	No. of Bottles Collected : 1
Did well purge dry? (Y/N):	Analysis:
Time % Recovered D-W-L	VOCs, SVOCs. Total and dissolved metals (As, Ba, Pb, Fe, Mn, V, pesticides, herbicides, PCBs.

Field Parameter Measurements:

TIME	Turbidity (NTU)	D.O (mg/l)	SPC (umhos) (ms/cm)	TEMP (°c)	PH (s.u.)	DTW	Purged Volume
							Initial gallons=
							1 well volume gallons=
							2 well volumes gallons=
							3 well volumes gallons=

CURRENT WEATHER CONDITIONS:

Pump Type / Asset #: Water Quality Meter Type / Asset#:

Notes: (odors, sheens, pumping conditions etc...) Was able to grab 35mL from well. Lack of water. Will submit to lab.

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GROUNDWATER SAMPLE LOG

Project Name: QDI INSTITUTE, WV
Event: Groundwater Sampling

Project #: 4501020069

Purged/Sampled By: BAS

Date: 9/19/12

Well Identification: MW-109

Circle the diameter of well for (K) : 2 inches K = 0.163; 4 inches K = 0.653; 6 inches K = 1.469 , 8 inches K = 2.6112

Purge Volume Calculation

[Total Depth (27.96 feet) - **Depth to Water (** 19.80 feet)] = feet of water = 8.16

[Feet of w.c. x (k) = 5.32 gallons **(1 well volume)]** x 3 = 15.98 gallons **(3 well volumes)**

Purge Information:	**Sampling Information:**
Purge Method: Stainless Steel Submersible Pump	Sample Description: GROUNDWATER
Purge Start Time: 0937	Date / Time Sampled: 9/19/12 1030
Purge Rate (gpm): 0.5	Sampled By: BAS
Purge End Time: 1012	Sample Method: Bailer for VOCs, Pump for all others.
Purged Volume (gallons): 16+	No. of Bottles Collected :
Did well purge dry? (Y/N)	Analysis:
Time % Recovered D-W-L	VOCs, SVOCs. Total and dissolved metals (As, Ba, Pb, Fe, Mn, V, ~~pesticides, herbicides, PCB~~s.

Field Parameter Measurements:

TIME	Turbidity (NTU)	D.O (mg/l)	SPC (umhos) (ms/cm)	TEMP (°c)	PH (s.u.)	~~DTW~~ ORP	Purged Volume
0938	7999	5.12	1.04	20.14	6.28	-3	Initial gallons= 1
0950	166	1.01	1.03	20.19	6.27	22	1 well volume gallons= 6
1002	81.3	0.58	1.03	20.22	6.27	52	2 well volumes gallons= 12
1012	70.9	0.52	1.00	20.24	6.30	80	3 well volumes gallons= 16

CURRENT WEATHER CONDITIONS: Sunny 60F

Pump Type / Asset #: SS Hurricane Water Quality Meter Type / Asset#: U-52 57811

Notes: (odors, sheens, pumping conditions etc...)

SAIC.

GROUNDWATER SAMPLE LOG

Project Name: QDI INSTITUTE, WV
Event: Groundwater Sampling

Project #: 4501020069

Purged/Sampled By: BAS

Date: 9/19/12

Well Identification: Tmp-5

Circle the diameter of well for (K) : 2 inches K = 0.163; 4 inches K = 0.653; 6 inches K = 1.469 , 8 inches K = 2.6112

0.041 in.

Purge Volume Calculation

[Total Depth (25.90 **feet) - Depth to Water (** 19.01 **feet)]** = feet of water = 6.89

[Feet of w.c. x **(k)** = 0.27 **gallons (1 well volume)]** x 3 = 0.84 gallons **(3 well volumes)**

Purge Information:	**Sampling Information:**
Purge Method: Stainless Steel Submersible Pump	Sample Description: GROUNDWATER
Purge Start Time: 1156	Date / Time Sampled: 9/19/12 1230
Purge Rate (gpm): 100 mL/min	Sampled By: BAS
Purge End Time: 1210	Sample Method: Bailer for VOCs, Pump for all others.
Purged Volume (gallons): ~1	No. of Bottles Collected :
Did well purge dry? (Y/N)	Analysis:
Time % Recovered D-W-L	VOCs, SVOCs. Total and dissolved metals (As, Ba, Pb, Fe, Mn, V, ~~pesticides, herbicides, PCBs.~~

Field Parameter Measurements:

TIME	Turbidity (NTU)	D.O (mg/l)	SPC (umhos) (ms/cm)	TEMP (°c)	PH (s.u.)	~~DTW~~ ORP	Purged Volume
1200	>999	2.79	1.45	22.61	10.20	205	Initial gallons= 0.2
1204	139	2.12	1.38	22.56	9.77	196	1 well volume gallons= 0.5
1207	109	1.91	1.22	22.52	9.69	190	2 well volumes gallons= 0.9
1210	800	1.80	1.17	22.51	9.54	182	3 well volumes gallons= 1.0+

CURRENT WEATHER CONDITIONS: Sunny 70F

Pump Type / Asset #: Peristaltic

Water Quality Meter Type / Asset#: U-52 57811

Notes: (odors, sheens, pumping conditions etc...)

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GROUNDWATER SAMPLE LOG

Project Name: QDI INSTITUTE, WV
Event: Groundwater Sampling

Project #: 4501020069

Purged/Sampled By: BAS

Date: 9/19/12

Well Identification: MW-105

Circle the diameter of well for (K) : 2 inches K = 0.163; 4 inches K = 0.653; 6 inches K = 1.469 , 8 inches K = 2.6112

Purge Volume Calculation

[**Total Depth (** 33.42 feet) - **Depth to Water (** 20.04 feet)] = feet of water = 13.38

[Feet of w.c. x (**k**) = 8.73 gallons (**1 well volume**)] x 3 = 26.21 gallons (**3 well volumes**)

Purge Information:	**Sampling Information:**
Purge Method: Stainless Steel Submersible Pump	Sample Description: GROUNDWATER
Purge Start Time: 0842	Date / Time Sampled: 9/19/12 0920
Purge Rate (gpm): 1	Sampled By: BAS
Purge End Time: 0910	Sample Method: Bailer for VOCs, Pump for all others.
Purged Volume (gallons): 27	No. of Bottles Collected :
Did well purge dry? (Y/N):	Analysis:
Time / % Recovered / D-W-L	VOCs, SVOCs. Total and dissolved metals (As, Ba, Pb, Fe, Mn, V, ~~pesticides, herbicides, PCBs~~.

Field Parameter Measurements:

TIME	Turbidity (NTU)	D.O (mg/l)	SPC (umhos) (ms/cm)	TEMP (°c)	PH (s.u.)	~~DTW~~ ORP	Purged Volume
0844	>999	7.12	2.12	19.11	6.50	-160	Initial gallons= 2
0851	631	3.09	191	19.16	6.32	-141	1 well volume gallons= 9
0900	311	0.69	1.86	19.31	6.37	-130	2 well volumes gallons= 18
0909	162	0.42	1.80	19.30	6.40	-137	3 well volumes gallons= 27

CURRENT WEATHER CONDITIONS: Sunny 50F

Pump Type / Asset #: SS Hurricane Water Quality Meter Type / Asset#: U-52 57811

Notes: (odors, sheens, pumping conditions etc...)

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GROUNDWATER SAMPLE LOG

Project Name: QDI INSTITUTE, WV
Event: Groundwater Sampling

Project #: 4501020069

Purged/Sampled By: BAS

Date: 9/19/12

Well Identification: MW-104

Circle the diameter of well for (K) : 2 inches K = 0.163; 4 inches K = 0.653; 6 inches K = 1.469 , 8 inches K = 2.6112

Purge Volume Calculation

[**Total Depth (** 24.25 feet) - **Depth to Water (** 9.99 feet)] = feet of water = 14.26

[Feet of w.c. x (**k**) = 9.31 gallons (**1 well volume**)] x 3 = 27.93 gallons (**3 well volumes**)

Purge Information:	**Sampling Information:**
Purge Method: Stainless Steel Submersible Pump	Sample Description: GROUNDWATER
Purge Start Time: 0750	Date / Time Sampled: 9/19/12 - 0830
Purge Rate (gpm): 1	Sampled By: BAS
Purge End Time: 0818	Sample Method: Bailer for VOCs, Pump for all others.
Purged Volume (gallons): 28	No. of Bottles Collected :
Did well purge dry? (Y/N)	Analysis:
Time % Recovered D-W-L	VOCs, SVOCs. Total and dissolved metals (As, Ba, Pb, Fe, Mn, V, ~~pesticides, herbicides, PCBs~~.

Field Parameter Measurements:

TIME	Turbidity (NTU)	D.O (mg/l)	SPC (umhos) (ms/cm)	TEMP (°c)	PH (s.u.)	~~DTW~~ ORP	Purged Volume
0752	379	5.11	1.40	18.16	7.11	-261	Initial gallons= 2
0759	271	1.28	1.36	17.42	6.92	-220	1 well volume gallons= 9
0808	96.8	0.96	1.30	17.33	6.80	-193	2 well volumes gallons= 18
0818	50.2	0.88	1.22	17.19	6.77	-180	3 well volumes gallons= 28

CURRENT WEATHER CONDITIONS: Sunny 80F

Pump Type / Asset #: SS Hurricane Water Quality Meter Type / Asset#: U-52 57877

Notes: (odors, sheens, pumping conditions etc...) Slight HC odor
Collected dup "MW114" @ 1200

SAIC.

GROUNDWATER SAMPLE LOG

Project Name: QDI INSTITUTE, WV
Event: Groundwater Sampling

Project #: 450102[redacted]

Purged/Sampled By: BAS

Date: 9/19/12

Well Identification: TMW-3

Circle the diameter of well for (K) : 2 inches K = 0.163; 4 inches K = 0.653; 6 inches K = 1.469 , 8 inches K = 2.6112

1" 0.041

Purge Volume Calculation

[**Total Depth** (30.14 feet) - **Depth to Water** (21.83 feet)] = feet of water = 8.31

[Feet of w.c. x (k) = 0.34 gallons (1 well volume)] x 3 = 1.02 gallons (3 well volumes)

Purge Information:	**Sampling Information:**
Purge Method: Stainless Steel Submersible Pump	Sample Description: GROUNDWATER
Purge Start Time: 1328	Date / Time Sampled: 9/19/12 1420
Purge Rate (gpm): ~200 ml/min	Sampled By: BAS
Purge End Time: 1344	Sample Method: Bailer for VOCs, Pump for all others.
Purged Volume (gallons): 2	No. of Bottles Collected :
Did well purge dry? (Y/N):	Analysis:
Time % Recovered D-W-L	VOCs, SVOCs. Total and dissolved metals (As, Ba, Pb, Fe, Mn, ~~V, pesticides, herbicides, PCBs~~.

Field Parameter Measurements:

TIME	Turbidity (NTU)	D.O (mg/l)	SPC (umhos) (ms/cm)	TEMP (°c)	PH (s.u.)	DTW ORP	Purged Volume
1330	>999	2.93	1.49	26.93	9.22	135	Initial gallons= 0.5
1333	641	0.83	1.25	26.12	9.22	53	1 well volume gallons= 1
1336	625	0.50	1.23	25.25	9.14	42	2 well volumes gallons= 1.5
1340	581	0.44	1.23	25.25	9.14	37	3 well volumes gallons= 2

CURRENT WEATHER CONDITIONS:

Pump Type / Asset #: Peristaltic **Water Quality Meter Type / Asset#:** 5.52 57511

Notes: (odors, sheens, pumping conditions etc....)

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GROUNDWATER SAMPLE LOG

Project Name: QDI INSTITUTE, WV
Event: Groundwater Sampling

Project #: 4501020069

Purged/Sampled By: 9/19/12

Date: BH

Well Identification: MW-106

Circle the diameter of well for (K) : 2 inches K = 0.163; 4 inches K = 0.653; 6 inches K = 1.469 , 8 inches K = 2.6112

Purge Volume Calculation

[Total Depth (31.45 feet) - **Depth to Water (** 20.37 feet)] = feet of water = 11.08

[Feet of w.c. x (k) = 7.24 **gallons (1 well volume)]** x 3 = 21.71 gallons **(3 well volumes)**

Purge Information:	**Sampling Information:**
Purge Method: Stainless Steel Submersible Pump	Sample Description: GROUNDWATER
Purge Start Time: 1155	Date / Time Sampled: 9/19/12 1225
Purge Rate (gpm): > 1 gpm	Sampled By: BH
Purge End Time: 1220	Sample Method: Bailer for VOCs, Pump for all others.
Purged Volume (gallons): 22	No. of Bottles Collected : 7
Did well purge dry? (Y/N):	Analysis:
Time / % Recovered / D-W-L	VOCs, SVOCs. Total and dissolved metals (As, Ba, Pb, Fe, Mn, V, ~~pesticides, herbicides, PCBs~~.

Field Parameter Measurements:

TIME	Turbidity (NTU)	D.O (mg/l)	SPC (umhos) (ms/cm)	TEMP (°c)	PH (s.u.)	~~DTW~~ ORP	Purged Volume
							Initial gallons=
1203	462	4.66	1.02	15.68	6.56	32	1 well volume gallons= 7
1209	453	3.24	1.00	15.47	6.50	36	2 well volumes gallons= 14
1218	412	3.99	0.673	15.30	6.54	-27	3 well volumes gallons= 21

CURRENT WEATHER CONDITIONS: Sunny 70

Pump Type / Asset #: SS Hurricane Water Quality Meter Type / Asset#: 18831

Notes: (odors, sheens, pumping conditions etc...)

SAIC

GROUNDWATER SAMPLE LOG

Project Name: QDI INSTITUTE, WV
Event: Groundwater Sampling

Project #: 4501020069

Purged/Sampled By: BH

Date: 9/19/12

Well Identification: MW-110

Circle the diameter of well for (K) : 2 inches K = 0.163; 4 inches K = 0.653; 6 inches K = 1.469 , 8 inches K = 2.6112

Purge Volume Calculation

[Total Depth (35.43 feet) - **Depth to Water** (21.91 feet)] = feet of water = 13.52

[Feet of w.c. x (k) = 8.828 **gallons (1 well volume)]** x 3 = 26.485 gallons **(3 well volumes)**

Purge Information:	**Sampling Information:**
Purge Method: Stainless Steel Submersible Pump	Sample Description: GROUNDWATER
Purge Start Time: 0934	Date / Time Sampled: 9/19/12 1300
Purge Rate (gpm): <1gpm	Sampled By: BH
Purge End Time: 0957	Sample Method: Bailer for VOCs, Pump for all others.
Purged Volume (gallons): 21	No. of Bottles Collected : 7
Did well purge dry? (Y/N):	Analysis:
Time % Recovered D-W-L	VOCs, SVOCs. Total and dissolved metals (As, Ba, Pb, Fe, Mn, V, ~~pesticides, herbicides, PCBs~~.

Field Parameter Measurements:

TIME	Turbidity (NTU)	D.O (mg/l)	SPC (umhos) (ms/cm)	TEMP (°c)	PH (s.u.)	~~DTW~~ ORP	Purged Volume
0936	21.9	6.12	0.845	17.08	6.11	90	Initial gallons= 2
0943	9.3	2.31	0.830	17.12	5.80	83	1 well volume gallons= 9
0952	12.8	1.99	0.800	17.15	5.82	79	2 well volumes gallons= 18
							3 well volumes gallons=

CURRENT WEATHER CONDITIONS: Sunny 70F

Pump Type / Asset #: SS Hurricane Water Quality Meter Type / Asset#: 18831

Notes: (odors, sheens, pumping conditions etc...)

SAIC.

GROUNDWATER SAMPLE LOG

Project Name: QDI INSTITUTE, WV
Event: Groundwater Sampling
Purged/Sampled By: BH / BAS

Project #: 4501020069
Date: 9/20/12

Well Identification: MW-103

Circle the diameter of well for (K) : 2 inches K = 0.163; 4 inches K = 0.653; 6 inches K = 1.469 , 8 inches K = 2.6112

Purge Volume Calculation

[Total Depth (27.86 feet) - **Depth to Water** (22.36 feet)] = feet of water =

[Feet of w.c. x (k) = gallons (**1 well volume**)] x 3 = 16.77 g gallons (**3 well volumes**)

Purge Information:	**Sampling Information:**
Purge Method: Stainless Steel Submersible Pump	Sample Description: GROUNDWATER
Purge Start Time: ~~0720~~ 0718	Date / Time Sampled: 9/20/12 0730
Purge Rate (gpm): 1 gpm	Sampled By: BAS
Purge End Time: 0730	Sample Method: Bailer for VOCs, Pump for all others.
Purged Volume (gallons): 7	No. of Bottles Collected :
Did well purge dry? (Y/N): well dry 7 gallons	Analysis:
Time % Recovered D-W-L	VOCs, SVOCs. Total and dissolved metals (As, Ba, Pb, Fe, Mn, V, ~~pesticides, herbicides, PCBs~~.

Field Parameter Measurements:

TIME	Turbidity (NTU)	D.O (mg/l)	SPC (umhos) (ms/cm)	TEMP (°c)	PH (s.u.)	~~DTW~~ ORP	Purged Volume
0719	23.5	5.38	0.649	14.42	8.95	127	Initial gallons=
0724	12.3	7.77	0.535	14.79	8.16	128	1 well volume gallons= 4
							2 well volumes gallons= 8
							3 well volumes gallons= 12

CURRENT WEATHER CONDITIONS: 45°F, Sunny

Pump Type / Asset #: SS Hurricane Water Quality Meter Type / Asset#: 1773 /

Notes: (odors, sheens, pumping conditions etc...)

SAIC

GROUNDWATER SAMPLE LOG

Project Name: QDI INSTITUTE, WV
Event: Groundwater Sampling

Project #: 4501020069

Purged/Sampled By: BAS/BIT

Date: 9/20/12

Well Identification: MW-107

Circle the diameter of well for (K) : 2 inches K = 0.163; 4 inches K = 0.653; 6 inches K = 1.469 , 8 inches K = 2.6112

Purge Volume Calculation

[**Total Depth** (27.41 feet) - **Depth to Water** (9.93 feet)] = feet of water = 17.48

[Feet of w.c. x (**k**) = 8.14 gallons (**1 well volume**)] x 3 = 24.5 gallons (**3 well volumes**)

Purge Information:	**Sampling Information:**
Purge Method: Stainless Steel Submersible Pump	Sample Description: GROUNDWATER
Purge Start Time: 0746	Date / Time Sampled: 9/20/12 0805
Purge Rate (gpm): 2 gpm	Sampled By: BAS
Purge End Time: 0800	Sample Method: Bailer for VOCs, Pump for all others.
Purged Volume (gallons): 25	No. of Bottles Collected : 2
Did well purge dry? (Y/N)? N	Analysis:
Time / % Recovered / D-W-L	VOCs, SVOCs. Total and dissolved metals (As, Ba, Pb, Fe, Mn, V, pesticides, herbicides, PCBs.

Field Parameter Measurements:

TIME	Turbidity (NTU)	D.O (mg/l)	SPC (umhos) (ms/cm)	TEMP (°c)	PH (s.u.)	~~DTW~~ ORP	Purged Volume
0747	504	5.65	1.26	15.46	7.46	-57	Initial gallons=
0750	201	1.09	1.15	15.49	7.17	131	1 well volume gallons= 8
0754	101	0.61	1.12	15.31	7.24	129	2 well volumes gallons= 16
0758	70.8	0.46	1.12	15.31	7.09	122	3 well volumes gallons= 24

CURRENT WEATHER CONDITIONS: Cool 50F

Pump Type / Asset #: SS Hurricane Water Quality Meter Type / Asset#: 18831

Notes: (odors, sheens, pumping conditions etc...) Duplicate MW-10 collected at this well (MW-107)

SAIC.

GROUNDWATER SAMPLE LOG

Project Name: QDI INSTITUTE, WV
Event: Groundwater Sampling

Project #: 4501020069

Purged/Sampled By: BAS

Date: 9/20/12

Well Identification: WWT-1

Circle the diameter of well for (K) : 2 inches K = 0.163; 4 inches K = 0.653; 6 inches K = 1.469 , 8 inches K = 2.6112

1"

Purge Volume Calculation

[Total Depth (11.65 **feet) - Depth to Water (** 9.11 **feet)] = feet of water =** 1.94

[Feet of w.c. x (k) = 0.679 **gallons (1 well volume)]** x 3 = 0.24 **gallons (3 well volumes)**

Purge Information:	**Sampling Information:**
Purge Method: Stainless Steel Submersible Pump	Sample Description: GROUNDWATER
Purge Start Time: —	Date / Time Sampled: 9/20/12 0950
Purge Rate (gpm): —	Sampled By: BAS
Purge End Time: —	Sample Method: Bailer for VOCs, Pump for all others.
Purged Volume (gallons): —	No. of Bottles Collected :
Did well purge dry? (Y/N): —	Analysis:
Time % Recovered D-W-L	VOCs, SVOCs. Total and dissolved metals (As, Ba, Pb, Fe, Mn, V, pesticides, herbicides, PCBs.

Field Parameter Measurements:

TIME	Turbidity (NTU)	D.O (mg/l)	SPC (umhos) (ms/cm)	TEMP (°c)	PH (s.u.)	DTW	Purged Volume
No parameters collected.							Initial gallons=
							1 well volume gallons=
							2 well volumes gallons=
							3 well volumes gallons=

CURRENT WEATHER CONDITIONS:

Pump Type / Asset #: Water Quality Meter Type / Asset#:

Notes: (odors, sheens, pumping conditions etc...) Grabbed VOC sample from bailer. No purge.

SAIC.

GROUNDWATER SAMPLE LOG

Project Name: QDI INSTITUTE, WV
Event: Groundwater Sampling

Project #: 450102000

Purged/Sampled By: BAS

Date: 9/20/12

Well Identification: TMP-2

Circle the diameter of well for (K): 2 inches K = 0.163; 4 inches K = 0.653; **6 inches K = 1.469**. **8 inches K = 2.6112**

1"

Purge Volume Calculation

[Total Depth (24.95 **feet) - Depth to Water (** 20.16 feet)] = feet of water =

[Feet of w.c. x (k) = 6.40 **gallons (1 well volume)]** x 3 = 1.2 gallons **(3 well volumes)**

Purge Information:	**Sampling Information:**
Purge Method: Stainless Steel Submersible Pump	Sample Description: GROUNDWATER
Purge Start Time: 0818	Date / Time Sampled: 9/20/12 0915
Purge Rate (gpm): < 1 gpm	Sampled By: BAS
Purge End Time: 0840	Sample Method: Bailer for VOCs, Pump for all others.
Purged Volume (gallons): 1.5	No. of Bottles Collected : 7
Did well purge dry? (Y/N): N	Analysis:
Time / % Recovered / D-W-L	VOCs, SVOCs. Total and dissolved metals (As, Ba, Pb, Fe, Mn, V, ~~pesticides, herbicides, PCBs~~.

Field Parameter Measurements:

TIME	Turbidity (NTU)	D.O (mg/l)	SPC (umhos) (ms/cm)	TEMP (°c)	PH (s.u.)	~~DTW~~ ORP	Purged Volume
0820	7999	0.90	1.36	13.46	7.31	81	Initial gallons=
0825	477	0.44	1.38	13.46	7.27	63	1 well volume gallons=
0830	153	0.38	1.36	13.97	7.31	67	2 well volumes gallons=
0835	101	0.35	1.35	14.15	7.20	70	3 well volumes gallons=

CURRENT WEATHER CONDITIONS: Sunny 50F

Pump Type / Asset #: Peristaltic

Water Quality Meter Type / Asset#: Horiba 57811

Notes: ***(odors, sheens, pumping conditions etc...)***

APPENDIX F

Reconnaissance Photographs

Photo 1 – Communications tower access road near tower.

Photo 2 – ATV trail along power line near communications tower.

Photo 3 – Typical view along communications tower access road.

Photo 4 – Typical view along communications tower access road.

Photo 5 – Typical view along communications tower access road.

Photo 6 – Typical view along communications tower access road.

Photo 7 – Typical of vegetation cover over undeveloped portion of Site.

Photo 8 – Typical of vegetation cover over undeveloped portion of Site.

Photo 9 – Typical of vegetation cover over undeveloped portion of Site.

Photo 10 – Typical of vegetation cover over undeveloped portion of Site.

Photo 11 – Typical of vegetation cover over undeveloped portion of Site.

Photo 12 – Apparent piezometer/monitoring well approximately 1,300’ WNW of northernmost point of the Site (not on Site property).

Photo 13 – Start of ATV trail near west edge of Site, looking south toward Route 25.

Photo 14 – View north along ATV trail near west edge of Site.

Photo 15 – Typical of hillside along ATV trail near west edge of Site.

Photo 16 – Further along ATV trail near west edge of Site.

APPENDIX G

MW Well Logs

MONITORING WELL LOG

SAIC — An Employee-Owned Company

CLIENT: Quality Distribution PROJECT: Quality Carriers Facility PROJECT NO.: 01-1408-00-3973-000	BORING/WELL NO: MW-101 PAGE 1 OF 1 LOCATION: Institute, WV TOP OF CASING ELEVATION: N/A

DEPTH FEET	PID	WELL LOG	LITHOLOGIC DESCRIPTION	WELL CONSTRUCTION DETAILS
	ppm		Ground Surface	6" Steel Stickup
	0		Organic material, roots, grass. Moderate brown (5 YR 4/4) silty sand, fine to medium grained (SM).	6" Protective Steel Casing (+3'-3')
	0			0-9.5': 4" PVC Riser
5				
	0		[5-7' Blow counts 15-11-9-14; Recovery 2'/2'] Moderate brown (5 YR 4/4) clayey silt. Low plasticity, dry (ML) Rock fragments up to 2" diameter of sandstone and shale.	9.5'-19.5': 4" PVC Screen, 10 slot
	0			
	0			
10			[10-12' Blow counts 10-7-12-14; Recovery 2'/2'] Moderate brown (5 YR 3/4), silty sand, fine to medium grained, with moderate olive brown 5 YR 4/4 mottling, dry, non-plastic (SM) few ¼" thick, moderate olive brown 5 YR 4/4 schist layers	0-1.5': Bentonite Cement Grout
	0			
	0			1.5'-6.5': Bentonite
15	0		[15-17' Blow counts 5-7-18-22;Recovery 1.8'/2']	6.5'-20': #1 Sand
	0		16' Moderate brown (5 YR 3/4) Weathered shale, thinly bedded, nearly vertical cleavage pattern, some seams wet, otherwise the soil is damp, no plasticity, low clay content	
	0			
20			[17.5' Blow counts 50/0.17']	
			Auger Refusal at 20'	
25				
30				

DRILLER: Southeastern Environmental

OBSERVED WATER BEARING ZONES: 16'bgl

LOGGED BY: Stephanie Williams

NOTES: The groundwater level shown in the well log was measured within two hours following the well installation.

DRILLING STARTED/COMPLETED: August 9, 1999

MONITORING WELL LOG

SAIC — An Employee-Owned Company

CLIENT: Quality Distribution
PROJECT: Quality Carriers Facility
PROJECT NO.: 01-1408-00-3973-000

BORING/WELL NO: MW-102 PAGE 1 OF 1
LOCATION: Institute, WV
TOP OF CASING ELEVATION: N/A

DEPTH FEET	PID ppm	WELL LOG	LITHOLOGIC DESCRIPTION	WELL CONSTRUCTION DETAILS
			Ground Surface	6" Steel Stickup
	1.1		Moderate brown (5 YR 4/4) clayey silt, low plasticity, damp (ML)	6" Protective Steel Casing; (+3'-3')
5	1.6 148		[5-7' Blow counts 8-50/2"; Recovery .7'/.7'] Same as above. Sandstone rock at 5.5'	0-12': 4" PVC Riser 12'-25': 4" PVC Screen, 10 slot
			9' Perched water bearing zone	
10	42 185 0		[10-12' Blow counts 2-2-2-2; Recovery 2'/2'] Moderate brown (5 YR 4/4) silty clay, moderately plastic, damp (CL)	0-4': Bentonite Cement Grout 4'-9': Bentonite
15	6.2 10.3		[15-17' Blow counts 6-5-2-2; Recovery 1.1'/2'] Moderate brown (5 YR 4/4) clayey silt, low plasticity, saturated (ML)	9'-26': #1 Sand
20	0 0		[20-22' Blow counts 3-4-6-7; Recovery 1.4'/2'] Moderate brown (5 YR 4/4) silty clay,with dark yellowish brown 10 YR 4/2 mottling. Slightly micaceous, damp, low to medium plasticity, (CL)	
25	6 3.5		[25-27' Blow counts 6-7-11-12; Recovery 1.9'/2'] Medium to coarse grained, semi-angular, saturated sand, very little fines (SP)	
30				

DRILLER: Southeastern Environmental

OBSERVED WATER BEARING ZONES: 9'(perched) & 24' bgl

LOGGED BY: Stephanie Williams

NOTES: The groundwater level shown in the well log was measured within two hours following the well installation.

DRILLING STARTED/COMPLETED: August 9, 1999-August 12, 1999

MONITORING WELL LOG

SAIC — An Employee-Owned Company

CLIENT: Quality Distribution	BORING/WELL NO: MW-103 PAGE 1 OF 1
PROJECT: Quality Carriers Facility	LOCATION: Institute, WV
PROJECT NO.: 01-1408-00-3973-000	TOP OF CASING ELEVATION: N/A

DEPTH FEET	PID ppm	WELL LOG	LITHOLOGIC DESCRIPTION	WELL CONSTRUCTION DETAILS
			Ground Surface	6" Steel Stickup
	0		Moderate brown (5 YR 3/4) clayey silt, low plasticity, dry,(ML), some sandstone fragments	6" Protective Steel Casing; (+3'-3')
	0			0-13': 4" PVC Riser
5			[5-7' Blow counts 6-4-5-6; Recovery 1.5'/2']	
	0		Same as above	13'-26': 4" PVC Screen, 10 slot
	0			
			8.5' Soft zone, increasing soil moisture	
	0		[9-11' Blow counts 2-4-7-8; Recovery 2'/2']	0-5': Bentonite Cement Grout
10			9.5' Grayish brown 5 YR 3/2 silty clay, moist, low plasticity (CL)	
	0			5'-10': Bentonite
	0		[13-15' Blow counts 5-8-10-13; Recovery 1.6'/2]	
			[15-17' Blow counts 4-8-13-16; Recovery 2'/2']	
15	0		Moderate yellowish brown (10 YR 5/4) clayey silt with grayish brown (5 YR 3/2) and pale brown (5 YR 5/2) mottling, damp, low plasticity (ML). Sandstone fragments.	10'-26.7': #1 Sand
	0			
	0			
20				
	0		[20-22' Blow counts 3-5-8-11; Recovery 2/2']	
	0		Same as above	
			23' Soft zone, possible water bearing zone	
25				
			[25-27' Blow counts 2-1-1-1; Recovery 1.4'/2']	
			26' Medium to coarse grained, semi-angular, saturated sand, very little fines (SP)	
			Auger Refusal at 26.7'	
30				

DRILLER: Southeastern Environmental

OBSERVED WATER BEARING ZONES: 23'bgl

LOGGED BY: Stephanie Williams

NOTES: The groundwater level shown in the well log was measured within two hours following the well installation.

DRILLING STARTED/COMPLETED: August 10, 1999

MONITORING WELL LOG

SAIC — An Employee-Owned Company

CLIENT: Quality Distribution
PROJECT: Quality Carriers Facility
PROJECT NO.: 01-1408-00-3973-000

BORING/WELL NO: MW-104
LOCATION: Institute, WV
TOP OF CASING ELEVATION: N/A

DEPTH FEET	PID ppm	WELL LOG	LITHOLOGIC DESCRIPTION	WELL CONSTRUCTION DETAILS
			Ground Surface	8" Flushmount
	0		0-1' Concrete pad Moderate brown (5 YR 3/4) sandy silt, non-plastic, dry, very fine grained sand (ML)	8" Flushmount in a 2' Square 1' Deep Concrete Pad
5	2.2		[5-7' Blow counts 9-13-16-18; Recovery 1.2'/2'] Same as above.	0-13': 4" PVC Riser
	1.7		6.5' Dusky yellow 5 YR 6/4, sandstone, fine grained, micaceous, weathered	13'-23': 4" PVC Screen, 10 slot
10	1.5		[10-12' Blow counts 5-5-9-11; Recovery .2'/2'] Moderate brown (5 YR 3/4) sandy silt, non-plastic, dry, very fine grained sand (ML)	0-5.0': Cement Bentonite Grout 5.0'-10': Bentonite
15	2.3		[15-17' Blow counts 3-4-4-4; Recovery 1.6'/2']	10'-23.5': #1 Sand
	1.9		16' Grayish olive 10 Y4/2 silty sand, very fine to fine grained with mica, moist (SM)	
20	1.3		[20-22' Blow counts 4-8-11-13; Recovery .7'/2'] 21' Medium gray (N5) sandstone, very fine grained, micaceous, weathered, damp 23' Water bearing zone, auger refusal	
25				
30				

DRILLER: Southeastern Environmental

OBSERVED WATER BEARING ZONES: 23 'bgl

LOGGED BY: Stephanie Williams

NOTES: The groundwater level shown in the well log was measured within two hours following the well installation.

DRILLING STARTED/COMPLETED: August 11, 1999

MONITORING WELL LOG

SAIC — An Employee-Owned Company

CLIENT: Quality Distribution
PROJECT: Quality Carriers Facility
PROJECT NO.: 01-1408-00-3973-000

BORING/WELL NO: MW-105
LOCATION: Institute, WV
TOP OF CASING ELEVATION: N/A

DEPTH FEET	PID	WELL LOG	LITHOLOGIC DESCRIPTION	WELL CONSTRUCTION DETAILS
	ppm		Ground Surface	8" Flushmount
	0		0 - .5 Gravel Moderate brown (5 YR 4/4) sandy silt with clay, very fine grained, slight plasticity, dry,(ML)	8" Flushmount in a 2' Square 1' Deep Concrete Pad
5	0		[5-7' Blow counts 5-7-9-12; Recovery 2'/2'] Same as above	0-15': 4" PVC Riser
	0			15'-35': 4" PVC Screen, 10 slot
10	0		[10-12' Blow counts 5-6-8-9; Recovery 1.7'/2'] Moderate brown (5 YR 4/4) clayey silt, low to medium plasticity, damp, some medium light gray (N6) mottling, (ML)	0-7': Bentonite Cement Grout
	0			7'-12': Bentonite
15	0		[15-17' Blow counts 4-5-6-8; Recovery 1.8'/2'] Moderate brown (5 YR 4/4) sandy silt, very fine grained, abundant mottling, moderate brown (5 YR ¾), medium light gray (N6) with clay lenses. Slight to low plasticity, damp, increasing clay content with depth (ML)	12'-35.5': #1 Sand
	0			
20	0		[20-22' Blow counts 4-3-3-3; Recovery .3/2'] Same as above	
	0			
25	0		23' Medium dark gray (N4) silty clay, very soft, moderate plasticity, some mica, some medium grained sand zones, with fine grains (CL)	
	0		[25-27' Blow counts 2-1-2-1; Recovery 1.9'/2'] Same as above	
30			[30-32' Blow counts 24-50/2"; Recovery .7'/.7'] Moderate brown (5 YR ¾) sandy silt(ML), dry low plasticity 31.5' Weathered shale, light olive brown (5 YR 5/6), light olive gray (5 YR 5/2), grayish olive (10 Y 4/2) mottling, thinly bedded, soft, weathered, some sandy zones. 34' Water bearing zone	

DRILLER: Southeastern Environmental

LOGGED BY: Stephanie Williams

DRILLING STARTED/COMPLETED: August 11, 1999

OBSERVED WATER BEARING ZONES: 34'bgl

NOTES: The groundwater level shown in the well log was measured within two hours following the well installation.

MONITORING WELL LOG

SAIC — An Employee-Owned Company

CLIENT: Quality Distribution
PROJECT: Quality Carriers Facility
PROJECT NO.: 01-1408-00-3973-000

BORING/WELL NO: MW-106 PAGE 1 OF 1
LOCATION: Institute, WV
TOP OF CASING ELEVATION: N/A

DEPTH FEET	PID ppm	WELL LOG	LITHOLOGIC DESCRIPTION	WELL CONSTRUCTION DETAILS
			Ground Surface	8" Flushmount
			0 - .5 Gravel Moderate brown (5 YR 4/4) clayey silt, low plasticity, moist,(ML) 3' sandstone boulder	8" Flushmount in a 2' Square 1' Deep Concrete Pad
5			[5-7' Blow counts 50/0"; Recovery 0]	0-15': 4" PVC Riser
				15'-35': 4" PVC Screen, 10 slot
10			[10-12' Blow counts 5-8-9-14; Recovery 1.7'/2'] Moderate brown (5 YR 4/4) clayey silt, with moderate brown (5 YR ¾), slight plasticity, damp (ML), some fine-grained sandstone fragments	0-7': Bentonite Cement Grout
				7'-12': Bentonite
15			[15-17' Blow counts 18-9-13-9; Recovery 1.4'/2'] Moderate brown (5 YR 4/4) clayey silt, slight plasticity, damp, mottled moderate brown (5 YR ¾), and pale brown (5 YR 5/2) (ML)	12'-35.5': #1 Sand
20			[20-22' Blow counts 3-3-4-6; Recovery 1.6'/2'] Silty clay with sand, low plasticity, moist, micaceous, mottled moderate brown (5 YR ¾), and pale brown (5 YR 5/2) (ML)	
25			[25-27' Blow counts 1-3-3-4; Recovery 1.5'/2'] 25.5' sandy silt with clay, same colors and mottling, slight plasticity, (ML) micaceous, moist 26.5' silty sand, fine grained, same colors, wet (SM)	
30			[30-32' Blow counts 7-17-22-29; Recovery 1.7'/2'] Moderate brown (5 YR ¾) clayey silt , with light olive gray and medium gray mottling, low plasticity, moist (ML) [35-37' Blow counts 23,50/0; Recovery .1/.5'] Weathered shale. Thinly bedded, greenish gray, saturated.	

DRILLER: Southeastern Environmental
LOGGED BY: Stephanie Williams

OBSERVED WATER BEARING ZONES: 30'
NOTES: The groundwater level shown in the well log was measured within two hours following the well installation.

DRILLING STARTED/COMPLETED: August 11, 1999

MONITORING WELL LOG

An Employee-Owned Company

CLIENT: Quality Distribution
PROJECT: Quality Carriers Facility
PROJECT NO.: 01-1633-00-3973-000

BORING/WELL NO: MW-107
LOCATION: Institute, WV
TOP OF CASING ELEVATION: N/A

DEPTH FEET	PID ppm	WELL LOG	LITHOLOGIC DESCRIPTION	WELL CONSTRUCTION DETAILS
			Ground Surface	8" Flushmount
	0		0 - .5 Gravel Clay with silt, moderately plastic, damp, dark yellowish brown 10 YR 4/6 (CL)	8" Flushmount in a 2' square concrete pad
	11		3'- 4.5' stained olive brown 2.5 YR 4/3 to black, hydrocarbon odor.	0 - 9.5': 4" PVC Riser
5	0		[5 -7' Blow counts 5-9-10-11; Recovery 2'/2']	
	0		Silty clay, moderately plastic, damp, dark yellowish brown 10 YR 5/6 (CL) with light gray mottling 7'- 9.5' Shelby tube	9.5 - 24.5': 4" PVC Screen, 10 slot
10	0		[10-12' Blow counts 7-6-7-8; Recovery 2'/2'] Silty clay with some fine sand, moist, soft, mottled, micaceous, yellowish brown 10 YR 5/6 (CL)	0-1.5': Bentonite Cement Grout
	0		14' Soft zone, water, same as above	1.5'- 6.5': Bentonite
15	0			6.5'- 25': #1 Sand
20	0			
25	0		Total Depth 25'	
30				

DRILLER: Don Malone / Double J Drilling
LOGGED BY: Stephanie Pulaski

OBSERVED WATER BEARING ZONES: 14'
NOTES: Used 6 1/2" ID, 12" OD hollow stem augers

DRILLING STARTED/COMPLETED: July 25, 2000

MONITORING WELL LOG

SAIC — An Employee-Owned Company

CLIENT: Quality Distribution
PROJECT: Quality Carriers Facility
PROJECT NO.: 01-1633-00-3973-000

BORING/WELL NO: MW-108 PAGE 1 OF 1
LOCATION: Institute, WV
TOP OF CASING ELEVATION: N/A

DEPTH FEET	PID ppm	WELL LOG	LITHOLOGIC DESCRIPTION	WELL CONSTRUCTION DETAILS
			Ground Surface	8" Flushmount
	0		0 - 1 Gravel, grass, silty sand with pebbles, dry, gray 5 YR 6/1 (GP - GM) 1' River gravel (fill) 2' Silty clay, slightly plastic, damp, yellowish red 5 YR 4/6 (CL)	8" Flushmount in a 2' square concrete pad
	0			0 - 9.5': 4" PVC Riser
5	0		[5 -7' Blow counts 6-10-11-16; Recovery 1.6'/2']	
	0		Silty clay; dry, reddish brown 5 YR 4/3 with black and tan mottling (CL) [7'- 9' Blow counts 4-5-6-7; Recovery 1.8'/2'] Same as above (CL)	9.5 - 24.5': 4" PVC Screen, 10 slot
10	0		9-11.5' Shelby Tube sample	0-1.5': Bentonite Cement Grout
	0		12' Silty clay with fine grained sand; moist, soft, moderately plastic, micaceous, Dark yellowish brown 10 YR 4/6	1.5'- 6.5': Bentonite
15	0		[14 - 16' Blow counts 2-4-3-5; Recovery 2'/2'] Silty clay with some fine sand, sand lenses, moist, soft, mottled, micaceous, yellowish brown 10 YR 5/6 (CL)	6.5'- 25': #1 Sand
			[16 - 18' Blow counts 4-3-4-9; Recovery 2'/2'] Sandy clay to clayey sand, with some clay lenses, fine grained sand, wet, soft, micaceous, sand content increasing with depth, yellowish brown 10 YR 5/6 (CL - SC)	
20	0			
25	0		Total depth 25'.	
30				

DRILLER: Don Malone / Double J Drilling
LOGGED BY: Stephanie Pulaski

OBSERVED WATER BEARING ZONES: 12'
NOTES: Used 6 1/2" ID, 12" OD hollow stem augers

DRILLING STARTED/COMPLETED: July 24, 2000

MONITORING WELL LOG

SAIC — An Employee-Owned Company

CLIENT: Quality Distribution
PROJECT: Quality Carriers Facility
PROJECT NO.: 01-1633-00-3973-000

BORING/WELL NO: MW-109 PAGE 1 OF 1
LOCATION: Institute, WV
TOP OF CASING ELEVATION: N/A

DEPTH FEET	PID ppm	WELL LOG	LITHOLOGIC DESCRIPTION	WELL CONSTRUCTION DETAILS
			Ground Surface	8" Flushmount
	0		0 - 1 Gravel, grass, clayey silt, low plasticity, damp, brown 7.5 YR 4/4	8" Flushmount in a 2' square concrete pad
	0		3' Silty clay; moderately plastic, damp, brown 7.5 YR 4/2 (CL)	0 - 13.5': 4" PVC Riser
5	0		[5 -7' Blow counts 2-5-10-9; Recovery 2'/2']	
	0		Clay with some silt and fine grained sand; low to moderate plasticity, damp, slightly mottled, some mica, brown 7.5 YR 5/4 (CL)	13.5 - 28.5': 4" PVC Screen, 10 slot
10	0		[10'-12' Blow counts 4-9-11-15; Recovery 1.9'/2'] Same as above (CL)	0-4': Bentonite Cement Grout
	0		12' Fine grained sand lens	4'- 10': Bentonite
15	0		15' - 17.5' Shelby tube	10- 28.5': #1 Sand
			Clay with silt; moist, soft, moderately plastic, micaceous, reddish brown 5 YR 4/3 (CL)	
20	0		[20 - 22' Blow counts 3-4-5-8; Recovery 2'/2'] Same as above (CL)	
			22' Clay with silt and some fine grained sand, very moist, soft, moderate to high plasticity, micaceous, reddish brown 5 YR 4/3 (CL)	
25	0		23' Sand, medium grained, well sorted, few fines, subangular, saturated, reddish brown 5 YR 4/3 (SP)	
			[25 - 27' Blow counts 2-5-7-7; Recovery 2'/2'] Sand, same as above (SP)	
	0			
30			Total depth 30'.	

DRILLER: Don Malone / Double J Drilling
LOGGED BY: Stephanie Pulaski

OBSERVED WATER BEARING ZONES: 23'
NOTES: Used 6 1/2" ID, 12" OD hollow stem augers

DRILLING STARTED/COMPLETED: July 25, 2000

MONITORING WELL LOG

An Employee-Owned Company

CLIENT: Quality Distribution PROJECT: Quality Carriers Facility PROJECT NO.: 01-1633-00-3973-000	BORING/WELL NO: MW-110 PAGE 1 OF 1 LOCATION: Institute, WV TOP OF CASING ELEVATION: N/A

DEPTH FEET	PID ppm	WELL LOG	LITHOLOGIC DESCRIPTION	WELL CONSTRUCTION DETAILS
			Ground Surface	2.6' Stick-up
	0		Clayey silt with some small rock fragments; low plasticity, damp, reddish brown 5 YR 4/4 (ML)	2.6' Stick-up in a 3' square concrete pad
	0			0 - 17.5': 4" PVC Riser
5	0		[5 -7' Blow counts 3-4-5-3; Recovery 1'/2']	
	0		Same as above; with some olive brown 2.5 YR 4/4 weathered schist mottling (ML)	17.5 - 32.5': 4" PVC Screen, 10 slot
			Clay with some silt and fine grained sand; low to moderate plasticity, damp, slightly mottled, some mica, strong brown 7.5 YR 5/4 (CL)	
10	0		[10'-12' Blow counts 3-5-6-6; Recovery 0.4'/2']	0-9': Bentonite Cement Grout
	0		Same as above with increasing rock fragments (CL)	
				9'- 14.5': Bentonite
15	0		[15' - 17' Blow counts 3-4-5-8; Recovery 1'/2']	14.5- 33': #1 Sand
			Silty clay; moderate plasticity, damp, strong brown 7.5 YR 5/4 (CL)	
20	0		20 - 22.5' Shelby tube	
			22.5' Sandy silt; fine grained, little clay, moist, non-plastic, micaceous, reddish brown 5 YR 4/3 (ML)	
25	0		[25 - 27' Blow counts 4-4-4-6; Recovery 2'/2']	
			Sandy silt, same as above (ML)	
	0			
30			[30 - 32' Blow counts 38-50/2; Recovery 0.3'/0.67']	
	0		Refusal, weathered shale	
			Total depth 33'.	

DRILLER: Don Malone / Double J Drilling
LOGGED BY: Stephanie Pulaski

OBSERVED WATER BEARING ZONES: 22'
NOTES: Used 6 1/2" ID, 12" OD hollow stem augers

DRILLING STARTED/COMPLETED: July 26, 2000

APPENDIX H

Data Validation Documents

QDI Institute, WV - Data Validation Summary Report

Summary: A level III data validation was performed on ten percent of samples reported in six laboratory reports for the QDI Institute, WV sampling event. A total of eight samples (6 soil samples, 2 water samples) were reviewed and the analytical quality control/quality assurance performance data evaluated and summarized. The general criteria used to assess the analytical integrity of the data were based on an examination of: case narrative, analytical holding times, sample preservation, method calibration, method and project blanks, analytical surrogate recoveries, internal standard performance, MS/MSD recoveries and differences, LCS recoveries, and re-analysis and secondary dilution recovery. A summary of the findings is listed below.

Sample MW-101 (Lab Sample ID 180-13537-2, Report SDG 180-13537)

- Hexachlorocyclopendadiene result rejected due to low LCS recovery
- Pesticide results estimated (J) due to low surrogate recovery

Sample MW-105 (Lab Sample ID 180-13503-5, Report SDG 180-13503)

- Hexachlorocyclopendadiene result rejected due to low LCS recovery

Sample TSS-6 (3.8-5.8) (Lab Sample ID 180-13267-5, Report SDG 180-13567)

- All positive VOC detections estimated (J) due to high surrogate recovery
- Methyl acetate estimated (J) due to high LCS recovery

Sample TSS-2 (5-7) (Lab Sample ID 180-13267-21, Report SDG 180-13567)

- Beta-BHC result estimated (J) due to high percent difference between column results

Sample WTA-1 (1-2) (Lab Sample ID 180-13334-4, Report SDG 180-13567)

- Methyl acetate result estimated (UJ) due to high CCV recovery

The following samples and reports did not have any data issues requiring validation flags:

- Sample DBA-1 (0-2) (Lab Sample ID 180-13333-7, Report SDG 180-13333)
- Sample PSA-1 (10-12) (Lab Sample ID 180-13209-3, Report SDG 180-13209)
- Sample WWTP-2 (Lab Sample ID 180-13209-7, Report SDG 180-13209)

QDI Institute, WV
Data Validation Summary

Field Sample ID	Lab Sample ID	SDG	Parameter	Lab Qualifier	Validator Qualifer	Comments
MW-101	180-13537-2	180-13537	Hexachlorocyclopentadiene	U*	R	Reject due to very low LCS recovery
MW-101	180-13537-2	180-13537	Aldrin	U	J	Estimated due to low surrogate recovery
MW-101	180-13537-2	180-13537	alpha-BHC	U	J	Estimated due to low surrogate recovery
MW-101	180-13537-2	180-13537	beta-BHC	U	J	Estimated due to low surrogate recovery
MW-101	180-13537-2	180-13537	delta-BHC	U	J	Estimated due to low surrogate recovery
MW-101	180-13537-2	180-13537	gamma-BHC (Lindane)	U	J	Estimated due to low surrogate recovery
MW-101	180-13537-2	180-13537	alpha-Chlordane	U	J	Estimated due to low surrogate recovery
MW-101	180-13537-2	180-13537	gamma-Chlordane	U	J	Estimated due to low surrogate recovery
MW-101	180-13537-2	180-13537	4,4'-DDD	U	J	Estimated due to low surrogate recovery
MW-101	180-13537-2	180-13537	4,4'-DDE	U	J	Estimated due to low surrogate recovery
MW-101	180-13537-2	180-13537	4,4'-DDT	U*	J	Estimated due to low surrogate recovery
MW-101	180-13537-2	180-13537	Dieldrin	U	J	Estimated due to low surrogate recovery
MW-101	180-13537-2	180-13537	Endosulfan I	U	J	Estimated due to low surrogate recovery
MW-101	180-13537-2	180-13537	Endosulfan II	U	J	Estimated due to low surrogate recovery
MW-101	180-13537-2	180-13537	Endosulfan sulfate	U	J	Estimated due to low surrogate recovery
MW-101	180-13537-2	180-13537	Endrin	U	J	Estimated due to low surrogate recovery
MW-101	180-13537-2	180-13537	Endrin aldehyde	U	J	Estimated due to low surrogate recovery
MW-101	180-13537-2	180-13537	Endrin ketone	U	J	Estimated due to low surrogate recovery
MW-101	180-13537-2	180-13537	Heptachlor	U	J	Estimated due to low surrogate recovery
MW-101	180-13537-2	180-13537	Heptachlor epoxide	U	J	Estimated due to low surrogate recovery
MW-101	180-13537-2	180-13537	Methoxychlor	U	J	Estimated due to low surrogate recovery
MW-101	180-13537-2	180-13537	Toxaphene	U	J	Estimated due to low surrogate recovery
TSS-6 (3.8-5.8)	180-13267-5	180-13267	Methyl acetate	J*	J	Estimated due to high surrogate recovery
TSS-6 (3.8-5.8)	180-13267-5	180-13267	Ethylbenzene		J	Estimated due to high surrogate recovery
TSS-6 (3.8-5.8)	180-13267-5	180-13267	Styrene		J	Estimated due to high surrogate recovery
TSS-6 (3.8-5.8)	180-13267-5	180-13267	1,2,4-Trichlorobenzene		J	Estimated due to high surrogate recovery
TSS-6 (3.8-5.8)	180-13267-5	180-13267	1,2-Dichlorobenzene		J	Estimated due to high surrogate recovery
TSS-6 (3.8-5.8)	180-13267-5	180-13267	1,3-Dichlorobenzene		J	Estimated due to high surrogate recovery
TSS-6 (3.8-5.8)	180-13267-5	180-13267	1,4-Dichlorobenzene		J	Estimated due to high surrogate recovery
TSS-6 (3.8-5.8)	180-13267-5	180-13267	2-Butanone (MEK)	J	J	Estimated due to high surrogate recovery
TSS-6 (3.8-5.8)	180-13267-5	180-13267	Acetone		J	Estimated due to high surrogate recovery
TSS-6 (3.8-5.8)	180-13267-5	180-13267	Chlorobenzene		J	Estimated due to high surrogate recovery
TSS-6 (3.8-5.8)	180-13267-5	180-13267	cis-1.2-Dichloroethene		J	Estimated due to high surrogate recovery
TSS-6 (3.8-5.8)	180-13267-5	180-13267	Isopropylbenzene		J	Estimated due to high surrogate recovery

QDI Institute, WV

Data Validation Summary

Field Sample ID	Lab Sample ID	SDG	Parameter	Lab Qualifier	Validator Qualifer	Comments
TSS-6 (3.8-5.8)	180-13267-5	180-13267	Methyl acetate	J*	J	Estimated due to high surrogate recovery
TSS-6 (3.8-5.8)	180-13267-5	180-13267	Trichloroethene		J	Estimated due to high surrogate recovery
TSS-6 (3.8-5.8)	180-13267-5	180-13267	Xylenes, Total		J	Estimated due to high surrogate recovery
TSS-2 (5-7)	180-13267-21	180-13267	beta-BHC		J	Estimated due to high percent difference between columns
MW-105	180-13503-5	180-13503	Hexachlorocyclopentadiene	U*	R	Reject due to very low LCS recovery
WTA-1 (1-2)	180-13334-1	180-13334	Methyl acetate	*	UJ	Estimated due to high CCV recovery

Notes:

J : Associated value estimated

U : not detected at the associated level

UJ : not detected and associated value estimated

* : LCS or LCSD exceeds the control limits

LCS : Laboratory Control Sample

CCV: Continuing Calibration Verification

QDI Institute, WV - Data Validation Summary Report

Summary: A level III data validation was performed on ten percent of samples reported in two laboratory reports for the QDI Institute, WV sampling event. A total of two water samples were reviewed and the analytical quality control/quality assurance performance data evaluated and summarized. The general criteria used to assess the analytical integrity of the data were based on an examination of: case narrative, analytical holding times, sample preservation, method calibration, method and project blanks, analytical surrogate recoveries, internal standard performance, MS/MSD recoveries and differences, LCS recoveries, and re-analysis and secondary dilution recovery. A summary of the findings is listed below.

Sample MW-111 (Lab Sample ID 180-14654-4, Report SDG 180-14654)

- Dissolved Lead result rejected due to method blank detection
- Acetone qualified "J" due to CCV %D >25%
- Bromomethane and Chloroethane qualified "UJ" due to CCV %D >40%

The following sample and report did not have any data issues requiring validation flags:

- Sample MW-104 (Lab Sample ID 180-14634-2, Report SDG 180-14634)

Notes:

J : Associated value estimated
R : Data rejected
CCV : Continuing Calibration Verification
%D : Percent Difference
U : Not detected at the laboratory reporting limit

QDI Institute, WV

Data Validation Summary

Field Sample ID	Lab Sample ID	SDG	Parameter	Lab Qualifier	Validator Qualifer	Comments
MW-111	180-14654-4	180-14654	Lead (dissolved)	J	R	Reject due to method blank detection.
MW-111	180-14654-4	180-14654	Acetone	J	J	Estimated due to CCV %D >25%
MW-111	180-14654-4	180-14654	Bromomethane		UJ	Estimated due to CCV %D >40%
MW-111	180-14654-4	180-14654	Chloroethane	*	UJ	Estimated due to CCV %D >40%

Notes:

J : Associated value estimated

R : Data rejected

* : LCS or LCSD exceeds the control limits

CCV : Continuing Calibration Verification

%D : Percent Difference

U : Not detected at the laboratory reporting limit

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
Organic Data Review Checklist - Standard Validation

Project: QDI Institute, WV

SDG No: 180-13537

Analysis: VOCs SVOCs Pesticides PCBs

Method: 8270B, 8270C, 8081A, 8082

Laboratory: Test America Pittsburgh

Matrix: Water

The above data package has been reviewed and the analytical quality control/quality assurance performance data have been summarized. The general criteria used to assess the analytical integrityof the data were based on an examination of the following:

Case Narrative	Analytical Surrogate Recoveries
Analytical Holding Times	Internal Standard Performance
Sample Preservation	MS/MSD Recoveries and Differences
Method Calibration	LCS Recoveries
Method and Project Blanks	Re-analysis and Secondary Dilution

Project Specific QA/QC or contract requirements may take priority over validation criteria in this procedure.

Overall Remarks: Results for hexachlorocyclopentadiene should be rejected due to very low LCS recovery. Results for pesticides should be 'J' qualified due to low surrogate recovery.

Definition of Qualifiers:

"U", not detected at the associated level
"UJ", not detected and associated value estimated
"J", associated value estimated
"R", associated value unusable or analyte identity unfounded
"=", compound properly identified and value positive

Reviewed by: Denae Athay Denae Athay Date: 10/10/2012

QA Reviewed by: _____ Date: _____

I. Case Narrative

Verify direct statements made within the Laboratory Case Narrative (note discrepancies).

Remarks:

General: COC did not list parameters for sample IDW7. This sample was logged in for TCLP VOAs, TCLP BNAs, and TCLP metals as per an email from the client. - Verified

VOCs: Methylene chloride was detected in the method blank for 180-46427 at a level that was above the MDL but below the RL. The value should be considered an estimate, and has been flagged.

SVOCs: The ~~laboratory~~ LCS and LCSD for batch 180-4557 recovered outside the control limits for hexachlorocyclopentadiene. All control compounds recovered within the control limits

Pesticides: The samples had tetrachloro-m-xylene recover outside of the control limits. The RPD between the LCS and LCSD of batch 180-45667 was outside the limit for 4,4'-DDT.

PCBs: Several samples had surrogate tetra-m-xylene recover outside the control limits.

II. Re-analysis and Secondary Dilutions

Verify that re-analysis and secondary dilutions were performed and reported as necessary. Determine appropriate results to report.

Remarks: No dilutions or reanalysis required.

III. Holding Times

VOC - Waters - unpreserved: aromatic within 7 days, non-aromatic within 14 days of sample collection
VOC - Waters - preserved: aromatic and non-aromatic within 14 days of sample collection
VOC - Soils - preserve or analyze within 48 hours of sample collection; analyze within 14 days of preservation

SVOC, Pest., PCB - Waters - extract within 7 days of sample collection, analyze within 40 days of extraction
SVOC, Pest., PCB - Soils - extract within 14 days of sample collection, analyze within 40 days of extraction

Deviations:

Sample #	VOC		SVOC			Pest/PCB		
	Date Collected	Date Analyzed	Date Collected	Date Extracted	Date Analyzed	Date Collected	Date Extracted	Date Analyzed
MW-101	8/16/12	8/27/12	8/16/12	8/20/12	8/21/12	8/16/12	8/20/12	9/5/12
DA ~~8/16/12~~		~~8/21/12~~				8/16/12	8/20/12	8/30/12 — PCBs

Actions:
1. If holding times are exceeded, all results are qualified as estimated (J/UJ)
2. If holding times are exceeded by more than 2X, reviewer may qualify non-detected results as unusable (R)

Remarks: No exceedances

IV. System Monitoring Compounds (SMC) Recoveries (VOC, SVOC, Pesticides, PCBs)

List SMC compounds with unacceptable recoveries:

Deviations:

Sample #	VOC			SVOC B/N Compounds			SVOC Acid Compounds			Pest	PCB
	TOL	BFB	DCFA	NBZ	FBP	TPH	PHL	2FP	TBP	TCX	DCB
MW-105										42 -	PCB
										35 -	Pest
										47	
QC	71	70	64	37	35	25	30	26	33	~~60~~	~~56~~ 50
Limits	118	118	135	104	108	130	102	100	122	~~111~~ 150	~~122~~ 140

47-150 - PCB
60-111 - Pest

50-140 PCB
56-122 Pest

Actions:

1. If any SMC recovery is <10%, qualify all positive results in associated fractions as estimated (J)
2. If any SMC recovery is <10%, qualify all nondetects in associated fractions as unusable (R)
3. If SMC recoveries fall between 10% and the lower recovery limit, qualify results as estimated (J/UJ)
4. If SMC recoveries fall above the upper recovery limit, qualify positive results as estimated (J)
5. → Use professional judgement to qualify Pest/PCB results when SMC recoveries are >10%
6. Use professional judgement to qualify results when SMC recoveries have been diluted out of spec.
7. For SVOC, qualification of the data is required only when 2 or more SMC per fraction are not within control limits
8. Note: SMC formerly known as surrogates.

Remarks: J Qualify pesticides due to low surrogate recovery by BPJ. Don't qualify PCB by BPJ

V. Internal Standards Performance (VOC, SVOC)

VOC internal standard area counts within -50% to +100% of standard (Y/N) Y
VOC internal standard retention times within ± 30 seconds of standard (Y/N) Y

SVOC internal standard area counts within -50% to +100% of standard (Y/N) Y
SVOC internal standard retention times within + 30 seconds of standard (Y/N) Y

Deviations:

Sample #	IS Affected	Area Counts	Acceptable Range	RT	Std. RT Value

Actions:

1. If area counts are outside limits, qualify positive results associated with that IS as estimated (J)
2. Non-detected compounds quantitated using an IS area count >100% should not be qualified
3. Non-detected compounds quantitated using an IS area count <50%, qualify as estimated (UJ)
4. If extremely low area counts are reported (<50% of the lower limit), qualify non-detects as unusable (R)
5. If an IS retention time varies more than 30 seconds, review the chromatographic profile for shifts and irregularities. Use professional judgement to qualify the data estimated (J/UJ) or unusable (R)

Remarks: No exceedances

VI. Blanks

All blanks were reported per matrix per concentration level for each 12 hour period on each GC/ MS system used to analyze VOCs and SVOCs Yes [X] No [ ]
Review associated laboratory and project blank samples. List documented contamination below:

Laboratory Method Blanks:

Date:	Lab ID #	Fraction	Compound	Conc. (ppb)
8/27/12	MB 180-46427/4	Water	methylene chloride	0.271

Associated Project Blanks (e.g., equipment rinsates, trip blanks, etc.)

Date	Lab ID #	Fraction	Compound	Conc. (ppb)

Remarks: Methylene chloride detect >MDL but < RL. No project blanks.

VI. Blanks (continued)

Calculate action levels based on 10X the highest blank concentration of "common laboratory solvents", VOCs (methylene chloride, acetone, toluene, 2-butanone, cyclohexane) or SVOCs (phthalates), and 5X the highest blank concentration for all other VOC, SVOC, Pesticides, and PCB compounds. Sample weights, volumes, and dilution factors must be taken into account when applying the 5X and 10X criteria. This allows the total amount of contaminant present to be considered.

Deviations:

Compound	Maximum Conc. Detected, (ppb)	Action Level (ppb)	Samples Affected
Methylene chloride	0.271	2.71	MW-101

Actions:

1. If compound results exceed the action levels, the data are not qualified
2. If compound results are below the required reporting level, report results as non-detect (U) at the reporting level
3. If the compound is detected above the reporting level, but below the action level, qualify as not-detected (U)
4. If gross contamination exists in blanks (i.e.,, saturated peaks by GC/ MS), all affected compounds in the associated samles should be qualifed as unusable (R) due to interference.
5. If blanks were not analyzed per matrix per concentration level for each 12 hour period on each GC/MS system used to analyze VOCs and SVOCs use professional judgement to qualifty data. Data may be rejected (R).

Remarks: Methylene chloride results for MW-101 do not require qualification due to non detect results.

VII. Initial & Contining Calibration (VOC, SVOC)

GC/MS instrument performance checks (BFB / DFTPP) Acceptable Y or N
All compounds must have and RRF > 0.01, %RSD < 30, and %D < 25

VOC - Date of initial calibration: 7/23/2012
VOC - Date(s) of continuing calibration: Sample analyzed: 8/27/12 1443
Was the 12 hour critieria met? Y or N CCV: 8/27/12 10:13, ~~10:45~~

SVOC- Date of initial calibration: 8/13/2012
SVOC - Date(s) of continuing calibration: Sample Analyzed: 8/21/12 2330
Was the 12 hour critieria met? Y or N CCV: 8/21/2012 15:03

Deviations:

Compound	Date	RRF	%RSD	%D	Samples Affected

* % Difference = $((RF_{CCV} - RF_{ICAL\ AVG})/RF_{ICAL\ AVG}) \times 100$. In instances where the bias of the CCV impacts validation qualifiers, review the RF values or amount reported to confirm that the % Difference or % Drift are reported with the correct negative or positive value.

Actions:

1. If any compound has an intial or continuing RRF of < 0.01, qualify positive results as estimated (J)
2. If any compound has an intial or continuing RRF of < 0.01, qualify non-detects as unusable (R)
3. If any compound has a %RSD >30 or a %D >25, qualify positive results as estimated (J)
4. If any compound has a %RSD >40 or a %D >40, qualify non-detects as estimated (UJ)
5. If BFB or DFTPP mass assignment / ION abundance criteria are all associated data as unusable (R).
6. If samples were analyzed outside the 12 hour BFB or DFTPP performance check time period, qualify the affected sample data as estimated (J/UJ).
7. If separate calibration for water and soil were not performed, use professional judgement to evaluate the data. Data may be rejected (R).
8. If calibrations were not completed within the 12 hour criterion, qualifty all associated data as estimated (J/UJ). If the 12 hour criterion was grossly exceeded, reject all associated data (R).

Remarks: No exceedance

VIII. Initial & Continuing Calibration (Pesticides, PCBs)

Linearity evaluation, are %RSD <20? (Y/N) Y

Is the RPD between calibration factors ≤25? (Y/N) Y

Are multicomponent calibration data provided for each analysis date? (Y/N) Y

Is the difference between columns check ≤ 25%D? (Y/N) Y

Are 4, 4'- DDT and endrin breakdown (PEM) ≤ 20% and combined breakdown ≤ 30% (Y/N) Y

Deviations:

Compound	%RSD	RPD	Samples Affected

* % Difference = $((RF_{CCV} - RF_{ICAL\ AVG})/RF_{ICAL\ AVG}) \times 100$. In instances where the bias of the CCV impacts validation qualifiers, review the RF values or amount reported to confirm that the % Difference or % Drift are reported with the correct negative or positive value.

Actions:

1. If %RSD criteria are not met, qualify positive results as estimated (J) and non-detects as estimated (UJ)
2. If RPD criteria are not met, qualify positive results as estimated (J) and non-detects as estimated (UJ)
3. If %D criteria is not met, qualify positive results as estimated (J) and non-detects as estimated (UJ)
4. If breadkwon criteria are not met, positive 4, 4'-DDT and endrin should be qualified as estimated (J). And non-detects should be rejected (R).

Remarks: No exceedances.

IX. Matrix Spike/Matrix Spike Duplicate Information

General MS/MSD Criteria:
percent recovery (%R)
relative percent difference (RPD)

VOC	SVOC	Pest	PCB
70-130	45-135	40-140	40-140
<30	<50	<50	<50

Project Sample(s) Spiked: None

Deviations:

Compound	%R	%R Limits	RPD	RPD Limits	Samples Affected

Actions:

1. If the spike recovery is above the upper control limit (UCL), qualify all positive values in the unspiked sample as estimated (J) and non-detects as estimated (UJ).
2. If the spike recovery is below the lower control limit (LCL), qualifty positive values as estimated (J). And non-detects as estimated (UJ).
3. If the spike recovery is <10%, qualify non-detect values as unusable (R)
4. If the RPD does not meet criteria, qualify positive values in the unspiked sample as estimated (J)
5. Use professional judgement to qualify additional samples in the analytical group based on MS/MSD results
6. Use professional judgement for qualification of data for unspiked compounds

Remarks: N/A

X. Laboratory Control Sample Information

General LCS Criteria:
percent recovery (%R).

VOC	SVOC	Pest	PCB
80-120	60-120	50-130	50-130

Laboratory LCS Identifications: _____

Deviations:

Compound	Date	%R	Samples Affected/Qualifiers Applied
Hexachlorocyclo-pentadiene	8/21/12	15	MW-105

Actions:

Action should be based on both the number of compounds outside the criterion and the magnitude of the exceedance.

1. If the LCS recovery is below limits but > one- half the lower limit, qualify valves as estimated (J/UJ).
2. If the LCS recovery is < one-half the lower limit, qualify all data for that analyte as unusable (R).
3. If the LCS recovery is greater than the upper limit, qualify positive valves for that analyte as estimated (J).
4. If more than half the compounds in this LCS are not within recovery criteria, then qualify associated detected compounds as estimated (J).
5. Use professional judgement for qualification of data for compounds with no LCS information

Remarks: Hexachlorocyclopentadiene results should be rejected due to very low LCS/LCSD recovery.

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
Metals Data Review Checklist - Standard Validation

Project: QDI Institute, WV

SDG No: 180-13537

Analysis: Metals

Method: 6020A

Laboratory: Test America Pittsburgh

Matrix: Water

The above data package has been reviewed and the analytical quality control/quality assurance performance data have been summarized. The general criteria used to assess the analytical integrity of the data were based on an examination of the following:

Case Narrative	MS/MSD Recoveries and Differences
Analytical Holding Times	Duplicate Relative Percent Differences
Sample Preservation	ICP Serial Dilution
Method Calibration	Furnace Atomic Absorption QC
Method and Project Blanks	Re-analysis and Secondary Dilution
LCS Recoveries	Internal Standard Performance (if applicable)

Project specific QA/QC or contract requirements may take priority over validation criteria in this procedure.

Overall Remarks: No qualification issues. Some blank detects however sample results >10x the blank detect.

Definition of Qualifiers:

"U", not detected at the associated level
"UJ", not detected and associated value estimated
"J", associated value estimated
"R", associated value unusable or analyte identity unfounded
"=", compound properly identified and value positive

Reviewed by: Denae Athay Denae Athay Date: 10/12/2012

QA Reviewed by: _____ Date: _____

I. Case Narrative

Verify direct statements made within the Laboratory Case Narrative (note discrepancies).

Remarks: Metals analysis case narrative statements verified.

II. Re-analysis and Secondary Dilutions

Verify that re-analysis and secondary dilutions were performed and reported as necessary. Determine appropriate results to report.

Remarks: No dilutions or reanalysis required.

III. Holding Times

Metals - Waters - preserved to pH<2, 180 days from sample collection
Metals - Soils - 180 days from sample collection
Mercury - Waters - preserved to pH<2, 28 days from sample collection
Mercury - Soils - 28 days from sample collection

Deviations:

Sample #	Metals				Mercury			
	Date Collected	Date Analyzed	Days >HT	pH Check	Date Collected	Date Analyzed	Days >HT	pH Check
MW-101 - total	8/16/12	9/7/12	ø	Y	—	—	—	—
MW-101 - dissolved	8/16/12	9/7/12	ø	Y	—	—	—	—

Actions:

1. If preserved samples exceed holding time, qualifty all associated results as estimated (J/UJ).
2. If unpreserved samples exceed holding time, qualify all associated results as unusable (R).
3. If holding times are exceeded by more than 2X, reviewer may qualify non-detected results as unusable (R)
4. If water samples are not acidified, use professional judgement. Minimally, qualify data as estimated (J) and non-detects unusable (R).
5. If soil samples exceed holding time, use professional judgement to qualify data.

Remarks: No exceedances

IV. Initial & Contining Calibration (ICP, GFAA, CVAA, etc.)

Initial calibration linearity criteria is r ≥ 0.995
ICV and CCV criteria are ± 10% recovery, low level check standard allowed ± 30%
ICP inter-element check standard criteria ± 20%

Deviations:

Element	Date	Intial Calib.	ICV/ CCV	%R	Samples Affected

Actions:

1. If any elements initial claibration linearity is <0.995, qualify the data as estimated (J/UJ)
2. If any elements initial claibration linearity is <0.95, qualify the data as unusable (R)

3a. If any elements ICV or CCV recovery is <90%, qualify the data as estimated (J/UJ)

3b. If any elements ICV or CCV recovery is > 110%, qualify results ≥ MDL as estimated (J), do not qualify non-detects

4a. If any elements ICV or CCV recovery is <75%, qualify the data as unusable (R)

4b. If any elements ICV or CCV recovery is > 125%, qualify positive results as estimated (J) or non-detects unusable (R)

4c. If any elements ICV or CCV recovery is > 160%, qualify positive results ≥ MDL us unusable (R). Do not qualify non-detects.

5a. If any elements CRI recovery is 50-69% (30-49% for Sb, Pb, Tl), qualify results ≥ MDL (but < 2 x CRQL) as estimated (J/UJ) and results > 2 x CRQL are not qualified.

5b. If any elements CRI recovery is < 50% (< 30% for Sb, Pb, Tl), qualify results ≥ MDL (but < 2 x CRQL) as unusable (R) and results > 2 x CRQL as estimate (J).

5c. If any elements CRI recovery is > 130% but < 180 % (> 150% but ≤ 200% for Sb, Pb, Tl) quality results ≥ MDL (but < 2 x CRQL) as esimated (J) and non-detects and results > 2 x CRQL are not qualified.

5d. If CRI or (R) > 180% (> 200% for Sb, Pb, Ti), qualify results that are ≥ MDL as unusable (R).

Remarks: No exceedances

IV. Initial & Contining Calibration (ICP, GFAA, CVAA, etc.) (continued)

Analytical Sequence and MS Tune	(Y/N)
1. Were the appropriate number of ICP standards used?	Y
2. Were the appropriate number of AA standards used?	–
3. Was calibration performed and documented at the beginning of each run?	Y
4. Were calibration check standards run at 10% frequency or every two hours?	Y
5. Were low level standard checks analyzed at approximately 2X the PQL?	Y
6. Was ICP-MS mass calibration within 0.1 AMU?	Y
7. Was ICP-MS % RSD of the absolute signals for all analytes < 5%?	Y

Deviations:

Element	Deviation	Samples Affected

Actions:

1. If instrument calibration is questionable, use professional judgement, qualify the data as estimated (J/UJ)
2. If instrument calibration documentation can not be obtained or is inadequate, qualify the data as unusable (R)
3. If mass calibration for ICP-MS was not within 0.1 AMU, qualify analyte results as estimated (J/UJ).
4. If % RSD for ICP-MS was > 5% for any analyte in the tuning solution, qualify associated resuts as estimated (J/UJ).

Remarks: No exceedances.

V. Blanks (ICB, CCB, Method Blank, Equipment Rinsate Blank)

A. Blank Results

If the blank level is > CRQL for any analyte check that the analyte's concentration in a sample is > 10 x the blank value.The highest blank concentration of observed elements is the action level.
Sample weights, volumes, and dilution factors must be taken into account when applying the action level.
Blank results given in ug/L must be converted to mg/kg to compare them with soil sample results.
use the following equation:

ug/L x V/W x 1L/1000mL x 1000g/1kg x 1mg/1000ug = mg/kg

where: V = volume of samples digest solution (usually 200 mL)
W = weight of sample digested (usually 1 g)

Deviations:

Blank ID	Element	Max. Conc. Detected	Action Level	Samples Affected
MB 180-45944	Mn	0.134	1.34	MW-105
/1A	Pb	0.0890	0.89	↓
	V	0.312	3.12	↓

If additional space is required, use next page

Actions:

1. For blank results ≥ MDL but ≤ CRQL, qualify sample results ≥ MDL but < CRQL as CRQL U. Use professional judgement to qualify sample results exceeding the CRQL.

2a. If blank results are > CRQL: for sample values ≥ MDL but ≤ CRQL, qualify results as CRQL U; for sample values > CRQL but < 10 x the blank, qualify results as unusable (R) or estimated (J). No action is taken for sample results ≥ 10 x the blank values.

2b. If ICB/ CCB results are > CRQL: for sample values ≥ MDL but ≤ CRQL, qualify results as CRQL U; for sample values > CRQL but < blank results, qualfiy results as not detected (U) at the level of the blank or unusable (R). Use proffessional judgement for sample results > blank results.

Remarks: No qualification recommended due to results >10x the blank detection.

V. Blanks (continued)

The highest blank concentration of observed elements is the action level.
Sample weights, volumes, and dilution factors must be taken into account.
Blank results given in ug/L must be converted to mg/kg to compare them with soil sample results.
use the following equation:

ug/L x V/W x 1L/1000mL x 1000g/1kg x 1mg/1000ug = mg/kg

where: V = volume of samples digest solution (usually 200 mL)
W = weight of sample digested (usually 1 g)

Deviations:

Blank ID	Element	Max. Conc. Detected	Action Level	Samples Affected

V. Blanks (continued)

B. Frequency Requirements

	(Y/N)
1. Was a method (preparation) blank analyzed for each matrix?	Y
2. Was a method blank processed for every analytical batch (20 samples)?	Y
3. Was a calibration blank analyzed at 10% frequency or every two hours?	Y

Deviations:

Element	Deviation	Samples Affected

Remarks: No exceedances

C. Baseline Shift Evaluation

List the highest negative blank concentration for each analyte observed in laboratory or project blanks.

Deviations:

Blank ID	Element	Max. Neg. Conc.	Action Level	Samples Affected

Actions:

1. If the absolute value of the maximum negative blank result is > the CRQL, qualify positive results as estimated (J) and non-detects as estimated (UJ).

Remarks: No negative blank results.

VI. Laboratory Control Sample Evaluation

All LCS recovery criteria are set at 80-120%
An LCS must be analyzed for each matrix and for each digestion batch or set of twenty samples

Deviations:

Element	Date	%R	Matrix	Samples Affected

Actions:

1. If any element's LCS recovery is >120%, qualify positive results as (J) .
2. If any element's LCS recovery is 50-79%, qualify positive results as (J) and non-detect results as (UJ).

3a. If any element's LCS recovery is <50%, qualify positive results as (J) and non-detect results as (R).
3b. If the LCS recovery is > 150%, qualify all results as unusable (R).

4. For soil LCS recovery > upper limit, qualify sample results ≥ MDL as estimated (J).
5. For soil LCS recovery < lower limit, qualify results ≥ MDL as estimated (J) and non-detects estimated (UJ).
6. Use professional judgement to qualify data if the LCS frequency criteria are not met.

Remarks: No exceedances

VII. Matrix Spike Evaluation

All MS recovery criteria are set at 75-125%
An MS must be analyzed for each matrix and for each digestion batch or set of twenty samples
Verify that a field blank or PE sample was not used for spiked sample analysis.
Verify that a post-digestion spike was analyzed for those analytes where the pre-digestion spike recovery is outside control limits and the sample result is < 4 x the spike added.

Project Sample(s) Spiked: None

Deviations:

Element	Spiked Sample Result	Sample Result	Spike Amount	%R	Samples Affected

Actions:

1. If the sample concentration exceeds the spiking level by a factor of 4X or more, do not qualify the data
2. If the spike recovery is >125%, qualify all positive values as (J).
3. If the spike recovery is between 30-74%, qualify positive values as (J) and non-detect values as estimated (UJ)
4. If the spike recovery is <30%, qualify positive values as (J) and non-detects are qualified unusable (R) if the post-digestion spike recovery is < 75% (or none was performed); non-detects are qualified as estimated (UJ) if the post-digestion spike recovery is ≥ 75%. There is no post-digestion spike performed for mercury.
5. Qualify all samples of similar matrix to the spiked sample in the same manner
6. Use professional judgement to qualify data if the MS frequency criteria are not met.
7. Use professional judgement for qualification of data for unspiked elements

Remarks: N/A

VIII. Laboratory Duplicate Evaluation

Duplicate relative percent difference (RPD) for water is 20% (both results > 5 times CRDL) or < CRDL difference (if either result is < 5 times CRDL) and RPD for soil is 35% (if both results are > 5 times CRDL or < 2 times CRDL if either result is < 5 times CRDL.
When duplicate sample values are both less than the reporting level they are considered acceptable
When dupicate sample values are within 5X the reporting level they are acceptable if their absolute difference is within 3X the reporting level
Verify that a field blank or PE samples was not used for duplicate analysis.

Deviations:

Element	Sample #	Duplicate #	RPD	Samples Affected

Actions:

1. If an element's RPD is >20% (water) / 35% (soil), qualify positive results as (J) and non-detect results as (UJ)
2. For low concentrations, if an element's duplicate absolute difference is > 3X the reporting level, qualify positive results as (J) and non-detect results as (UJ)
3. Use professional judgement to qualify data if the duplicate frequency criteria are not met.

Remarks: No exceedances.

IX. Inductively Coupled Plasma (ICP) Serial Dilution Analysis

Verify that a field blank or PE sample was not used for serial dulution.
Serial dilution of positive results are performed when values exceed 50X the IDL
Results from serial dilutions should agree within 10% of the original undiluted analysis

Deviations:

Element	Sample #	Sample Result	Serial Dilution	%D	Action

Actions:

1. If the serial dilution %D is >10 and the analyte results are >50X the IDL, qualify all positive results as estimated (J) and non-detects as estimated (UJ).

Remarks: No serial dilutions required.

X. Furnace Atomic Absorption QC

A. Duplicate Precision (Y/N)

1. Were duplicate injections performed for all samples? Y
2. Were one point analytical spikes performed for all samples? Y
3. Did duplicate injections agree within ± 20%? Y

Deviations:

Element	Deviation	Sample Affected

Actions:

1. If duplicate injection results are outside ± 20%, qualify positive results as (J) and non-detect results as (UJ)

Remarks: No exceedances

B. Post Digestion Spike Recoveries (Y/N)

1. Did post digestion spike recoveries meet an 85-115% recovery criteria? _____
2. If spike recoveries did not meet recovery criteria were samples analyzed by MSA? _____
3. If MSA was used to analyze samples, was its' correlation coefficient ≥ 0.995? _____

Deviations:

Element	Deviation	Sample Affected

Actions:

1. If post digestion spike recoveries are >115%, qualify positive results as (J) and non-detect results as (U)
2. If post digestion spike recoveries are 11-84%, qualify positive results as (J) and non-detect results as (UJ)
3. If post digestion spike recoveries are <10%, qualify positive results as (R) and non-detect results as (R)
4. If MSA was used to quantitate values and the correlation coefficient was <0.995, qualify data as (J or UJ)
5. If MSA was used to quantitate values and the correlation coefficient was <0.95, qualify data as (R)

Remarks: No exceedances

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
Metals Data Review Checklist - Standard Validation

Project: QDI Institute, WV

SDG No: 180-13503

Laboratory: Test America Pittsburgh

Analysis: Metals, Mercury

Method: ~~6010C, 7471B~~ 6020A

Matrix: ~~Solid~~ Water

The above data package has been reviewed and the analytical quality control/quality assurance performance data have been summarized. The general criteria used to assess the analytical integrity of the data were based on an examination of the following:

Case Narrative	MS/MSD Recoveries and Differences
Analytical Holding Times	Duplicate Relative Percent Differences
Sample Preservation	ICP Serial Dilution
Method Calibration	Furnace Atomic Absorption QC
Method and Project Blanks	Re-analysis and Secondary Dilution
LCS Recoveries	Internal Standard Performance (if applicable)

Project specific QA/QC or contract requirements may take priority over validation criteria in this procedure.

Overall Remarks: No validation issues. Some blank detects but sample result >10x blank detect.

Definition of Qualifiers:

"U", not detected at the associated level
"UJ", not detected and associated value estimated
"J", associated value estimated
"R", associated value unusable or analyte identity unfounded
"=", compound properly identified and value positive

Reviewed by: Denae Athay Denae Athay Date: 10/12/2012

QA Reviewed by: _____ Date: _____

I. Case Narrative

Verify direct statements made within the Laboratory Case Narrative (note discrepancies).

Remarks: Metals analysis case narrative statements verified.

II. Re-analysis and Secondary Dilutions

Verify that re-analysis and secondary dilutions were performed and reported as necessary. Determine appropriate results to report.

Remarks: No re-analysis or dilutions required.

III. Holding Times

Metals - Waters - preserved to pH<2, 180 days from sample collection
Metals - Soils - 180 days from sample collection
Mercury - Waters - preserved to pH<2, 28 days from sample collection
Mercury - Soils - 28 days from sample collection

Deviations:

Sample #	Metals				Mercury			
	Date Collected	Date Analyzed	Days >HT	pH Check	Date Collected	Date Analyzed	Days >HT	pH Check
MW-105 total	8/15/12	9/6/12	Ø	Y				
MW-105 dissolved	8/15/12	9/6/12	Ø	Y				

Actions:

1. If preserved samples exceed holding time, qualifty all associated results as estimated (J/UJ).
2. If unpreserved samples exceed holding time, qualify all associated results as unusable (R).
3. If holding times are exceeded by more than 2X, reviewer may qualify non-detected results as unusable (R)
4. If water samples are not acidified, use professional judgement. Minimally, qualify data as estimated (J) and non-detects unusable (R).
5. If soil samples exceed holding time, use professional judgement to qualify data.

Remarks: No exceedances

IV. Initial & Contining Calibration (ICP, GFAA, CVAA, etc.)

Initial calibration linearity criteria is r ≥ 0.995
ICV and CCV criteria are ± 10% recovery, low level check standard allowed ± 30%
ICP inter-element check standard criteria ± 20%

Deviations:

Element	Date	Intial Calib.	ICV/ CCV	%R	Samples Affected

Actions:

1. If any elements initial claibration linearity is <0.995, qualify the data as estimated (J/UJ)

2. If any elements initial claibration linearity is <0.95, qualify the data as unusable (R)

3a. If any elements ICV or CCV recovery is <90%, qualify the data as estimated (J/UJ)

3b. If any elements ICV or CCV recovery is > 110%, qualify results ≥ MDL as estimated (J), do not qualify non-detects

4a. If any elements ICV or CCV recovery is <75%, qualify the data as unusable (R)

4b. If any elements ICV or CCV recovery is > 125%, qualify positive results as estimated (J) or non-detects unusable (R)

4c. If any elements ICV or CCV recovery is > 160%, qualify positive results ≥ MDL us unusable (R). Do not qualify non-detects.

5a. If any elements CRI recovery is 50-69% (30-49% for Sb, Pb, Tl), qualify results ≥ MDL (but < 2 x CRQL) as estimated (J/UJ) and results > 2 x CRQL are not qualified.

5b. If any elements CRI recovery is < 50% (< 30% for Sb, Pb, Tl), qualify results ≥ MDL (but < 2 x CRQL) as unusable (R) and results > 2 x CRQL as estimate (J).

5c. If any elements CRI recovery is > 130% but < 180 % (> 150% but ≤ 200% for Sb, Pb, Tl) quality results ≥ MDL (but < 2 x CRQL) as esimated (J) and non-detects and results > 2 x CRQL are not qualified.

5d. If CRI or (R) > 180% (> 200% for Sb, Pb, Ti), qualify results that are ≥ MDL as unusable (R).

Remarks: No exceedances.

IV. Initial & Contining Calibration (ICP, GFAA, CVAA, etc.) (continued)

Analytical Sequence and MS Tune (Y/N)

1. Were the appropriate number of ICP standards used? Y
2. Were the appropriate number of AA standards used? -
3. Was calibration performed and documented at the beginning of each run? Y
4. Were calibration check standards run at 10% frequency or every two hours? Y
5. Were low level standard checks analyzed at approximately 2X the PQL? Y
6. Was ICP-MS mass calibration within 0.1 AMU? Y
7. Was ICP-MS % RSD of the absolute signals for all analytes < 5%? Y

Deviations:

Element	Deviation	Samples Affected

Actions:

1. If instrument calibration is questionable, use professional judgement, qualify the data as estimated (J/UJ)
2. If instrument calibration documentation can not be obtained or is inadequate, qualify the data as unusable (R)
3. If mass calibration for ICP-MS was not within 0.1 AMU, qualify analyte results as estimated (J/UJ).
4. If % RSD for ICP-MS was > 5% for any analyte in the tuning solution, qualify associated resuts as estimated (J/UJ).

Remarks: No exceedances

V. Blanks (ICB, CCB, Method Blank, Equipment Rinsate Blank)

A. Blank Results

If the blank level is > CRQL for any analyte check that the analyte's concentration in a sample is > 10 x the blank value.The highest blank concentration of observed elements is the action level.
Sample weights, volumes, and dilution factors must be taken into account when applying the action level.
Blank results given in ug/L must be converted to mg/kg to compare them with soil sample results.
use the following equation:

ug/L x V/W x 1L/1000mL x 1000g/1kg x 1mg/1000ug = mg/kg

where: V = volume of samples digest solution (usually 200 mL)
W = weight of sample digested (usually 1 g)

Deviations:

Blank ID	Element	Max. Conc. Detected	Action Level	Samples Affected
MB 180-45944/1-A	Pb	0.0890	0.89	MW 105
	Mn	0.134	1.34	↓
	V	0.312	3.12	↓

If additional space is required, use next page

Actions:

1. For blank results ≥ MDL but ≤ CRQL, qualify sample results ≥ MDL but < CRQL as CRQL U. Use professional judgement to qualify sample results exceeding the CRQL.

2a. If blank results are > CRQL: for sample values ≥ MDL but ≤ CRQL, qualify results as CRQL U; for sample values > CRQL but < 10 x the blank, qualify results as unusable (R) or estimated (J). No action is taken for sample results ≥ 10 x the blank values.

2b. If ICB/ CCB results are > CRQL: for sample values ≥ MDL but ≤ CRQL, qualify results as CRQL U; for sample values > CRQL but < blank results, qualfiy results as not detected (U) at the level of the blank or unusable (R). Use proffessional judgement for sample results > blank results.

Remarks: No qualifier required, sample result > 10x blank detect.

V. Blanks (continued)

The highest blank concentration of observed elements is the action level.
Sample weights, volumes, and dilution factors must be taken into account.
Blank results given in ug/L must be converted to mg/kg to compare them with soil sample results.
use the following equation:

ug/L x V/W x 1L/1000mL x 1000g/1kg x 1mg/1000ug = mg/kg

where: V = volume of samples digest solution (usually 200 mL)
W = weight of sample digested (usually 1 g)

Deviations:

Blank ID	Element	Max. Conc. Detected	Action Level	Samples Affected

V. Blanks (continued)

B. Frequency Requirements (Y/N)

1. Was a method (preparation) blank analyzed for each matrix? Y
2. Was a method blank processed for every analytical batch (20 samples)? Y
3. Was a calibration blank analyzed at 10% frequency or every two hours? Y

Deviations:

Element	Deviation	Samples Affected

Remarks: No exceedances.

C. Baseline Shift Evaluation

List the highest negative blank concentration for each analyte observed in laboratory or project blanks.

Deviations:

Blank ID	Element	Max. Neg. Conc.	Action Level	Samples Affected

Actions:

1. If the absolute value of the maximum negative blank result is > the CRQL, qualify positive results as estimated (J) and non-detects as estimated (UJ).

Remarks: No negative blank results

VI. Laboratory Control Sample Evaluation

All LCS recovery criteria are set at 80-120%
An LCS must be analyzed for each matrix and for each digestion batch or set of twenty samples

Deviations:

Element	Date	%R	Matrix	Samples Affected

Actions:

1. If any element's LCS recovery is >120%, qualify positive results as (J) .
2. If any element's LCS recovery is 50-79%, qualify positive results as (J) and non-detect results as (UJ).

3a. If any element's LCS recovery is <50%, qualify positive results as (J) and non-detect results as (R).
3b. If the LCS recovery is > 150%, qualify all results as unusable (R).

4. For soil LCS recovery > upper limit, qualify sample results ≥ MDL as estimated (J).
5. For soil LCS recovery < lower limit, qualify results ≥ MDL as estimated (J) and non-detects estimated (UJ).
6. Use professional judgement to qualify data if the LCS frequency criteria are not met.

Remarks: No exceedances.

VII. Matrix Spike Evaluation

All MS recovery criteria are set at 75-125%
An MS must be analyzed for each matrix and for each digestion batch or set of twenty samples
Verify that a field blank or PE sample was not used for spiked sample analysis.
Verify that a post-digestion spike was analyzed for those analytes where the pre-digestion spike recovery is outside control limits and the sample result is < 4 x the spike added.

Project Sample(s) Spiked: None

Deviations:

Element	Spiked Sample Result	Sample Result	Spike Amount	%R	Samples Affected

Actions:

1. If the sample concentration exceeds the spiking level by a factor of 4X or more, do not qualify the data
2. If the spike recovery is >125%, qualify all positive values as (J).
3. If the spike recovery is between 30-74%, qualify positive values as (J) and non-detect values as estimated (UJ)
4. If the spike recovery is <30%, qualify positive values as (J) and non-detects are qualified unusable (R) if the post-digestion spike recovery is < 75% (or none was performed); non-detects are qualified as estimated (UJ) if the post-digestion spike recovery is ≥ 75%. There is no post-digestion spike performed for mercury.
5. Qualify all samples of similar matrix to the spiked sample in the same manner
6. Use professional judgement to qualify data if the MS frequency criteria are not met.
7. Use professional judgement for qualification of data for unspiked elements

Remarks: N/A

VIII. Laboratory Duplicate Evaluation

Duplicate relative percent difference (RPD) for water is 20% (both results > 5 times CRDL) or < CRDL difference (if either result is < 5 times CRDL) and RPD for soil is 35% (if both results are > 5 times CRDL or < 2 times CRDL if either result is < 5 times CRDL.
When duplicate sample values are both less than the reporting level they are considered acceptable
When dupicate sample values are within 5X the reporting level they are acceptable if their absolute difference is within 3X the reporting level
Verify that a field blank or PE samples was not used for duplicate analysis.

Deviations:

Element	Sample #	Duplicate #	RPD	Samples Affected

Actions:

1. If an element's RPD is >20% (water) / 35% (soil), qualify positive results as (J) and non-detect results as (UJ)
2. For low concentrations, if an element's duplicate absolute difference is > 3X the reporting level, qualify positive results as (J) and non-detect results as (UJ)
3. Use professional judgement to qualify data if the duplicate frequency criteria are not met.

Remarks: No exceedances.

IX. Inductively Coupled Plasma (ICP) Serial Dilution Analysis

Verify that a field blank or PE sample was not used for serial dulution.
Serial dilution of positive results are performed when values exceed 50X the IDL
Results from serial dilutions should agree within 10% of the original undiluted analysis

Deviations:

Element	Sample #	Sample Result	Serial Dilution	%D	Action

Actions:

1. If the serial dilution %D is >10 and the analyte results are >50X the IDL, qualify all positive results as estimated (J) and non-detects as estimated (UJ).

Remarks: No serial dilutions required.

X. Furnace Atomic Absorption QC

A. Duplicate Precision (Y/N)

1. Were duplicate injections performed for all samples? Y
2. Were one point analytical spikes performed for all samples? Y
3. Did duplicate injections agree within ± 20%? Y

Deviations:

Element	Deviation	Sample Affected

Actions:

1. If duplicate injection results are outside ± 20%, qualify positive results as (J) and non-detect results as (UJ)

Remarks: No exceedances.

B. Post Digestion Spike Recoveries (Y/N)

1. Did post digestion spike recoveries meet an 85-115% recovery criteria? _____
2. If spike recoveries did not meet recovery criteria were samples analyzed by MSA? _____
3. If MSA was used to analyze samples, was its' correlation coefficient ≥ 0.995? _____

Deviations:

Element	Deviation	Sample Affected

Actions:

1. If post digestion spike recoveries are >115%, qualify positive results as (J) and non-detect results as (U)
2. If post digestion spike recoveries are 11-84%, qualify positive results as (J) and non-detect results as (UJ)
3. If post digestion spike recoveries are <10%, qualify positive results as (R) and non-detect results as (R)
4. If MSA was used to quantitate values and the correlation coefficient was <0.995, qualify data as (J or UJ)
5. If MSA was used to quantitate values and the correlation coefficient was <0.95, qualify data as (R)

Remarks: No exceedances.

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
Organic Data Review Checklist - Standard Validation

Project: QDI Institute, WV

SDG No: 180-13503-1

Analysis: VOCs, SVOCs, Pesticides, PCBs

Method: SW846 8270B, SW 8270C

Laboratory: Test America Pittsburgh

Matrix: Water 8081A, 8082

The above data package has been reviewed and the analytical quality control/quality assurance performance data have been summarized. The general criteria used to assess the analytical integrityof the data were based on an examination of the following:

Case Narrative	Analytical Surrogate Recoveries
Analytical Holding Times	Internal Standard Performance
Sample Preservation	MS/MSD Recoveries and Differences
Method Calibration	LCS Recoveries
Method and Project Blanks	Re-analysis and Secondary Dilution

Project Specific QA/QC or contract requirements may take priority over validation criteria in this procedure.

Overall Remarks: Results for hexachlorocyclopentadiene should be rejected due to very low LCS recovery.

Definition of Qualifiers:

"U", not detected at the associated level
"UJ", not detected and associated value estimated
"J", associated value estimated
"R", associated value unusable or analyte identity unfounded
"=", compound properly identified and value positive

Reviewed by: Denae Athay Denae Athay Date: 10/10/2012

QA Reviewed by: _____ Date: _____

I. Case Narrative

Verify direct statements made within the Laboratory Case Narrative (note discrepancies).

Remarks:

VOCs: The reported TIC silanol, trimethyl is most likely contamination from the septa of the vial.
See dilution statement below.

SVOCs: The laboratory ~~st~~ control standard and the laboratory control standard duplicate of batch 180-45559 recovered outside the control limits for hexachlorocyclopentadiene. All control compounds recovered within the control limits. – Verified

II. Re-analysis and Secondary Dilutions

Verify that re-analysis and secondary dilutions were performed and reported as necessary. Determine appropriate results to report.

Remarks:

MW-105 analyzed at 5x dilution for VOCs. MW-105 analyzed at 20x dilution for SVOCs. – Verified

III. Holding Times

VOC - Waters - unpreserved: aromatic within 7 days, non-aromatic within 14 days of sample collection
VOC - Waters - preserved: aromatic and non-aromatic within 14 days of sample collection
VOC - Soils - preserve or analyze within 48 hours of sample collection; analyze within 14 days of preservation

SVOC, Pest., PCB - Waters - extract within 7 days of sample collection, analyze within 40 days of extraction
SVOC, Pest., PCB - Soils - extract within 14 days of sample collection, analyze within 40 days of extraction

Deviations:

Sample #	VOC		SVOC			Pest/PCB			
	Date Collected	Date Analyzed	Date Collected	Date Extracted	Date Analyzed	Date Collected	Date Extracted	Date Analyzed	
MW-105	8/15/12	8/27/12	8/15/12	8/20/12	8/22/12	8/15/12	8/17/12	9/5/12	-Pest
						8/15/12	8/17/12	8/29/12	- PCBs

Actions:
1. If holding times are exceeded, all results are qualified as estimated (J/UJ)
2. If holding times are exceeded by more than 2X, reviewer may qualify non-detected results as unusable (R)

Remarks: No exceedances

IV. System Monitoring Compounds (SMC) Recoveries (VOC, SVOC, Pesticides, PCBs)

List SMC compounds with unacceptable recoveries:

Deviations:

Sample #	VOC			SVOC B/N Compounds			SVOC Acid Compounds			Pest	PCB
	TOL	BFB	DCEA	NBZ	FBP	TPH	PHL	2FP	TBP	TCX	DCB
MW-105	109	108	113	54	52	54	52	56	65	61	67
QC	71	70	64	23	19	10	15	10	16	~~61~~ 60	56
Limits	118	118	135	112	107	132	112	111	122	111	122

Actions:

1. If any SMC recovery is <10%, qualify all positive results in associated fractions as estimated (J)
2. If any SMC recovery is <10%, qualify all nondetects in associated fractions as unusable (R)
3. If SMC recoveries fall between 10% and the lower recovery limit, qualify results as estimated (J/UJ)
4. If SMC recoveries fall above the upper recovery limit, qualify positive results as estimated (J)
5. Use professional judgement to qualify Pest/PCB results when SMC recoveries are >10%
6. Use professional judgement to qualify results when SMC recoveries have been diluted out of spec.
7. For SVOC, qualification of the data is required only when 2 or more SMC per fraction are not within control limits
8. Note: SMC formerly known as surrogates.

Remarks: No exceedances

VI. Blanks

All blanks were reported per matrix per concentration level for each 12 hour period on each GC/ MS system used to analyze VOCs and SVOCs Yes [X] No [ ]
Review associated laboratory and project blank samples. List documented contamination below:

Laboratory Method Blanks:

Date:	Lab ID #	Fraction	Compound	Conc. (ppb)

Associated Project Blanks (e.g., equipment rinsates, trip blanks, etc.)

Date	Lab ID #	Fraction	Compound	Conc. (ppb)
8/27/12	180-13503-1		Silanol, trimethyl	3.2 J

Remarks: No laboratory blank detects. The silanol, trimethyl was detected as a TIC and between the RL and MDL. The laboratory states that the results are likely contamination from the septum.

VI. Blanks (continued)

Calculate action levels based on 10X the highest blank concentration of "common laboratory solvents", VOCs (methylene chloride, acetone, toluene, 2-butanone, cyclohexane) or SVOCs (phthalates), and 5X the highest blank concentration for all other VOC, SVOC, Pesticides, and PCB compounds. Sample weights, volumes, and dilution factors must be taken into account when applying the 5X and 10X criteria. This allows the total amount of contaminant present to be considered.

Deviations:

Compound	Maximum Conc. Detected, (ppb)	Action Level (ppb)	Samples Affected

Actions:

1. If compound results exceed the action levels, the data are not qualified
2. If compound results are below the required reporting level, report results as non-detect (U) at the reporting level
3. If the compound is detected above the reporting level, but below the action level, qualify as not-detected (U)
4. If gross contamination exists in blanks (i.e.,, saturated peaks by GC/ MS), all affected compounds in the associated samles should be qualifed as unusable (R) due to interference.
5. If blanks were not analyzed per matrix per concentration level for each 12 hour period on each GC/MS system used to analyze VOCs and SVOCs use professional judgement to qualifty data. Data may be rejected (R).

Remarks: No laboratory solvents detected

V. Internal Standards Performance (VOC, SVOC)

VOC internal standard area counts within -50% to +100% of standard (Y/N)
VOC internal standard retention times within ± 30 seconds of standard (Y/N)

SVOC internal standard area counts within -50% to +100% of standard (Y/N)
SVOC internal standard retention times within + 30 seconds of standard (Y/N)

Deviations:

Sample #	IS Affected	Area Counts	Acceptable Range	RT	Std. RT Value

Actions:

1. If area counts are outside limits, qualify positive results associated with that IS as estimated (J)
2. Non-detected compounds quantitated using an IS area count >100% should not be qualified
3. Non-detected compounds quantitated using an IS area count <50%, qualify as estimated (UJ)
4. If extremely low area counts are reported (<50% of the lower limit), qualify non-detects as unusable (R)
5. If an IS retention time varies more than 30 seconds, review the chromatographic profile for shifts and irregularities. Use professional judgement to qualify the data estimated (J/UJ) or unusable (R)

Remarks: No exceedances

VII. Initial & Contining Calibration (VOC, SVOC)

GC/MS instrument performance checks (BFB / DFTPP) Acceptable Y or N
All compounds must have and RRF > 0.01, %RSD < 30, and %D < 25

VOC - Date of initial calibration: ~~8/9/2012~~ 8/10/2012
VOC - Date(s) of continuing calibration: Sample analyzed 8/27/2012 1625
Was the 12 hour critieria met? (Y) or N CCV: 8/27/2012 0938, 1002

SVOC- Date of initial calibration: 8/13/2012
SVOC - Date(s) of continuing calibration: Sample analyzed 8/22/2012 0244
Was the 12 hour critieria met? (Y) or N CCV: 8/21/2012 15:03, 8/22/2012 10:05

Deviations:

Compound	Date	RRF	%RSD	%D	Samples Affected

* % Difference = $((RF_{CCV} - RF_{ICAL\ AVG})/RF_{ICAL\ AVG}) \times 100$. In instances where the bias of the CCV impacts validation qualifiers, review the RF values or amount reported to confirm that the % Difference or % Drift are reported with the correct negative or positive value.

Actions:

1. If any compound has an intial or continuing RRF of < 0.01, qualify positive results as estimated (J)
2. If any compound has an intial or continuing RRF of < 0.01, qualify non-detects as unusable (R)
3. If any compound has a %RSD >30 or a %D >25, qualify positive results as estimated (J)
4. If any compound has a %RSD >40 or a %D >40, qualify non-detects as estimated (UJ)
5. If BFB or DFTPP mass assignment / ION abundance criteria are all associated data as unusable (R).
6. If samples were analyzed outside the 12 hour BFB or DFTPP performance check time period, qualify the affected sample data as estimated (J/UJ).
7. If separate calibration for water and soil were not performed, use professional judgement to evaluate the data. Data may be rejected (R).
8. If calibrations were not completed within the 12 hour criterion, qualifty all associated data as estimated (J/UJ). If the 12 hour criterion was grossly exceeded, reject all associated data (R).

Remarks: No exceedances

VIII. Initial & Continuing Calibration (Pesticides, PCBs)

Linearity evaluation, are %RSD <20? (Y/N) Y

Is the RPD between calibration factors ≤25? (Y/N) ~~NA~~ N

Are multicomponent calibration data provided for each analysis date? (Y/N) Y

Is the difference between columns check ≤ 25%D? (Y/N) NA

Are 4, 4'- DDT and endrin breakdown (PEM) ≤ 20% and combined breakdown ≤ 30% (Y/N) Y

Deviations:

Compound	%RSD	RPD	Samples Affected
4,4'-DDDT		-15.2	MW-105

* % Difference = $((RF_{CCV} - RF_{ICAL\ AVG})/RF_{ICAL\ AVG}) \times 100$. In instances where the bias of the CCV impacts validation qualifiers, review the RF values or amount reported to confirm that the % Difference or % Drift are reported with the correct negative or positive value.

Actions:

1. If %RSD criteria are not met, qualify positive results as estimated (J) and non-detects as estimated (UJ)
2. If RPD criteria are not met, qualify positive results as estimated (J) and non-detects as estimated (UJ)
3. If %D criteria is not met, qualify positive results as estimated (J) and non-detects as estimated (UJ)
4. If breadkwon criteria are not met, positive 4, 4'-DDT and endrin should be qualified as estimated (J). And non-detects should be rejected (R).

Remarks: ~~4-4'~~ 4,4'- DDT - non detect so no qualifier required.

IX. Matrix Spike/Matrix Spike Duplicate Information

General MS/MSD Criteria:	VOC	SVOC	Pest	PCB
percent recovery (%R)	70-130	45-135	40-140	40-140
relative percent difference (RPD)	<30	<50	<50	<50

Project Sample(s) Spiked: none

Deviations:

Compound	%R	%R Limits	RPD	RPD Limits	Samples Affected

Actions:

1. If the spike recovery is above the upper control limit (UCL), qualify all positive values in the unspiked sample as estimated (J) and non-detects as estimated (UJ).
2. If the spike recovery is below the lower control limit (LCL), qualifty positive values as estimated (J). And non-detects as estimated (UJ).
3. If the spike recovery is <10%, qualify non-detect values as unusable (R)
4. If the RPD does not meet criteria, qualify positive values in the unspiked sample as estimated (J)
5. Use professional judgement to qualify additional samples in the analytical group based on MS/MSD results
6. Use professional judgement for qualification of data for unspiked compounds

Remarks: No project samples used for MS/MSD analysis

X. Laboratory Control Sample Information

General LCS Criteria:
percent recovery (%R)

VOC	SVOC	Pest	PCB
80-120	60-120	50-130	50-130

Laboratory LCS Identifications: LCS 180-45559/2-A & LCSD 180-45559/3-A

Deviations:

Compound	Date	%R	Samples Affected/Qualifiers Applied
Hexachlorocyclopent-	8/21/12	9	MW-105 - R
adiene			

Actions:

Action should be based on both the number of compounds outside the criterion and the magnitude of the exceedance.

1. If the LCS recovery is below limits but > one- half the lower limit, qualify valves as estimated (J/UJ).
2. If the LCS recovery is < one-half the lower limit, qualify all data for that analyte as unusable (R).
3. If the LCS recovery is greater than the upper limit, qualify positive valves for that analyte as estimated (J).
4. If more than half the compounds in this LCS are not within recovery criteria, then qualify associated detected compounds as estimated (J).
5. Use professional judgement for qualification of data for compounds with no LCS information

Remarks: Results for hexachlorocyclopentadiene require rejection due to very low recovery.

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
GC and LC Organic Data Review Checklist - Standard Validation
(Explosives, PAHs, Herbicides, GRO/DRO, Methanol, etc.)

Project: QDI Institute, WV

SDG No: 180-13503-1

Analysis: Herbicides

Method: 8151A

Laboratory: Test America Pittsburgh

Matrix: Water

The above data package has been reviewed and the analytical quality control/quality assurance performance data have been summarized. The general criteria used to assess the analytical integrityof the data were based on an examination of the following:

Case Narrative	Analytical Surrogate Recoveries
Analytical Holding Times	MS/MSD Recoveries and Differences
Sample Preservation	LCS Recoveries
Method Calibration	Re-analysis and Secondary Dilution
Method and Project Blanks	

Overall Remarks: No issues found. No qualifiers needed.

Definition of Qualifiers:

"U", not detected at the associated level
"UJ", not detected and associated value estimated
"J", associated value estimated
"R", associated value unusable or analyte identity unfounded
"=", compound properly identified and value positive

Reviewed by: Denae Athay Denae Athay Date: 10/10/2012

QA Reviewed by: _____ Date: _____

I. Case Narrative

Verify direct statements made within the Laboratory Case Narrative (note discrepancies).

Remarks: No statements related to herbicide analysis

II. Re-analysis and Secondary Dilutions

Verify that re-analysis and secondary dilutions were performed and reported as necessary. Determine appropriate results to report.

Remarks: No dilutions or reanalysis ~~reo~~ performed.

III. Holding Times

VOC types - Waters - unpreserved: aromatic within 7 days, non-aromatic within 14 days of sample collection
VOC types - Waters - preserved: aromatic and non-aromatic within 14 days of sample collection
VOC types - Soils - preserve/analyze within 48 hours of sample collection; analyze within 14 days of preservation

SVOC types - Waters - extract within 7 days of sample collection, analyze within 40 days of extraction
SVOC types - Soils - extract within 14 days of sample collection, analyze within 40 days of extraction

Deviations:

Sample #	VOC types		SVOC types			Notes:
	Date Collected	Date Analyzed	Date Collected	Date Extracted	Date Analyzed	
MW-105	8/15/12	8/25/12	8/15/12	8/17/12	8/25/12	

Actions:

1. If holding times are exceeded, all results are qualified as estimated (J/UJ)
2. If holding times are exceeded by more than 2X, reviewer may qualify non-detected results as unusable (R)

Remarks: No exceedances.

IV. Initial & Continuing Calibration

A blank and five standards should be analyzed, with one of the standards being within 2X the MDL Y
Correlation coefficients must be ≥ 0.995
The RSD of the calibration factor or the relative response factor (RRF) must be ≤ 20% Y
Continuing calibration %D must be within ± 15% Y

Deviations:

Compound	Correlation Coefficient	% RSD	%D	Samples Affected

* % Difference = $((RF_{CCV} - RF_{ICAL\ AVG})/RF_{ICAL\ AVG}) \times 100$. In instances where the bias of the CCV impacts validation qualifiers, review the RF values or amount reported to confirm that the % Difference or % Drift are reported with the correct negative or positive value.

Actions:

1. If any compounds initial calibration linearity is <0.995, qualifiy the data as estimated (J/UJ)
2. If any compounds initial calibration linearity is <0.95, qualify the data as unusable (R)
3. If %RSD criteria are not met, qualify positive results as estimated (J) and non-detects as estimated (UJ)
3. If %D criteria is not met, qualify positive results as estimated (J) and non-detects as estimated (UJ)

Remarks: No exceedances

V. Surrogate Recoveries

List surrogate compounds with unacceptable recoveries:

Deviations:

Sample #	Surrogate ID	% R	QC Limits	Samples Affected

Actions:

1. If any surrogate recovery is <10%, qualify all positive results in associated fractions as estimated (J)
2. If any surrogate recovery is <10%, qualify all nondetects in associated fractions as unusable (R)
3. If surrogate recoveries fall between 10% and the lower recovery limit, qualify results as estimated (J/UJ)
4. If surrogate recoveries fall above the upper recovery limit, qualify positive results as estimated (J)
6. Use professional judgement to qualify results when surrogate recoveries have been diluted out of spec.

Remarks: No exceedances

VI. Blanks

Review associated laboratory and project blank samples. List documented contamination below:

Laboratory Method Blanks:

Date	Lab ID #	Fraction	Compound	Conc. (ppb)

Associated Project Blanks (e.g., equipment rinsates, trip blanks, etc.)

Date	Lab ID #	Fraction	Compound	Conc. (ppb)

Remarks: No laboratory blank detections. Herbicides not analyzed on project blanks.

VI. Blanks (continued)

Calculate action levels based on 5X the highest blank concentration of any given compound
Sample weights, volumes, and dilution factors must be taken into account when applying the 5X criteria

Deviations:

Compound	Maximum Conc. Detected, (ppb)	Action Level (ppb)	Samples Affected

Actions:

1. If compound results exceed the action levels, the data are not qualified
2. If compound results are below the required reporting level, report results as non-detect (U) at the reporting level
3. If the compound is detected above the reporting level, but below the action level, qualify as not-detected (U)

Remarks: No blank detections

VII. Matrix Spike/Matrix Spike Duplicate Information

General MS/MSD Criteria:

	VOC types	SVOC types
percent recovery (%R)	70-130	45-135
relative percent difference (RPD)	<30	<50

Project Sample(s) Spiked: None

Deviations:

Compound	%R	%R Limits	RPD	RPD Limits	Samples Affected

Actions:

1. If the spike recovery is outside limits, qualify all positive values in the unspiked sample as estimated (J)
2. If the spike recovery is <10%, qualify non-detect values as unusable (R)
3. If the RPD does not meet criteria, qualify positive values in the unspiked sample as estimated (J)
4. Use professional judgement to qualify additional samples in the analytical group based on MS/MSD results
5. Use professional judgement for qualification of data for unspiked compounds

Remarks:

No project samples used for MS/MSD analysis

VIII. Laboratory Control Sample Information

General LCS Criteria:

	VOC types	SVOC types
percent recovery (%R)	80-120	60-120

Laboratory LCS Identifications: LCS 180-45443/2-A, LCSD 180-45443/3-A

Deviations:

Compound	Date	%R	Samples Affected/Qualifiers Applied

Actions:

1. If the LCS recovery is outside limits but >10%, qualify all positive values as esimated (J)
2. If the LCS recovery is outside limits but >10%, qualify non-detect values as estimated (UJ)
3. If the LCS recovery is <10%, qualify all data for that analyte as unusable (R)
4. Use professional judgement for qualification of data for compounds with no LCS information

Remarks: No exceedances

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
Metals Data Review Checklist - Standard Validation

Project: QDI Institute, WV

SDG No: 180-13334

Analysis: Metals, Mercury

Method: 6010C, 7471B

Laboratory: Test America Pittsburgh

Matrix: Solid

The above data package has been reviewed and the analytical quality control/quality assurance performance data have been summarized. The general criteria used to assess the analytical integrity of the data were based on an examination of the following:

Case Narrative	MS/MSD Recoveries and Differences
Analytical Holding Times	Duplicate Relative Percent Differences
Sample Preservation	ICP Serial Dilution
Method Calibration	Furnace Atomic Absorption QC
Method and Project Blanks	Re-analysis and Secondary Dilution
LCS Recoveries	Internal Standard Performance (if applicable)

Project specific QA/QC or contract requirements may take priority over validation criteria in this procedure.

Overall Remarks: No validation issues

Definition of Qualifiers:

"U", not detected at the associated level
"UJ", not detected and associated value estimated
"J", associated value estimated
"R", associated value unusable or analyte identity unfounded
"=", compound properly identified and value positive

Reviewed by: Denae Athay Denae Athay Date: 10/12/2012

QA Reviewed by: _____ Date: _____

I. Case Narrative

Verify direct statements made within the Laboratory Case Narrative (note discrepancies).

Remarks: No metals analysis issues.

II. Re-analysis and Secondary Dilutions

Verify that re-analysis and secondary dilutions were performed and reported as necessary. Determine appropriate results to report.

Remarks: Do dilutions or reanalysis required.

III. Holding Times

Metals - Waters - preserved to pH<2, 180 days from sample collection
Metals - Soils - 180 days from sample collection
Mercury - Waters - preserved to pH<2, 28 days from sample collection
Mercury - Soils - 28 days from sample collection

Deviations:

Sample #	Metals				Mercury			
	Date Collected	Date Analyzed	Days >HT	pH Check	Date Collected	Date Analyzed	Days >HT	pH Check
WTA-1 (1-2)	8/9/12	8/16/12	Ø	Y	8/9/12	8/17/12	Ø	Y

Actions:

1. If preserved samples exceed holding time, qualifty all associated results as estimated (J/UJ).
2. If unpreserved samples exceed holding time, qualify all associated results as unusable (R).
3. If holding times are exceeded by more than 2X, reviewer may qualify non-detected results as unusable (R)
4. If water samples are not acidified, use professional judgement. Minimally, qualify data as estimated (J) and non-detects unusable (R).
5. If soil samples exceed holding time, use professional judgement to qualify data.

Remarks: No exceedances.

V. Blanks (ICB, CCB, Method Blank, Equipment Rinsate Blank)

A. Blank Results

If the blank level is > CRQL for any analyte check that the analyte's concentration in a sample is > 10 x the blank value.The highest blank concentration of observed elements is the action level.
Sample weights, volumes, and dilution factors must be taken into account when applying the action level.
Blank results given in ug/L must be converted to mg/kg to compare them with soil sample results.
use the following equation:

ug/L x V/W x 1L/1000mL x 1000g/1kg x 1mg/1000ug = mg/kg

where: V = volume of samples digest solution (usually 200 mL)
W = weight of sample digested (usually 1 g)

Deviations:

Blank ID	Element	Max. Conc. Detected	Action Level	Samples Affected

If additional space is required, use next page

Actions:

1. For blank results ≥ MDL but ≤ CRQL, qualify sample results ≥ MDL but < CRQL as CRQL U. Use professional judgement to qualify sample results exceeding the CRQL.

2a. If blank results are > CRQL: for sample values ≥ MDL but ≤ CRQL, qualify results as CRQL U; for sample values > CRQL but < 10 x the blank, qualify results as unusable (R) or estimated (J). No action is taken for sample results ≥ 10 x the blank values.

2b. If ICB/ CCB results are > CRQL: for sample values ≥ MDL but ≤ CRQL, qualify results as CRQL U; for sample values > CRQL but < blank results, qualfiy results as not detected (U) at the level of the blank or unusable (R). Use proffessional judgement for sample results > blank results.

Remarks: No blank defects.

V. Blanks (continued)

The highest blank concentration of observed elements is the action level.
Sample weights, volumes, and dilution factors must be taken into account.
Blank results given in ug/L must be converted to mg/kg to compare them with soil sample results.
use the following equation:

ug/L x V/W x 1L/1000mL x 1000g/1kg x 1mg/1000ug = mg/kg

where: V = volume of samples digest solution (usually 200 mL)
W = weight of sample digested (usually 1 g)

Deviations:

Blank ID	Element	Max. Conc. Detected	Action Level	Samples Affected

VI. Laboratory Control Sample Evaluation

All LCS recovery criteria are set at 80-120%
An LCS must be analyzed for each matrix and for each digestion batch or set of twenty samples

Deviations:

Element	Date	%R	Matrix	Samples Affected

Actions:

1. If any element's LCS recovery is >120%, qualify positive results as (J) .
2. If any element's LCS recovery is 50-79%, qualify positive results as (J) and non-detect results as (UJ).

3a. If any element's LCS recovery is <50%, qualify positive results as (J) and non-detect results as (R).
3b. If the LCS recovery is > 150%, qualify all results as unusable (R).

4. For soil LCS recovery > upper limit, qualify sample results ≥ MDL as estimated (J).
5. For soil LCS recovery < lower limit, qualify results ≥ MDL as estimated (J) and non-detects estimated (UJ).
6. Use professional judgement to qualify data if the LCS frequency criteria are not met.

Remarks: No exceedances

VII. Matrix Spike Evaluation

All MS recovery criteria are set at 75-125%
An MS must be analyzed for each matrix and for each digestion batch or set of twenty samples
Verify that a field blank or PE sample was not used for spiked sample analysis.
Verify that a post-digestion spike was analyzed for those analytes where the pre-digestion spike recovery is outside control limits and the sample result is < 4 x the spike added.

Project Sample(s) Spiked: None

Deviations:

Element	Spiked Sample Result	Sample Result	Spike Amount	%R	Samples Affected

Actions:

1. If the sample concentration exceeds the spiking level by a factor of 4X or more, do not qualify the data
2. If the spike recovery is >125%, qualify all positive values as (J).
3. If the spike recovery is between 30-74%, qualify positive values as (J) and non-detect values as estimated (UJ)
4. If the spike recovery is <30%, qualify positive values as (J) and non-detects are qualified unusable (R) if the post-digestion spike recovery is < 75% (or none was performed); non-detects are qualified as estimated (UJ) if the post-digestion spike recovery is ≥ 75%. There is no post-digestion spike performed for mercury.
5. Qualify all samples of similar matrix to the spiked sample in the same manner
6. Use professional judgement to qualify data if the MS frequency criteria are not met.
7. Use professional judgement for qualification of data for unspiked elements

Remarks: N/A

IV. Initial & Contining Calibration (ICP, GFAA, CVAA, etc.)

Initial calibration linearity criteria is r ≥ 0.995
ICV and CCV criteria are ± 10% recovery, low level check standard allowed ± 30%
ICP inter-element check standard criteria ± 20%

Deviations:

Element	Date	Intial Calib.	ICV/ CCV	%R	Samples Affected

Actions:

1. If any elements initial claibration linearity is <0.995, qualify the data as estimated (J/UJ)
2. If any elements initial claibration linearity is <0.95, qualify the data as unusable (R)

3a. If any elements ICV or CCV recovery is <90%, qualify the data as estimated (J/UJ)

3b. If any elements ICV or CCV recovery is > 110%, qualify results ≥ MDL as estimated (J), do not qualify non-detects

4a. If any elements ICV or CCV recovery is <75%, qualify the data as unusable (R)

4b. If any elements ICV or CCV recovery is > 125%, qualify positive results as estimated (J) or non-detects unusable (R)

4c. If any elements ICV or CCV recovery is > 160%, qualify positive results ≥ MDL us unusable (R). Do not qualify non-detects.

5a. If any elements CRI recovery is 50-69% (30-49% for Sb, Pb, Tl), qualify results ≥ MDL (but < 2 x CRQL) as estimated (J/UJ) and results > 2 x CRQL are not qualified.

5b. If any elements CRI recovery is < 50% (< 30% for Sb, Pb, Tl), qualify results ≥ MDL (but < 2 x CRQL) as unusable (R) and results > 2 x CRQL as estimate (J).

5c. If any elements CRI recovery is > 130% but < 180 % (> 150% but ≤ 200% for Sb, Pb, Tl) quality results ≥ MDL (but < 2 x CRQL) as esimated (J) and non-detects and results > 2 x CRQL are not qualified.

5d. If CRI or (R) > 180% (> 200% for Sb, Pb, Ti), qualify results that are ≥ MDL as unusable (R).

Remarks: No exceedances.

IV. Initial & Contining Calibration (ICP, GFAA, CVAA, etc.) (continued)

Analytical Sequence and MS Tune (Y/N)

1. Were the appropriate number of ICP standards used? Y
2. Were the appropriate number of AA standards used? /
3. Was calibration performed and documented at the beginning of each run? Y
4. Were calibration check standards run at 10% frequency or every two hours? Y
5. Were low level standard checks analyzed at approximately 2X the PQL? Y
6. Was ICP-MS mass calibration within 0.1 AMU? Y
7. Was ICP-MS % RSD of the absolute signals for all analytes < 5%? Y

Deviations:

Element	Deviation	Samples Affected

Actions:

1. If instrument calibration is questionable, use professional judgement, qualify the data as estimated (J/UJ)
2. If instrument calibration documentation can not be obtained or is inadequate, qualify the data as unusable (R)
3. If mass calibration for ICP-MS was not within 0.1 AMU, qualify analyte results as estimated (J/UJ).
4. If % RSD for ICP-MS was > 5% for any analyte in the tuning solution, qualify associated resuts as estimated (J/UJ).

Remarks: No exceedances.

V. Blanks (continued)

B. Frequency Requirements (Y/N)

1. Was a method (preparation) blank analyzed for each matrix? Y
2. Was a method blank processed for every analytical batch (20 samples)? Y
3. Was a calibration blank analyzed at 10% frequency or every two hours? Y

Deviations:

Element	Deviation	Samples Affected

Remarks: No exceedances.

C. Baseline Shift Evaluation

List the highest negative blank concentration for each analyte observed in laboratory or project blanks.

Deviations:

Blank ID	Element	Max. Neg. Conc.	Action Level	Samples Affected

Actions:

1. If the absolute value of the maximum negative blank result is > the CRQL, qualify positive results as estimated (J) and non-detects as estimated (UJ).

Remarks: No negative blank results.

VIII. Laboratory Duplicate Evaluation

Duplicate relative percent difference (RPD) for water is 20% (both results > 5 times CRDL) or < CRDL difference (if either result is < 5 times CRDL) and RPD for soil is 35% (if both results are > 5 times CRDL or < 2 times CRDL if either result is < 5 times CRDL.
When duplicate sample values are both less than the reporting level they are considered acceptable
When dupicate sample values are within 5X the reporting level they are acceptable if their absolute difference is within 3X the reporting level
Verify that a field blank or PE samples was not used for duplicate analysis.

Deviations:

Element	Sample #	Duplicate #	RPD	Samples Affected

Actions:

1. If an element's RPD is >20% (water) / 35% (soil), qualify positive results as (J) and non-detect results as (UJ)
2. For low concentrations, if an element's duplicate absolute difference is > 3X the reporting level, qualify positive results as (J) and non-detect results as (UJ)
3. Use professional judgement to qualify data if the duplicate frequency criteria are not met.

Remarks: No exceedances.

IX. Inductively Coupled Plasma (ICP) Serial Dilution Analysis

Verify that a field blank or PE sample was not used for serial dulution.
Serial dilution of positive results are performed when values exceed 50X the IDL
Results from serial dilutions should agree within 10% of the original undiluted analysis

Deviations:

Element	Sample #	Sample Result	Serial Dilution	%D	Action

Actions:

1. If the serial dilution %D is >10 and the analyte results are >50X the IDL, qualify all positive results as estimated (J) and non-detects as estimated (UJ).

Remarks: No dilutions or exceedances.

X. Furnace Atomic Absorption QC

A. Duplicate Precision (Y/N)

1. Were duplicate injections performed for all samples? Y
2. Were one point analytical spikes performed for all samples? Y
3. Did duplicate injections agree within ± 20%? Y

Deviations:

Element	Deviation	Sample Affected

Actions:

1. If duplicate injection results are outside ± 20%, qualify positive results as (J) and non-detect results as (UJ)

Remarks: No exceedances.

B. Post Digestion Spike Recoveries (Y/N)

1. Did post digestion spike recoveries meet an 85-115% recovery criteria? _____
2. If spike recoveries did not meet recovery criteria were samples analyzed by MSA? _____
3. If MSA was used to analyze samples, was its' correlation coefficient ≥ 0.995? _____

Deviations:

Element	Deviation	Sample Affected

Actions:

1. If post digestion spike recoveries are >115%, qualify positive results as (J) and non-detect results as (U)
2. If post digestion spike recoveries are 11-84%, qualify positive results as (J) and non-detect results as (UJ)
3. If post digestion spike recoveries are <10%, qualify positive results as (R) and non-detect results as (R)
4. If MSA was used to quantitate values and the correlation coefficient was <0.995, qualify data as (J or UJ)
5. If MSA was used to quantitate values and the correlation coefficient was <0.95, qualify data as (R)

Remarks: No exceedances

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
Organic Data Review Checklist - Standard Validation

Project: QDI Institute, WV

SDG No: 180-13334

Analysis: VOCs, SVOCs

Method: 8260B, 8270C

Laboratory: Test America Pittsburgh

Matrix: Solid

The above data package has been reviewed and the analytical quality control/quality assurance performance data have been summarized. The general criteria used to assess the analytical integrityof the data were based on an examination of the following:

Case Narrative	Analytical Surrogate Recoveries
Analytical Holding Times	Internal Standard Performance
Sample Preservation	MS/MSD Recoveries and Differences
Method Calibration	LCS Recoveries
Method and Project Blanks	Re-analysis and Secondary Dilution

Project Specific QA/QC or contract requirements may take priority over validation criteria in this procedure.

Overall Remarks: VOC CCV issues result in 'J' qualification of: ~~2 chloroethyl vinyl ether~~, methyl acetate - low CCV recovery.

Definition of Qualifiers:

"U", not detected at the associated level
"UJ", not detected and associated value estimated
"J", associated value estimated
"R", associated value unusable or analyte identity unfounded
"=", compound properly identified and value positive

Reviewed by: Denae Athay Denae Athay Date: 10/12/2012

QA Reviewed by: _____ Date: _____

I. Case Narrative

Verify direct statements made within the Laboratory Case Narrative (note discrepancies).

Remarks: All case narrative statements for VOC and SVOC analysis verified.

II. Re-analysis and Secondary Dilutions

Verify that re-analysis and secondary dilutions were performed and reported as necessary. Determine appropriate results to report.

Remarks: No dilutions or reanalysis required.

III. Holding Times

VOC - Waters - unpreserved: aromatic within 7 days, non-aromatic within 14 days of sample collection
VOC - Waters - preserved: aromatic and non-aromatic within 14 days of sample collection
VOC - Soils - preserve or analyze within 48 hours of sample collection; analyze within 14 days of preservation

SVOC, Pest., PCB - Waters - extract within 7 days of sample collection, analyze within 40 days of extraction
SVOC, Pest., PCB - Soils - extract within 14 days of sample collection, analyze within 40 days of extraction

Deviations:

Sample #	VOC		SVOC			Pest/PCB		
	Date Collected	Date Analyzed	Date Collected	Date Extracted	Date Analyzed	Date Collected	Date Extracted	Date Analyzed
WTA-1(1-2)	8/9/12	8/22/12	8/9/12	8/20/12	8/21/12	—	—	—

Actions:
1. If holding times are exceeded, all results are qualified as estimated (J/UJ)
2. If holding times are exceeded by more than 2X, reviewer may qualify non-detected results as unusable (R)

Remarks: No exceedances.

IV. System Monitoring Compounds (SMC) Recoveries (VOC, SVOC, Pesticides, PCBs)

List SMC compounds with unacceptable recoveries:

Deviations:

Sample #	VOC			SVOC B/N Compounds			SVOC Acid Compounds			Pest	PCB
	TOL	BFB	DCE	NBZ	FBP	TPH	PHL	2FP	TBP	TCX	DCB
QC Limits											

Actions:

1. If any SMC recovery is <10%, qualify all positive results in associated fractions as estimated (J)
2. If any SMC recovery is <10%, qualify all nondetects in associated fractions as unusable (R)
3. If SMC recoveries fall between 10% and the lower recovery limit, qualify results as estimated (J/UJ)
4. If SMC recoveries fall above the upper recovery limit, qualify positive results as estimated (J)
5. Use professional judgement to qualify Pest/PCB results when SMC recoveries are >10%
6. Use professional judgement to qualify results when SMC recoveries have been diluted out of spec.
7. For SVOC, qualification of the data is required only when 2 or more SMC per fraction are not within control limits
8. Note: SMC formerly known as surrogates.

Remarks: No exceedances.

V. Internal Standards Performance (VOC, SVOC)

VOC internal standard area counts within -50% to +100% of standard (Y/N) Y
VOC internal standard retention times within ± 30 seconds of standard (Y/N) Y

SVOC internal standard area counts within -50% to +100% of standard (Y/N) Y
SVOC internal standard retention times within + 30 seconds of standard (Y/N) Y

Deviations:

Sample #	IS Affected	Area Counts	Acceptable Range	RT	Std. RT Value

Actions:

1. If area counts are outside limits, qualify positive results associated with that IS as estimated (J)
2. Non-detected compounds quantitated using an IS area count >100% should not be qualified
3. Non-detected compounds quantitated using an IS area count <50%, qualify as estimated (UJ)
4. If extremely low area counts are reported (<50% of the lower limit), qualify non-detects as unusable (R)
5. If an IS retention time varies more than 30 seconds, review the chromatographic profile for shifts and irregularities. Use professional judgement to qualify the data estimated (J/UJ) or unusable (R)

Remarks: No exceedances.

VI. Blanks

All blanks were reported per matrix per concentration level for each 12 hour period on each GC/ MS system used to analyze VOCs and SVOCs Yes [✓] No [ ]
Review associated laboratory and project blank samples. List documented contamination below:

Laboratory Method Blanks:

Date:	Lab ID #	Fraction	Compound	Conc. (ppb)
8/21/12	MB 490-14087/6	solid	Chloroform	6.99
			Methylene Chloride	1.80

Associated Project Blanks (e.g., equipment rinsates, trip blanks, etc.)

Date	Lab ID #	Fraction	Compound	Conc. (ppb)

Remarks: Chloroform and methylene chloride detected in method blank. Affected sample results non-detect. No project blanks.

VI. Blanks (continued)

Calculate action levels based on 10X the highest blank concentration of "common laboratory solvents", VOCs (methylene chloride, acetone, toluene, 2-butanone, cyclohexane) or SVOCs (phthalates), and 5X the highest blank concentration for all other VOC, SVOC, Pesticides, and PCB compounds. Sample weights, volumes, and dilution factors must be taken into account when applying the 5X and 10X criteria. This allows the total amount of contaminant present to be considered.

Deviations:

Compound	Maximum Conc. Detected, (ppb)	Action Level (ppb)	Samples Affected
Chloroform	6.99	34.95	WTA-1 (1-2)
Methylene Chloride	1.80	18.0	"

Actions:

1. If compound results exceed the action levels, the data are not qualified
2. If compound results are below the required reporting level, report results as non-detect (U) at the reporting level
3. If the compound is detected above the reporting level, but below the action level, qualify as not-detected (U)
4. If gross contamination exists in blanks (i.e.,, saturated peaks by GC/ MS), all affected compounds in the associated samles should be qualifed as unusable (R) due to interference.
5. If blanks were not analyzed per matrix per concentration level for each 12 hour period on each GC/MS system used to analyze VOCs and SVOCs use professional judgement to qualifty data. Data may be rejected (R).

Remarks: Results non-detect- no qualification needed.

VII. Initial & Contining Calibration (VOC, SVOC)

GC/MS instrument performance checks (BFB / DFTPP) Acceptable Y or N
All compounds must have and RRF > 0.01, %RSD < 30, and %D < 25

VOC - Date of initial calibration: 8/3/2012
VOC - Date(s) of continuing calibration: WTA-1 (1-2) analyzed 8/22/12 01:52
Was the 12 hour critieria met? (Y) or N CCV: 8/21/12 21:08 8/23/12 10:38

SVOC- Date of initial calibration: 7/29/2012
SVOC - Date(s) of continuing calibration: CCV: 8/21/12 16:34, 16:57, 17:20
Was the 12 hour critieria met? (Y) or N WTA-1 (1-2) analyzed 8/21/2012 23:49

Deviations:

Compound	Date	RRF	%RSD	%D	Samples Affected
- Vinyl Chloride	8/21			28.4	WTA-1 (1-2) analyzed
Isopropyl alcohol				20.1	
- Methyl Acetate				49.9	W
Tetrahydrofuran				20.4	
2-Chloroethyl vinyl ether				-84.8	W
tert-amyl methyl ether				25.4	
2,3-Dichloro-1-propene				38.9	

* % Difference = $((RF_{CCV} - RF_{ICAL\ AVG})/RF_{ICAL\ AVG}) \times 100$. In instances where the bias of the CCV impacts validation qualifiers, review the RF values or amount reported to confirm that the % Difference or % Drift are reported with the correct negative or positive value.

Actions:

1. If any compound has an intial or continuing RRF of < 0.01, qualify positive results as estimated (J)
2. If any compound has an intial or continuing RRF of < 0.01, qualify non-detects as unusable (R)
3. If any compound has a %RSD >30 or a %D >25, qualify positive results as estimated (J)
4. If any compound has a %RSD >40 or a %D >40, qualify non-detects as estimated (UJ)
5. If BFB or DFTPP mass assignment / ION abundance criteria are all associated data as unusable (R).
6. If samples were analyzed outside the 12 hour BFB or DFTPP performance check time period, qualify the affected sample data as estimated (J/UJ).
7. If separate calibration for water and soil were not performed, use professional judgement to evaluate the data. Data may be rejected (R).
8. If calibrations were not completed within the 12 hour criterion, qualifty all associated data as estimated (J/UJ). If the 12 hour criterion was grossly exceeded, reject all associated data (R).

Remarks: Cont: %D: tert-Butyl formate 72, -4-Methyl-2-pentanone 21.6, -2-Hexanone 24.5, 1-Chlorohexane 42.1, -1,1,2,2-Tetrachloroethane 25.3, 1,2,3-Trichloropropane 22.2, trans-1,4-Dichloro-2-butene 25.6

see reverse

VIII. Initial & Continuing Calibration (Pesticides, PCBs)

Linearity evaluation, are %RSD <20? (Y/N) _____ NA

Is the RPD between calibration factors ≤25? (Y/N) _____

Are multicomponent calibration data provided for each analysis date? (Y/N)_____

Is the difference between columns check ≤ 25%D? (Y/N) _____

Are 4, 4'- DDT and endrin breakdown (PEM) ≤ 20% and combined breakdown ≤ 30% (Y/N)

Deviations:

Compound	%RSD	RPD	Samples Affected

* % Difference = $((RF_{CCV} - RF_{ICAL\ AVG})/RF_{ICAL\ AVG}) \times 100$. In instances where the bias of the CCV impacts validation qualifiers, review the RF values or amount reported to confirm that the % Difference or % Drift are reported with the correct negative or positive value.

Actions:

1. If %RSD criteria are not met, qualify positive results as estimated (J) and non-detects as estimated (UJ)
2. If RPD criteria are not met, qualify positive results as estimated (J) and non-detects as estimated (UJ)
3. If %D criteria is not met, qualify positive results as estimated (J) and non-detects as estimated (UJ)
4. If breadkwon criteria are not met, positive 4, 4'-DDT and endrin should be qualified as estimated (J). And non-detects should be rejected (R).

Remarks: Not analyzed

IX. Matrix Spike/Matrix Spike Duplicate Information

General MS/MSD Criteria:

	VOC	SVOC	Pest	PCB
percent recovery (%R)	70-130	45-135	40-140	40-140
relative percent difference (RPD)	<30	<50	<50	<50

Project Sample(s) Spiked: None

Deviations:

Compound	%R	%R Limits	RPD	RPD Limits	Samples Affected

Actions:

1. If the spike recovery is above the upper control limit (UCL), qualify all positive values in the unspiked sample as estimated (J) and non-detects as estimated (UJ).
2. If the spike recovery is below the lower control limit (LCL), qualifty positive values as estimated (J). And non-detects as estimated (UJ).
3. If the spike recovery is <10%, qualify non-detect values as unusable (R)
4. If the RPD does not meet criteria, qualify positive values in the unspiked sample as estimated (J)
5. Use professional judgement to qualify additional samples in the analytical group based on MS/MSD results
6. Use professional judgement for qualification of data for unspiked compounds

Remarks:

X. Laboratory Control Sample Information

General LCS Criteria:
percent recovery (%R)

VOC	SVOC	Pest	PCB
80-120	60-120	50-130	50-130

Laboratory LCS Identifications: LCSD 490-14087/4

Deviations:

Compound	Date	%R	Samples Affected/Qualifiers Applied
Methyl Acetate	8/21/12	189	WTA-1(1-2) - none

Actions:

Action should be based on both the number of compounds outside the criterion and the magnitude of the exceedance.

1. If the LCS recovery is below limits but > one- half the lower limit, qualify valves as estimated (J/UJ).
2. If the LCS recovery is < one-half the lower limit, qualify all data for that analyte as unusable (R).
3. If the LCS recovery is greater than the upper limit, qualify positive valves for that analyte as estimated (J).
4. If more than half the compounds in this LCS are not within recovery criteria, then qualify associated detected compounds as estimated (J).
5. Use professional judgement for qualification of data for compounds with no LCS information

Remarks: Methyl Acetate exceeded recovery for LCSD, however methyl acetate not detected in sample.

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
Metals Data Review Checklist - Standard Validation

Project: QDI Institute, WV

SDG No: 180-13333

Laboratory: TestAmerica Pittsburgh

Analysis: Metals, Mercury

Method: 6010C, 7471B

Matrix: Solid

The above data package has been reviewed and the analytical quality control/quality assurance performance data have been summarized. The general criteria used to assess the analytical integrity of the data were based on an examination of the following:

Case Narrative	MS/MSD Recoveries and Differences
Analytical Holding Times	Duplicate Relative Percent Differences
Sample Preservation	ICP Serial Dilution
Method Calibration	Furnace Atomic Absorption QC
Method and Project Blanks	Re-analysis and Secondary Dilution
LCS Recoveries	Internal Standard Performance (if applicable)

Project specific QA/QC or contract requirements may take priority over validation criteria in this procedure.

Overall Remarks: No validation issues.

Definition of Qualifiers:

"U", not detected at the associated level
"UJ", not detected and associated value estimated
"J", associated value estimated
"R", associated value unusable or analyte identity unfounded
"=", compound properly identified and value positive

Reviewed by: Denae Athay Denae Athay Date: 10/11/12

QA Reviewed by: _____ Date: _____

I. Case Narrative

Verify direct statements made within the Laboratory Case Narrative (note discrepancies).

Remarks: No case narrative remarks directed to validated samples.

II. Re-analysis and Secondary Dilutions

Verify that re-analysis and secondary dilutions were performed and reported as necessary. Determine appropriate results to report.

Remarks: No dilutions or reanalysis required.

III. Holding Times

Metals - Waters - preserved to pH<2, 180 days from sample collection
Metals - Soils - 180 days from sample collection
Mercury - Waters - preserved to pH<2, 28 days from sample collection
Mercury - Soils - 28 days from sample collection

Deviations:

Sample #	Metals				Mercury			
	Date Collected	Date Analyzed	Days >HT	pH Check	Date Collected	Date Analyzed	Days >HT	pH Check
DBA -1 (0-2)	8/9/12	8/17/12	Ø	Y	8/9/12	8/17/12	Ø	Y

Actions:

1. If preserved samples exceed holding time, qualifty all associated results as estimated (J/UJ).
2. If unpreserved samples exceed holding time, qualify all associated results as unusable (R).
3. If holding times are exceeded by more than 2X, reviewer may qualify non-detected results as unusable (R)
4. If water samples are not acidified, use professional judgement. Minimally, qualify data as estimated (J) and non-detects unusable (R).
5. If soil samples exceed holding time, use professional judgement to qualify data.

Remarks: No exceedances

IV. Initial & Contining Calibration (ICP, GFAA, CVAA, etc.)

Initial calibration linearity criteria is r ≥ 0.995
ICV and CCV criteria are ± 10% recovery, low level check standard allowed ± 30%
ICP inter-element check standard criteria ± 20%

Deviations:

Element	Date	Intial Calib.	ICV/ CCV	%R	Samples Affected

Actions:

1. If any elements initial claibration linearity is <0.995, qualify the data as estimated (J/UJ)
2. If any elements initial claibration linearity is <0.95, qualify the data as unusable (R)

3a. If any elements ICV or CCV recovery is <90%, qualify the data as estimated (J/UJ)

3b. If any elements ICV or CCV recovery is > 110%, qualify results ≥ MDL as estimated (J), do not qualify non-detects

4a. If any elements ICV or CCV recovery is <75%, qualify the data as unusable (R)

4b. If any elements ICV or CCV recovery is > 125%, qualify positive results as estimated (J) or non-detects unusable (R)

4c. If any elements ICV or CCV recovery is > 160%, qualify positive results ≥ MDL us unusable (R). Do not qualify non-detects.

5a. If any elements CRI recovery is 50-69% (30-49% for Sb, Pb, Tl), qualify results ≥ MDL (but < 2 x CRQL) as estimated (J/UJ) and results > 2 x CRQL are not qualified.

5b. If any elements CRI recovery is < 50% (< 30% for Sb, Pb, Tl), qualify results ≥ MDL (but < 2 x CRQL) as unusable (R) and results > 2 x CRQL as estimate (J).

5c. If any elements CRI recovery is > 130% but < 180 % (> 150% but ≤ 200% for Sb, Pb, Tl) quality results ≥ MDL (but < 2 x CRQL) as esimated (J) and non-detects and results > 2 x CRQL are not qualified.

5d. If CRI or (R) > 180% (> 200% for Sb, Pb, Ti), qualify results that are ≥ MDL as unusable (R).

Remarks: No exceedances.

IV. Initial & Contining Calibration (ICP, GFAA, CVAA, etc.) (continued)

Analytical Sequence and MS Tune (Y/N)

1. Were the appropriate number of ICP standards used? Y
2. Were the appropriate number of AA standards used? -
3. Was calibration performed and documented at the beginning of each run? Y
4. Were calibration check standards run at 10% frequency or every two hours? Y
5. Were low level standard checks analyzed at approximately 2X the PQL? Y
6. Was ICP-MS mass calibration within 0.1 AMU? Y
7. Was ICP-MS % RSD of the absolute signals for all analytes < 5%? Y

Deviations:

Element	Deviation	Samples Affected

Actions:

1. If instrument calibration is questionable, use professional judgement, qualify the data as estimated (J/UJ)
2. If instrument calibration documentation can not be obtained or is inadequate, qualify the data as unusable (R)
3. If mass calibration for ICP-MS was not within 0.1 AMU, qualify analyte results as estimated (J/UJ).
4. If % RSD for ICP-MS was > 5% for any analyte in the tuning solution, qualify associated resuts as estimated (J/UJ).

Remarks: No exceedances.

V. Blanks (ICB, CCB, Method Blank, Equipment Rinsate Blank)

A. Blank Results

If the blank level is > CRQL for any analyte check that the analyte's concentration in a sample is > 10 x the blank value.The highest blank concentration of observed elements is the action level.
Sample weights, volumes, and dilution factors must be taken into account when applying the action level.
Blank results given in ug/L must be converted to mg/kg to compare them with soil sample results.
use the following equation:

ug/L x V/W x 1L/1000mL x 1000g/1kg x 1mg/1000ug = mg/kg

where: V = volume of samples digest solution (usually 200 mL)
W = weight of sample digested (usually 1 g)

Deviations:

Blank ID	Element	Max. Conc. Detected	Action Level	Samples Affected

If additional space is required, use next page

Actions:

1. For blank results ≥ MDL but ≤ CRQL, qualify sample results ≥ MDL but < CRQL as CRQL U. Use professional judgement to qualify sample results exceeding the CRQL.

2a. If blank results are > CRQL: for sample values ≥ MDL but ≤ CRQL, qualify results as CRQL U; for sample values > CRQL but < 10 x the blank, qualify results as unusable (R) or estimated (J). No action is taken for sample results ≥ 10 x the blank values.

2b. If ICB/ CCB results are > CRQL: for sample values ≥ MDL but ≤ CRQL, qualify results as CRQL U; for sample values > CRQL but < blank results, qualfiy results as not detected (U) at the level of the blank or unusable (R). Use proffessional judgement for sample results > blank results.

Remarks: No blank detects

V. Blanks (continued)

The highest blank concentration of observed elements is the action level.
Sample weights, volumes, and dilution factors must be taken into account.
Blank results given in ug/L must be converted to mg/kg to compare them with soil sample results.
use the following equation:

ug/L x V/W x 1L/1000mL x 1000g/1kg x 1mg/1000ug = mg/kg

where: V = volume of samples digest solution (usually 200 mL)
W = weight of sample digested (usually 1 g)

Deviations:

Blank ID	Element	Max. Conc. Detected	Action Level	Samples Affected

V. Blanks (continued)

B. Frequency Requirements

	(Y/N)
1. Was a method (preparation) blank analyzed for each matrix?	Y
2. Was a method blank processed for every analytical batch (20 samples)?	Y
3. Was a calibration blank analyzed at 10% frequency or every two hours?	Y

Deviations:

Element	Deviation	Samples Affected

Remarks: No exceedances.

C. Baseline Shift Evaluation

List the highest negative blank concentration for each analyte observed in laboratory or project blanks.

Deviations:

Blank ID	Element	Max. Neg. Conc.	Action Level	Samples Affected

Actions:

1. If the absolute value of the maximum negative blank result is > the CRQL, qualify positive results as estimated (J) and non-detects as estimated (UJ).

Remarks: No negative blank results

VI. Laboratory Control Sample Evaluation

All LCS recovery criteria are set at 80-120%
An LCS must be analyzed for each matrix and for each digestion batch or set of twenty samples

Deviations:

Element	Date	%R	Matrix	Samples Affected

Actions:

1. If any element's LCS recovery is >120%, qualify positive results as (J) .
2. If any element's LCS recovery is 50-79%, qualify positive results as (J) and non-detect results as (UJ).
3a. If any element's LCS recovery is <50%, qualify positive results as (J) and non-detect results as (R).
3b. If the LCS recovery is > 150%, qualify all results as unusable (R).
4. For soil LCS recovery > upper limit, qualify sample results ≥ MDL as estimated (J).
5. For soil LCS recovery < lower limit, qualify results ≥ MDL as estimated (J) and non-detects estimated (UJ).
6. Use professional judgement to qualify data if the LCS frequency criteria are not met.

Remarks: No exceedances.

VII. Matrix Spike Evaluation

All MS recovery criteria are set at 75-125%
An MS must be analyzed for each matrix and for each digestion batch or set of twenty samples
Verify that a field blank or PE sample was not used for spiked sample analysis.
Verify that a post-digestion spike was analyzed for those analytes where the pre-digestion spike recovery is outside control limits and the sample result is < 4 x the spike added.

Project Sample(s) Spiked: None

Deviations:

Element	Spiked Sample Result	Sample Result	Spike Amount	%R	Samples Affected

Actions:

1. If the sample concentration exceeds the spiking level by a factor of 4X or more, do not qualify the data
2. If the spike recovery is >125%, qualify all positive values as (J).
3. If the spike recovery is between 30-74%, qualify positive values as (J) and non-detect values as estimated (UJ)
4. If the spike recovery is <30%, qualify positive values as (J) and non-detects are qualified unusable (R) if the post-digestion spike recovery is < 75% (or none was performed); non-detects are qualified as estimated (UJ) if the post-digestion spike recovery is ≥ 75%. There is no post-digestion spike performed for mercury.
5. Qualify all samples of similar matrix to the spiked sample in the same manner
6. Use professional judgement to qualify data if the MS frequency criteria are not met.
7. Use professional judgement for qualification of data for unspiked elements

Remarks: N/A

VIII. Laboratory Duplicate Evaluation

Duplicate relative percent difference (RPD) for water is 20% (both results > 5 times CRDL) or < CRDL difference (if either result is < 5 times CRDL) and RPD for soil is 35% (if both results are > 5 times CRDL or < 2 times CRDL if either result is < 5 times CRDL.
When duplicate sample values are both less than the reporting level they are considered acceptable
When dupicate sample values are within 5X the reporting level they are acceptable if their absolute difference is within 3X the reporting level
Verify that a field blank or PE samples was not used for duplicate analysis.

Deviations:

Element	Sample #	Duplicate #	RPD	Samples Affected

Actions:

1. If an element's RPD is >20% (water) / 35% (soil), qualify positive results as (J) and non-detect results as (UJ)
2. For low concentrations, if an element's duplicate absolute difference is > 3X the reporting level, qualify positive results as (J) and non-detect results as (UJ)
3. Use professional judgement to qualify data if the duplicate frequency criteria are not met.

Remarks: No exceedances.

IX. Inductively Coupled Plasma (ICP) Serial Dilution Analysis

Verify that a field blank or PE sample was not used for serial dulution.
Serial dilution of positive results are performed when values exceed 50X the IDL
Results from serial dilutions should agree within 10% of the original undiluted analysis

Deviations:

Element	Sample #	Sample Result	Serial Dilution	%D	Action

Actions:

1. If the serial dilution %D is >10 and the analyte results are >50X the IDL, qualify all positive results as estimated (J) and non-detects as estimated (UJ).

Remarks: No serial dilutions for validated samples

X. Furnace Atomic Absorption QC

A. Duplicate Precision (Y/N)

1. Were duplicate injections performed for all samples? Y
2. Were one point analytical spikes performed for all samples? Y
3. Did duplicate injections agree within ± 20%? Y

Deviations:

Element	Deviation	Sample Affected

Actions:

1. If duplicate injection results are outside ± 20%, qualify positive results as (J) and non-detect results as (UJ)

Remarks: No exceedances.

B. Post Digestion Spike Recoveries (Y/N)

1. Did post digestion spike recoveries meet an 85-115% recovery criteria? Y
2. If spike recoveries did not meet recovery criteria were samples analyzed by MSA? –
3. If MSA was used to analyze samples, was its' correlation coefficient ≥ 0.995? –

Deviations:

Element	Deviation	Sample Affected

Actions:

1. If post digestion spike recoveries are >115%, qualify positive results as (J) and non-detect results as (U)
2. If post digestion spike recoveries are 11-84%, qualify positive results as (J) and non-detect results as (UJ)
3. If post digestion spike recoveries are <10%, qualify positive results as (R) and non-detect results as (R)
4. If MSA was used to quantitate values and the correlation coefficient was <0.995, qualify data as (J or UJ)
5. If MSA was used to quantitate values and the correlation coefficient was <0.95, qualify data as (R)

Remarks: No exceedances.

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
Organic Data Review Checklist - Standard Validation

Project: QDI Institute, WV

SDG No: 180-13333

Analysis: VOCs, SVOCs

Method: 8260B, 8270C

Laboratory: Test America Pittsburgh

Matrix: Solid

The above data package has been reviewed and the analytical quality control/quality assurance performance data have been summarized. The general criteria used to assess the analytical integrityof the data were based on an examination of the following:

Case Narrative	Analytical Surrogate Recoveries
Analytical Holding Times	Internal Standard Performance
Sample Preservation	MS/MSD Recoveries and Differences
Method Calibration	LCS Recoveries
Method and Project Blanks	Re-analysis and Secondary Dilution

Project Specific QA/QC or contract requirements may take priority over validation criteria in this procedure.

Overall Remarks: No qualifications recomended.

Definition of Qualifiers:

"U", not detected at the associated level
"UJ", not detected and associated value estimated
"J", associated value estimated
"R", associated value unusable or analyte identity unfounded
"=", compound properly identified and value positive

Reviewed by: Denae Athay Denae Athay Date: 10/11/12

QA Reviewed by: _____ Date: _____

I. Case Narrative

Verify direct statements made within the Laboratory Case Narrative (note discrepancies).

Remarks:

No case narrative remarks directed to validated samples.

II. Re-analysis and Secondary Dilutions

Verify that re-analysis and secondary dilutions were performed and reported as necessary. Determine appropriate results to report.

Remarks: No dilutions or reanalysis required.

III. Holding Times

VOC - Waters - unpreserved: aromatic within 7 days, non-aromatic within 14 days of sample collection
VOC - Waters - preserved: aromatic and non-aromatic within 14 days of sample collection
VOC - Soils - preserve or analyze within 48 hours of sample collection; analyze within 14 days of preservation

SVOC, Pest., PCB - Waters - extract within 7 days of sample collection, analyze within 40 days of extraction
SVOC, Pest., PCB - Soils - extract within 14 days of sample collection, analyze within 40 days of extraction

Deviations:

Sample #	VOC		SVOC			Pest/PCB		
	Date Collected	Date Analyzed	Date Collected	Date Extracted	Date Analyzed	Date Collected	Date Extracted	Date Analyzed
DBA-1 (0-2)	8/9/12	8/16/12	8/9/12	8/20/12	8/25/12			

Actions:
1. If holding times are exceeded, all results are qualified as estimated (J/UJ)
2. If holding times are exceeded by more than 2X, reviewer may qualify non-detected results as unusable (R)

Remarks: No exceedances.

IV. System Monitoring Compounds (SMC) Recoveries (VOC, SVOC, Pesticides, PCBs)

List SMC compounds with unacceptable recoveries:

Deviations:

Sample #	VOC			SVOC B/N Compounds			SVOC Acid Compounds			Pest	PCB
	TOL	BFB	DCE	NBZ	FBP	TPH	PHL	2FP	TBP	TCX	DCB
QC Limits											

Actions:

1. If any SMC recovery is <10%, qualify all positive results in associated fractions as estimated (J)
2. If any SMC recovery is <10%, qualify all nondetects in associated fractions as unusable (R)
3. If SMC recoveries fall between 10% and the lower recovery limit, qualify results as estimated (J/UJ)
4. If SMC recoveries fall above the upper recovery limit, qualify positive results as estimated (J)
5. Use professional judgement to qualify Pest/PCB results when SMC recoveries are >10%
6. Use professional judgement to qualify results when SMC recoveries have been diluted out of spec.
7. For SVOC, qualification of the data is required only when 2 or more SMC per fraction are not within control limits
8. Note: SMC formerly known as surrogates.

Remarks: No exceedances.

V. Internal Standards Performance (VOC, SVOC)

VOC internal standard area counts within -50% to +100% of standard (Y/N)
VOC internal standard retention times within ± 30 seconds of standard (Y/N)

SVOC internal standard area counts within -50% to +100% of standard (Y/N)
SVOC internal standard retention times within + 30 seconds of standard (Y/N)

Deviations:

Sample #	IS Affected	Area Counts	Acceptable Range	RT	Std. RT Value

Actions:

1. If area counts are outside limits, qualify positive results associated with that IS as estimated (J)
2. Non-detected compounds quantitated using an IS area count >100% should not be qualified
3. Non-detected compounds quantitated using an IS area count <50%, qualify as estimated (UJ)
4. If extremely low area counts are reported (<50% of the lower limit), qualify non-detects as unusable (R)
5. If an IS retention time varies more than 30 seconds, review the chromatographic profile for shifts and irregularities. Use professional judgement to qualify the data estimated (J/UJ) or unusable (R)

Remarks: No exceedances.

VI. Blanks

All blanks were reported per matrix per concentration level for each 12 hour period on each GC/ MS system used to analyze VOCs and SVOCs Yes [X] No [ ]

Review associated laboratory and project blank samples. List documented contamination below:

Laboratory Method Blanks:

Date:	Lab ID #	Fraction	Compound	Conc. (ppb)

Associated Project Blanks (e.g., equipment rinsates, trip blanks, etc.)

Date	Lab ID #	Fraction	Compound	Conc. (ppb)

Remarks: No blank detects. No project blanks.

VI. Blanks (continued)

Calculate action levels based on 10X the highest blank concentration of "common laboratory solvents", VOCs (methylene chloride, acetone, toluene, 2-butanone, cyclohexane) or SVOCs (phthalates), and 5X the highest blank concentration for all other VOC, SVOC, Pesticides, and PCB compounds. Sample weights, volumes, and dilution factors must be taken into account when applying the 5X and 10X criteria. This allows the total amount of contaminant present to be considered.

Deviations:

Compound	Maximum Conc. Detected, (ppb)	Action Level (ppb)	Samples Affected

Actions:

1. If compound results exceed the action levels, the data are not qualified
2. If compound results are below the required reporting level, report results as non-detect (U) at the reporting level
3. If the compound is detected above the reporting level, but below the action level, qualify as not-detected (U)
4. If gross contamination exists in blanks (i.e.,, saturated peaks by GC/ MS), all affected compounds in the associated samles should be qualifed as unusable (R) due to interference.
5. If blanks were not analyzed per matrix per concentration level for each 12 hour period on each GC/MS system used to analyze VOCs and SVOCs use professional judgement to qualifty data. Data may be rejected (R).

Remarks: No blank detects.

VII. Initial & Contining Calibration (VOC, SVOC)

GC/MS instrument performance checks (BFB / DFTPP) Acceptable Y or N
All compounds must have and RRF > 0.01, %RSD < 30, and %D < 25

VOC - Date of initial calibration: 8/3/2012
VOC - Date(s) of continuing calibration: DBA-1(0-2) analyzed 8/16/12 16:01
Was the 12 hour critieria met? (Y) or N CCV: 8/16/12 10:47

SVOC- Date of initial calibration: 7/29/2012
SVOC - Date(s) of continuing calibration: CCV: 8/24/2012 15:28, 8/25/2012 12:23
Was the 12 hour critieria met? (Y) or N DBA-1(0-2) analyzed 8/25/12 01:13

Deviations:

Compound	Date	RRF	%RSD	%D	Samples Affected

* % Difference = $((RF_{CCV} - RF_{ICAL\ AVG})/RF_{ICAL\ AVG}) \times 100$. In instances where the bias of the CCV impacts validation qualifiers, review the RF values or amount reported to confirm that the % Difference or % Drift are reported with the correct negative or positive value.

Actions:

1. If any compound has an intial or continuing RRF of < 0.01, qualify positive results as estimated (J)
2. If any compound has an intial or continuing RRF of < 0.01, qualify non-detects as unusable (R)
3. If any compound has a %RSD >30 or a %D >25, qualify positive results as estimated (J)
4. If any compound has a %RSD >40 or a %D >40, qualify non-detects as estimated (UJ)
5. If BFB or DFTPP mass assignment / ION abundance criteria are all associated data as unusable (R).
6. If samples were analyzed outside the 12 hour BFB or DFTPP performance check time period, qualify the affected sample data as estimated (J/UJ).
7. If separate calibration for water and soil were not performed, use professional judgement to evaluate the data. Data may be rejected (R).
8. If calibrations were not completed within the 12 hour criterion, qualifty all associated data as estimated (J/UJ). If the 12 hour criterion was grossly exceeded, reject all associated data (R).

Remarks: No exceedances.

VIII. Initial & Continuing Calibration (Pesticides, PCBs)

Linearity evaluation, are %RSD <20? (Y/N) N/A

Is the RPD between calibration factors ≤25? (Y/N) _____

Are multicomponent calibration data provided for each analysis date? (Y/N) _____

Is the difference between columns check ≤ 25%D? (Y/N) _____

Are 4, 4'- DDT and endrin breakdown (PEM) ≤ 20% and combined breakdown ≤ 30% (Y/N)

Deviations:

Compound	%RSD	RPD	Samples Affected

* % Difference = $((RF_{CCV} - RF_{ICAL\ AVG})/RF_{ICAL\ AVG}) \times 100$. In instances where the bias of the CCV impacts validation qualifiers, review the RF values or amount reported to confirm that the % Difference or % Drift are reported with the correct negative or positive value.

Actions:

1. If %RSD criteria are not met, qualify positive results as estimated (J) and non-detects as estimated (UJ)
2. If RPD criteria are not met, qualify positive results as estimated (J) and non-detects as estimated (UJ)
3. If %D criteria is not met, qualify positive results as estimated (J) and non-detects as estimated (UJ)
4. If breadkwon criteria are not met, positive 4, 4'-DDT and endrin should be qualified as estimated (J). And non-detects should be rejected (R).

Remarks: Pesticides /PCBs not analyzed

IX. Matrix Spike/Matrix Spike Duplicate Information

General MS/MSD Criteria:	VOC	SVOC	Pest	PCB
percent recovery (%R)	70-130	45-135	40-140	40-140
relative percent difference (RPD)	<30	<50	<50	<50

Project Sample(s) Spiked: None

Deviations:

Compound	%R	%R Limits	RPD	RPD Limits	Samples Affected

Actions:

1. If the spike recovery is above the upper control limit (UCL), qualify all positive values in the unspiked sample as estimated (J) and non-detects as estimated (UJ).
2. If the spike recovery is below the lower control limit (LCL), qualifty positive values as estimated (J). And non-detects as estimated (UJ).
3. If the spike recovery is <10%, qualify non-detect values as unusable (R)
4. If the RPD does not meet criteria, qualify positive values in the unspiked sample as estimated (J)
5. Use professional judgement to qualify additional samples in the analytical group based on MS/MSD results
6. Use professional judgement for qualification of data for unspiked compounds

Remarks: N/A

X. Laboratory Control Sample Information

General LCS Criteria:
percent recovery (%R)

VOC	SVOC	Pest	PCB
80-120	60-120	50-130	50-130

Laboratory LCS Identifications: _____

Deviations:

Compound	Date	%R	Samples Affected/Qualifiers Applied

Actions:

Action should be based on both the number of compounds outside the criterion and the magnitude of the exceedance.

1. If the LCS recovery is below limits but > one- half the lower limit, qualify valves as estimated (J/UJ).
2. If the LCS recovery is < one-half the lower limit, qualify all data for that analyte as unusable (R).
3. If the LCS recovery is greater than the upper limit, qualify positive valves for that analyte as estimated (J).
4. If more than half the compounds in this LCS are not within recovery criteria, then qualify associated detected compounds as estimated (J).
5. Use professional judgement for qualification of data for compounds with no LCS information

Remarks: No exceedances

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
Organic Data Review Checklist - Standard Validation

Project: QDI Institute, WV

SDG No: 180-13267

Analysis: VOC, SVOC, Pesticides, PCBs

Method: 8260B, 8270C, 8081A, 8082

Laboratory: TestAmerica Pittsburg

Matrix: Solid

The above data package has been reviewed and the analytical quality control/quality assurance performance data have been summarized. The general criteria used to assess the analytical integrityof the data were based on an examination of the following:

Case Narrative	Analytical Surrogate Recoveries
Analytical Holding Times	Internal Standard Performance
Sample Preservation	MS/MSD Recoveries and Differences
Method Calibration	LCS Recoveries
Method and Project Blanks	Re-analysis and Secondary Dilution

Project Specific QA/QC or contract requirements may take priority over validation criteria in this procedure.

Overall Remarks:

TSS-6 (3.5-5.8): All positive VOC detects need 'J' qualifier due to high surrogate recovery. Beta-BHC recommend 'J'* qualifier due to differences between column results. (for TSS-2 (5-7)) Methyl acetate estimated 'J' for TSS-6 (3.5-5.8), due to high LCS recovery.

Definition of Qualifiers:

"U", not detected at the associated level
"UJ", not detected and associated value estimated
"J", associated value estimated
"R", associated value unusable or analyte identity unfounded
"=", compound properly identified and value positive

Reviewed by: Denae Athay Denae Athay Date: 10/11/2012

QA Reviewed by: Date:

I. Case Narrative

Verify direct statements made within the Laboratory Case Narrative (note discrepancies).

Remarks:

VOA: Sample TSS-6 (3.8-5.8) had surrogate 4-bromofluorobenzene recovery was outside of the control limits. Evidence of matrix interference was present; therefore, re-extraction and/or reanalysis was not performed. → DA

All case narrative statement for VOA and SVOC analysis verified

II. Re-analysis and Secondary Dilutions

Verify that re-analysis and secondary dilutions were performed and reported as necessary. Determine appropriate results to report.

Remarks: Verified

III. Holding Times

VOC - Waters - unpreserved: aromatic within 7 days, non-aromatic within 14 days of sample collection
VOC - Waters - preserved: aromatic and non-aromatic within 14 days of sample collection
VOC - Soils - preserve or analyze within 48 hours of sample collection; analyze within 14 days of preservation

SVOC, Pest., PCB - Waters - extract within 7 days of sample collection, analyze within 40 days of extraction
SVOC, Pest., PCB - Soils - extract within 14 days of sample collection, analyze within 40 days of extraction

Deviations:

Sample #	VOC		SVOC			Pest/PCB			
	Date Collected	Date Analyzed	Date Collected	Date Extracted	Date Analyzed	Date Collected	Date Extracted	Date Analyzed	
TSS-6(3.8-5.8)	8/8/12	8/17/12	8/8/12	8/20/12	8/23/12	8/8/12	8/17/12	9/6/12	– Pest
TSS-2(5-7)	8/8/12	8/18/12	8/8/12	8/20/12	8/24/12		8/22/12	8/23/12	– PCB

Actions:
1. If holding times are exceeded, all results are qualified as estimated (J/UJ)
2. If holding times are exceeded by more than 2X, reviewer may qualify non-detected results as unusable (R)

Remarks: No exceedances.

IV. System Monitoring Compounds (SMC) Recoveries (VOC, SVOC, Pesticides, PCBs)

List SMC compounds with unacceptable recoveries:

Deviations:

Sample #	VOC			SVOC B/N Compounds			SVOC Acid Compounds			Pest	PCB
	TOL	BFB	DCE	NBZ	FBP	TPH	PHL	2FP	TBP	TCX	DCB
~~180~~ 9A TSS-6(3.8-5.8)		139									
QC		70									
Limits		130									

Actions:

1. If any SMC recovery is <10%, qualify all positive results in associated fractions as estimated (J)
2. If any SMC recovery is <10%, qualify all nondetects in associated fractions as unusable (R)
3. If SMC recoveries fall between 10% and the lower recovery limit, qualify results as estimated (J/UJ)
4. If SMC recoveries fall above the upper recovery limit, qualify positive results as estimated (J)
5. Use professional judgement to qualify Pest/PCB results when SMC recoveries are >10%
6. Use professional judgement to qualify results when SMC recoveries have been diluted out of spec.
7. For SVOC, qualification of the data is required only when 2 or more SMC per fraction are not within control limits
8. Note: SMC formerly known as surrogates.

Remarks: All positive VOC detects for TSS-6(3.8-5.8) need a 'J' qualifier: ethylbenzene, Styrene, 1,2,4-Trichlorobenzene, 1,2-Dichlorobenzene, 1,3-Dichlorobenzene, 1,4-Dichlorobenzene, MEK, Acetone, Chlorobenzene, cis-1,2-Dichloroethene, Isopropylbenzene, Methyl Acetate, trichloroethene, Xylenes

V. Internal Standards Performance (VOC, SVOC)

VOC internal standard area counts within -50% to +100% of standard (Y/N) Y
VOC internal standard retention times within ± 30 seconds of standard (Y/N) Y

SVOC internal standard area counts within -50% to +100% of standard (Y/N) Y
SVOC internal standard retention times within + 30 seconds of standard (Y/N) Y

Deviations:

Sample #	IS Affected	Area Counts	Acceptable Range	RT	Std. RT Value

Actions:

1. If area counts are outside limits, qualify positive results associated with that IS as estimated (J)
2. Non-detected compounds quantitated using an IS area count >100% should not be qualified
3. Non-detected compounds quantitated using an IS area count <50%, qualify as estimated (UJ)
4. If extremely low area counts are reported (<50% of the lower limit), qualify non-detects as unusable (R)
5. If an IS retention time varies more than 30 seconds, review the chromatographic profile for shifts and irregularities. Use professional judgement to qualify the data estimated (J/UJ) or unusable (R)

Remarks: No exceedances.

VI. Blanks

All blanks were reported per matrix per concentration level for each 12 hour period on each GC/ MS system used to analyze VOCs and SVOCs Yes [X] No [ ]
Review associated laboratory and project blank samples. List documented contamination below:

Laboratory Method Blanks:

Date:	Lab ID #	Fraction	Compound	Conc. (ppb)
8/17/12	MB 490-13242/6	Solid	Chloroform	5.51

Associated Project Blanks (e.g., equipment rinsates, trip blanks, etc.)

Date	Lab ID #	Fraction	Compound	Conc. (ppb)

Remarks: No project blanks.

VI. Blanks (continued)

Calculate action levels based on 10X the highest blank concentration of "common laboratory solvents", VOCs (methylene chloride, acetone, toluene, 2-butanone, cyclohexane) or SVOCs (phthalates), and 5X the highest blank concentration for all other VOC, SVOC, Pesticides, and PCB compounds. Sample weights, volumes, and dilution factors must be taken into account when applying the 5X and 10X criteria. This allows the total amount of contaminant present to be considered.

Deviations:

Compound	Maximum Conc. Detected, (ppb)	Action Level (ppb) 27.55	Samples Affected
chloroform	551 ~~5.51~~ ~~16.99~~	~~34.95~~ ~~27.55~~	TSS-6 (3.8-5.8), TSS-2 (5-7)
methylene chloride	~~1.80~~	~~18.0~~	

Actions:

1. If compound results exceed the action levels, the data are not qualified
2. If compound results are below the required reporting level, report results as non-detect (U) at the reporting level
3. If the compound is detected above the reporting level, but below the action level, qualify as not-detected (U)
4. If gross contamination exists in blanks (i.e.,, saturated peaks by GC/ MS), all affected compounds in the associated samles should be qualifed as unusable (R) due to interference.
5. If blanks were not analyzed per matrix per concentration level for each 12 hour period on each GC/MS system used to analyze VOCs and SVOCs use professional judgement to qualifty data. Data may be rejected (R).

Remarks: Chloroform results are non-detect, no qual ~~req~~ necessary.

VII. Initial & Contining Calibration (VOC, SVOC)

GC/MS instrument performance checks (BFB / DFTPP) Acceptable Y or N
All compounds must have and RRF > 0.01, %RSD < 30, and %D < 25

VOC - Date of initial calibration: 8/3/2012
VOC - Date(s) of continuing calibration: TSS-6(3.8-5.8) analyzed 8/17/2012 2323
Was the 12 hour critieria met? (Y) or N TSS-2(5-7) analyzed 8/17/2012 0746
CCV: 8/17/2012 0812, 2046

SVOC- Date of initial calibration: 7/29/2012
SVOC - Date(s) of continuing calibration: 8/23/2012 13:48, 14:41 8/24/12 14:41, 15:04
Was the 12 hour critieria met? (Y) or N TSS-6(3.8-5.8) analyzed 8/23/2012 2313
TSS-2 (5-7) analyzed 8/24/2012 2232

Deviations:

Compound	Date	RRF	%RSD	%D	Samples Affected

* % Difference = $((RF_{CCV} - RF_{ICAL\ AVG})/RF_{ICAL\ AVG}) \times 100$. In instances where the bias of the CCV impacts validation qualifiers, review the RF values or amount reported to confirm that the % Difference or % Drift are reported with the correct negative or positive value.

Actions:

1. If any compound has an intial or continuing RRF of < 0.01, qualify positive results as estimated (J)
2. If any compound has an intial or continuing RRF of < 0.01, qualify non-detects as unusable (R)
3. If any compound has a %RSD >30 or a %D >25, qualify positive results as estimated (J)
4. If any compound has a %RSD >40 or a %D >40, qualify non-detects as estimated (UJ)
5. If BFB or DFTPP mass assignment / ION abundance criteria are all associated data as unusable (R).
6. If samples were analyzed outside the 12 hour BFB or DFTPP performance check time period, qualify the affected sample data as estimated (J/UJ).
7. If separate calibration for water and soil were not performed, use professional judgement to evaluate the data. Data may be rejected (R).
8. If calibrations were not completed within the 12 hour criterion, qualifty all associated data as estimated (J/UJ). If the 12 hour criterion was grossly exceeded, reject all associated data (R).

Remarks: No exceedances

VIII. Initial & Continuing Calibration (Pesticides, PCBs)

Linearity evaluation, are %RSD <20? (Y/N) Y

Is the RPD between calibration factors ≤25? (Y/N) Y

Are multicomponent calibration data provided for each analysis date? (Y/N) Y

Is the difference between columns check ≤ 25%D? (Y/N) N

Are 4, 4'- DDT and endrin breakdown (PEM) ≤ 20% and combined breakdown ≤ 30% (Y/N)

Deviations:

Compound	%RSD	RPD	Samples Affected
beta-BHC		31.7	TSS -2 (5-7)

* % Difference = $((RF_{CCV} - RF_{ICAL\ AVG})/RF_{ICAL\ AVG}) \times 100$. In instances where the bias of the CCV impacts validation qualifiers, review the RF values or amount reported to confirm that the % Difference or % Drift are reported with the correct negative or positive value.

Actions:

1. If %RSD criteria are not met, qualify positive results as estimated (J) and non-detects as estimated (UJ)
2. If RPD criteria are not met, qualify positive results as estimated (J) and non-detects as estimated (UJ)
3. If %D criteria is not met, qualify positive results as estimated (J) and non-detects as estimated (UJ)
4. If breadkwon criteria are not met, positive 4, 4'-DDT and endrin should be qualified as estimated (J). And non-detects should be rejected (R).

Remarks: qualify beta-BHC -J

IX. Matrix Spike/Matrix Spike Duplicate Information

General MS/MSD Criteria:	VOC	SVOC	Pest	PCB
percent recovery (%R)	70-130	45-135	40-140	40-140
relative percent difference (RPD)	<30	<50	<50	<50

Project Sample(s) Spiked: None

Deviations:

Compound	%R	%R Limits	RPD	RPD Limits	Samples Affected

Actions:

1. If the spike recovery is above the upper control limit (UCL), qualify all positive values in the unspiked sample as estimated (J) and non-detects as estimated (UJ).
2. If the spike recovery is below the lower control limit (LCL), qualifty positive values as estimated (J). And non-detects as estimated (UJ).
3. If the spike recovery is <10%, qualify non-detect values as unusable (R)
4. If the RPD does not meet criteria, qualify positive values in the unspiked sample as estimated (J)
5. Use professional judgement to qualify additional samples in the analytical group based on MS/MSD results
6. Use professional judgement for qualification of data for unspiked compounds

Remarks: N/A

X. Laboratory Control Sample Information

General LCS Criteria:
percent recovery (%R)

VOC	SVOC	Pest	PCB
80-120	60-120	50-130	50-130

Laboratory LCS Identifications: LCS 490-13242/3

Deviations:

Compound	Date	%R	Samples Affected/Qualifiers Applied
Methyl Acetate	8/17/12	185	TSS-6 (3.8-5.8), TSS-2 (5-7)
			↓ ↓ none

Actions:

Action should be based on both the number of compounds outside the criterion and the magnitude of the exceedance.

1. If the LCS recovery is below limits but > one- half the lower limit, qualify valves as estimated (J/UJ).
2. If the LCS recovery is < one-half the lower limit, qualify all data for that analyte as unusable (R).
3. If the LCS recovery is greater than the upper limit, qualify positive valves for that analyte as estimated (J).
4. If more than half the compounds in this LCS are not within recovery criteria, then qualify associated detected compounds as estimated (J).
5. Use professional judgement for qualification of data for compounds with no LCS information

Remarks: Methyl acetate positive results need a 'J' qualifier. Affects TSS-6 (3.8-5.8).

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
GC and LC Organic Data Review Checklist - Standard Validation
(Explosives, PAHs, Herbicides, GRO/DRO, Methanol, etc.)

Project: QDI Institute, WV

SDG No: 180-13267

Analysis: Dioxins, Herbicides

Method: 8290, 8151A

Laboratory: Test America Pittsburg

Matrix: Solid

The above data package has been reviewed and the analytical quality control/quality assurance performance data have been summarized. The general criteria used to assess the analytical integrityof the data were based on an examination of the following:

Case Narrative	Analytical Surrogate Recoveries
Analytical Holding Times	MS/MSD Recoveries and Differences
Sample Preservation	LCS Recoveries
Method Calibration	Re-analysis and Secondary Dilution
Method and Project Blanks	

Overall Remarks: No qualifications recommended.

Definition of Qualifiers:

"U", not detected at the associated level
"UJ", not detected and associated value estimated
"J", associated value estimated
"R", associated value unusable or analyte identity unfounded
"=", compound properly identified and value positive

Reviewed by: Denae Athay Date: 10/11/2012

QA Reviewed by: Date:

I. Case Narrative

Verify direct statements made within the Laboratory Case Narrative (note discrepancies).

Remarks:

Herbicides: CCV recovery high - verified

II. Re-analysis and Secondary Dilutions

Verify that re-analysis and secondary dilutions were performed and reported as necessary. Determine appropriate results to report.

Remarks: No re-analysis or dilutions required.

III. Holding Times

VOC types - Waters - unpreserved: aromatic within 7 days, non-aromatic within 14 days of sample collection
VOC types - Waters - preserved: aromatic and non-aromatic within 14 days of sample collection
VOC types - Soils - preserve/analyze within 48 hours of sample collection; analyze within 14 days of preservation

SVOC types - Waters - extract within 7 days of sample collection, analyze within 40 days of extraction
SVOC types - Soils - extract within 14 days of sample collection, analyze within 40 days of extraction

Deviations:

Sample #	VOC types		SVOC types			Notes:
	Date Collected	Date Analyzed	Date Collected	Date Extracted	Date Analyzed	
TSS-2 (5-7)	8/8/12	8/18/12				

Actions:
1. If holding times are exceeded, all results are qualified as estimated (J/UJ)
2. If holding times are exceeded by more than 2X, reviewer may qualify non-detected results as unusable (R)

Remarks: No holding time exceedances.

IV. Initial & Continuing Calibration

A blank and five standards should be analyzed, with one of the standards being within 2X the MDL
Correlation coefficients must be ≥ 0.995
The RSD of the calibration factor or the relative response factor (RRF) must be ≤ 20%
Continuing calibration %D must be within ± 15%

Deviations:

Compound	Correlation Coefficient	% RSD	%D	Samples Affected

* % Difference = $((RF_{CCV} - RF_{ICAL\ AVG})/RF_{ICAL\ AVG}) \times 100$. In instances where the bias of the CCV impacts validation qualifiers, review the RF values or amount reported to confirm that the % Difference or % Drift are reported with the correct negative or positive value.

Actions:

1. If any compounds initial calibration linearity is <0.995, qualifiy the data as estimated (J/UJ)
2. If any compounds initial calibration linearity is <0.95, qualify the data as unusable (R)
3. If %RSD criteria are not met, qualify positive results as estimated (J) and non-detects as estimated (UJ)
3. If %D criteria is not met, qualify positive results as estimated (J) and non-detects as estimated (UJ)

Remarks: No exceedances

V. Surrogate Recoveries

List surrogate compounds with unacceptable recoveries:

Deviations:

Sample #	Surrogate ID	% R	QC Limits	Samples Affected

Actions:

1. If any surrogate recovery is <10%, qualify all positive results in associated fractions as estimated (J)
2. If any surrogate recovery is <10%, qualify all nondetects in associated fractions as unusable (R)
3. If surrogate recoveries fall between 10% and the lower recovery limit, qualify results as estimated (J/UJ)
4. If surrogate recoveries fall above the upper recovery limit, qualify positive results as estimated (J)
6. Use professional judgement to qualify results when surrogate recoveries have been diluted out of spec.

Remarks: No exceedances.

VI. Blanks

Review associated laboratory and project blank samples. List documented contamination below:

Laboratory Method Blanks:

Date	Lab ID #	Fraction	Compound	Conc. ~~(ppb)~~ pg/g
9/12/12	H2I050000-033B	Solid	1,2,3,7,8,9-HxCDD	0.066
			1,2,3,4,6,7,8-HpCDD	0.063
			OCDD	0.26
			2,3,7,8-TCDF	0.067
			2,3,4,7,8-PeCDF	0.032
			1,2,3,7,8,9-HxCDF	0.037
			1,2,3,4,6,7,8-HpCDF	0.042
			OCDF	0.093
			1,2,3,6,7,8-HxCDF	0.028
			2,3,4,6,7,8-HxCDF	0.041

Associated Project Blanks (e.g., equipment rinsates, trip blanks, etc.)

Date	Lab ID #	Fraction	Compound	Conc. (ppb)

Remarks: ~~No blank detects.~~ No project blanks.

VI. Blanks (continued)

Calculate action levels based on 5X the highest blank concentration of any given compound
Sample weights, volumes, and dilution factors must be taken into account when applying the 5X criteria

Deviations:

Compound	Maximum Conc. Detected, ~~(ppb)~~ pg/g	Action Level (ppb)	Samples Affected
1,2,3,7,8,9-HxCDD	0.066	0.33	
1,2,3,4,6,7,8-HpCDD	0.063	0.315	
OCDD	0.26	1.3	
2,3,7,8-TCDF	0.067	0.335	
2,3,4,7,8-PeCDF	0.032	0.16	
1,2,3,7,8,9-HxCDF	0.037	0.185	
OCDF	0.093 ~~0.042~~	0.465	
1,2,3,6,7,8-HxCDF	~~0~~ 0.028	0.14	
2,3,4,6,7,8-HxCDF	0.041	0.205	
1,2,3,4,6,7,8-HpCDF	0.042	0.21	

Actions:

1. If compound results exceed the action levels, the data are not qualified
2. If compound results are below the required reporting level, report results as non-detect (U) at the reporting level
3. If the compound is detected above the reporting level, but below the action level, qualify as not-detected (U)

Remarks: ~~No blank detects.~~ No qualification necessary, no blank detects higher than minimum level. Most sample results estimated due to being less than minimum level. Two results above minimul level and greater than action level.

VII. Matrix Spike/Matrix Spike Duplicate Information

General MS/MSD Criteria:

	VOC types	SVOC types
percent recovery (%R)	70-130	45-135
relative percent difference (RPD)	<30	<50

Project Sample(s) Spiked: None.

Deviations:

Compound	%R	%R Limits	RPD	RPD Limits	Samples Affected

Actions:

1. If the spike recovery is outside limits, qualify all positive values in the unspiked sample as estimated (J)
2. If the spike recovery is <10%, qualify non-detect values as unusable (R)
3. If the RPD does not meet criteria, qualify positive values in the unspiked sample as estimated (J)
4. Use professional judgement to qualify additional samples in the analytical group based on MS/MSD results
5. Use professional judgement for qualification of data for unspiked compounds

Remarks: N/A

VIII. Laboratory Control Sample Information

General LCS Criteria:

	VOC types	SVOC types
percent recovery (%R)	80-120	60-120

Laboratory LCS Identifications: _____

Deviations:

Compound	Date	%R	Samples Affected/Qualifiers Applied

Actions:

1. If the LCS recovery is outside limits but >10%, qualify all positive values as esimated (J)
2. If the LCS recovery is outside limits but >10%, qualify non-detect values as estimated (UJ)
3. If the LCS recovery is <10%, qualify all data for that analyte as unusable (R)
4. Use professional judgement for qualification of data for compounds with no LCS information

Remarks: No exceedances

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
Metals Data Review Checklist - Standard Validation

Project: QDI Institute, WV

SDG No: 190-13267

Analysis: Metals, Mercury

Method: 6010C, 7471B

Laboratory: Test America Pittsburg

Matrix: Solid

The above data package has been reviewed and the analytical quality control/quality assurance performance data have been summarized. The general criteria used to assess the analytical integrity of the data were based on an examination of the following:

Case Narrative	MS/MSD Recoveries and Differences
Analytical Holding Times	Duplicate Relative Percent Differences
Sample Preservation	ICP Serial Dilution
Method Calibration	Furnace Atomic Absorption QC
Method and Project Blanks	Re-analysis and Secondary Dilution
LCS Recoveries	Internal Standard Performance (if applicable)

Project specific QA/QC or contract requirements may take priority over validation criteria in this procedure.

Overall Remarks: No validation issues.

Definition of Qualifiers:

"U", not detected at the associated level
"UJ", not detected and associated value estimated
"J", associated value estimated
"R", associated value unusable or analyte identity unfounded
"=", compound properly identified and value positive

Reviewed by: Denae Athay Denae Athay Date: 10/11/2012

QA Reviewed by: _____ Date: _____

I. Case Narrative

Verify direct statements made within the Laboratory Case Narrative (note discrepancies).

Remarks: No case narrative remarks for metals analysis applicable to validated results.

II. Re-analysis and Secondary Dilutions

Verify that re-analysis and secondary dilutions were performed and reported as necessary. Determine appropriate results to report.

Remarks: No dilutions or re-analysis.

III. Holding Times

Metals - Waters - preserved to pH<2, 180 days from sample collection
Metals - Soils - 180 days from sample collection
Mercury - Waters - preserved to pH<2, 28 days from sample collection
Mercury - Soils - 28 days from sample collection

Deviations:

Sample #	Metals				Mercury			
	Date Collected	Date Analyzed	Days >HT	pH Check	Date Collected	Date Analyzed	Days >HT	pH Check
TSS-6 (3.8-5.8)	8/8/12	8/17/12		Y	8/8/12	8/17/12		Y
TSS-2 (5-7)	8/8/12	8/17/12		Y	8/8/12	8/17/12		Y

Actions:

1. If preserved samples exceed holding time, qualifty all associated results as estimated (J/UJ).
2. If unpreserved samples exceed holding time, qualify all associated results as unusable (R).
3. If holding times are exceeded by more than 2X, reviewer may qualify non-detected results as unusable (R)
4. If water samples are not acidified, use professional judgement. Minimally, qualify data as estimated (J) and non-detects unusable (R).
5. If soil samples exceed holding time, use professional judgement to qualify data.

Remarks: No exceedances

IV. Initial & Contining Calibration (ICP, GFAA, CVAA, etc.)

Initial calibration linearity criteria is r ≥ 0.995 Y
ICV and CCV criteria are ± 10% recovery, low level check standard allowed ± 30% Y
ICP inter-element check standard criteria ± 20% Y

Deviations:

Element	Date	Intial Calib.	ICV/ CCV	%R	Samples Affected

Actions:

1. If any elements initial claibration linearity is <0.995, qualify the data as estimated (J/UJ)
2. If any elements initial claibration linearity is <0.95, qualify the data as unusable (R)

3a. If any elements ICV or CCV recovery is <90%, qualify the data as estimated (J/UJ)

3b. If any elements ICV or CCV recovery is > 110%, qualify results ≥ MDL as estimated (J), do not qualify non-detects

4a. If any elements ICV or CCV recovery is <75%, qualify the data as unusable (R)

4b. If any elements ICV or CCV recovery is > 125%, qualify positive results as estimated (J) or non-detects unusable (R)

4c. If any elements ICV or CCV recovery is > 160%, qualify positive results ≥ MDL us unusable (R). Do not qualify non-detects.

5a. If any elements CRI recovery is 50-69% (30-49% for Sb, Pb, Tl), qualify results ≥ MDL (but < 2 x CRQL) as estimated (J/UJ) and results > 2 x CRQL are not qualified.

5b. If any elements CRI recovery is < 50% (< 30% for Sb, Pb, Tl), qualify results ≥ MDL (but < 2 x CRQL) as unusable (R) and results > 2 x CRQL as estimate (J).

5c. If any elements CRI recovery is > 130% but < 180 % (> 150% but ≤ 200% for Sb, Pb, Tl) quality results ≥ MDL (but < 2 x CRQL) as esimated (J) and non-detects and results > 2 x CRQL are not qualified.

5d. If CRI or (R) > 180% (> 200% for Sb, Pb, Ti), qualify results that are ≥ MDL as unusable (R).

Remarks: No exceedances

IV. Initial & Contining Calibration (ICP, GFAA, CVAA, etc.) (continued)

Analytical Sequence and MS Tune (Y/N)

1. Were the appropriate number of ICP standards used? Y
2. Were the appropriate number of AA standards used? -
3. Was calibration performed and documented at the beginning of each run? Y
4. Were calibration check standards run at 10% frequency or every two hours? Y
5. Were low level standard checks analyzed at approximately 2X the PQL? Y
6. Was ICP-MS mass calibration within 0.1 AMU? Y
7. Was ICP-MS % RSD of the absolute signals for all analytes < 5%? Y

Deviations:

Element	Deviation	Samples Affected

Actions:

1. If instrument calibration is questionable, use professional judgement, qualify the data as estimated (J/UJ)
2. If instrument calibration documentation can not be obtained or is inadequate, qualify the data as unusable (R)
3. If mass calibration for ICP-MS was not within 0.1 AMU, qualify analyte results as estimated (J/UJ).
4. If % RSD for ICP-MS was > 5% for any analyte in the tuning solution, qualify associated resuts as estimated (J/UJ).

Remarks: No exceedances.

V. Blanks (ICB, CCB, Method Blank, Equipment Rinsate Blank)

A. Blank Results

If the blank level is > CRQL for any analyte check that the analyte's concentration in a sample is > 10 x the blank value.The highest blank concentration of observed elements is the action level.
Sample weights, volumes, and dilution factors must be taken into account when applying the action level.
Blank results given in ug/L must be converted to mg/kg to compare them with soil sample results.
use the following equation:

ug/L x V/W x 1L/1000mL x 1000g/1kg x 1mg/1000ug = mg/kg

where: V = volume of samples digest solution (usually 200 mL)
W = weight of sample digested (usually 1 g)

Deviations:

Blank ID	Element	Max. Conc. Detected	Action Level	Samples Affected

If additional space is required, use next page

Actions:

1. For blank results ≥ MDL but ≤ CRQL, qualify sample results ≥ MDL but < CRQL as CRQL U. Use professional judgement to qualify sample results exceeding the CRQL.

2a. If blank results are > CRQL: for sample values ≥ MDL but ≤ CRQL, qualify results as CRQL U; for sample values > CRQL but < 10 x the blank, qualify results as unusable (R) or estimated (J). No action is taken for sample results ≥ 10 x the blank values.

2b. If ICB/ CCB results are > CRQL: for sample values ≥ MDL but ≤ CRQL, qualify results as CRQL U; for sample values > CRQL but < blank results, qualfiy results as not detected (U) at the level of the blank or unusable (R). Use proffessional judgement for sample results > blank results.

Remarks: No blank detects.

V. Blanks (continued)

The highest blank concentration of observed elements is the action level.
Sample weights, volumes, and dilution factors must be taken into account.
Blank results given in ug/L must be converted to mg/kg to compare them with soil sample results.
use the following equation:

ug/L x V/W x 1L/1000mL x 1000g/1kg x 1mg/1000ug = mg/kg

where: V = volume of samples digest solution (usually 200 mL)
W = weight of sample digested (usually 1 g)

Deviations:

Blank ID	Element	Max. Conc. Detected	Action Level	Samples Affected

V. Blanks (continued)

B. Frequency Requirements (Y/N)

1. Was a method (preparation) blank analyzed for each matrix? Y
2. Was a method blank processed for every analytical batch (20 samples)? Y
3. Was a calibration blank analyzed at 10% frequency or every two hours? Y

Deviations:

Element	Deviation	Samples Affected

Remarks: No problems

C. Baseline Shift Evaluation

List the highest negative blank concentration for each analyte observed in laboratory or project blanks.

Deviations:

Blank ID	Element	Max. Neg. Conc.	Action Level	Samples Affected

Actions:

1. If the absolute value of the maximum negative blank result is > the CRQL, qualify positive results as estimated (J) and non-detects as estimated (UJ).

Remarks: No ~~exceedances.~~ negative blank results.

VI. Laboratory Control Sample Evaluation

All LCS recovery criteria are set at 80-120%
An LCS must be analyzed for each matrix and for each digestion batch or set of twenty samples

Deviations:

Element	Date	%R	Matrix	Samples Affected

Actions:

1. If any element's LCS recovery is >120%, qualify positive results as (J) .
2. If any element's LCS recovery is 50-79%, qualify positive results as (J) and non-detect results as (UJ).
3a. If any element's LCS recovery is <50%, qualify positive results as (J) and non-detect results as (R).
3b. If the LCS recovery is > 150%, qualify all results as unusable (R).
4. For soil LCS recovery > upper limit, qualify sample results ≥ MDL as estimated (J).
5. For soil LCS recovery < lower limit, qualify results ≥ MDL as estimated (J) and non-detects estimated (UJ).
6. Use professional judgement to qualify data if the LCS frequency criteria are not met.

Remarks: No exceedances

VII. Matrix Spike Evaluation

All MS recovery criteria are set at 75-125%
An MS must be analyzed for each matrix and for each digestion batch or set of twenty samples
Verify that a field blank or PE sample was not used for spiked sample analysis.
Verify that a post-digestion spike was analyzed for those analytes where the pre-digestion spike recovery is outside control limits and the sample result is < 4 x the spike added.

Project Sample(s) Spiked: None

Deviations:

Element	Spiked Sample Result	Sample Result	Spike Amount	%R	Samples Affected

Actions:

1. If the sample concentration exceeds the spiking level by a factor of 4X or more, do not qualify the data
2. If the spike recovery is >125%, qualify all positive values as (J).
3. If the spike recovery is between 30-74%, qualify positive values as (J) and non-detect values as estimated (UJ)
4. If the spike recovery is <30%, qualify positive values as (J) and non-detects are qualified unusable (R) if the post-digestion spike recovery is < 75% (or none was performed); non-detects are qualified as estimated (UJ) if the post-digestion spike recovery is ≥ 75%. There is no post-digestion spike performed for mercury.
5. Qualify all samples of similar matrix to the spiked sample in the same manner
6. Use professional judgement to qualify data if the MS frequency criteria are not met.
7. Use professional judgement for qualification of data for unspiked elements

Remarks: N/A

VIII. Laboratory Duplicate Evaluation

Duplicate relative percent difference (RPD) for water is 20% (both results > 5 times CRDL) or < CRDL difference (if either result is < 5 times CRDL) and RPD for soil is 35% (if both results are > 5 times CRDL or < 2 times CRDL if either result is < 5 times CRDL.
When duplicate sample values are both less than the reporting level they are considered acceptable
When dupicate sample values are within 5X the reporting level they are acceptable if their absolute difference is within 3X the reporting level
Verify that a field blank or PE samples was not used for duplicate analysis.

Deviations:

Element	Sample #	Duplicate #	RPD	Samples Affected

Actions:

1. If an element's RPD is >20% (water) / 35% (soil), qualify positive results as (J) and non-detect results as (UJ)
2. For low concentrations, if an element's duplicate absolute difference is > 3X the reporting level, qualify positive results as (J) and non-detect results as (UJ)
3. Use professional judgement to qualify data if the duplicate frequency criteria are not met.

Remarks: No exceedances.

IX. Inductively Coupled Plasma (ICP) Serial Dilution Analysis

Verify that a field blank or PE sample was not used for serial dulution.
Serial dilution of positive results are performed when values exceed 50X the IDL
Results from serial dilutions should agree within 10% of the original undiluted analysis

Deviations:

Element	Sample #	Sample Result	Serial Dilution	%D	Action

Actions:

1. If the serial dilution %D is >10 and the analyte results are >50X the IDL, qualify all positive results as estimated (J) and non-detects as estimated (UJ).

Remarks: No serial dilutions performed.

X. Furnace Atomic Absorption QC

A. Duplicate Precision (Y/N)

1. Were duplicate injections performed for all samples? Y
2. Were one point analytical spikes performed for all samples? Y
3. Did duplicate injections agree within ± 20%? Y

Deviations:

Element	Deviation	Sample Affected

Actions:

1. If duplicate injection results are outside ± 20%, qualify positive results as (J) and non-detect results as (UJ)

Remarks: No exceedances

B. Post Digestion Spike Recoveries (Y/N)

1. Did post digestion spike recoveries meet an 85-115% recovery criteria? Y
2. If spike recoveries did not meet recovery criteria were samples analyzed by MSA? —
3. If MSA was used to analyze samples, was its correlation coefficient ≥ 0.995? —

Deviations:

Element	Deviation	Sample Affected

Actions:

1. If post digestion spike recoveries are >115%, qualify positive results as (J) and non-detect results as (U)
2. If post digestion spike recoveries are 11-84%, qualify positive results as (J) and non-detect results as (UJ)
3. If post digestion spike recoveries are <10%, qualify positive results as (R) and non-detect results as (R)
4. If MSA was used to quantitate values and the correlation coefficient was <0.995, qualify data as (J or UJ)
5. If MSA was used to quantitate values and the correlation coefficient was <0.95, qualify data as (R)

Remarks: No exceedances

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
Metals Data Review Checklist - Standard Validation

Project: QDI Institute, WV

SDG No: 180-13209-1

Analysis: Metals, Mercury

Method: 6010C, 7471B

Laboratory: Test America- Pittsburgh

Matrix: Solid

The above data package has been reviewed and the analytical quality control/quality assurance performance data have been summarized. The general criteria used to assess the analytical integrity of the data were based on an examination of the following:

Case Narrative	MS/MSD Recoveries and Differences
Analytical Holding Times	Duplicate Relative Percent Differences
Sample Preservation	ICP Serial Dilution
Method Calibration	Furnace Atomic Absorption QC
Method and Project Blanks	Re-analysis and Secondary Dilution
LCS Recoveries	Internal Standard Performance (if applicable)

Project specific QA/QC or contract requirements may take priority over validation criteria in this procedure.

Overall Remarks: No issues requiring qualification. A blank detect noted however the sample result >10x the sample result.

Definition of Qualifiers:

"U", not detected at the associated level
"UJ", not detected and associated value estimated
"J", associated value estimated
"R", associated value unusable or analyte identity unfounded
"=", compound properly identified and value positive

Reviewed by: Denae Athay Denae Athay Date: 10/15/2012

QA Reviewed by: _____ Date: _____

I. Case Narrative

Verify direct statements made within the Laboratory Case Narrative (note discrepancies).

Remarks: No case narrative statements for metals analysis

II. Re-analysis and Secondary Dilutions

Verify that re-analysis and secondary dilutions were performed and reported as necessary. Determine appropriate results to report.

Remarks: None required

III. Holding Times

Metals - Waters - preserved to pH<2, 180 days from sample collection
Metals - Soils - 180 days from sample collection
Mercury - Waters - preserved to pH<2, 28 days from sample collection
Mercury - Soils - 28 days from sample collection

Deviations:

Sample #	Metals				Mercury			
	Date Collected	Date Analyzed	Days >HT	pH Check	Date Collected	Date Analyzed	Days >HT	pH Check
PSA - 1 (10-12)	8/7/2012	8/17/2012	Ø					
WWTP - 2	8/7/2012	8/17/2012	Ø					

Actions:

1. If preserved samples exceed holding time, qualifty all associated results as estimated (J/UJ).
2. If unpreserved samples exceed holding time, qualify all associated results as unusable (R).
3. If holding times are exceeded by more than 2X, reviewer may qualify non-detected results as unusable (R)
4. If water samples are not acidified, use professional judgement. Minimally, qualify data as estimated (J) and non-detects unusable (R).
5. If soil samples exceed holding time, use professional judgement to qualify data.

Remarks: No holding times exceeded

IV. Initial & Contining Calibration (ICP, GFAA, CVAA, etc.)

Initial calibration linearity criteria is r ≥ 0.995
ICV and CCV criteria are ± 10% recovery, low level check standard allowed ± 30%
ICP inter-element check standard criteria ± 20%

Deviations:

Element	Date	Intial Calib.	ICV/ CCV	%R	Samples Affected

Actions:

1. If any elements initial claibration linearity is <0.995, qualify the data as estimated (J/UJ)
2. If any elements initial claibration linearity is <0.95, qualify the data as unusable (R)

3a. If any elements ICV or CCV recovery is <90%, qualify the data as estimated (J/UJ)

3b. If any elements ICV or CCV recovery is > 110%, qualify results ≥ MDL as estimated (J), do not qualify non-detects

4a. If any elements ICV or CCV recovery is <75%, qualify the data as unusable (R)

4b. If any elements ICV or CCV recovery is > 125%, qualify positive results as estimated (J) or non-detects unusable (R)

4c. If any elements ICV or CCV recovery is > 160%, qualify positive results ≥ MDL us unusable (R). Do not qualify non-detects.

5a. If any elements CRI recovery is 50-69% (30-49% for Sb, Pb, Tl), qualify results ≥ MDL (but < 2 x CRQL) as estimated (J/UJ) and results > 2 x CRQL are not qualified.

5b. If any elements CRI recovery is < 50% (< 30% for Sb, Pb, Tl), qualify results ≥ MDL (but < 2 x CRQL) as unusable (R) and results > 2 x CRQL as estimate (J).

5c. If any elements CRI recovery is > 130% but < 180 % (> 150% but ≤ 200% for Sb, Pb, Tl) quality results ≥ MDL (but < 2 x CRQL) as esimated (J) and non-detects and results > 2 x CRQL are not qualified.

5d. If CRI or (R) > 180% (> 200% for Sb, Pb, Ti), qualify results that are ≥ MDL as unusable (R).

Remarks: All ICV/CCV within limits

IV. Initial & Contining Calibration (ICP, GFAA, CVAA, etc.) (continued)

Analytical Sequence and MS Tune (Y/N)

1. Were the appropriate number of ICP standards used? Y
2. Were the appropriate number of AA standards used? -
3. Was calibration performed and documented at the beginning of each run? Y
4. Were calibration check standards run at 10% frequency or every two hours? Y
5. Were low level standard checks analyzed at approximately 2X the PQL? Y
6. Was ICP-MS mass calibration within 0.1 AMU? Y
7. Was ICP-MS % RSD of the absolute signals for all analytes < 5%? Y

Deviations:

Element	Deviation	Samples Affected

Actions:

1. If instrument calibration is questionable, use professional judgement, qualify the data as estimated (J/UJ)
2. If instrument calibration documentation can not be obtained or is inadequate, qualify the data as unusable (R)
3. If mass calibration for ICP-MS was not within 0.1 AMU, qualify analyte results as estimated (J/UJ).
4. If % RSD for ICP-MS was > 5% for any analyte in the tuning solution, qualify associated resuts as estimated (J/UJ).

Remarks: No exceedances.

V. Blanks (ICB, CCB, Method Blank, Equipment Rinsate Blank)

A. Blank Results

If the blank level is > CRQL for any analyte check that the analyte's concentration in a sample is > 10 x the blank value.The highest blank concentration of observed elements is the action level.
Sample weights, volumes, and dilution factors must be taken into account when applying the action level.
Blank results given in ug/L must be converted to mg/kg to compare them with soil sample results.
use the following equation:

ug/L x V/W x 1L/1000mL x 1000g/1kg x 1mg/1000ug = mg/kg

where: V = volume of samples digest solution (usually 200 mL)
W = weight of sample digested (usually 1 g)

Deviations:

Blank ID	Element	Max. Conc. Detected	Action Level	Samples Affected
490-13067/32	Cd	0.0003	0.0010	PSA 1 (10-12), WWTP 2

If additional space is required, use next page

Actions:

1. For blank results ≥ MDL but ≤ CRQL, qualify sample results ≥ MDL but < CRQL as CRQL U. Use professional judgement to qualify sample results exceeding the CRQL.

2a. If blank results are > CRQL: for sample values ≥ MDL but ≤ CRQL, qualify results as CRQL U; for sample values > CRQL but < 10 x the blank, qualify results as unusable (R) or estimated (J). No action is taken for sample results ≥ 10 x the blank values.

2b. If ICB/ CCB results are > CRQL: for sample values ≥ MDL but ≤ CRQL, qualify results as CRQL U; for sample values > CRQL but < blank results, qualfiy results as not detected (U) at the level of the blank or unusable (R). Use proffessional judgement for sample results > blank results.

Remarks: ~~No blank detects or~~ No qualifications required, sample results > 10x the blank results.

V. Blanks (continued)

The highest blank concentration of observed elements is the action level.
Sample weights, volumes, and dilution factors must be taken into account.
Blank results given in ug/L must be converted to mg/kg to compare them with soil sample results.
use the following equation:

ug/L x V/W x 1L/1000mL x 1000g/1kg x 1mg/1000ug = mg/kg

where: V = volume of samples digest solution (usually 200 mL)
W = weight of sample digested (usually 1 g)

Deviations:

Blank ID	Element	Max. Conc. Detected	Action Level	Samples Affected

V. Blanks (continued)

B. Frequency Requirements (Y/N)

1. Was a method (preparation) blank analyzed for each matrix? Y
2. Was a method blank processed for every analytical batch (20 samples)? Y
3. Was a calibration blank analyzed at 10% frequency or every two hours? Y

Deviations:

Element	Deviation	Samples Affected

Remarks: No exceedances

C. Baseline Shift Evaluation

List the highest negative blank concentration for each analyte observed in laboratory or project blanks.

Deviations:

Blank ID	Element	Max. Neg. Conc.	Action Level	Samples Affected

Actions:

1. If the absolute value of the maximum negative blank result is > the CRQL, qualify positive results as estimated (J) and non-detects as estimated (UJ).

Remarks: No negative blank results.

VI. Laboratory Control Sample Evaluation

All LCS recovery criteria are set at 80-120%
An LCS must be analyzed for each matrix and for each digestion batch or set of twenty samples

Deviations:

Element	Date	%R	Matrix	Samples Affected

Actions:

1. If any element's LCS recovery is >120%, qualify positive results as (J) .
2. If any element's LCS recovery is 50-79%, qualify positive results as (J) and non-detect results as (UJ).
3a. If any element's LCS recovery is <50%, qualify positive results as (J) and non-detect results as (R).
3b. If the LCS recovery is > 150%, qualify all results as unusable (R).
4. For soil LCS recovery > upper limit, qualify sample results ≥ MDL as estimated (J).
5. For soil LCS recovery < lower limit, qualify results ≥ MDL as estimated (J) and non-detects estimated (UJ).
6. Use professional judgement to qualify data if the LCS frequency criteria are not met.

Remarks: No LCS exceedances

VII. Matrix Spike Evaluation

All MS recovery criteria are set at 75-125%
An MS must be analyzed for each matrix and for each digestion batch or set of twenty samples
Verify that a field blank or PE sample was not used for spiked sample analysis.
Verify that a post-digestion spike was analyzed for those analytes where the pre-digestion spike recovery is outside control limits and the sample result is < 4 x the spike added.

Project Sample(s) Spiked: none

Deviations:

Element	Spiked Sample Result	Sample Result	Spike Amount	%R	Samples Affected

Actions:

1. If the sample concentration exceeds the spiking level by a factor of 4X or more, do not qualify the data
2. If the spike recovery is >125%, qualify all positive values as (J).
3. If the spike recovery is between 30-74%, qualify positive values as (J) and non-detect values as estimated (UJ)
4. If the spike recovery is <30%, qualify positive values as (J) and non-detects are qualified unusable (R) if the post-digestion spike recovery is < 75% (or none was performed); non-detects are qualified as estimated (UJ) if the post-digestion spike recovery is ≥ 75%. There is no post-digestion spike performed for mercury.
5. Qualify all samples of similar matrix to the spiked sample in the same manner
6. Use professional judgement to qualify data if the MS frequency criteria are not met.
7. Use professional judgement for qualification of data for unspiked elements

Remarks: N/A

VIII. Laboratory Duplicate Evaluation

Duplicate relative percent difference (RPD) for water is 20% (both results > 5 times CRDL) or < CRDL difference (if either result is < 5 times CRDL) and RPD for soil is 35% (if both results are > 5 times CRDL or < 2 times CRDL if either result is < 5 times CRDL.
When duplicate sample values are both less than the reporting level they are considered acceptable
When dupicate sample values are within 5X the reporting level they are acceptable if their absolute difference is within 3X the reporting level
Verify that a field blank or PE samples was not used for duplicate analysis.

Deviations:

Element	Sample #	Duplicate #	RPD	Samples Affected

Actions:

1. If an element's RPD is >20% (water) / 35% (soil), qualify positive results as (J) and non-detect results as (UJ)
2. For low concentrations, if an element's duplicate absolute difference is > 3X the reporting level, qualify positive results as (J) and non-detect results as (UJ)
3. Use professional judgement to qualify data if the duplicate frequency criteria are not met.

Remarks: No duplicate RPD exceedances

IX. Inductively Coupled Plasma (ICP) Serial Dilution Analysis

Verify that a field blank or PE sample was not used for serial dulution.
Serial dilution of positive results are performed when values exceed 50X the IDL
Results from serial dilutions should agree within 10% of the original undiluted analysis

Deviations:

Element	Sample #	Sample Result	Serial Dilution	%D	Action
V	180-13209	34	32.5	4.5	None

Actions:

1. If the serial dilution %D is >10 and the analyte results are >50X the IDL, qualify all positive results as estimated (J) and non-detects as estimated (UJ).

Remarks: No exceedances requiring qualifiers.

X. Furnace Atomic Absorption QC

A. Duplicate Precision (Y/N)

1. Were duplicate injections performed for all samples? ~~N/A~~ Y
2. Were one point analytical spikes performed for all samples? Y
3. Did duplicate injections agree within ± 20%? Y

Deviations:

Element	Deviation	Sample Affected

Actions:

1. If duplicate injection results are outside ± 20%, qualify positive results as (J) and non-detect results as (UJ)

Remarks: N/A

B. Post Digestion Spike Recoveries (Y/N)

1. Did post digestion spike recoveries meet an 85-115% recovery criteria? Y
2. If spike recoveries did not meet recovery criteria were samples analyzed by MSA? NA
3. If MSA was used to analyze samples, was its' correlation coefficient ≥ 0.995? NA

Deviations:

Element	Deviation	Sample Affected

Actions:

1. If post digestion spike recoveries are >115%, qualify positive results as (J) and non-detect results as (U)
2. If post digestion spike recoveries are 11-84%, qualify positive results as (J) and non-detect results as (UJ)
3. If post digestion spike recoveries are <10%, qualify positive results as (R) and non-detect results as (R)
4. If MSA was used to quantitate values and the correlation coefficient was <0.995, qualify data as (J or UJ)
5. If MSA was used to quantitate values and the correlation coefficient was <0.95, qualify data as (R)

Remarks: N/A

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
Organic Data Review Checklist - Standard Validation

Project: QDI Institute, WV

SDG No: 180-13209-1

Analysis: ~~Solid DA~~ VOCs, SVOCs

Method: 8260B, 8270C

Laboratory: Test America - Pittsburgh

Matrix: Solid

The above data package has been reviewed and the analytical quality control/quality assurance performance data have been summarized. The general criteria used to assess the analytical integrityof the data were based on an examination of the following:

Case Narrative	Analytical Surrogate Recoveries
Analytical Holding Times	Internal Standard Performance
Sample Preservation	MS/MSD Recoveries and Differences
Method Calibration	LCS Recoveries
Method and Project Blanks	Re-analysis and Secondary Dilution

Project Specific QA/QC or contract requirements may take priority over validation criteria in this procedure.

Overall Remarks: No issues requiring qualification

Definition of Qualifiers:

"U", not detected at the associated level
"UJ", not detected and associated value estimated
"J", associated value estimated
"R", associated value unusable or analyte identity unfounded
"=", compound properly identified and value positive

Reviewed by: Denae Athay Denae Athay Date: 10/9/2012

QA Reviewed by: _____ Date: _____

I. Case Narrative

Verify direct statements made within the Laboratory Case Narrative (note discrepancies).

Remarks: Laboratory did not receive TRIP BLANK listed on the Chain of Custody. CCV for Vinyl Chloride recovered above upper control limit. The samples associated with this CCV were non-detects for this analyte.

II. Re-analysis and Secondary Dilutions

Verify that re-analysis and secondary dilutions were performed and reported as necessary. Determine appropriate results to report.

Remarks: None required

III. Holding Times

VOC - Waters - unpreserved: aromatic within 7 days, non-aromatic within 14 days of sample collection
VOC - Waters - preserved: aromatic and non-aromatic within 14 days of sample collection
VOC - Soils - preserve or analyze within 48 hours of sample collection; analyze within 14 days of preservation

SVOC, Pest., PCB - Waters - extract within 7 days of sample collection, analyze within 40 days of extraction
SVOC, Pest., PCB - Soils - extract within 14 days of sample collection, analyze within 40 days of extraction

Deviations:

Sample #	VOC		SVOC			Pest/PCB		
	Date Collected	Date Analyzed	Date Collected	Date Extracted	Date Analyzed	Date Collected	Date Extracted	Date Analyzed
PSA-1 (10-12)	8/7/2012	8/21/2012	8/7/2012	8/20/2012	8/23/2012			
WWTP-2	8/7/2012	8/21/2012	8/17/2012	8/20/2012	8/23/2012			

Actions:
1. If holding times are exceeded, all results are qualified as estimated (J/UJ)
2. If holding times are exceeded by more than 2X, reviewer may qualify non-detected results as unusable (R)

Remarks: No holding times exceeded.

IV. System Monitoring Compounds (SMC) Recoveries (VOC, SVOC, Pesticides, PCBs)

List SMC compounds with unacceptable recoveries:

Deviations:

Sample #	VOC			SVOC B/N Compounds			SVOC Acid Compounds			Pest	PCB
	TOL	BFB	~~DCE~~ DCA	NBZ	~~FBP~~ 2FP	TPH	PHL	2FP	TBP	TCX	DCB
QC Limits	70	70	70	27	~~10~~	13	10	10	10		
	130	130	130	120	~~120~~	120	120	120	120		

Actions:

1. If any SMC recovery is <10%, qualify all positive results in associated fractions as estimated (J)
2. If any SMC recovery is <10%, qualify all nondetects in associated fractions as unusable (R)
3. If SMC recoveries fall between 10% and the lower recovery limit, qualify results as estimated (J/UJ)
4. If SMC recoveries fall above the upper recovery limit, qualify positive results as estimated (J)
5. Use professional judgement to qualify Pest/PCB results when SMC recoveries are >10%
6. Use professional judgement to qualify results when SMC recoveries have been diluted out of spec.
7. For SVOC, qualification of the data is required only when 2 or more SMC per fraction are not within control limits
8. Note: SMC formerly known as surrogates.

Remarks: All surrogate recoveries within acceptable limits

V. Internal Standards Performance (VOC, SVOC)

VOC internal standard area counts within -50% to +100% of standard (Y/N)
VOC internal standard retention times within ± 30 seconds of standard (Y/N)

SVOC internal standard area counts within -50% to +100% of standard (Y/N)
SVOC internal standard retention times within + 30 seconds of standard (Y/N)

Deviations:

Sample #	IS Affected	Area Counts	Acceptable Range	RT	Std. RT Value

Actions:

1. If area counts are outside limits, qualify positive results associated with that IS as estimated (J)
2. Non-detected compounds quantitated using an IS area count >100% should not be qualified
3. Non-detected compounds quantitated using an IS area count <50%, qualify as estimated (UJ)
4. If extremely low area counts are reported (<50% of the lower limit), qualify non-detects as unusable (R)
5. If an IS retention time varies more than 30 seconds, review the chromatographic profile for shifts and irregularities. Use professional judgement to qualify the data estimated (J/UJ) or unusable (R)

Remarks:

No SVOC Internal Standard exceedances

VI. Blanks

All blanks were reported per matrix per concentration level for each 12 hour period on each GC/ MS system used to analyze VOCs and SVOCs Yes ☐ No ☐

Review associated laboratory and project blank samples. List documented contamination below:

Laboratory Method Blanks:

Date:	Lab ID #	Fraction	Compound	Conc. (ppb)

Associated Project Blanks (e.g., equipment rinsates, trip blanks, etc.)

Date	Lab ID #	Fraction	Compound	Conc. (ppb)

Remarks: No laboratory blank detections. No project blanks provided.

VI. Blanks (continued)

Calculate action levels based on 10X the highest blank concentration of "common laboratory solvents", VOCs (methylene chloride, acetone, toluene, 2-butanone, cyclohexane) or SVOCs (phthalates), and 5X the highest blank concentration for all other VOC, SVOC, Pesticides, and PCB compounds. Sample weights, volumes, and dilution factors must be taken into account when applying the 5X and 10X criteria. This allows the total amount of contaminant present to be considered.

Deviations:

Compound	Maximum Conc. Detected, (ppb)	Action Level (ppb)	Samples Affected

Actions:

1. If compound results exceed the action levels, the data are not qualified
2. If compound results are below the required reporting level, report results as non-detect (U) at the reporting level
3. If the compound is detected above the reporting level, but below the action level, qualify as not-detected (U)
4. If gross contamination exists in blanks (i.e.,, saturated peaks by GC/ MS), all affected compounds in the associated samles should be qualifed as unusable (R) due to interference.
5. If blanks were not analyzed per matrix per concentration level for each 12 hour period on each GC/MS system used to analyze VOCs and SVOCs use professional judgement to qualifty data. Data may be rejected (R).

Remarks: No laboratory blank detections

VII. Initial & Contining Calibration (VOC, SVOC)

GC/MS instrument performance checks (BFB / DFTPP) Acceptable Y or N
All compounds must have and RRF > 0.01, %RSD < 30, and %D < 25

VOC - Date of initial calibration: 08/03/2012 0642 - 08/03/2012 0953
VOC - Date(s) of continuing calibration: ~~08/03/2012 0856~~ 8/21/2012 0845 ~~1153~~
Was the 12 hour critieria met? (Y) or N

Analysis: 08/21/2012 ~~1153~~ 1314 PSA 1 (10-12)
1520 WWTP2

SVOC- Date of initial calibration: 07/29/2012 1721 - 07/29/2012 1939
SVOC - Date(s) of continuing calibration: 08/23/2012 1348, ~~1448~~ 8/24/2012 1441
Was the 12 hour critieria met? (Y) or N

Analysis: 8/23/2012 2008 PSA 1 (10-12)
8/23/2012 2141 WWTP2

Deviations:

Compound	Date	RRF	%RSD	%D	Samples Affected
* Vinyl Chloride	8/21/12	0.4192		25.9	PSA 1 (10-12), WWTP2

* % Difference = $((RF_{CCV} - RF_{ICAL\ AVG})/RF_{ICAL\ AVG}) \times 100$. In instances where the bias of the CCV impacts validation qualifiers, review the RF values or amount reported to confirm that the % Difference or % Drift are reported with the correct negative or positive value.

Actions:

1. If any compound has an intial or continuing RRF of < 0.01, qualify positive results as estimated (J)
2. If any compound has an intial or continuing RRF of < 0.01, qualify non-detects as unusable (R)
3. If any compound has a %RSD >30 or a %D >25, qualify positive results as estimated (J)
4. If any compound has a %RSD >40 or a %D >40, qualify non-detects as estimated (UJ)
5. If BFB or DFTPP mass assignment / ION abundance criteria are all associated data as unusable (R).
6. If samples were analyzed outside the 12 hour BFB or DFTPP performance check time period, qualify the affected sample data as estimated (J/UJ).
7. If separate calibration for water and soil were not performed, use professional judgement to evaluate the data. Data may be rejected (R).
8. If calibrations were not completed within the 12 hour criterion, qualifty all associated data as estimated (J/UJ). If the 12 hour criterion was grossly exceeded, reject all associated data (R).

Remarks: Vinyl Chloride >25% D but samples non-detect, no qual

N/A

VIII. Initial & Continuing Calibration (Pesticides, PCBs)

Linearity evaluation, are %RSD <20? (Y/N) _____

Is the RPD between calibration factors ≤25? (Y/N) _____

Are multicomponent calibration data provided for each analysis date? (Y/N)_____

Is the difference between columns check ≤ 25%D? (Y/N) _____

Are 4, 4'- DDT and endrin breakdown (PEM) ≤ 20% and combined breakdown ≤ 30% (Y/N)

Deviations:

Compound	%RSD	RPD	Samples Affected

* % Difference = $((RF_{CCV} - RF_{ICAL\ AVG})/RF_{ICAL\ AVG}) \times 100$. In instances where the bias of the CCV impacts validation qualifiers, review the RF values or amount reported to confirm that the % Difference or % Drift are reported with the correct negative or positive value.

Actions:

1. If %RSD criteria are not met, qualify positive results as estimated (J) and non-detects as estimated (UJ)
2. If RPD criteria are not met, qualify positive results as estimated (J) and non-detects as estimated (UJ)
3. If %D criteria is not met, qualify positive results as estimated (J) and non-detects as estimated (UJ)
4. If breadkwon criteria are not met, positive 4, 4'-DDT and endrin should be qualified as estimated (J). And non-detects should be rejected (R).

Remarks: _____

IX. Matrix Spike/Matrix Spike Duplicate Information

General MS/MSD Criteria:

	VOC	SVOC	Pest	PCB
percent recovery (%R)	70-130	45-135	40-140	40-140
relative percent difference (RPD)	<30	<50	<50	<50

Project Sample(s) Spiked: None

Deviations:

Compound	%R	%R Limits	RPD	RPD Limits	Samples Affected

Actions:

1. If the spike recovery is above the upper control limit (UCL), qualify all positive values in the unspiked sample as estimated (J) and non-detects as estimated (UJ).
2. If the spike recovery is below the lower control limit (LCL), qualifty positive values as estimated (J). And non-detects as estimated (UJ).
3. If the spike recovery is <10%, qualify non-detect values as unusable (R)
4. If the RPD does not meet criteria, qualify positive values in the unspiked sample as estimated (J)
5. Use professional judgement to qualify additional samples in the analytical group based on MS/MSD results
6. Use professional judgement for qualification of data for unspiked compounds

Remarks:

X. Laboratory Control Sample Information

General LCS Criteria:
percent recovery (%R)

VOC	SVOC	Pest	PCB
80-120	60-120	50-130	50-130

Laboratory LCS Identifications: LCS 490-13850/3, LCSD 490-13850/4

Deviations:

Compound	Date	%R	Samples Affected/Qualifiers Applied

Actions:

Action should be based on both the number of compounds outside the criterion and the magnitude of the exceedance.

1. If the LCS recovery is below limits but > one- half the lower limit, qualify valves as estimated (J/UJ).
2. If the LCS recovery is < one-half the lower limit, qualify all data for that analyte as unusable (R).
3. If the LCS recovery is greater than the upper limit, qualify positive valves for that analyte as estimated (J).
4. If more than half the compounds in this LCS are not within recovery criteria, then qualify associated detected compounds as estimated (J).
5. Use professional judgement for qualification of data for compounds with no LCS information

Remarks: No LCS/LCSD exceedances