UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION III

STATEMENT OF BASIS

CHEMICAL LEAMAN TANK LINES INCORPORATED
1350 1[ST] AVE SOUTH

INSTITUTE, WEST VIRGINIA

EPA ID NO. WVR000001719

Prepared by
Office of Remediation
Land, Chemicals and Redevelopment Division
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List of Acronyms

AOC	Areas of Concern
AMSL	Above Mean Sea Level
AR	Administrative Record
BGS	Below Ground Surface
BTEX	Benzene, Toluene, Ethylbenzene and Xylenes
CAO	Corrective Action Objective
CBR	Chemical Batch Reactor
CLTL	Chemical Leaman Tank Lines
COC	Contaminants of Concern
DPA	Disposal Pit Area
DBA	Drum Burial Area
EPA	Environmental Protection Agency
FDRTC	Final Decision Response to Comments
GPRA	Government Performance and Results Act
HASP	Health and Safety Plan
HHRA	Human Health Risk Assessment
ICs	Institutional Controls
MMP	Materials Management Plan
MCL	Maximum Contaminant Level
PCBs	Polychlorinated Biphenyls
PSA	Polymer Spill Area
QCI	Quality Carriers, Inc.
QDI	Quality Distribution, Inc.
QSI	Quala Systems, Inc.
RAWP	Remedial Action Work Plan
RCRA	Resource Conservation and Recovery Act
RSL	Regional Screening Level
SAR	Site Assessment Report
SAWP	Site Assessment Work Plan
SB	Statement of Basis
SVOC	Semi-Volatile Organic Compound
TCE	Trichloroethene
TCLP	Toxicity Characteristic Leaching Procedure
TSS	Treated Soil Stockpile
USGS	United States Geological Survey
VISL	Vapor Intrusion Screening Level
VOC	Volatile Organic Compound
VRP	Voluntary Remediation Program
WVDEP	West Virginia Department of Environmental Protection
WWTP	Wastewater Treatment Plant

Section 1: Introduction

The United States Environmental Protection Agency (EPA) has prepared this Statement of Basis (SB) to solicit public comment on its proposed remedy for the Chemical Leaman Tank Lines Incorporated (CLTL) facility located in Institute, West Virginia (hereinafter referred to as the Facility or Site). EPA's proposed remedy for the Facility consists of the following components: 1) natural attenuation with continued monitoring until drinking water standards or background levels are met and 2) compliance with and maintenance of groundwater and land use restrictions to be implemented through institutional controls (ICs). This SB highlights key information relied upon by EPA in proposing its remedy for the Facility.

The Facility is subject to EPA's Corrective Action program under the Solid Waste Disposal Act, as amended, commonly referred to as the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. §§ 6901 et seq. The Corrective Action program requires that owners or operators of facilities subject to certain provisions of RCRA investigate and address releases of hazardous waste and hazardous constituents, usually in the form of soil or groundwater contamination, that have occurred at or emanated from their properties.

EPA is providing a thirty (30) day public comment period for this SB. EPA may modify its proposed remedy based on comments received during this period. EPA will announce its selection of a final remedy for the Facility in a Final Decision and Response to Comments (FDRTC) after the public comment period has ended.

Information on the Corrective Action program as well as a fact sheet for the Facility can be found by navigating to https://www.epa.gov/hwcorrectiveactionsites/hazardous-waste-cleanup-chemical-leaman-tank-lines-incorporated-also-known. The administrative Record (AR) for the Facility contains all documents, including data and quality assurance information, on which EPA's proposed remedy is based. See Section 8, Public Participation, below, for information on how you may review the AR.

Section 2: Facility Background

2.1 Site History

The Facility is located at 38° 23' 40" north latitude and 81° 47' 45" west longitude along Route 25 in Institute, West Virginia, approximately seven miles northwest of the City of Charleston. The Facility is located on an 8-acre portion of the larger 142-acre property. The Facility has an office/maintenance building and gravel parking lots to the east and west, respectively. Approximately 10 acres of the 142-acre property have been developed. The Facility property is fenced along Route 25, while steep hills and woods form boundaries on the unfenced sides approximately one-half mile north of the Kanawha River. A Wastewater Treatment Plant (WWTP) is located at the rear of the Facility property, up the hill from the main building and parking areas. The Facility appears on the Saint Albans, West Virginia, United States Geological Survey (USGS), 7,5-minute topographic triangle Figure 1. A map depicting the Facility boundary is provided as Figure 2**.**

Union Carbide owned the Facility property from 1942 to 1962 and operated a large chemical manufacturing facility across from Route 25. During this time, the Facility property was maintained as an unused, empty lot. Ownership of the Facility property prior to 1942 is unknown. In 1963, ownership was transferred to CLTL when their operations were moved from St. Albans, WV to Institute, WV. At this point, the existing building and WWTP were constructed for use in their tank cleaning operations and bulk chemical transportation business.

CLTL removed and drummed residuals in tanker trucks prior to washing, utilizing a primarily a mixture of sodium hydroxide, sequestering agents, defoamers and water. Steam was also used to clean tanker trucks that hauled bulk quantities of commercial products and industrial wastes. Cleaning operations at the Facility generated waste streams that were treated in the on-site WWTP or drummed for transportation off site for disposal.

Between 1998 and 2013, the operation and ownership of the Facility changed several times. Chemical Leaman Corp., a subsidiary of Quality Distribution, Inc. (QDI), has remained in existence for the purposes of holding environmental liabilities, including for the Facility. On or about February 15, 2013, the tank wash operations ceased.

2.2 Physical Setting

The topography of Kanawha County is typical of the maturely dissected unglaciated Appalachian Plateau, consisting of mazes of steep-sided valleys and narrow winding ridges. Flat areas, underlain by alluvium, exist along the river valleys. The Kanawha River flows generally northwestward across the central part of the county. The entire county is drained by the Kanawha River and its tributaries.

The Facility is within the Kanawha River floodplain at an elevation of approximately 600 feet above mean sea level (amsl). The Facility is in a relatively flat, low-lying area, partly because of on-site filling and grading activities conducted in the past to support industrial operations adjacent to the Kanawha River. Immediately north of the developed area of the Facility, the topography becomes comparably steeper as the topography transitions from the floodplain to the bedrock hills. The developed area is within the 500-year floodplain. The Kanawha River water level is controlled by dams above and below the Facility.

2.2.1. Unconsolidated Alluvium

The Facility 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 to the north. 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 Facility is shown in Figure 9.

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. 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.

2.2.2 Bedrock

The Facility is located in the unglaciated portion of the Appalachian Plateau Physiographic Province. Bedrock underlying the Facility 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 Facility is shown in Figure 10. 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.

2.2.3. Hydrogeology

The uppermost groundwater beneath the Facility 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 Facility property. 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 a few feet thick. Recharge to the shallow groundwater zone is by surface infiltration from precipitation and by discharge of groundwater to the unconsolidated deposits from the underlying bedrock valley wall. By this condition, and consistent with observations of water levels in monitoring wells which are typically somewhat higher than levels where saturation was first observed, the overall vertical hydraulic gradient beneath the developed areas of the Facility is interpreted to be upward.

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 11. 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, groundwater within the alluvial aquifer generally flows toward the Kanawha

River. Results of hydraulic testing conducted indicated an average hydraulic conductivity value of 68.62 gallons per day per square foot (gpd/ft^2) for the unconsolidated alluvial aquifer.

2.3 Areas of Investigation

Drum Burial Area

In 1994, it was discovered that hazardous waste drums were buried on-site. In response, Facility investigation and cleanup were initiated in July 1995 with the West Virginia Department of Environmental Protection (WVDEP) issuing a RCRA Post-Closure permit. Approximately 490 drums were removed from the Drum Burial Area (DBA) as part of remedial efforts. Soil in the DBA was determined to be impacted with Volatile Organic Compounds (VOCs) including Benzene, Toluene, Ethylbenzene and Xylenes (BTEX) and Semi-Volatile Organic Compounds (SVOCs) in an approximately 0.10-acre area of the Facility.

Treated Soil Stockpile

As part of remediation work in 1997, originally contaminated soil that met Land Disposal Restrictions (LDRs) after ex-situ bioremediation was moved to the Treated Soil Stockpile (TSS) constructed at the eastern end of the Facility. The TSS covers about 0.11 acres and contains approximately 2,200 yd^3 of soil. Prior to construction of the stockpile, the area of land was cleared and leveled, a liner was placed, soil was placed on top and graded, seeding was applied, and erosion controls were implemented.

Polymer Spill Area

According to Facility personnel, in 2007, 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 a 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 Polymer Spill Area (PSA). 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.

Wastewater Treatment Plant Area

Sometime in 2010, seepage occurred from the Chemical Batch Reactor (CBR) tank in the Facility's wastewater treatment area (WWTA). 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 of the building. The area of soil affected by the seepage is estimated to be 4 feet by 5 feet. The seepage did not reach the intermittent drainage ditch that carries seasonal surface water flow from the highland area to the north and is located adjacent to the east side of the wastewater treatment area.

Disposal Pit Area – AOC No. 1

Former employees identified the Disposal Pit Area (DPA), an area near the east side of the Facility's WWTP, as one of two locations where drums may have been buried (the other area was the confirmed DBA). The DPA is between the wastewater treatment facility and the intermittent drainage ditch. In response, the WVDEP requested a subsurface investigation of the DPA. An investigation was performed on behalf of CLTL by Vector Enterprises, Inc. in late 1994/early 1995. As part of the investigation, two soil borings were drilled, and three monitoring wells were installed in the area, although currently, only two monitoring wells can be currently located (WWT-1 and WWT-2).

On October 27, 2009, representatives of Tetra Tech EC, Inc. (Tetra Tech) and EPA conducted a RCRA site visit at the Facility. Tetra Tech subsequently issued a Final RCRA Site Visit Report dated March 31, 2010. That report identified an area near the wastewater treatment facility as Area of Concern (AOC) No. 1 which was later identified as the DPA. According to the Tetra Tech report, analyses of soil samples indicated no exceedance of Toxicity Characteristic Leaching Procedure (TCLP) priority pollutants; however, the WVDEP indicated that additional characterization of this area was warranted.

Sludge Release Area

On February 7, 2013, workers at the Facility discovered that approximately 200 gallons of non-hazardous sludge had been released from a plastic storage tank in the WWTP area. The release was reported to WVDEP. The sludge was covered with a tarp in the event of precipitation that evening. A contractor removed the sludge and several inches of underlying soil on February 8, 2012.

To evaluate soil conditions beneath the area of the sludge release and subsequent cleanup, soil samples were collected at two locations within the area of the spill, designated as SRA-SS-01 and SRA-SS-02. Samples were collected from the upper 1 foot of soil using manual sampling methods and were analyzed for VOCs and SVOCs, as described in the Site Assessment Work Plan.

Section 3: Summary of Environmental Investigations

3.1 Environmental Investigations

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 were performed in 1995, in accordance with an agreement with WVDEP. Subsequent ex-situ treatment of excavated soil was performed under the terms of a Consent Agreement with WVDEP. As part of the remediation work, the TSS was constructed near the eastern end of the developed portion of the Facility and is still present. 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 was conducted in December 2005, and a final report was approved by WVDEP in February 2006.

On March 30, 2007, and in a joint letter from EPA and WVDEP, CLTL was notified that the Facility was being listed on EPA's Corrective Action 2020 Baseline Universe. This listing was further discussed during a meeting on October 27, 2009 between representatives of EPA, WVDEP, and CLTL. During this meeting, the mechanisms to address Corrective Action at the Facility were explained by EPA. The two most viable mechanisms discussed were addressing Corrective Action through the Facility's RCRA Post-Closure Permit or participation in West Virginia's Voluntary Remediation Program (VRP). CLTL elected to address its Corrective Action obligation thru its participation in the VRP.

On September 9, 2011, CLTL's Voluntary Remediation Program (VRP) Application was accepted and executed on February 29, 2012. Site characterization activities under the VRP pursuant to an approved Site Assessment Work Plan (SAWP), were performed during the period from August through December 2012. WVDEP provided CLTL with comments to the Site Assessment Report (SAR) dated January 30, 2013, summarizing results of work completed under the SAWP. Supplemental soil and groundwater sampling under a SAWP addendum were performed from May to July 2013. Soil samples were collected from 26 locations in six areas of the Site where releases to soil are known or suspected to have occurred, described in Section 2.3 above. A total of 67 soil samples were collected and analyzed for selected metals, VOCs, and SVOCs. Selected soil samples were also analyzed for pesticide/herbicide compounds, polychlorinated biphenyls (PCBs), and dioxin/furan compounds. During both investigations, groundwater samples were collected from ten monitoring wells and three temporary sampling points. Groundwater samples were analyzed for selected metals, VOCs, SVOCs, pesticide/herbicide compounds, and PCBs. Based on investigation conducted to date, a total of 12 constituents of concern (COCs) have been identified in soils and 22 COCs have been identified in groundwater (shown in Table 1).

3.1.1. Soil Sampling

During the Site Assessment, conducted from August through December 2012, soil samples were collected at seven locations at the DBA, nine locations in the TSS, two locations approximate location of the PSA, two locations in the vicinity of the Wastewater Treatment Tank, and two locations within the WWTP area believed to correspond to the reported DPA, just north-northeast of the wastewater treatment area. All soil samples from the DBA were analyzed for RCRA metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver), vanadium, VOCs, and SVOCs (including polynuclear aromatic hydrocarbons [PAHs] compounds). Based on the results of the field PID screening, five soil samples from the DBA were selected for additional analyses, including pesticides, herbicides, PCBs, dioxins, and furans. Additionally, based on the results of the initial sampling analyses, one soil sample near the Wastewater Tank seepage area and two samples from the WWTP area were also analyzed for pesticides/herbicides, PCBs, and dioxins/furans.

A total of 59 soil samples (including duplicate samples) were collected during the 2012 Site Assessment from various depths at 22 locations and five areas where contaminants are known or suspected to have been released to soil. Soil concentrations were screened against EPA Region III Screening Levels (RSL). Naphthalene concentrations exceed the residential soil RSL at four locations ranging from 4,300 µg/L to 54,000 µg/L, two of which exceed the industrial RSL of 17,000 µg/L. Exceedances were found at sample location WWT-2 in the WWTA and three TSS locations ranging about 3 to 8 feet bgs. Subsurface soil at WWT-2 also exceeded the residential RSL for trichloroethene (TCE), vinyl chloride and bis(2-ethylhexyl) phthalate, and the industrial RSL for naphthalene. Vinyl chloride concentrations at DBA soil sample point DBA-1 exceed the residential RSL at 10 – 11 feet bgs. All other soil sample results were below residential RSLs for VOCs, SVOCs, and PCB Aroclor 1260. Metal concentrations suggests that Facility soils are consistent with local background levels.

3.1.2. Groundwater Investigation

From June 2000 through May 2003, routine semiannual sampling of groundwater monitoring wells was conducted, with analyses for VOCs, SVOCs, nitrate-nitrogen, sulfate, and total dissolved lead. Groundwater conditions associated with the 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 were installed during August 1999, while wells MW-107 through MW-110 were installed during July 2000. Monitoring wells MW-101 and MW-110 are hydraulically upgradient from areas of the Facility where remediation activities have taken place, and therefore, represent background water quality standards.

During the 2012 Site Assessment, groundwater samples were collected from nine MW series groundwater monitoring wells and three temporary (TMP series) groundwater sampling points. Two monitoring wells are located hydraulically upgradient from areas of current or previous waste handling, and four monitoring wells and three temporary points are located along a line just north of and roughly parallel to the downgradient boundary of the Facility. Three monitoring wells and one temporary point are located within or adjacent to known or suspected release areas. 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. Based on comments received from WVDEP regarding the 2017 Remedial Action Work Plan (RAWP), an additional groundwater monitoring event was conducted in March 2018. Groundwater concentrations are screened against maximum contaminant levels (MCLs) promulgated pursuant to the Safe Drinking Water Act, 42 U.S.C. §§ 300f et seq., and codified at 40 CFR Part 141, or for constituents for which no MCL is available, EPA Regional Screening Levels (RSLs).

Pesticide/herbicide results were below detection or below Tapwater RSL values except for PCB Aroclor 1260 in the sample from MW-102 (0.16 μg/L), which exceeds the RSL value of 0.0078 μg/L. Arsenic was reported above the MCL (10 micrograms per liter [μg/L]) only in samples from the MW-104 and MW-105 monitoring wells, ranging from 25 μg/L to 60 μg/L.

Iron was detected above the Tapwater RSL (14,000 μg/L) only in samples from MW-105 (75,000 μg/L and 95,000 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.

Manganese was reported at concentrations above its Tapwater RSL in one or both groundwater samples from the following locations: MW-I04, MW-105, MW-106, MW-107, MW-108R, TMP-2, and TMP-5. Manganese concentrations above the Tapwater RSL range from 1,800 μg/L to 5,100 μ/L.

Eight VOCs were reported at concentrations above their respective MCL or Tapwater RSL. All except two 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. One VOC, 1,2- dichloropropane (1,2-DCP), was detected at a concentration of 12 μg/L in monitoring well MW-102, slightly above its MCL of 5 μg/L. Another VOC, vinyl chloride (VC), was detected at a concentration of 3 μg/L in monitoring well MW-109, slightly above its MCL of 2 μg/L. No other detections of VOCs exceeding RSL values were reported for sampling locations along the downgradient boundary. 1,4-dioxane, ranging from 0.92 to 190 μg/L, was reported in all samples from monitoring wells MW-104, MW-105, and MW-106, which are all adjacent to or immediately downgradient from the DBA.

A total of 31 SVOCs were reported in one or more groundwater samples. Of these, the VOCs above their respective MCL or Tapwater RSL were: 1,1,2-trichloroethane (24 to 25 μg/L); 1,2-dichloropropane (5.6 to 7.9 μg/L); 1,4- dioxane (280 to 390 μg/L); benzene (5.2 to 120 μg/L); chlorobenzene (1,500 to 4,100 μg/L); cis-1,2-dichloroethene (71 to 120 μg/L); trichloroethene (49 to 170 μg/L); and, vinyl chloride (5.2 to 5.6 μg/L).

3.1.3 Human Health and Ecological Risk Assessment and Evaluation of Exposure Pathways

The Human Health and Ecological Risk Assessment (HHRA) dated September 30, 2015 estimates the risk of harm to human health posed by chemicals that are present at or may be migrating from the Facility based on information presented in the SAR. The HHRA determined that Facility-related chemicals in soils and groundwater do not pose a threat to human health for exposures via direct contact. Groundwater at and in the vicinity of the Facility is not used for any purpose, which eliminates the potential exposure pathway for workers and residents. Utility workers are unlikely to be exposed to Facility-related chemicals in groundwater via direct contact, incidental ingestion or inhalation of vapors as the water table is more than 10 feet below ground surface. Furthermore, proactive measures such as a Health and Safety Plan (HASP) and site health and safety practices are followed by workers and construction workers at the Facility. These controls greatly reduce the possibility of direct dermal or inhalation exposure to impacted groundwater.

The presence of VOCs in groundwater was evaluated in the SAR and shown not to pose a concern for exposure via vapor intrusion based on modeling results obtained using EPA's Vapor Intrusion Screening Level (VISL) calculator. The VISL calculator, however, has been modified since the SAR was prepared. Vapor intrusion risk was re-evaluated as part of the HHRA and it was determined that the presence of VOCs in groundwater presents an unacceptable risk in any buildings, current or future, overlying areas where elevated VOC concentrations are present in groundwater. VOCs in soil were determined to require further evaluation for exposure via vapor intrusion into hypothetical future buildings.

Cancer risks and non-cancer hazard quotients were calculated for the vapor intrusion pathway for soils using the Johnson and Ettinger (J&E) model. Potential for unacceptable cancer risks greater than 1.0E-4 and hazard quotients greater than 1.0 were calculated for hypothetical buildings in the TSS, a location in the WTA-2, and the DBA of the Facility. The contaminants that contributed the most risk for each area were: naphthalene in the TSS area; TCE, vinyl chloride, naphthalene, cis-1,2-DCE, and 1,2-DCP in the WTA-2 area; and TCE, vinyl chloride, cis-1,2-DCE, and chlorobenzene in the DBA.

Currently, there are no buildings in the TSS or WTA-2 areas and based on the land conditions in the areas, no buildings are likely to be constructed in the future. The TSS is a broad stockpile of excavated soil some 6 to 10 feet high where construction of a building would not be practical. The WTA-2 location is in a narrow, steep-sided ravine where construction of a building would not reasonably be expected to occur. The DBA is relatively flat and could be the site of future building construction. Several options exist to address vapor intrusion risk, should construction of a building be considered for the DBA area in the future. The main Facility building is located hydraulically upgradient of where VOCs were detected. As such, the potential for volatilization and intrusion of VOCs into existing buildings is negligible.

The Facility is an active industrial property, and land use is not expected to change in the foreseeable future. Much of the developed area of the Facility where COCs are present in soil does not constitute a viable ecological habitat. In the eastern area of the Facility where potentially viable habitat exists, impacted soil has been consolidated and covered with a vegetated soil cover, as approved by WVDEP. Therefore, the potential for ecological receptors to contact COCs in soil at the Facility is negligible. Consistent with the VRP Guidance Manual, and ecological checklist was completed demonstrating lack of ecological concern. Also, evaluation of fate and transport presented in the SAR determined that Facility-related chemicals in groundwater would not have an impact on water quality in nearby surface waters.

3.1.4 Summary of Remedial Activities Completed

Drum Burial Area Excavation

As part of remedial efforts in 1995, contaminated soil was excavated along with buried drums. A total of 2,000 yd^3 of contaminated soil, 500 yd^3 of other hazardous waste materials, and 19,000 gallons of contaminated wastewater were generated. The excavation work utilized a systematic grid approach for removal of drums and associated soil. Depth of the excavation ranged from 5 feet to 18 feet below ground surface. The excavated area was backfilled with compacted crushed stone.

Ex-Situ Bio-Remediation of Excavated Soil

An estimated 2,400 yd^3 of impacted soil was placed in an approximately 0.56-acre area with eight bio-cells (Figure 2). The bio-cells were constructed by excavating to a depth of approximately 2 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 6 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 original eight 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 LDRs under the RCRA regulations was sent for off-site treatment. Closure of the bio-cells included backfilling of the areas with clean soil from the Site and regrading.

Interim In-Situ 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.

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 West Virginia Groundwater Protection

Standards (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 approved by WVDEP February 2006.

3.2 Natural Attenuation

Natural attenuation entails a variety of physical, chemical and/or biological processes that reduce the mass, toxicity, mobility, volume or concentration of COCs. These processes are classified as degradation (biological or chemical), sorption (chemical) and dispersion, diffusion, dilution, and volatilization (physical). Facility conditions were evaluated in a manner consistent with the Technical Protocol for Monitored Natural Attenuation of Chlorinated Solvents in Groundwater by Todd Weidemeier (September 1998) for the purpose of understanding the fate and transport of DBA source contaminants.

The primary COCs in groundwater are VOCs and SVOCs related to the DBA. Monitoring at the Facility has shown that the contaminants are effectively being addressed by natural attenuation. Specifically, the extent of contamination in groundwater is not increasing and concentrations of contaminants are declining over time. EPA's Groundwater Statistics Tool was used to evaluate groundwater data trends for a given constituent at a single monitoring well. Results are shown on Figures 13 through Figures 17.

3.3 Environmental Indicators

Under the Government Performance and Results Act (GPRA), EPA has set national goals to address RCRA corrective action facilities. Under GPRA, EPA evaluates two key environmental clean-up indicators for each facility: (1) Current Human Exposures Under Control, and (2) Migration of Contaminated Groundwater Under Control. The Facility met both indicators on October 7, 2013 and July 16, 2014, respectively.

Section 4: Corrective Action Objectives

For the AOCs evaluated, the results of the site-specific HHRA show that COCs in groundwater and soil do not pose an unacceptable risk to human health or the environment under current and presumed future industrial land-use scenarios. There are specific risks of exposure to surface soils at the TSS and WWTA. Potential human health carcinogenic risks are within the EPA target risk range of $1x10^{-4}$ to $1x10^{-6}$, if the future land use remains industrial. Potential risks associated with exposure to vapor intrusion from groundwater exist on the Facility property, and corrective action alternatives to address that risk are evaluated in this SB. EPA has identified the following Corrective Action Objectives (CAO) for soils and groundwater at the Facility:

1. Soils

EPA's CAO for soil is to prevent human exposure to contaminant concentrations above the EPA acceptable risk range of $1x10^{-4}$ to $1x10^{-6}$ and a non-cancer hazardous index (HI) of 1 for an industrial exposure scenario, which includes soils in WWTA and TSS where concentrations of COCs exceed the HI of 1.

2. Groundwater

EPA expects final remedies to return usable groundwater to its maximum beneficial use within a reasonable timeframe given the circumstances of the project. EPA's Corrective Action Objectives for Facility groundwater are 1) to restore the groundwater to drinking water standards, otherwise known as MCLs, or for each contaminant that does not have an MCL, to the relevant RSL for tapwater, and 2) until these drinking water standards are met, to control exposure to the hazardous constituents remaining in the groundwater.

3. Vapor Intrusion

The CAO for potential vapor intrusion risk for occupied buildings is to control human exposure and attain EPA's acceptable cancer risk range of $l0^{-4}$ to $l0^{-6}$ and the non-cancer risk hazard quotient of 1 or less within 100 feet of WTA-2, TSS, DBA areas, and monitoring well MW-6.

Section 5: Proposed Remedy

1. Introduction

Under this proposed remedy, some contaminants remain in the soil and groundwater at the Facility above levels appropriate for residential uses. Because some contaminants remain in the soil and groundwater at the Facility at levels which exceed residential use, EPA's proposed decision requires compliance with and maintenance of soil and groundwater use restrictions. EPA proposes to implement the land and groundwater restrictions necessary to prevent human exposure to contaminants at the Facility through an enforceable mechanism such as a permit, order, or environmental covenant. The elements of the proposed remedy are described below.

2. Soils

Surface soil contamination in the DBA, WWTA and TSS exceed the HI of 1. These soils are currently covered with a vegetated soil cover preventing exposure. EPA's proposed remedy for the Facility consists of compliance with and maintenance of land use restrictions to prevent human exposure to those contaminants remaining in the soil. Under EPA's proposed remedy, the following use restrictions will be implemented for soils:

1. The Facility shall be not be used for any residential purpose unless it is demonstrated to EPA that such use will not pose a thread to human health or the environment or adversely affect or interfere with the selected remedy, and EPA and/or WVDEP provides written approval for such use.

2. Prior to any earthmoving activities, including excavation, drilling, and construction activities at the WWTA, TSS, and areas at the Facility where any contaminants remain in soils above EPA's Screening levels for non-residential use or groundwater above MCLs or Tapwater RSLs, a Materials Management Plan (MMP) addressing those activities shall be developed and submitted to EPA for review and approval.

3. Groundwater

Monitoring at the Facility has shown that contamination in groundwater is not increasing and concentrations of those contaminants are declining or stable over time. Therefore, the proposed remedy for groundwater consists of natural attenuation with continued monitoring until CAOs are met, compliance with and maintenance of an EPA-approved groundwater monitoring plan, and groundwater use restrictions to be implemented at the Facility to prevent exposure to contaminants until CAO standards are met. The proposed remedy also includes implementation of a vapor intrusion control system, the design of which shall be submitted to EPA for review and approval. A vapor intrusion control system shall be installed in new structures constructed within 100 feet of the perimeter of the WTA-2, TSS, DBA areas, and monitoring well MW-6. The vapor intrusion system shall be operated until it is demonstrated to EPA and EPA provides written approval that vapor intrusion of contaminants at the Facility does not pose a threat to human health.

EPA’s proposed remedy includes the following groundwater use restrictions:

1. Groundwater at the Facility shall not be used for any purpose other than the operation, maintenance, and monitoring activities required by EPA, unless it is demonstrated to EPA that such use will not pose a threat to human health or the environment or adversely affect or interfere with the final remedy and the Facility obtains prior written approval from EPA for such use;

2. No new wells shall be installed on Facility property unless it is demonstrated to EPA that such wells are necessary to implement the final remedy and the Facility obtains prior written approval from EPA to install such wells;

3. Compliance with an EPA-approved groundwater monitoring program; and

4. An evaluation of the vapor-intrusion pathway and installation of a vapor barrier, as necessary, must precede any future construction of occupied buildings in the area above or within 100 feet of VOC-contaminated groundwater.

In addition, the Facility shall provide EPA with a coordinate survey as well as a metes and bounds survey of the Facility boundary. Mapping the extent of the land use restrictions will allow for presentation in a publicly accessible mapping program such as Google Earth or Google Maps.

Section 6: Evaluation of Proposed Remedy

This section provides a description of the criteria EPA used to evaluate the proposed remedy consistent with EPA guidance. The criteria are applied in two phases. In the first phase, EPA evaluates three decision threshold criteria as general goals. In the second phase, for those remedies which meet the threshold criteria, EPA then evaluates seven balancing criteria.

Threshold Criteria	Evaluation
1) Protect human health and the environment	EPA's proposed remedy for the Facility protects human health and the environment by eliminating, reducing, or controlling potential unacceptable risk through the implementation and maintenance of use restrictions. EPA is proposing to restrict land use to commercial or industrial purposes at the Facility. With respect to groundwater, while contaminants remain in the groundwater beneath the Facility at concentrations above their MCLs or RSLs, as applicable, the contaminant concentrations are decreasing through natural attenuation as shown by groundwater monitoring data and EPA's groundwater statistical analysis tool. In addition, under EPA's proposed remedy groundwater monitoring will continue until CAO groundwater clean-up standards are met. Currently, groundwater at and in the immediate vicinity of the Facility is not used for any potable purpose. Potential for exposure to contaminated groundwater by excavation/construction workers is negligible based on depth to groundwater beneath the Facility ranging from 15 to 25 feet bgs. With respect to future uses, the proposed remedy requires groundwater use restrictions to minimize the potential for human exposure to contamination and protect the integrity of the remedy. The Risk Assessment concluded that the existing main Facility building is not likely to be impacted by vapor intrusion. No subsurface sources of VOCs in the immediate vicinity of the building have been identified. The main building is located

	hydraulically upgradient and side gradient of the former DBA, a known VOC source area. If new buildings are constructed, the Facility shall include a vapor mitigation barrier in those buildings. The Risk Assessment for the Facility concluded that there would be no risk associated with the soil as long as the Facility complies with an EPA-approved Soil Management Plan and property uses remains industrial.
2) Achieve media cleanup objectives	EPA's proposed remedy meets the media cleanup objectives based on assumptions regarding current and reasonably anticipated land and water resource use(s). The remedy proposed in this SB is based on the current and future anticipated land use at the Facility as commercial or industrial. The Risk Assessment for the Facility concluded that there would be no risk associated with the soil as long as the Facility complies with an EPA-approved Soil Management Plan and use remains industrial. The groundwater plume appears to be stable (not migrating); although contaminants are above MCLs, they are declining over time. In addition, groundwater monitoring will continue until CAO groundwater clean-up standards are met. EPA's proposed remedy requires the implementation and maintenance of use restrictions to ensure that groundwater beneath Facility property is not used for any purpose except to conduct the operation, maintenance, and monitoring activities required by EPA.
3) Remediating the Source of Releases	In all proposed remedies, EPA seeks to eliminate or reduce further releases of hazardous wastes and hazardous constituents that may pose a threat to human health and the environment, and the Facility meets this objective. The sources of contaminants have been removed from the soil at the Facility, thereby eliminating, to the extent practicable, further releases of hazardous constituents from on-site soils as well as the source of the groundwater contamination. The Risk Assessment for the Facility concluded that there would be no risk associated with the soil as long as the Facility complies with an EPA-approved Soil Management Plan and property use remains industrial.

	Contaminant concentrations in groundwater are declining through attenuation. There are no remaining large, discrete sources of waste from which constituents would be released to the environment. Groundwater is not used for potable purposes at the Facility or in the vicinity of the facility. In addition, groundwater monitoring will continue until CAO groundwater clean-up standards are met through attenuation. The proposed remedy restricts the installation of new groundwater wells to minimize the potential for human exposure to contamination and protect the integrity of the remedy. Additionally, the Facility and surrounding area are already being provided with potable water from the local public water supply system. Therefore, EPA has determined that this criterion has been met. The Risk Assessment determined that there was no unacceptable risk to human health associated with indoor air exposure to VOCs in existing buildings provided the Facility land use remained industrial or commercial. If new buildings are constructed, the Facility shall include a vapor mitigation barrier in those buildings.

Section 6: Evaluation of Proposed Remedy (continued)

Balancing Criteria	Evaluation
4) Long-term effectiveness	Groundwater is not used on the Facility for drinking water, and no downgradient users of off-site groundwater exist. Therefore, the proposed long-term effectiveness of the proposed remedy for the Facility will be maintained by the continuation of the groundwater monitoring program and implementation of use restrictions.
5) Reduction of toxicity, mobility, or volume of the Hazardous Constituents	The reduction of toxicity, mobility, and volume of hazardous constituents will continue by attenuation at the Facility. Reduction has already been achieved, as demonstrated by the data from the groundwater monitoring. In addition, the groundwater monitoring program will be developed as required by the proposed remedy.
6) Short-term effectiveness	EPA's proposed remedy does not involve any activities, such as construction or excavation that would pose short-term risks to workers, residents, and the environment. EPA anticipates that the land and groundwater use restrictions will be fully implemented shortly after the issuance of the Final Decision and Response to Comments. A groundwater monitoring program will be developed as required by the proposed remedy.
7) Implementability	EPA's proposed remedy is readily implementable. A groundwater monitoring network is already in place, and a monitoring plan will be developed. EPA proposes to implement the use restrictions through an enforceable mechanism such as an Environmental Covenant, permit, or order.
8) Cost	EPA's proposed remedy is cost-effective. The costs associated with this proposed remedy and the continuation of groundwater monitoring have already been incurred (estimated cost of $250,000 per year). Costs to implement an institutional control mechanism such as preparing and recording an Environmental Covenant with activity and use restrictions on Facility property is estimated to be $15,000.
9) Community Acceptance	EPA will evaluate community acceptance of the proposed remedy during the public comment period, and it will be described in the Final Decision and Response to Comments.
10) State/Support Agency Acceptance	WVDEP has reviewed and concurred with the proposed remedy for the Facility.

Overall, based on the information currently available, the proposed remedy meets the threshold criteria and provides the best balance of tradeoffs with respect to the evaluation criteria.

Section 7: Financial Assurance

EPA has evaluated whether financial assurance for corrective action is necessary to implement EPA's proposed remedy at the Facility. Given that EPA's proposed remedy does not require any further engineering actions to remediate soil, groundwater, or indoor air contamination at this time, and given that the costs of implementing institutional controls and groundwater monitoring costs (estimated cost of $20,000 per year) at the Facility will be minimal, EPA is proposing that no financial assurance be required.

Section 8: Public Participation

Interested persons are invited to comment on EPA's proposed remedy. The public comment period will last thirty (30) calendar days from the date that notice is published in a local newspaper. Comments may be submitted by mail, fax, or electronic mail to Mr. John Hopkins at the contact information listed below.

A public meeting will be held upon request. Requests for a public meeting should be submitted to Mr. John Hopkins in writing at the contact information listed below. A meeting will not be scheduled unless one is requested.

The Administrative Record contains all the information considered by EPA for the proposed remedy at this Facility. The Administrative Record is available at the following location:

U.S. EPA Region III
1650 Arch Street
Philadelphia, PA 19103
Contact: Mr. John Hopkins (3LD10)
Phone: (215) 814-3437
Fax: (215) 814 - 3113
Email: hopkins.john@epa.gov

Attachments:

Figure 1: Site Location Map
Figure 2: Site Survey
Figure 3: Site Features
Figure 4: VOC COC Concentration Map in Soil (2012)
Figure 5: SVOC COC Concentration Map in Soil (2012)
Figure 6: VOC COC Concentration Map in Groundwater (2018)
Figure 7: SVOC COC Concentration Map in Groundwater (2018)
Figure 8: Metal COC Concentration Map in Groundwater (2018)
Figure 9: PCB COC Concentration Map in Groundwater (2018)
Figure 10: Generalized Geologic Cross Section
Figure 11: Rose Bedrock Diagram
Figure 12: Groundwater Elevation Contour Map
Figure 13: Statistical Analysis of 1,1,2-Trichloroethane at MW-106
Figure 14: Statistical Analysis of Trichloroethene at MW-106
Figure 15: Statistical Analysis of Vinyl Chloride at MW-106
Figure 16: Statistical Analysis of Benzene at MW-106
Figure 17: Statistical Analysis of Chlorobenzene at MW-106
Table 1: Groundwater and Soil COCs

Date: ____________________ ________________________________

John A. Armstead, Director
Land, Chemicals, and Redevelopment Division
US EPA, Region III

Section 9: Index to Administrative Record

Bio Cell 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 dated April 18, 1997

Closure Report for Bio Cells, Chemical Leaman Truck Lines Terminal, Institute, West Virginia dated November 21, 1997

RCRA Post-Closure Permit, West Virginia Department of Environmental Protection and Chemical Leaman Tank Lines Terminal, Institute, West Virginia dated June 1999

Voluntary Remediation Program Application, Quality Distribution, Inc., Institute, West Virginia dated August 18, 2011

Voluntary Remediation Program Acceptance letter, West Virginia Department of Environmental Protection, Institute, West Virginia dated

Sampling and Analysis Work Plan, Quality Distribution, Inc., Institute, West Virginia dated July 6, 2012

Site Assessment Report, Quality Distribution, Inc., Institute, West Virginia dated December 27, 2012

Revised Site Assessment Report - Addendum, Quality Distribution, Inc, Institute, West Virginia dated July 9, 2014

Revised Site Assessment Report – Addendum approval letter, West Virginia Department of Environmental Protection, Institute, West Virginia dated July 21, 2014

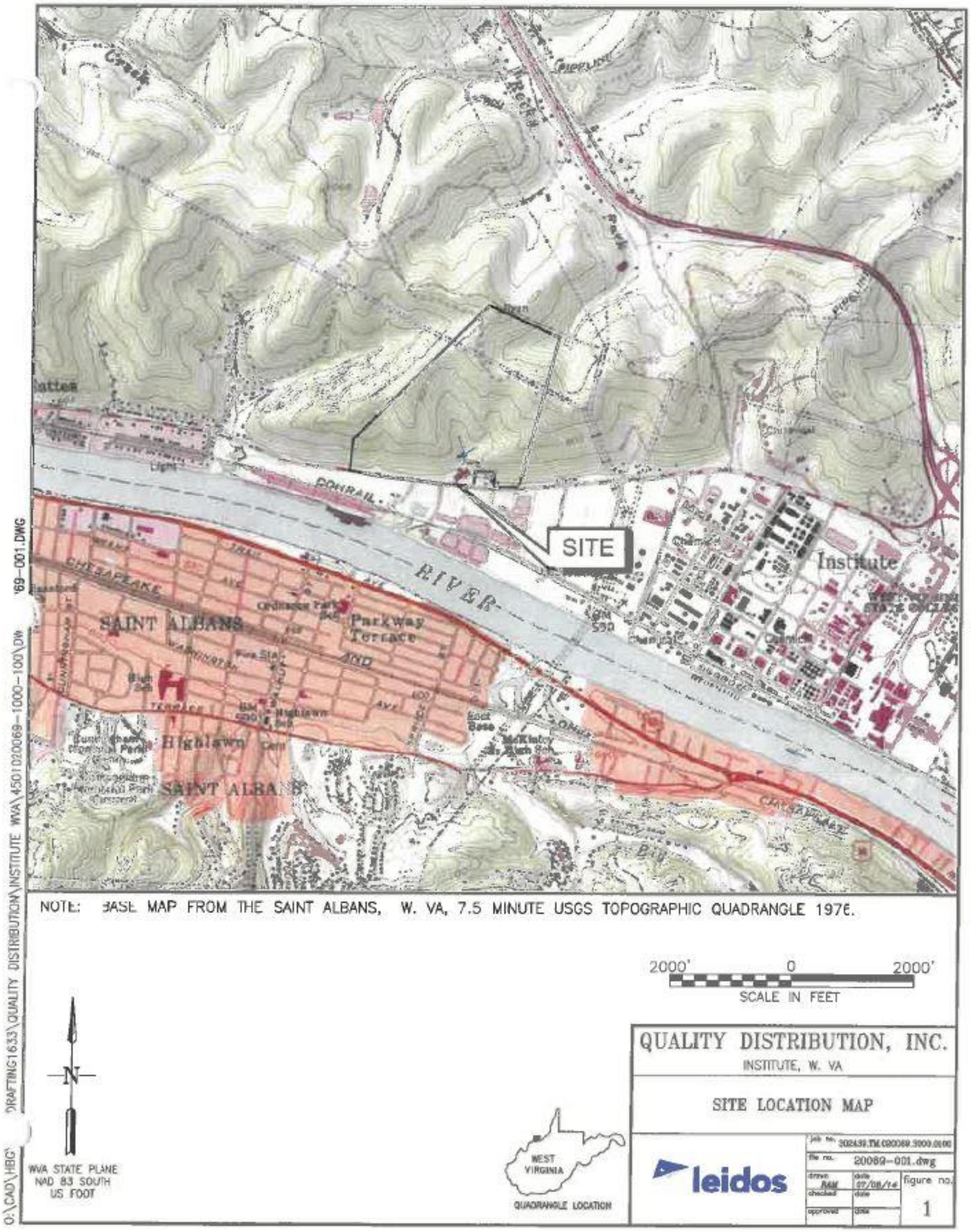
Human Health and Ecological Risk Assessment, Quality Distribution, Inc., Institute, West Virginia dated September 30, 2015

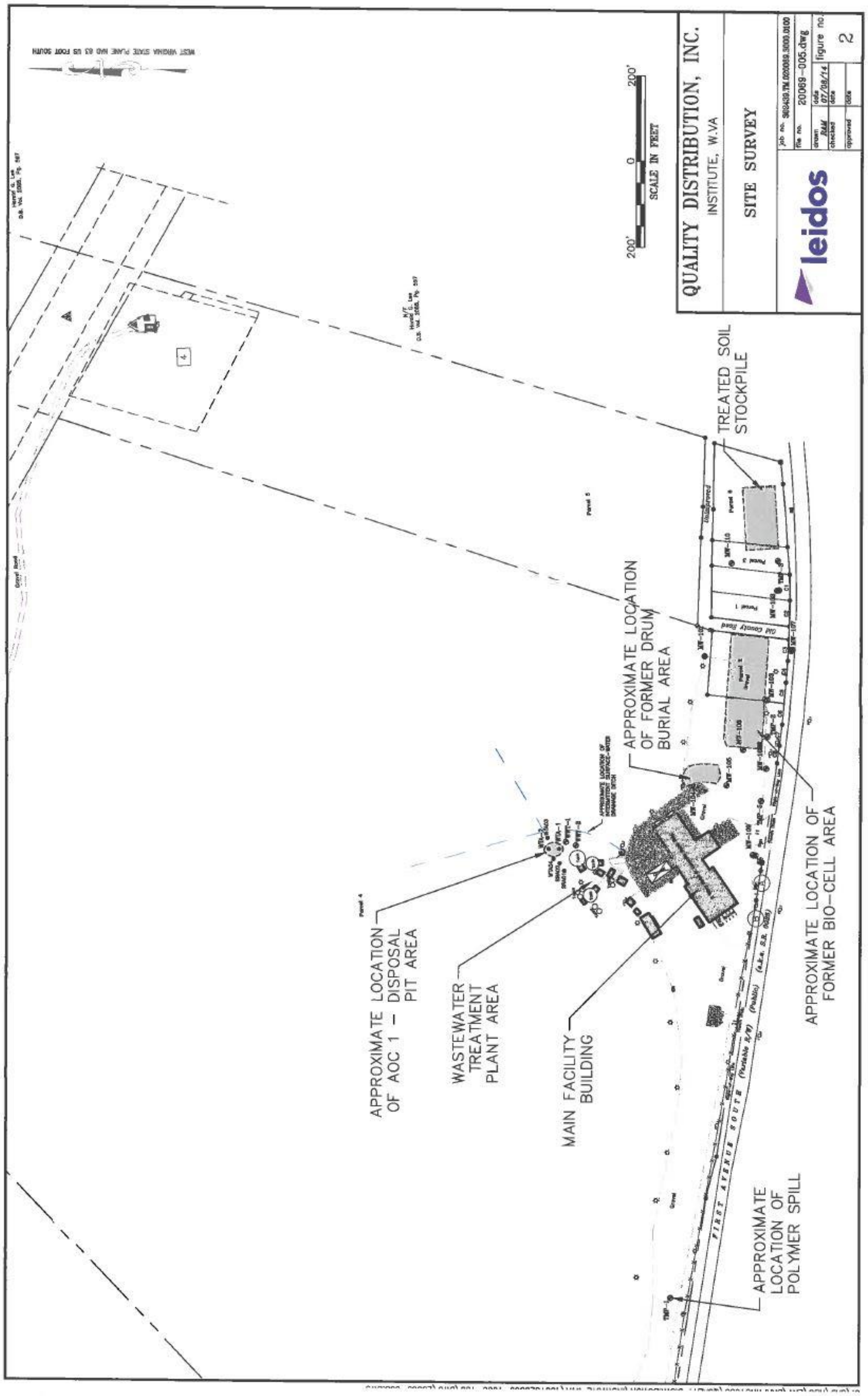
Human Health and Ecological Risk Assessment approval letter, West Virginia Department of Environmental Protection, Institute, West Virginia dated February 26, 2016

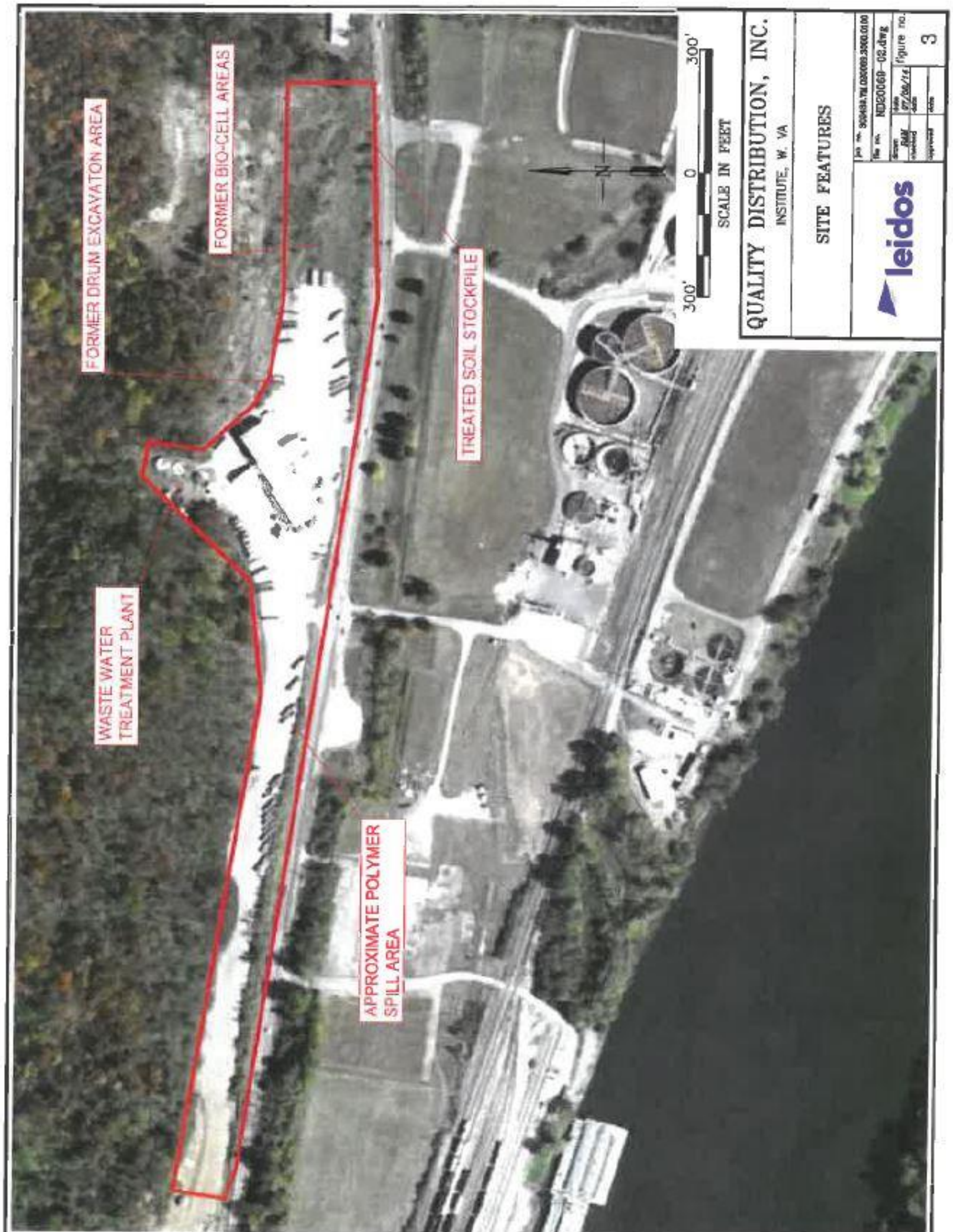
Revised Remedial Action Work Plan, Quality Distribution, Inc., Institute, West Virginia dated January 2019

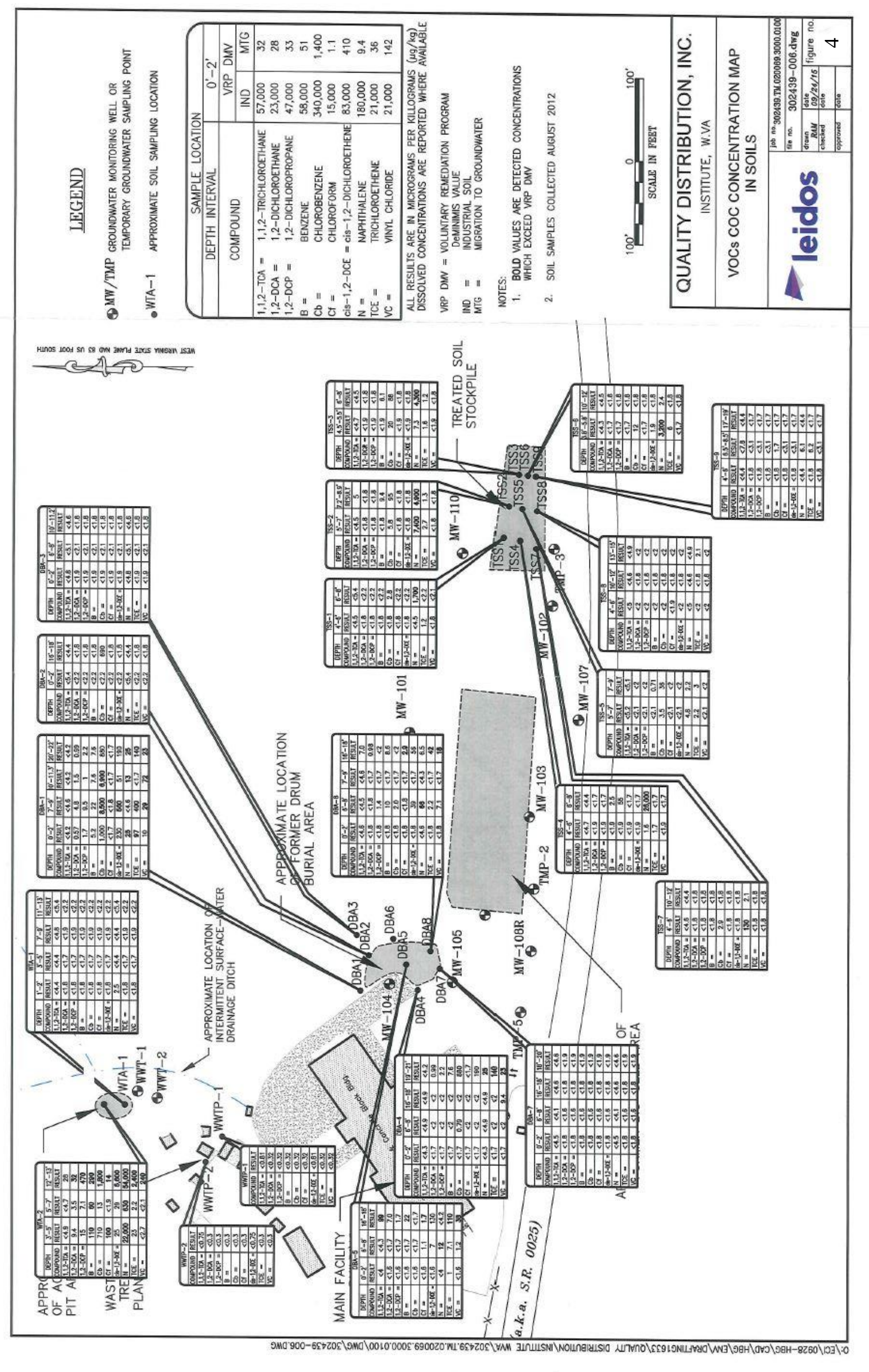
Revised Remedial Action Work Plan approval letter, West Virginia Department of Environmental Protection, Institute, West Virginia dated February 26, 2019

Attachments

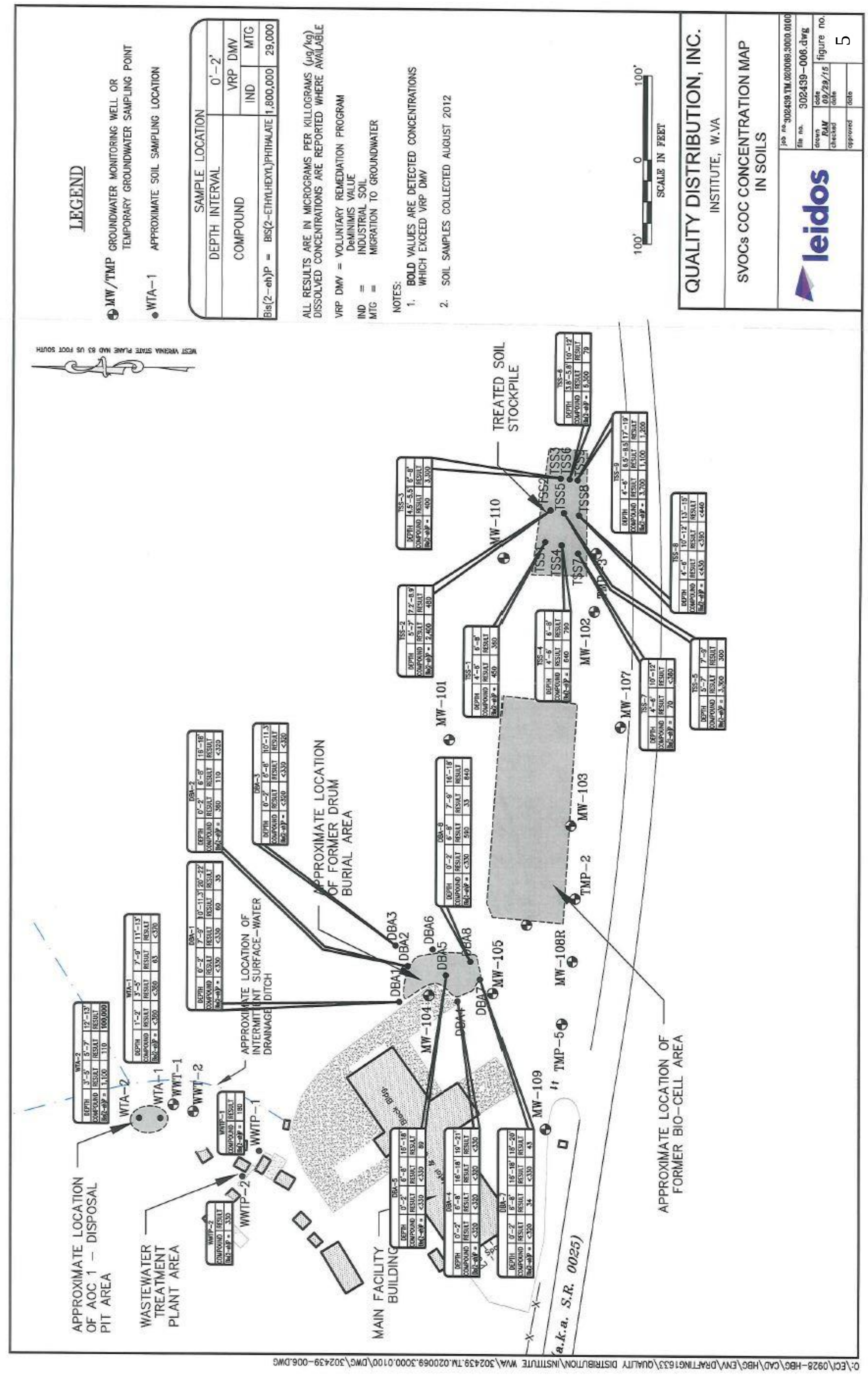

SITE
Institute
SAINT ALBANS
Parkway Terrace
Highlawn
RIVER
CONRAIL
NOTE: BASE MAP FROM THE SAINT ALBANS, W. VA, 7.5 MINUTE USGS TOPOGRAPHIC QUADRANGLE 1976.
2000' 0 2000'
SCALE IN FEET
N
WVA STATE PLANE
NAD 83 SOUTH
US FOOT
WEST VIRGINIA
QUADRANGLE LOCATION
QUALITY DISTRIBUTION, INC.
INSTITUTE, W. VA
SITE LOCATION MAP
leidos
20089-001.dwg
figure no.
1


QUALITY DISTRIBUTION, INC.
INSTITUTE, W.VA
SITE SURVEY
leidos
20069-005.dwg
figure no. 2
SCALE IN FEET
200'
0
200'
TREATED SOIL STOCKPILE
APPROXIMATE LOCATION OF FORMER DRUM BURIAL AREA
APPROXIMATE LOCATION OF AOC 1 - DISPOSAL PIT AREA
WASTEWATER TREATMENT PLANT AREA
MAIN FACILITY BUILDING
APPROXIMATE LOCATION OF FORMER BIO-CELL AREA
APPROXIMATE LOCATION OF POLYMER SPILL
FIRST AVENUE SOUTH

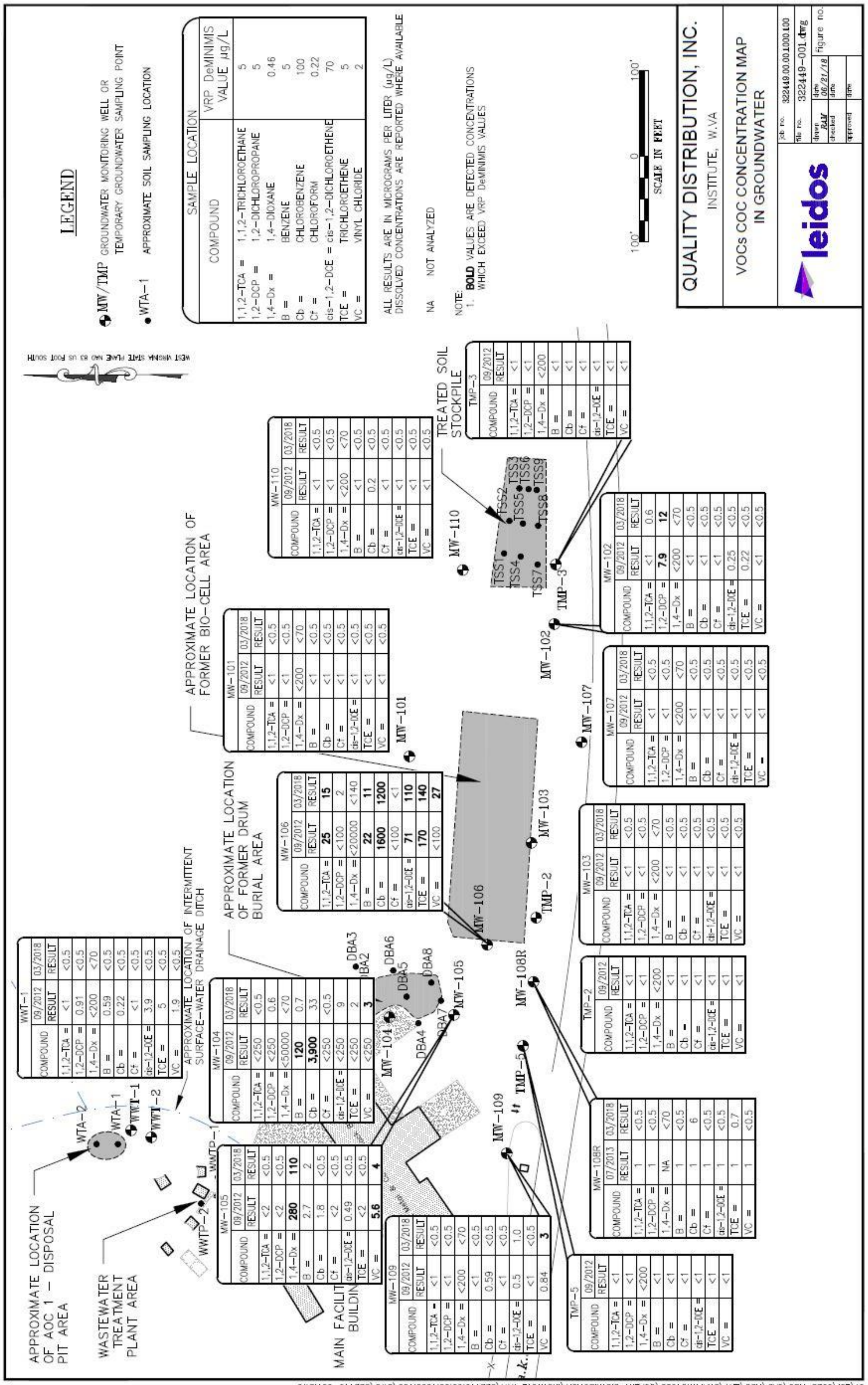

FORMER DRUM EXCAVATON AREA
FORMER BIO-CELL AREAS
WASTE WATER TREATMENT PLANT
TREATED SOIL STOCKPILE
APPROXIMATE POLYMER SPILL AREA
300'
0
300'
SCALE IN FEET
QUALITY DISTRIBUTION, INC.
INSTITUTE, W. VA
SITE FEATURES
leidos
figure no.
3



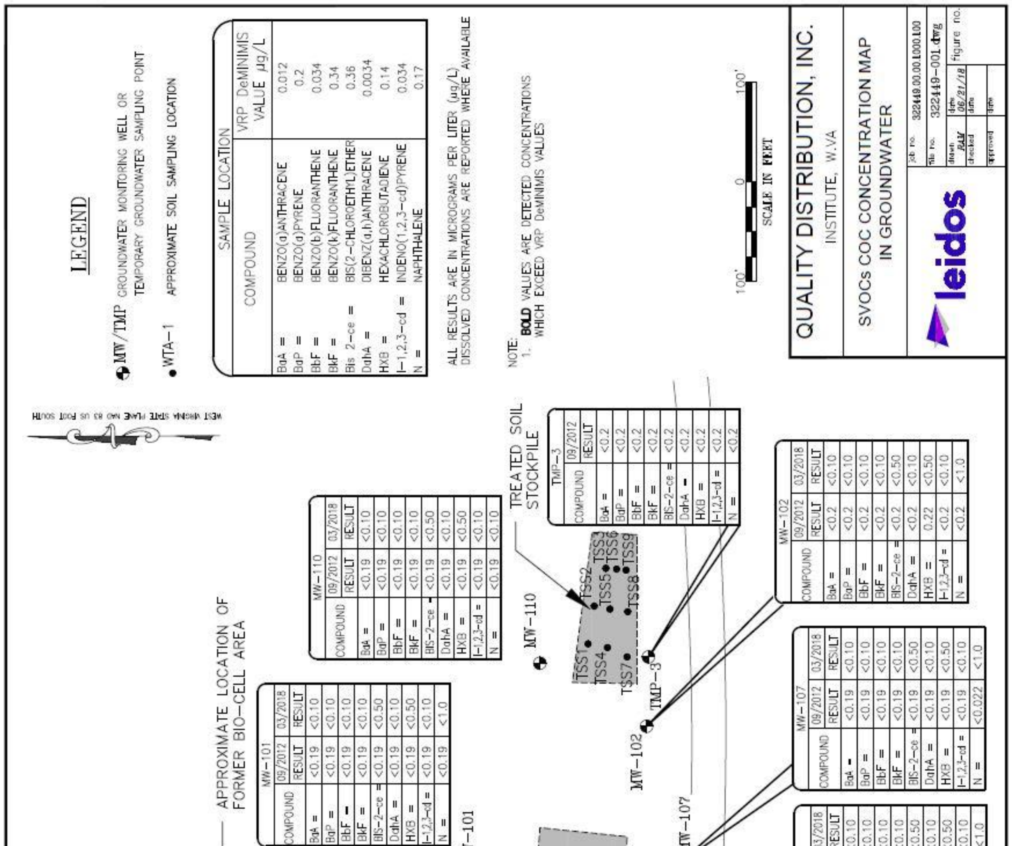
Statement of Basis



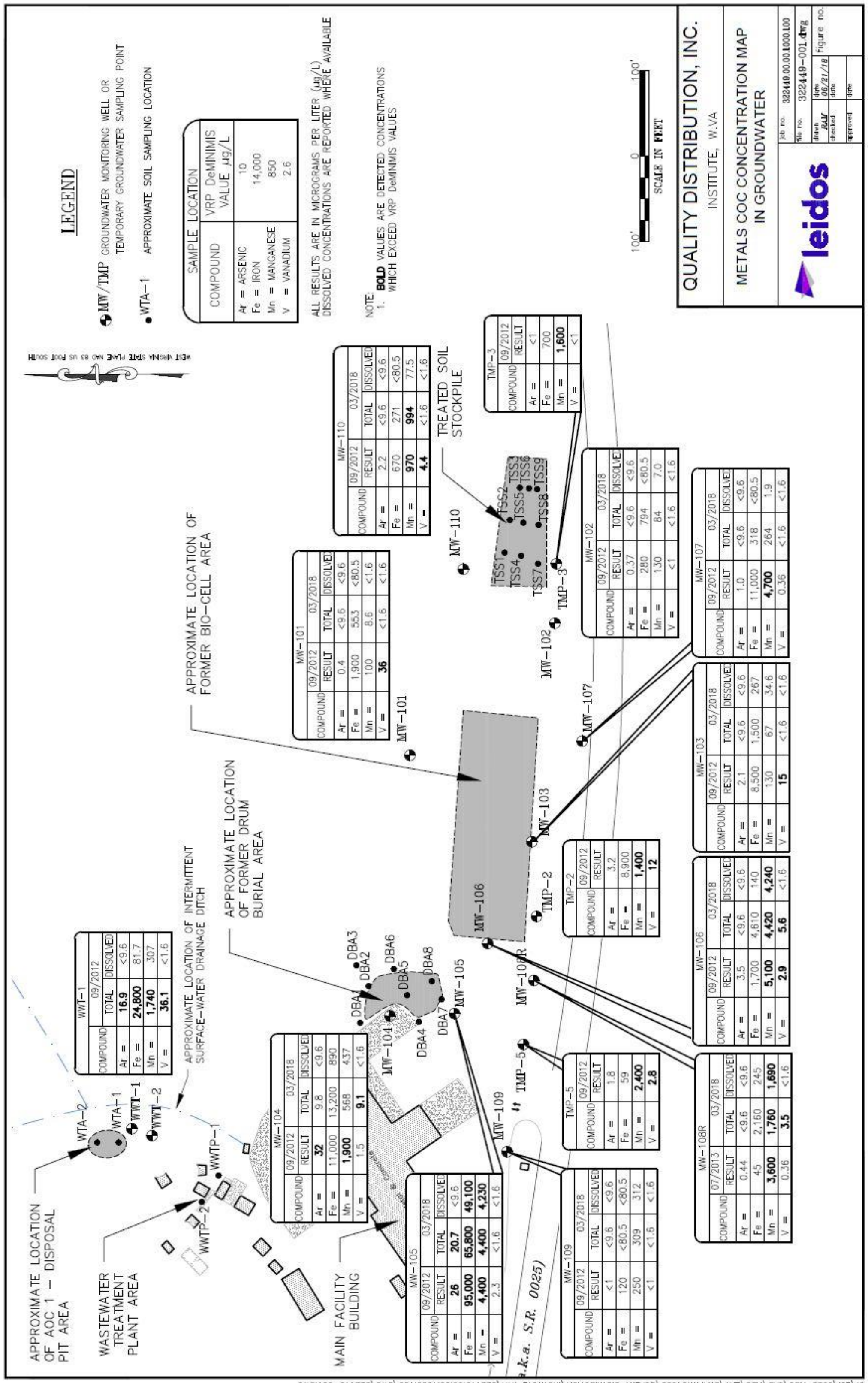
Statement of Basis



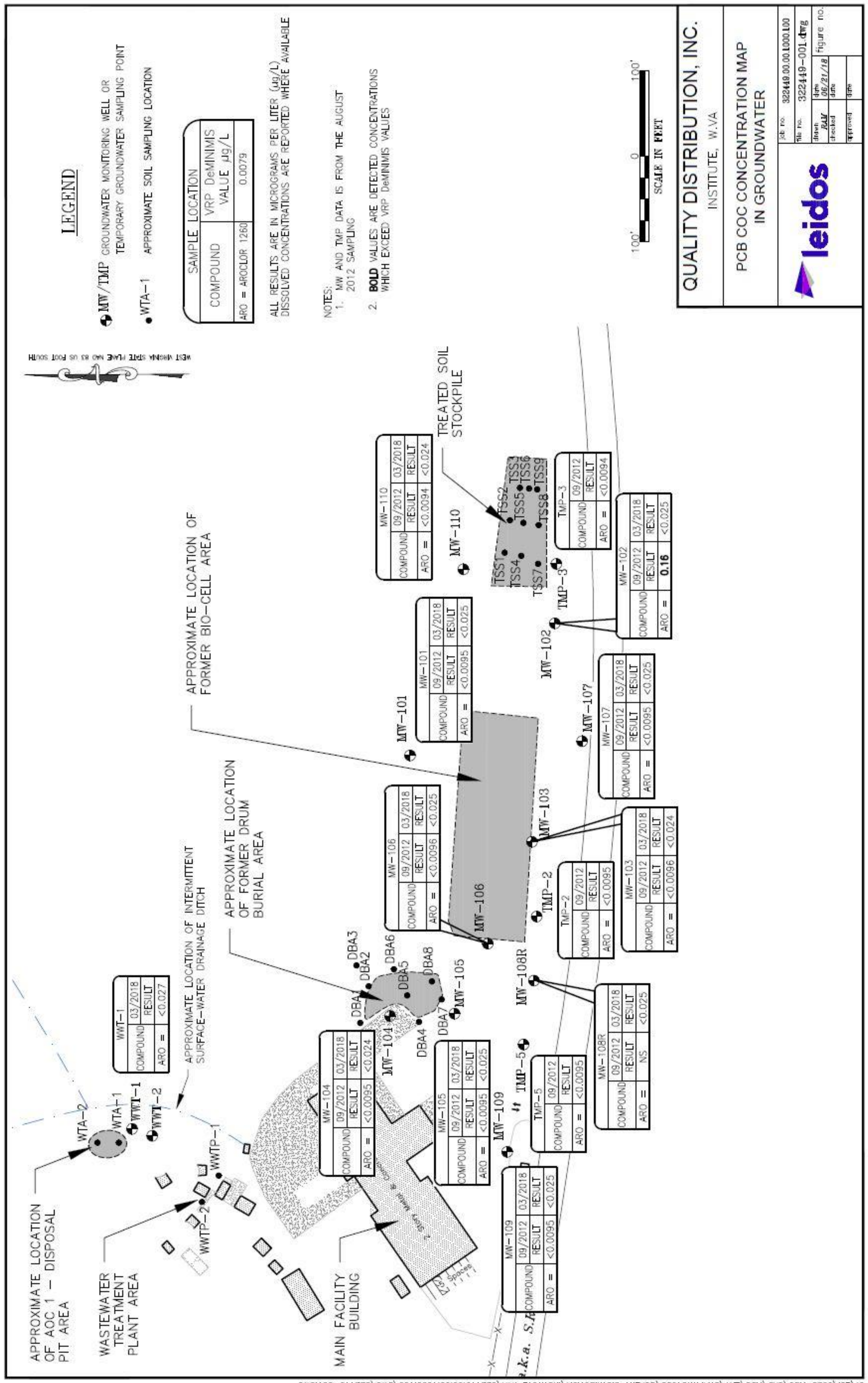
Statement of Basis


LEGEND
MW/TMP GROUNDWATER MONITORING WELL OR TEMPORARY GROUNDWATER SAMPLING POINT
WTA-1 APPROXIMATE SOIL SAMPLING LOCATION
ALL RESULTS ARE IN MICROGRAMS PER LITER (ug/L)
DISSOLVED CONCENTRATIONS ARE REPORTED WHERE AVAILABLE
NOTE:
1. BOLD VALUES ARE DETECTED CONCENTRATIONS WHICH EXCEED VRP DeMINIMIS VALUES
SCALE IN FEET
QUALITY DISTRIBUTION, INC.
INSTITUTE, W.VA
SVOCs COC CONCENTRATION MAP
IN GROUNDWATER
leidos

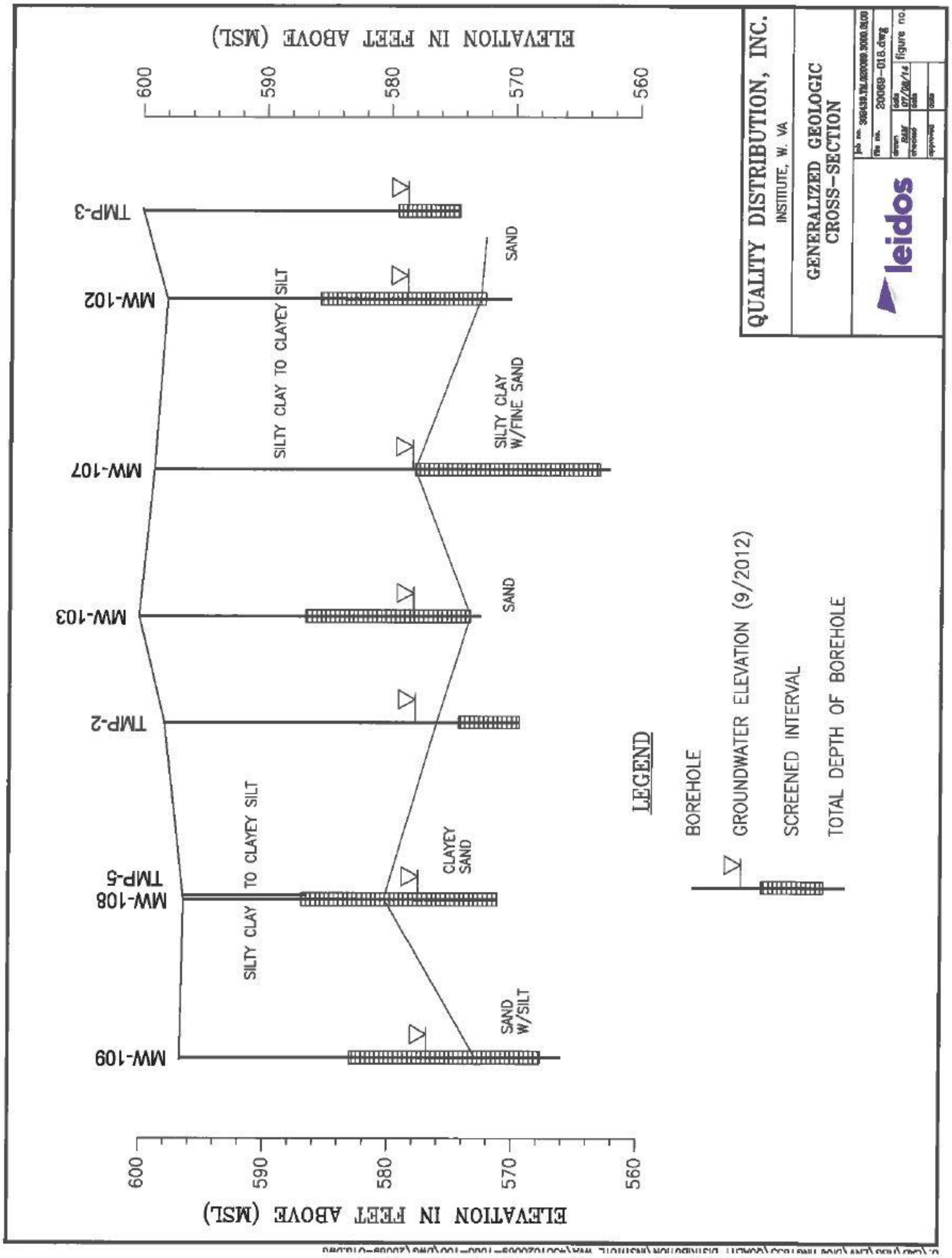
Statement


QUALITY DISTRIBUTION, INC.
INSTITUTE, W.VA
METALS COC CONCENTRATION MAP
IN GROUNDWATER
leidos
LEGEND
SCALE IN FEET

Statement


LEGEND
MW/TMP GROUNDWATER MONITORING WELL OR TEMPORARY GROUNDWATER SAMPLING POINT
WTA-1 APPROXIMATE SOIL SAMPLING LOCATION
SAMPLE LOCATION
COMPOUND
VRP DeMINIMIS VALUE µg/L
ARO = AROCLOR 1260
0.0079
ALL RESULTS ARE IN MICROGRAMS PER LITER (µg/L) DISSOLVED CONCENTRATIONS ARE REPORTED WHERE AVAILABLE
NOTES:
1. MW AND TMP DATA IS FROM THE AUGUST 2012 SAMPLING
2. BOLD VALUES ARE DETECTED CONCENTRATIONS WHICH EXCEED VRP DeMINIMIS VALUES
SCALE IN FEET
QUALITY DISTRIBUTION, INC.
INSTITUTE, W.VA
PCB COC CONCENTRATION MAP IN GROUNDWATER
leidos
322449-001.dwg
APPROXIMATE LOCATION OF AOC 1 – DISPOSAL PIT AREA
WASTEWATER TREATMENT PLANT AREA
MAIN FACILITY BUILDING
APPROXIMATE LOCATION OF INTERMITTENT SURFACE-WATER DRAINAGE DITCH
APPROXIMATE LOCATION OF FORMER DRUM BURIAL AREA
APPROXIMATE LOCATION OF FORMER BIO-CELL AREA
TREATED SOIL STOCKPILE
WWT-1 COMPOUND 03/2018 RESULT ARO = <0.027
MW-104 ARO = <0.0095 <0.024
MW-105 ARO = <0.0095 <0.025
MW-109 ARO = <0.0095 <0.025
TMP-5 ARO = <0.0095
MW-108R ARO = NS <0.025
MW-106 ARO = <0.0096 <0.025
TMP-2 ARO = <0.0095
MW-103 ARO = <0.0096 <0.024
MW-101 ARO = <0.0095 <0.025
MW-107 ARO = <0.0095 <0.025
MW-102 ARO = **0.16** <0.025
MW-110 ARO = <0.0094 <0.024
TMP-3 ARO = <0.0094

Statement


QUALITY DISTRIBUTION, INC.
INSTITUTE, W. VA
GENERALIZED GEOLOGIC CROSS-SECTION
leidos
ELEVATION IN FEET ABOVE (MSL)
600
590
580
570
560
MW-109
MW-108
TMP-5
TMP-2
MW-103
MW-107
MW-102
TMP-3
SILTY CLAY TO CLAYEY SILT
SAND W/SILT
CLAYEY SAND
SAND
SILTY CLAY W/FINE SAND
LEGEND
BOREHOLE
GROUNDWATER ELEVATION (9/2012)
SCREENED INTERVAL
TOTAL DEPTH OF BOREHOLE

Sta

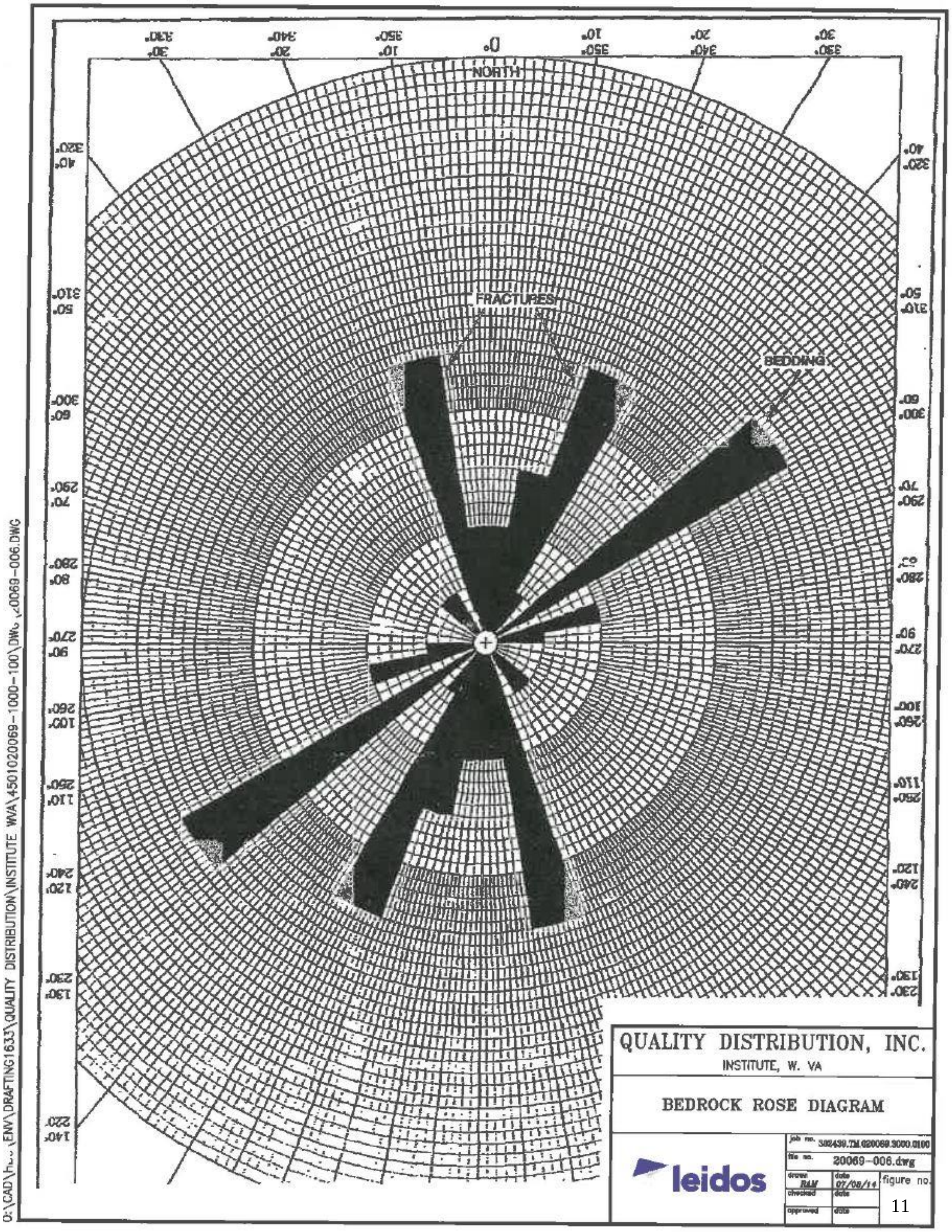

NORTH
FRACTURES
BEDDING
QUALITY DISTRIBUTION, INC.
INSTITUTE, W. VA
BEDROCK ROSE DIAGRAM
leidos
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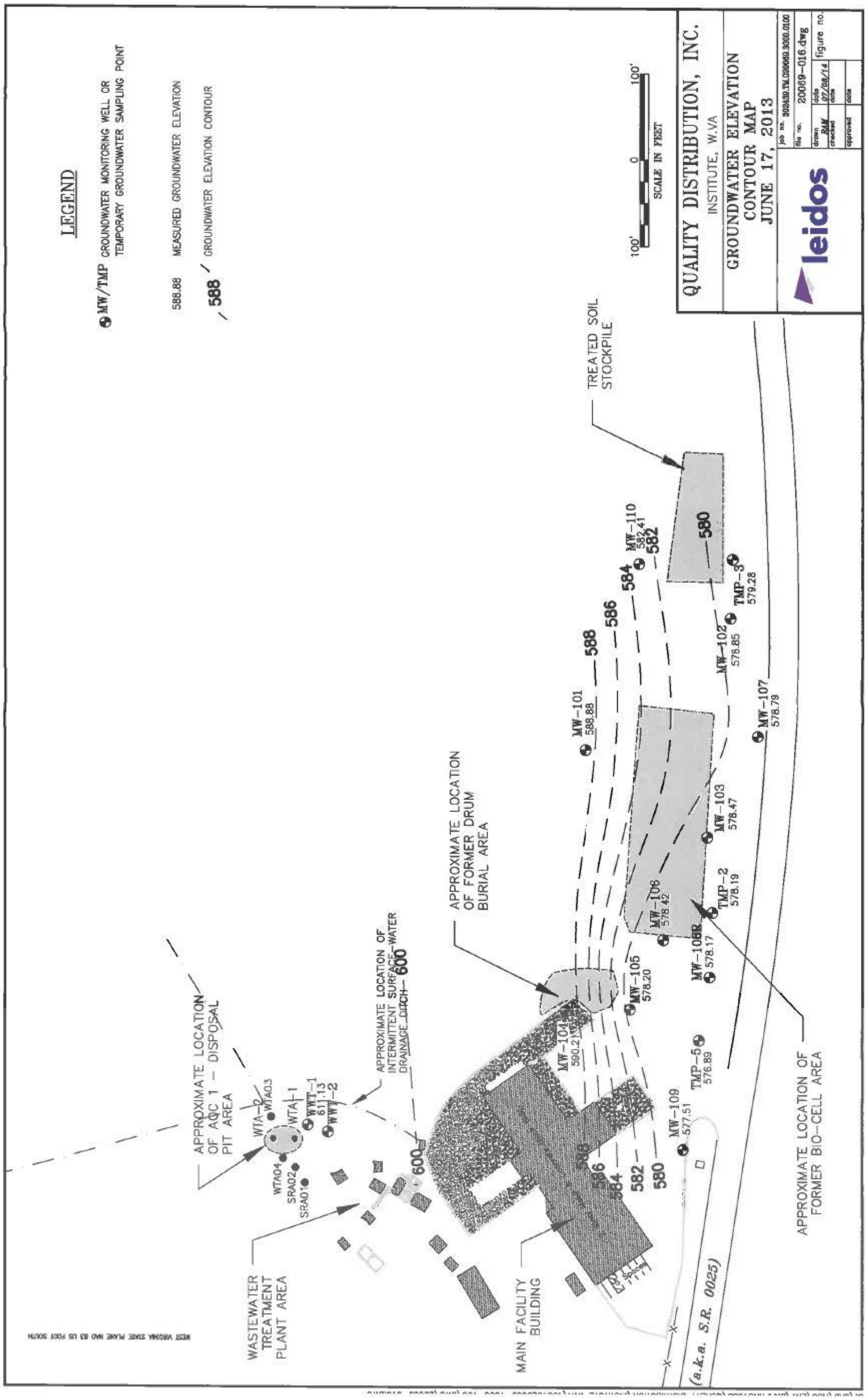
figure no.
11



LEGEND
MW/TMP GROUNDWATER MONITORING WELL OR TEMPORARY GROUNDWATER SAMPLING POINT
588.88 MEASURED GROUNDWATER ELEVATION
588 GROUNDWATER ELEVATION CONTOUR
100' 0 100'
SCALE IN FEET
QUALITY DISTRIBUTION, INC.
INSTITUTE, W.VA
GROUNDWATER ELEVATION CONTOUR MAP
JUNE 17, 2013
leidos
20069-016.dwg
TREATED SOIL STOCKPILE
APPROXIMATE LOCATION OF FORMER DRUM BURIAL AREA
APPROXIMATE LOCATION OF FORMER BIO-CELL AREA
APPROXIMATE LOCATION OF INTERMITTENT SURFACE WATER DRAINAGE DITCH
APPROXIMATE LOCATION OF AOC 1 - DISPOSAL PIT AREA
WASTEWATER TREATMENT PLANT AREA
MAIN FACILITY BUILDING
(a.k.a. S.R. 0025)
MW-110 582.41
TMP-3 579.28
MW-102 578.85
MW-107 578.79
MW-101 588.88
MW-103 578.47
TMP-2 578.19
MW-106 578.42
MW-106R 578.17
MW-105 578.20
MW-104 590.21
TMP-5 576.89
MW-109 577.51
WWT-1 611.13
WWT-2
WTA-1
WTA-2
WTA03
WTA04
SRA02
SRA01

Figure 13

Groundwater Statistics Tool
Site & Summary Statistics for Nonparametric Data Sets with Non-detects and Normal Residuals

General Information

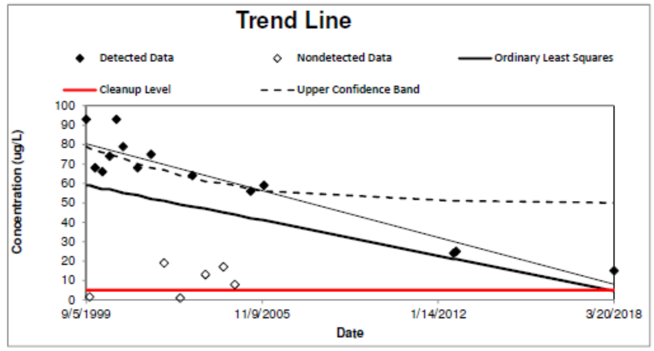
Analyst	JH
Date of Evaluation	3/1/2020
Site Name	Chemical Leaman Tank Lines
Operable Unit	N/A
Type of Evaluation	Remediation
Well Name/Number	MW-106
Chemical of Concern	1,1,2-Trichloroethane
Concentration Units	ug/L
Cleanup Level	5
Source of Cleanup Level	MCL
Confidence Level	95%
Risk of False Outlier Rejection	1%
Number of Results	20
Outliers present?	No
Number of Non-Detects	6

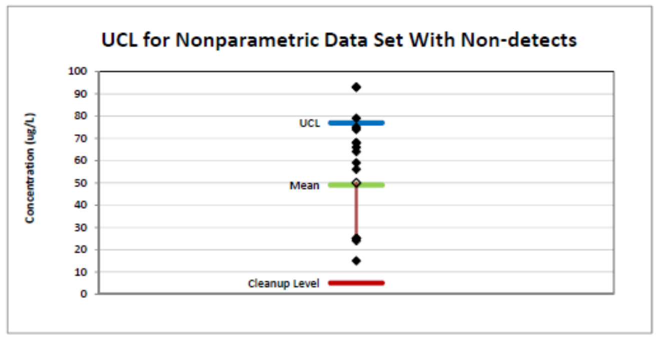
Trend Analysis

Trend Type	Normal
Method	Ordinary Least Squares
Is the Upper Confidence Band above the cleanup level?	Yes
Slope	-0.008
Intercept	350
R^2	0.8828
Test Result	Decreasing
When concentration is predicted to achieve the cleanup level	NA
When concentration is predicted to exceed the cleanup level	NA

UCL Analysis

Distribution Type	Nonparametric
Test	KM Chebyshev UCL
Mean	49
95% UCL	77
Is the 95% UCL greater than the cleanup level?	Yes





Previous Step: Trend Screen	Previous Step: UCL Screen	Restart: Data Input Screen

Figure 14

Groundwater Statistics Tool

Site & Summary Statistics for Normal Data Sets with Normal Residuals

General Information

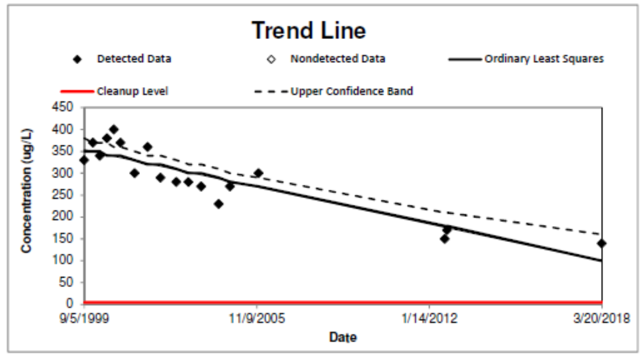
Analyst	JH
Date of Evaluation	3/1/2020
Site Name	Chemical Leaman Tank Lines
Operable Unit	N/A
Type of Evaluation	Remediation
Well Name/Number	MW-106
Chemical of Concern	Trichloroethene
Concentration Units	ug/L
Cleanup Level	5
Source of Cleanup Level	MCL
Confidence Level	95%
Risk of False Outlier Rejection	1%
Number of Results	18
Outliers present?	No
Number of Non-Detects	0

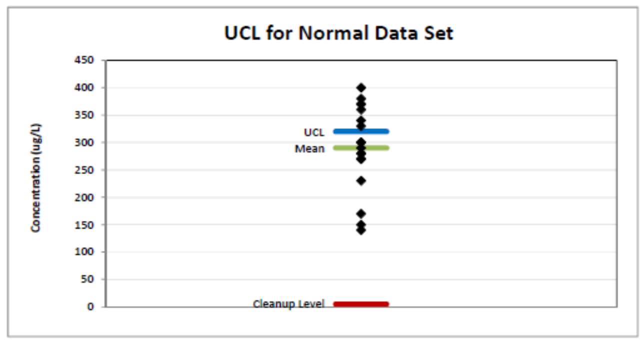
Trend Analysis

Trend Type	Normal
Method	Ordinary Least Squares
Is the Upper Confidence Band above the cleanup level?	Yes
Slope	-0.037
Intercept	1700
R^2	0.8151
Test Result	Decreasing
When concentration is predicted to achieve the cleanup level	2/23/2025
When concentration is predicted to exceed the cleanup level	NA

UCL Analysis

Distribution Type	Normal
Test	Student's t UCL
Mean	290
95% UCL	320
Is the 95% UCL greater than the cleanup level?	Yes





Previous Step: Trend Screen | Previous Step: UCL Screen | Restart: Data Input Screen

Figure 15

Groundwater Statistics Tool
Site & Summary Statistics for Nonparametric Data Sets with Non-detects and Normal Residuals

General Information

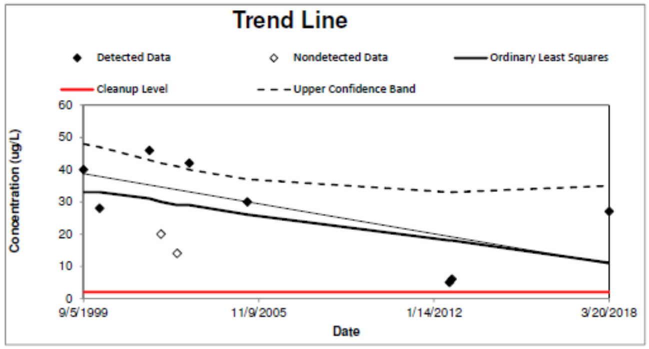
Analyst	JH
Date of Evaluation	3/1/2020
Site Name	Chemical Leaman Tank Lines
Operable Unit	N/A
Type of Evaluation	Remediation
Well Name/Number	MW-106
Chemical of Concern	Vinyl Chloride
Concentration Units	ug/L
Cleanup Level	2
Source of Cleanup Level	MCL
Confidence Level	95%
Risk of False Outlier Rejection	1%
Number of Results	10
Outliers present?	No
Number of Non-Detects	2

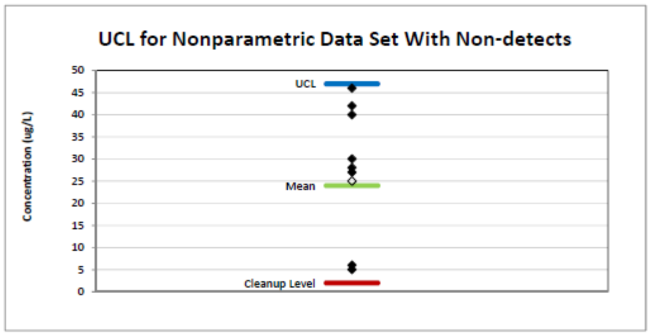
Trend Analysis

Trend Type	Normal
Method	Ordinary Least Squares
Is the Upper Confidence Band above the cleanup level?	Yes
Slope	-0.0033
Intercept	150
R^2	0.4447
Test Result	No trend
When concentration is predicted to achieve the cleanup level	11/2/2025
When concentration is predicted to exceed the cleanup level	NA

UCL Analysis

Distribution Type	Nonparametric
Test	KM Chebyshev UCL
Mean	24
95% UCL	47
Is the 95% UCL greater than the cleanup level?	Yes





Previous Step: Trend Screen | Previous Step: UCL Screen | Restart: Data Input Screen

Figure 16

Groundwater Statistics Tool
Site & Summary Statistics for Nonparametric Data Sets with Normal Residuals

General Information

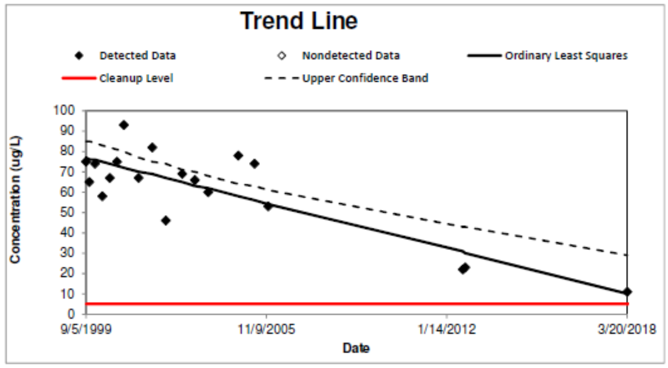
Analyst	JH
Date of Evaluation	3/1/2020
Site Name	Chemical Leaman Tank Lines
Operable Unit	N/A
Type of Evaluation	Remediation
Well Name/Number	MW-106
Chemical of Concern	Benzene
Concentration Units	ug/L
Cleanup Level	5
Source of Cleanup Level	MCL
Confidence Level	95%
Risk of False Outlier Rejection	1%
Number of Results	19
Outliers present?	No
Number of Non-Detects	0

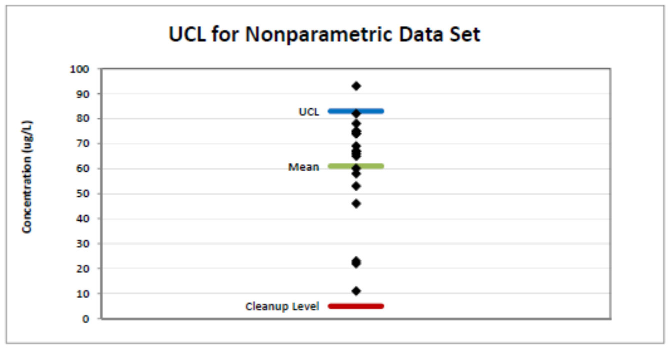
Trend Analysis

Trend Type	Normal
Method	Ordinary Least Squares
Is the Upper Confidence Band above the cleanup level?	Yes
Slope	-0.0098
Intercept	430
R^2	0.7147
Test Result	Decreasing
When concentration is predicted to achieve the cleanup level	9/24/2019
When concentration is predicted to exceed the cleanup level	NA

UCL Analysis

Distribution Type	Nonparametric
Test	Chebyshev UCL
Mean	61
95% UCL	83
Is the 95% UCL greater than the cleanup level?	Yes





Previous Step: Trend Screen | Previous Step: UCL Screen | Restart: Data Input Screen

Figure 17

Groundwater Statistics Tool

Site & Summary Statistics for Normal Data Sets with Normal Residuals

General Information

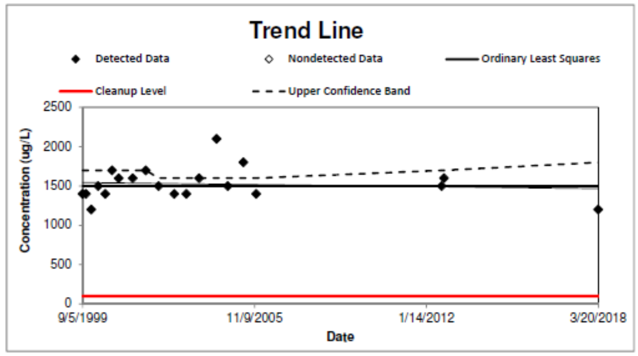
Analyst	JH
Date of Evaluation	3/1/2020
Site Name	Chemical Leaman Tank Lines
Operable Unit	N/A
Type of Evaluation	Remediation
Well Name/Number	MW-106
Chemical of Concern	Chlorobenzene
Concentration Units	ug/L
Cleanup Level	100
Source of Cleanup Level	MCL
Confidence Level	95%
Risk of False Outlier Rejection	1%
Number of Results	20
Outliers present?	Yes
Number of Non-Detects	0

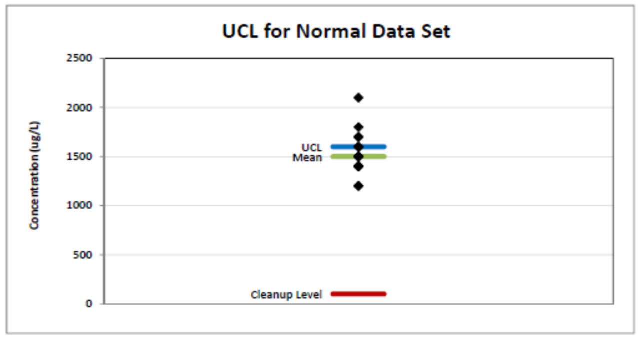
Trend Analysis

Trend Type	Normal
Method	Ordinary Least Squares
Is the Upper Confidence Band above the cleanup level?	Yes
Slope	-0.011
Intercept	2000
R^2	0.0104
Test Result	No trend
When concentration is predicted to achieve the cleanup level	7/29/2343
When concentration is predicted to exceed the cleanup level	NA

UCL Analysis

Distribution Type	Normal
Test	Student's t UCL
Mean	1500
95% UCL	1600
Is the 95% UCL greater than the cleanup level?	Yes





Previous Step: Trend Screen | Previous Step: UCL Screen | Restart: Data Input Screen

Table 1

Compound	Soil COC	Groundwater COC
Metals		
Arsenic		X
Iron		X
Manganese		X
Vanadium		X
VOCs		
1,1,2-Trichloroethene	X	X
1,2-Dichloropropane	X	X
1,2-Dichloroethane	X	
1,4-Dioxane		X
Benzene	X	X
Chlorobenzene	X	X
cis-1,2-Dichloroethene	X	X
Chloroform	X	X
Naphthalene	X	X
Tetrachloroethene	X	
Trichloroethene	X	X
Vinyl Chloride	X	X
SVOCs		
Benzo(a)anthracene		X
Benzo(a)pyrene		X
Benzo(b)fluoranthene		X
Benzo(k)fluoranthene		X
Bis(2-chloroethyl) ether		X
Bis(2-ethylhexyl) phthalate	X	
Dibenz(a,h)anthracene		X
Hexachiorobutadiene		X
Indeno 1 2 3-cd		
PCBs		
Aroclor 1260		X