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CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
SOUTH PLAINFIELD, NEW JERSEY

OPERABLE UNIT 3: GROUNDWATER
Remedial Design

FINAL LONG-TERM MONITORING PLAN

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CEA	Classification Exception Area (for groundwater)
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CDE	Cornell-Dubilier Electronics
COC	Contaminant of Concern
CVOC	Chlorinated Volatile Organic Compounds
DFN	Discrete Fracture Network
DNAPL	Dense Non-Aqueous Phase Liquid
FPW	Former Production Well
FS	Feasibility Study
IC	Institutional Controls
IDW	Investigation Derived Waste
LBG	The Louis Berger Group, Inc.
LTMP	Long-Term Monitoring Plan
OSWER	Office of Solid Waste and Emergency Response
OU	Operable Unit
PCB	Polychlorinated Biphenyl
RAO	Remedial Action Objectives
RI	Remedial Investigation
ROD	Record of Decision
SVOC	Semi-Volatile Organic Compound
TAL	Target Analyte List
TCE	Trichloroethylene
TIER	Technical Impracticability Evaluation Report
TVOC	Total Volatile Organic Compounds
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compounds

1. Introduction

The purpose of this Long-Term Monitoring Plan (LTMP) is to describe the rationale, objectives, data collection, sampling, analyses, and reporting procedures to be implemented by the CONTRACTOR selected to conduct long-term monitoring activities as per the Record of Decision (ROD) for Operable Unit (OU) 3 - Groundwater, for the Cornell-Dubilier Electronics (CDE) Superfund Site [EPA ID: NJD981557879] located in South Plainfield, New Jersey.

Cornell Dubilier Electronics, Inc. operated at 333 Hamilton Boulevard, South Plainfield, New Jersey from 1936 to 1962, manufacturing electronic parts and components, including capacitors. The United States Environmental Protection Agency (USEPA) has detected elevated concentrations of Volatile Organic Compounds (VOCs) and Polychlorinated Biphenyls (PCBs) in the soil, groundwater, and interiors of the former CDE facility, at nearby residential, commercial, and municipal properties, in the sediments and surface water of Bound Brook, which is adjacent to the southeast corner of the former CDE facility, and in groundwater beneath the Site. The Site has been divided into four OUs by the USEPA: OU1 addresses the residential, commercial, and industrial properties in the vicinity of the former CDE facility; OU2 addresses contaminated soils and buildings at the CDE facility; OU3 addresses the contaminated groundwater; and OU4 addresses Bound Brook. This LTMP describes the motivation and methodology for the long-term monitoring of OU3 groundwater in accordance with the requirements of the ROD, signed by the USEPA in September 2012.

The following terminology will be used throughout this document:

- The **"Site"** refers to all four OUs which comprise the CDE Superfund Site, and the extent of each OU investigation;
- The **"former CDE facility"** refers to the physical extent of the industrial park operated at 333 Hamilton Boulevard, which is OU2;
- **"OU3"** refers to the geographic extent of the groundwater investigation and associated contamination.

1.1 Site Description and History

The former CDE facility was located on a 26-acre parcel in the Borough of South Plainfield, Middlesex County, in the central portion of New Jersey. It is bounded on the northeast by Bound Brook and the former Lehigh Valley Railroad, Perth Amboy Branch (presently Conrail); on the southeast by Bound Brook and a property used by the South Plainfield Department of Public Works; on the southwest, across Spicer Avenue, by single family residential properties; and to the northwest, across Hamilton Boulevard, by mixed residential and commercial properties (Figure 1).

The Spicer Manufacturing Company operated a manufacturing plant on the property from 1912 to 1929. They manufactured universal joints and drive shafts, clutches, drop forgings, sheet metal stampings, screw products, and coil springs for the automobile industry. The plant included a machine shop, box shop, lumber shop, scrap shop, heat treating building, transformer platform, forge shop, shear shed, boiler room, acid pickle building, and die sinking shop. A chemical laboratory for the analysis of steel was added in 1917. Most of the major structures were erected by 1918. At least until the late 1920s, Bound Brook was dammed just upstream of the Conrail Railroad Bridge, forming an impoundment referred to as the condenser pond. The condenser pond water was used for cooling at the former CDE facility powerhouse; circulating pumps would have drawn cooling water from the pond, forced it through the tubes of surface condensers, and discharged the water back to Bound Brook. This condenser pond is first documented in the 1917 Dunham-Clarin Company map [refer to Figure 3 in the *Draft Historic American Engineering Record OU2* (Raber *et al*., 2008)]. The pond is also evident in the 1929 real estate map [refer to Figure 10 in the *Final Historic Places Significance Findings, OU2* (MP, 2009)]. When the Spicer Manufacturing Company ceased operations at the facility, the property consisted of approximately 210,000 square feet of buildings (FWENC, 2002). Even though the VOC constituent Trichloroethene (TCE) was commercially available during the latter half of Spicer Manufacturing Company's period of operation at the former CDE facility, there is no documentation that TCE was used in the manufacturing process during their period of operation at the former CDE facility.

After the departure of the Spicer Manufacturing Company, CDE manufactured electronic components, including capacitors, from 1936 to 1962. PCB and chlorinated organic degreasing solvents were used in the manufacturing process. It has been reported that the company also tested transformer oils for an unknown period of time, and disposed of PCB-containing materials and other hazardous substances at the facility. It has also been reported that the rear of the property was saturated with transformer oils and that capacitors were buried behind the facility (FWENC, 2002). The primary site-related chemicals of concern are PCB compounds and chlorinated volatile organic compounds (VOCs). In its November 1996 response to USEPA's request for information, CDE provided information that Aroclor 1254 was used in its power factor capacitors and some other capacitors. Additional details obtained based on deposition testimony indicated that CDE was also using Aroclor 1242 in the early 1960s in power factor capacitors.

Following CDE's departure from the facility in 1962, it was operated as a rental property consisting of commercial and light industrial tenants. The New Jersey Department of Environmental Protection (NJDEP) first investigated environmental conditions at the Site in 1986. In June 1996, the USEPA, at the request of NJDEP, collected soil, surface water, and sediment samples at the Site. Results showed elevated concentrations of PCBs, VOCs, and metals. In 1997, the USEPA conducted a preliminary investigation of Bound Brook and also collected surface soil and interior dust samples from nearby residential and commercial properties. These investigations led to an advisory regarding fish consumption in Bound Brook and removal actions at 15 residential properties. In 1998, the USEPA added the CDE Site to the National Priorities List (NPL).

Starting in 2007, the USEPA re-located the tenants of the industrial park, demolished the 18 buildings, and implemented the soil remedy outlined in the OU2 ROD (See Section 1.5 of this report).

1.2 Environmental Setting

1.2.1 Meteorology

The climate for Middlesex County is classified as temperate. Polar continental air masses control the region's winter weather and tropical air masses control summer weather. Prevailing winds are from the northwest from October through April, and from the southwest the remainder of the year. In South Plainfield, the temperature ranges from an average of 29 degrees Fahrenheit in January to an average of 75 degrees Fahrenheit in July, with an average annual temperature of about 53 degrees Fahrenheit (FWENC, 2002). The average annual precipitation is approximately 49 inches, with precipitation typically occurring evenly throughout the year.

However, flooding of the Raritan River and its tributaries has been occurring since the late 1800s. Prior to recordation using stream gauges, flood events were recounted by newspaper records and personal accounts. Stream gauge measurements indicate semi-regular flooding of the Raritan River; as of 2012, the highest historical flood stage recorded occurred in 1999, with a level of 42.13 feet at the Calco Dam, which corresponds to a height of 14.13 feet above flood stage. The Calco Dam gauge station is located just upstream from the confluence of Bound Brook and the Raritan River.

1.2.2 Topography

The topographic character of OU3 is generally considered to be low relief with frequent surface water features incised into unconsolidated glacial overburden. Standing in contrast is the Raritan Terminal Moraine that lies 2,000 feet to the east of the former CDE facility and the Watchung Mountains that lie 4 miles to the northwest and rise nearly 500 feet above the plains. Each of these features acts as a surface water divide. The OU2 portion of the Site, the former CDE facility, is capped with asphalt and equipped with a storm water collection system to collect runoff. The area surrounding the former CDE facility is also low relief and, as described in Section 1 above, is comprised of commercial and light industrial properties to the northeast and east, and mixed residential and commercial properties to the west.

1.3 Geologic Setting

The Site is underlain by fractured siltstone and mudstone of the Passaic Formation, which present unique challenges to characterizing the nature and extent of groundwater contamination, especially when impacted by organic dense non-aqueous phase liquid (DNAPL) compounds. One of the key challenges for this Site is characterizing the mass diffused into the bedrock matrix and the role it plays in the fate and transport of contaminants. The Discrete Fracture Network (DFN) approach (Parker, 2007) was the foundation for the 2009 bedrock hydrogeologic investigation,

and was a critical tool for understanding the dynamic equilibrium between the advective fracture flow of dissolved contaminants and diffusion into the low permeability matrix.

1.3.1 OU3 Surficial Geology

Unconsolidated deposits at the former CDE facility range in thickness from 0.5 to 15 feet and generally thicken to the east towards Bound Brook. Prior to implementation of the OU2 remedy (see Section 1.5), the natural unconsolidated materials consisted primarily of red-brown silt and sand with silt and clay layers, and were generally intermixed with urban fill materials (including cinders, ash, brick, glass fragments, metal, and other detritus) throughout the former CDE facility and vicinity. A thin (surface to 15 feet below ground surface) layer of weathered bedrock overlies competent bedrock, consistent with the weathered bedrock identified by regional surficial geologic mapping. This material primarily consists of heavily weathered siltstone and shale material with a heterogeneous texture ranging from silt to fine sand, with some zones of angular, silty gravel and silty clay. The remainder of the OU3 surficial geology north, west, and east of the former CDE facility is characterized by Aeolian deposits and glaciofluvial plain deposits with recent alluvial deposits associated with surface water features such as Bound Brook (Figure 2).

1.3.2 OU3 Bedrock Geology

The top of competent bedrock underlying the former CDE facility ranges from 4 to 15 feet below ground surface, except in the northwestern portion of the former CDE facility where bedrock was present immediately beneath the building foundations. Based on boring log data for wells installed during Louis Berger's OU3 Remedial Investigation (RI), the bedrock at the Site consists primarily of red-brown to dark brown mudstone, siltstone, and shale consistent with the Passaic Formation (Figure 3). Boring logs from wells to the north of the former CDE facility are generally indicative of Passaic Formation mudstone facies, while cores from the former CDE facility and areas southwest and east of the facility show siltstone and shale. The bedrock units range from massive rock with few features to highly laminated beds. The bedrock units are consistently fine-grained in texture, with numerous calcified veins and vugs throughout.

The shallow bedrock units are heavily fractured and weathered, with significant shallow fracture in-filling with weathered material ranging in texture from silt/clay to sand. The bedrock contains heavily fractured zones that occur along the bedding planes (parallel to sub-parallel). Based on the borehole geophysical data collected during Louis Berger's OU3 RI, the bedding planes of the bedrock units in the vicinity of the former CDE facility generally strike 65 degrees East of North (N65E), and generally dip toward the northwest between 5 and 15 degrees (Figure 4).

1.3.3 OU3 Hydrogeology

Groundwater in the Passaic Formation generally moves through bedding plane fractures and steeply dipping interconnected fractures and dissolution channels (secondary permeability). A very limited amount of groundwater flows through the interstitial pore spaces between silt or sand particles because of compaction and cementation of the formation (primary permeability).

Differences in permeability between layers resulting from variations in fracturing and weathering may account for the occurrence of many water bearing units.

Groundwater in the Passaic Formation is often unconfined in the shallower, more weathered part of the aquifer; however, silt and clay derived from the weathering process typically fill fractures, thereby reducing permeability. This relatively low permeability near-surface zone reportedly extends 50 to 60 feet bgs (Michalski, 1990). Groundwater in the deeper portion of the Passaic Formation is generally confined, as the lack of vertical fractures creates a confining effect with depth. Recharge occurs at surface sub-crops of fractured intervals, or by leakage through fractures in the confining units. The transmissivity of mudstone and siltstone units can range from 400 to 14,500 gallons per day per foot (gpd/ft) (Herman, 2001). Local and regional groundwater discharge boundaries include surface water bodies like Bound Brook. However, municipal pumping centers (water wells) account for most of the regional groundwater discharge, and groundwater extraction influences regional and local groundwater movement.

The shallow bedrock potentiometric surface is generally affected by localized discharge to Bound Brook, Cedar Brook, and Spring Lake. Groundwater in shallow bedrock moves away from the site in a radial pattern, moving north and east from the former CDE facility toward Bound Brook, and northwesterly toward the low-lying area at the confluence of Bound Brook and Cedar Brook. Groundwater elevations in wells MW-19, MW-20, and MW-21 in the northwestern portion of OU3 have a significantly lower elevation reflecting the influence of the Park Avenue wellfield. To the northeast of the former CDE facility, immediately across Bound Brook, groundwater movement in shallow bedrock is generally toward the west, with groundwater discharging to Bound Brook and Cedar Creek.

The generalized direction of groundwater movement in deep bedrock is to the north with the gradient generally trending northwest near the former CDE facility before turning to the north-northeast as a result of the influence of local pumping centers.

1.4 Previous Groundwater Investigations

1.4.1 Pitt Street Private Well Study (1990)

A number of groundwater investigations were conducted by different parties before the Louis Berger RI commenced in 2009. The first of these was the Pitt Street Private Well Study conducted in South Plainfield, New Jersey by New Jersey Department of Environmental Protection (NJDEP) in the late 1980s; this study was released in September 1990. The study revealed the presence of Tetrachloroethene (PCE) and TCE, and their associated degradation byproducts (cis 1, 2-Dichloroethene [cDCE], 1,1-Dichloroethene, and Vinyl Chloride [VC]), and other CVOCs (carbon tetrachloride and chloroform) in residential wells to the south and west of the former CDE facility. In addition to these CVOCs, other non-chlorinated VOCs were detected including Methyl-Tert-Butyl Ether (MTBE) and xylene. The area was designated a Currently Known Extent of Groundwater Contamination (CKE) by NJDEP. There are several lines of evidence that suggest the former CDE facility is not the source of the impacts at much of the Pitts Street Well Contamination

Study (Louis Berger OU3 RI, 2012), and the nature and extent of potential impacts to the entire Pitt Street Study Area, and their sources, are not known.

1.4.2 Foster Wheeler Remedial Investigation (2000-2002)

Foster Wheeler conducted a limited groundwater RI in 2000, which included installing and sampling 12 shallow bedrock monitoring wells (MW-01A, MW-02A, MW-3, MW-4, MW-5, MW-6, MW-7, MW-8, MW-9, MW-10, MW-11, and MW-12) to evaluate groundwater quality in the shallow bedrock (Figure 5). Additional remedial investigation work followed in 2001 and 2002, and the results documented elevated concentrations of VOCs, PCBs, pesticides, and inorganics in bedrock groundwater (FWENC, 2002).

1.4.3 USEPA Emergency Response Team (ERT) Supplemental Investigation (2008)

In 2008, USEPA initiated a monitoring well installation program using the ERT group to drill eight bedrock wells to a depth of 150 feet below ground surface (bgs) (Figure 5). As part of the well installation program, ERT conducted borehole geophysics, hydrophysical profiling, and zoned packer testing to isolate discrete fracture zones and to conduct discrete interval groundwater sampling. These data were evaluated and used to design permanent FLUTe™ multi-level sampling devices (FLUTe™ wells) which were installed in seven of the eight wells before the Louis Berger OU3 RI commenced.

Preliminary groundwater sampling of the 12 shallow bedrock wells (installed by Foster Wheeler) was conducted by USEPA in January 2008; the results indicated the presence of CVOCs in 11 of the 12 shallow bedrock wells located at the former CDE facility. TCE concentrations ranged from 4 micrograms per liter (µg/L) in MW-02A to 186,000 µg/L in MW-11. Results of groundwater samples collected using packers to isolate specific intervals of the open borehole from the eight newly drilled deep bedrock boreholes indicated the presence of TCE in all but one well, ERT-8. The results of the packer testing, as well as the borehole geophysics, were used to determine the depth intervals of the FLUTe™ ports.

In August 2008, ERT conducted a synoptic round of groundwater sampling that included the 12 shallow bedrock wells (described above) and the seven newly installed FLUTe™ wells (the eighth drilled well did not have a FLUTe™ installed because the temporary liner could not be removed). Groundwater samples were analyzed for VOCs, SVOCs, PCB Aroclors, pesticides, and metals. The results of the August 2008 sampling event further documented concentrations of VOCs, PCBs, pesticides, and inorganics in bedrock groundwater, and are presented and discussed in the Louis Berger OU3 RI (Louis Berger RI, 2012).

1.5 OU2 (Soils) Remedial Action (2007-2012)

Prior to issuance of the OU2 ROD, soil testing was performed at the former CDE facility in the overburden soils to bedrock, which was encountered as deep as about 15 feet below ground surface (15 feet bgs) in the rear of the facility. Extensive fill areas containing thousands of discarded capacitors were found in the rear, undeveloped portion of the property.

While evaluating remedies for the former CDE facility, the USEPA identified the following principal threats:

- Soils and debris contaminated with PCBs in excess of 500 mg/Kg, and
- TCE in excess of 1 mg/Kg, a potential mobile source of groundwater contamination.

The OU2 RI/FS estimated that as much as 115,000 cubic yards of soil and debris exceeded these thresholds. Further, concentrations of PCBs in nearly all of the soil samples collected at the former CDE facility exceeded 10 mg/Kg Total PCBs, a USEPA cleanup guideline for commercial or industrial re-use.

On September 30, 2004, the USEPA issued the OU2 ROD, with concurrence from the NJDEP. The remedy included four key components:

- Re-location of the tenants at the Hamilton Industrial Park, demolition of the buildings and removal of the PCB-contaminated building debris for off-site disposal;
- Excavation, for off-site transportation and disposal, of the Capacitor Disposal Area (CDA), an area of debris located in the rear of the facility;
- Excavation of the principal threat material for on-site treatment using low-temperature thermal desorption (LTTD), or off-site disposal for material not amenable to LTTD treatment; and
- Capping of the property to prevent direct contact with - or off-site migration of - any residual contaminants that might remain, coupled with institutional controls to restrict the future use of the property and control any exposure to the facility soil.

The OU2 remedy was implemented in three phases:

- Building demolition;
- Excavation and off-site disposal of the CDA soil and debris; and
- Excavation of the main areas of soil contamination, LTTD treatment or off-site disposal, backfilling, and capping.

The building demolition phase was performed first and provided access to underlying contaminated soil which required excavation. This phase was completed in 2008. The CDA phase was completed second and resulted in the removal of approximately 13,700 cubic yards of contaminated debris; this was also completed in 2008.

The third and final phase of the OU2 remedy addressed soil excavation, LTTD treatment or off-site disposal, and capping of the main areas of soil contamination. A total of 158,727 cubic yards (cy) of material were excavated as part of the third phase. Of that total, 65,333 cy were treated using LTTD, and the remaining 93,394 cy were transported off-site for disposal. During treatment, the LTTD unit's air emissions control systems were tested to make sure they met performance criteria set by NJDEP. The treatment of contaminated soil was initiated in November 2009, and was completed in February 2011. The LTTD unit was fully decontaminated and removed from the

former CDE facility in July 2011. Installation of the multilayer cap (*e.g.,* soil and asphalt) and the surface water collection system followed, and were completed in 2012.

1.6 OU3 (Groundwater) Remedial Investigation (2009-2012)

Beginning in January 2009, ten deep bedrock monitoring wells were drilled and constructed as part of the approved scope of work for the Louis Berger OU3 RI; three were located at the former CDE facility (MW-14D, MW-15D, MW-16) and seven at surrounding locations (MW-13, MW-17, MW-18, MW-19, MW-20, MW-21, MW-22) to further delineate the nature and extent of groundwater contamination. In addition to the original approved scope, one former production well was discovered during the course of the RI and was converted into a FLUTe™ well. Two additional shallow FLUTe™ wells were drilled and constructed during the initial field mobilization (MW-14S and MW-15S) to allow characterization of the entire drilled depth while minimizing the potential for inter-borehole migration of shallow contaminants to greater depths during the drilling process. Finally, one additional FLUTe™ well (MW-23) was drilled and constructed at the northern edge of OU3 in late 2010 to address a data gap. In total, 13 newly drilled wells and 2 existing wells (ERT-7 and the Former Production Well) were constructed as FLUTe™ wells for use during the OU3 RI (Table 1). The locations of all shallow and deep bedrock wells utilized for the Louis Berger OU3 RI are shown in Figure 5. In addition to the shallow and deep bedrock wells described above, three staff gages were installed in Bound Brook (SG-1, SG-2, and SG-3) near the former CDE facility; one staff gage was installed adjacent to MW-20 in Spring Lake (SG-4); and one staff gage was installed adjacent to MW-21 in Bound Brook (SG-5) at the locations shown in Figure 5.

The results from the RI are summarized below; further details can be found in the *Final Remedial Investigation Report for Operable Unit 3: Groundwater* (Louis Berger, June 2012):

- Contaminants released to the unconsolidated soil overlying bedrock was the source of CVOCs, PCBs, dioxins/furans, and pesticides detected in the underlying groundwater at, and down-gradient of, the former CDE facility.
- While the shallow water bearing zone underlying the Site is highly fractured and unconfined, with groundwater potentially discharging to Bound Brook and Cedar Creek, the intermediate and deep water bearing zones are not as highly fractured, creating anisotropy and a confining effect with depth. Groundwater samples collected from monitoring wells in shallow, intermediate and deep water bearing zones show the presence of CVOCs. Groundwater movement and aqueous CVOCs have migrated to the north, northeast, and northwest under the influence of current and historical regional groundwater pumping by several production wells and wellfields near the former CDE facility. [While Cedar Creek and Bound Brook were identified as potential receptors of the contaminated groundwater emanating from the former CDE facility in the Louis Berger OU3 RI, the Louis Berger OU4 RI confirmed that contaminated groundwater was discharging into Bound Brook.]

- Matrix diffusion analyses of bedrock cores show that CVOCs have diffused into the rock matrix at, and down gradient of, the former CDE facility. This renders them relatively immobile when compared to the dissolved aqueous mass in the fracture network. The mass in the rock matrix will act as a long-term storage reservoir of CVOCs in the bedrock.
- The fractured sedimentary rock matrix has a high capacity to attenuate the dissolved aqueous mass, and the factors influencing the distribution of aqueous mass will reach equilibrium with the attenuation capacity of the rock matrix. When this occurs, the leading edge of the contaminated groundwater emanating from the former CDE facility will stabilize, and will no longer advance down-gradient.
- CVOC mass which has diffused into the rock matrix becomes a source of dissolved CVOC mass to groundwater, and can be the source of CVOC contaminant mass for time periods ranging from decades to centuries. As a result, CVOC contaminated fractured rock aquifers generally cannot be restored to their highest beneficial use (potable water supply) in a reasonable timeframe or at a reasonable cost.

1.7 OU4 (Bound Brook) Remedial Investigation (2010-2014)

Beginning in October 2010 and continuing to May 2013, a field program was implemented at OU4 in support of a Remedial Investigation and Feasibility Study (RI/FS) of Bound Brook. The RI/FS for OU4 addressed Bound Brook sediment and floodplain soil as well as pockets of buried capacitor debris, contaminated OU3 groundwater discharging to surface water, and replacement of a water main crossing the former facility property. The OU4 work was necessitated by findings that indicated the potential for transport of contaminated soil and waste from OU2 into OU4, potential for discharge of contaminated groundwater from OU3 into OU4 (by detection of PCB concentrations up to 190 mg/kg in Bound Brook), and the potential for water main leakage to disrupt previous remediation activities at the former CDE facility property. The potential for discharge of contaminated groundwater from OU3 into OU4 stemmed from results of the OU3 RI, namely stream elevation surveys, groundwater modeling, and consideration of current municipal pumping regimes. The OU4 RI further characterized the potential for groundwater contaminants to impact Bound Brook via stream flow surveys and passive sampler (porewater and surface water) deployment and analysis. While the sediment beds in Bound Brook currently possess a large contaminant inventory, the PCB load in groundwater discharging to Bound Brook near the former CDE facility will become a concern in the future as a potential source of recontamination of remediated OU4 sediments.

The presence of VOCs in porewater and sediments near the former CDE facility provided an additional line of evidence that contaminated groundwater is discharging to Bound Brook. Moreover, elevated Total PCB concentrations in the surface water, porewater, and sediments coincide spatially with Total VOC porewater detections, suggesting that chlorinated solvents in the groundwater may be enhancing the mobility of PCBs due to co-solvency. Further details of the OU4 RI can be found in the *Final Remedial Investigation Report for Operable Unit 4: Bound Brook* (Louis Berger, June 2014).

1.8 Feasibility Study and Record of Decision

The Feasibility Study (FS) for OU3 documented the evaluation of the technical feasibility of aquifer restoration using potential remedial technologies. The standalone Technical Impracticability Evaluation Report (TIER) concluded that the long history of contaminant release, the presence of CVOCS in the bedrock groundwater and rock matrix pore water, and the complex geology of the Site, limit the ability of available remedial technologies to meet groundwater Applicable or Relevant and Appropriate Requirements (ARARs). The report identified an approximately 825 acre Technical Impracticability (TI) zone within which groundwater ARARs cannot be met using available remedial technologies.

EPA determined that the appropriate remedy for the groundwater at the Site was a combination of Institutional Controls (ICs) and Groundwater Monitoring. The selected remedy, as outlined in the September 2012 ROD, satisfies the requirements of CERCLA Section 121 and the National Contingency Plan's (NCP's) nine evaluation criteria for remedial alternatives, 40 CFR § 300.430(e)(9). The selected remedy includes the following components:

- Prevention of exposure to Site groundwater contamination by identifying private wells within the OU3 study area, placing ICs in the form of a CEA to prevent the installation of new drinking water wells;
- Implementation of a long-term sampling and analysis program to monitor the groundwater contamination at the Site, to prevent exposure and assess groundwater migration; and
- Implementation of a long-term vapor intrusion monitoring program.

1.9 Document Organization

This LTMP is organized as follows:

- Section 1: Introduction – Discusses the location of the Site, as well as provides a brief history of activities performed at the Site to date.
- Section 2: Scope and Objectives – Describes the problem statement, scope of the program, and data needs.
- Section 3: Implementation of the Selected Remedy – Presents overview of the selected remedy, biennial recertification of the CEA, and what field methods will be used for collection and preservation of the samples. Also describes field quality assurance and quality control procedures.
- Section 4: Project Organization – Defines key personnel and their anticipated roles.
- Section 5: Schedule and Reporting – Summarizes the long-term monitoring schedule requirements, reporting schedule, and describes the deliverable that will be produced.
- Section 6: References – Lists all documents from which information was taken to develop this LTMP.

The following tables are included in the LTMP to provide specific technical details for use by the CONTRACTOR in the execution of the program and the evaluation of results:

- Table 1 presents a monitoring well construction summary, which indicates the discrete depth interval targeted by each of the monitoring wells and FLUTe™ ports.
- Table 2 presents the sample frequency schedule for the long-term monitoring plan. This table is to be used to determine the specific analyte list and annual monitoring frequency, including recommended QAQC samples, for the duration of the long-term monitoring.
- Table 3 presents a sample summary table which presents the total number of samples to be collected, with sub-totals for each analyte, during each phase of the monitoring plan (i.e. years 1 and 2, years 3 through 5, years 6 through 15, etc.)
- Table 4 presents the water level measurements collected during synoptic monitoring events during the Louis Berger OU3 RI. This table is provided as use as a template for future synoptic water level measurements.
- Table 5 presents the groundwater remediation goals, as identified in the OU3 ROD. The remediation goals will be presented for comparison is all groundwater monitoring summary tables, and may be used to evaluate potential (future) changes to the monitoring plan.
- Table 6 presents a summary of the trend plots required to assess changes in the groundwater plume during the long-term monitoring program.

2. Scope and Objectives

The purpose of Long-Term Monitoring of the groundwater at the Site is to prevent exposure and assess groundwater migration. The Remedial Action Objectives (RAOs) for OU3 were developed to satisfy the expectations of the USEPA to return usable groundwater to its most beneficial use wherever practicable within a reasonable timeframe, given the characteristics of the Site. When this is not possible, the USEPA expects to prevent further migration of contaminants and evaluate further risk reduction.

2.1 Problem Statement

In developing the RAOs for groundwater, USEPA considered the expectation of returning usable groundwater to its beneficial uses wherever practicable, within a timeframe that is reasonable given the characteristics of the site. The RAOs for OU3, outlined in the ROD, are as follows:

For "Exposure Control":

- Prevent or minimize potential risks to human [and ecological][1] receptors from exposure by contact, ingestion, or inhalation/vapor intrusion of contaminants in groundwater attributable to the Site.

For "Source Control":

- Mitigate, to the extent practicable, a "contaminant source area" as an ongoing source of groundwater contamination to areas beyond it;
- Demonstrate the potential (through predictive aquifer modeling) that mass reduction or containment of the targeted "contaminant source area" would provide long-term improvement to the groundwater in a reasonable time frame; and
- Support further risk reduction for the site as a whole.

USEPA implemented a remedial action for the former CDE facility that addressed CVOCs and PCBs in the overburden soil. This action satisfied USEPA's efforts to address site sources to the extent practicable, and also supported further risk reduction at the Site.

USEPA also evaluated groundwater remedies designed to address "contaminant source areas" in bedrock groundwater beneath the former CDE facility. Contaminant fate and transport modeling demonstrated that additional mass reduction in bedrock groundwater beneath the former CDE facility would yield minimal long-term improvement in groundwater quality in a reasonable timeframe. USEPA acknowledged that groundwater restoration to drinking water standards is not always achievable due to limitations in remedial technologies and other site-specific factors.

[1] In the OU3 ROD, USEPA indicated that potential risks to ecological receptors will be evaluated in the OU4 RI/FS. The OU4 RI/FS has since been completed and USEPA's Proposed Plan for OU4 identifies risks to ecological receptors in Bound Brook.

Based on the findings of the FS and the Technical Impracticability Evaluation Report (TIER), a waiver of the groundwater ARARs was required due to Technical Impracticability.

For "Aqueous Plume Remediation":

- Prevent further migration of site contaminants in groundwater at levels posing an unacceptable risk to human health beyond the areal extent of the proposed TI zone.

For the bedrock groundwater, the extensive zone over which CVOCs have adsorbed to and/or diffused into the bedrock matrix (~825 acres) constitutes what is expected to be an ongoing source of contamination (for centuries) to the groundwater via back-diffusion to the groundwater in the fractures. Groundwater modeling demonstrated that the movement of groundwater is controlled by current and historical municipal well pumping, and that the plume is no longer expanding. As discussed in the TIER (Louis Berger, 2012c), there are no remedial prospects for achieving ARARs for the whole of the affected aquifer within a reasonable timeframe (Figure 6). However, USEPA expects to prevent further migration of the plume and prevent exposure to the contaminated groundwater, as expressed in the RAOs stated above.

USEPA also deferred any action related to the discharge of contaminated groundwater to surface water (Bound Brook) until the completion of the OU4 RI/FS. The September 2014 Proposed Plan for OU4 identified the following RAO that is NOT addressed as part of this LTMP:

- Prevent migration of contaminated groundwater above acceptable surface water quality standards to the surface water and sediments.

To achieve the RAOs for groundwater, the OU3 ROD specified the following remedy:

- Prevention of exposure to site groundwater contamination, by continuing efforts to identify existing private wells within the OU3 study area, and by placing institutional controls in the form of a Classification Exception Area to prevent the installation of new drinking water wells;
- Implementation of a long-term sampling and analysis program to monitor the groundwater contamination at the site, in order to prevent exposure and assess groundwater migration; and
- Implementation of a long-term vapor intrusion monitoring program (USEPA is evaluating vapor intrusion issues related to site contaminants under a separate monitoring program).

The development and implementation of a long-term groundwater sampling and analysis program, outlined in this LTMP, is to address, at a minimum, the following:

- Monitoring objectives, overview of monitoring approach, monitoring program design, data analysis and interpretation, reporting requirements, schedule, Field Sampling Plan, Quality Assurance Project Plan, Health and Safety Plan, field forms, and other relevant information.

- The primary objective of the monitoring program is to provide data that can be evaluated to confirm prevention of exposure to contaminated groundwater and document that contaminated groundwater is not migrating past its current extent.

The monitoring program for groundwater includes, but is not limited to, water level measurements, field measurements of water quality parameters, collection and analysis of samples from wells at the Site, and comparison of results to previous data. Wells to be sampled as part of the monitoring program include the 12 shallow bedrock wells and 22 deep bedrock wells installed prior to the ROD, and 4 deep bedrock wells at the distal and lateral extent of the TI zone installed subsequent to the ROD. All monitoring wells to be sampled under this LTMP are shown in Figure 5[2].

2.2 Monitoring Hypothesis

The objective of long-term monitoring at the Site is to answer the following questions:

- Does the institutional control prevent or minimize potential risks to human and ecological receptors from exposure by contact, ingestion, or inhalation/vapor intrusion of contaminants in groundwater attributable to the Site?

Groundwater contamination within the CEA will be monitored and compared with previously documented results. The results will be used to evaluate and support the ongoing need for institutional control (CEA) to maintain exposure control at the Site. While this LTMP directly addresses the evaluation of Site-related contaminants in groundwater, USEPA is evaluating vapor intrusion issues related to site contaminants under a separate monitoring program.

- Is the extent of groundwater contamination attributable to the Site remaining stable and not expanding beyond the TI zone (CEA)?

Groundwater concentration trends at each well or sampling port within the proposed CEA will be evaluated using the Mann-Kendall Test. Analytical parameters are shown on Table 2, and trend analysis will be required for all parameters included in the list of Remediation Goals (Table 5). A minimum number of trend plots for select parameters at select locations will be defined as shown in Table 6; additional representative locations can be plotted as needed to demonstrate trends and support management decisions (see Section 3.2). The results will be used to evaluate whether the contaminant plume attributable to the Site is remaining stable and not expanding beyond the TI waiver zone. .

2.3 Data Needs

To satisfy the ROD objectives, specifically the Preliminary Remediation Goals (as defined in Table 7 of the ROD), and to collect the data required to answer the questions posed above, the following

[2] The four wells designed and installed subsequent to the ROD are shown on Figure 5. Approximate locations are shown at this time; the actual locations will be incorporated in the Revised Final LTMP that will be issued once the baseline sampling program is complete.

data shall be collected with the required analyte type, sample location, and frequency specified in Table 2:

- Groundwater samples will be collected for some or all of the following analytes - VOCs, SVOCs, Metals, Pesticides, Dioxins/Furans, PCB Aroclors, and PCB Congeners (required to calculate the 2,3,7,8-TCDD Toxicity Equivalence) - from up to 12 traditionally constructed bedrock monitoring wells located on the former CDE facility, and 26 multi-level (FLUTe™) bedrock groundwater sampling devices located across the Site (*please refer to Table 2 - Sample Frequency Schedule*). A total of 162 discrete-depth sampling ports are available at the 26 FLUTe™ locations. Adding the 12 traditionally constructed locations with open-hole bedrock wells yields a total of 174 available sampling points in the monitoring network.
- Water quality parameters will be measured prior to sampling in order to determine groundwater stability during purging and establish the representativeness of samples.
- Water levels will be measured in each sampled monitoring well/ FLUTe™ port prior to sampling.
- Presence of organic vapors in well headspace prior to well monitoring and sample collection at open-hole bedrock monitoring wells (health and safety issue).

2.4 Data Quality Objectives

The QAPP outlines the detailed sampling and analytical procedures for the medium to be sampled, the number and type of each sample, and the Quality Assurance/Quality Control (QA/QC) sample requirements for each parameter. The DQOs for each sample type are identified in the QAPP based on the highest analytical level for the intended use of the data. The QAPP identifies precision, accuracy and completeness goals used in selecting the sampling and analysis methods. The QAPP also contains details of field activities, such as Standard Operating Procedures (SOPs) for the collection of groundwater samples. A representative framework USEPA-CLP QAPP is included as Appendix A to this Work Plan; the CONTRACTOR shall prepare a final QAPP, including CONTRACTOR'S standard operating procedures and proposed analytical methods (using either CLP or private subcontract laboratory as directed by USACE upon implementation of this LTMP) for review and approval by USACE prior to the initiation of any LTMP-related field activities.

The DQO process is a tool that may be used to improve the quality of the data collection process by generating data that support defensible decisions. The DQO process addresses study objectives, data collection, and limits on decision errors. Implementation of the DQO process involves a seven-step data life cycle that generates a set of quantitative and qualitative statements pertaining to data collection activities (USEPA, 2000).

DQOs ensure that the quality of data for particular field activities are acceptable for the intended use of the data and also ensure precision, accuracy, reproducibility, comparability, and completeness. The DQO process is discussed further in Attachment 1.1 of the QAPP.

3. Implementation of the Selected Remedy

This section outlines the selected remedy and long-term monitoring plan, describes the required biennial re-certification of the CEA, and describes the methods and procedures to be used during the monitoring at the Site.

NOTE TO THE READER: *Four monitoring wells referenced in this LTMP - MW-24, MW-25, MW-26, and MW-27 - have yet to be installed as of April 2015 [date of final LTMP]. However, since the intent of this document is for the sampling outlined herein to be implemented by a long-term RA contractor after installation of those four wells, the wells are presented as if they have already been installed.*

3.1 Overview of Selected Remedy and Monitoring Plan

The selected remedy was developed to prevent receptor exposure to contaminated groundwater while demonstrating that COCs are not migrating beyond the proposed TI Zone at levels posing unacceptable risks to receptors. The plan entails establishing institutional controls (CEA) to prevent or reduce exposure to hazardous substances, completing the monitoring well network, and conducting long-term monitoring to verify that concentrations of contaminants that emanate from the Site remain stable. The groundwater CEA has been established in accordance with New Jersey regulations. The CEA is depicted on Figure 7 (***actual CEA to be supplied upon certification by NJDEP***). Monitoring results will be evaluated and reported in annual monitoring reports.

The monitoring well network used for the Louis Berger OU3 RI (see Table 1) was enhanced by the addition of four new monitoring wells with FLUTe™ multi-level systems. The four additional monitoring wells (MW-24, MW-25, MW-26, and MW-27) were installed at the edges of the TI Zone to monitor contaminant concentrations near the distal portions of the plume (see Figure 6). The frequency of sampling will vary by location and year, with more samples collected during the initial years of the program and decreasing as the program progresses. A general summary of the program is as follows:

- All of the wells and ports shall be sampled quarterly for VOCs for the first two years. Samples shall also be collected at a reduced frequency from all wells/all ports during this period for PCB Aroclors and Metals. Samples shall be collected from select wells and ports at a reduced frequency for SVOCs, Pesticides, Dioxins, Furans, and PCB Congeners.
- After the first two years of quarterly monitoring, the prescribed frequency of sampling decreases to semi-annual for VOCs during Years 3 through 5, with additional reductions in frequency applied to select wells, ports, and analytes.
- Sampling will be performed on an annual basis during Years 6 through 15, and sampling would be performed once every two years during Years 16 through 30.

Details of the sampling frequency broken out by time period and by analyte are presented in Table 2, and a comprehensive sample summary is presented in Table 3.

Any well in the monitoring network that becomes damaged, or is required to be removed due to remedial action or other activities, will be replaced or repaired, as needed. Additionally, the condition of staff gauges shall be assessed and will be repaired/replaced as warranted. Because hazardous contaminants remain at the Site under the selected remedy, review of the remedy every five years is required under CERCLA Section 121(c). The initial five-year review was completed in November 2011; subsequent five year reviews will include data collected as part of this LTMP.

3.2 Monitoring Plan Management Decisions

The initial groundwater monitoring sampling network and analytes are shown in Table 2. Sampling will be conducted at the locations/ports recommended for retention in the CDE OU3 Final Feasibility Study (June 2012). As noted in USEPA (OSWER) directive No. 9355.4-28 dated January 2004, "it may be appropriate to decrease the monitoring frequency (*e.g.,* semiannually, annually, or for even longer time periods) and number of constituents once it has been determined that the remedy is performing as expected and very little change is observed from one sampling round to the next."

Following the completion of the first year of monitoring under this LTMP, CONTRACTOR shall compile and review data from the following sampling events/reports: 2012 Remedial Investigation Report; the 2016 Remedial Action Baseline Sampling Report; and the Year 1 results of this LTMP. These data will be used to evaluate the need for retention/elimination of sampling locations/analytes or increased/decreased monitoring frequency, in accordance with the proposed decision rules described below.

3.2.1 Trend Analysis

Data trend statistics shall be evaluated using the Mann-Kendall Trend Test or Seasonal Kendall Test (where a sufficient number of non-seasonally influenced data have not yet been collected) on all data collected. At a minimum, trend plots will be generated for target compounds at select locations (see Table 6); additional representative trend plots may be produced and included in data evaluation reports as needed to support management decisions.

The first two years of sampling are intended to complete the statistical baseline for evaluation of trends that shall be performed using data from subsequent sampling rounds. The Mann-Kendall Trend Test requires non-seasonally affected data, and a minimum of four (n=4) data points to conduct a trend evaluation. The RI/FS data, the baseline data collected as part of the RA, and the first two years of the LTMP provide n=4 for a minimum of two seasons. The Seasonal Kendall Test shall also be applied to the data to evaluate seasonal variability, and to potentially correct for seasonality in the remaining data sets.

The Mann-Kendall statistic (S) is calculated through pair-wise comparisons of each data point with all preceding data points, and calculating the number of increases, decreases, and ties. A positive value for S implies an increasing temporal trend, whereas a negative value implies a decreasing

trend. A value of S near zero suggests stability; there is no significant upward or downward trend. A statistically significant trend is reported if the absolute value of S is greater than the "critical value" of S (obtained from a table) (ITRC, 2013).

3.2.2 Decision Rules

The following general decision rules are proposed for consideration as part of the decision-making process to be used in the evaluation of the long-term management of this plan. However, the satisfaction of one or more of these criteria must also be weighed against the overall data needs required to reliably implement the remedy.

1. The elimination of a well/port may be proposed if the concentration of all Site-related COCs are less than the Remediation Goals (Table 5) for three consecutive sampling events.
2. The elimination of an individual analyte or analyte group at a select well/port may be proposed if the concentration(s) of the individual analyte or analyte group are less than the Remediation Goals (Table 5) for three consecutive sampling events.
3. The elimination of a well/port may be proposed if the concentration of all Site-related COCs show a decreasing trend.
4. A reduction in sampling frequency of a well/port may be proposed if the concentration of all site related COCs show a stable trend.
5. A reduction in sampling frequency of an individual analyte or analyte group at a select well/port may be proposed if the concentration(s) of the individual analyte or analyte group shows a stable trend.
6. The expansion of the monitoring network (installation of a new well) may be proposed if Site-related COCs show an increasing trend at the down-gradient extent or side-gradient extent of the CEA.

Justification for the elimination of wells, ports, or analytes will be submitted on a location-specific basis. No changes will be made to the monitoring network or list of analytes without the prior written concurrence of the USEPA and USACE. If a change is approved, the sampling protocol will be revised and incorporated as an addendum to the LTMP.

3.3 Biennial Re-Certification of the Classification Exemption Area (CEA)

As part of the long-term monitoring of OU3 Groundwater, the CEA must be evaluated on a biennial basis to affirm and certify its protectiveness of public health and the environment. This certification must be submitted to NJDEP every two years following the anniversary of the effective date of the permit, and shall be prepared under the direction and oversight of the USEPA. The Remedial Action Protectiveness/Biennial Certification Form-Groundwater is attached as Appendix B. The evaluation of the protectiveness of the remedy will include, but is not limited to, the following:

- The remedial action protectiveness biennial certification shall include a comparison of the laws, Ground Water Quality Standards, and other regulations applicable at the time the Department established the ground water classification exception area, with any relevant

subsequently promulgated or modified laws or regulations to determine whether the classification exception area remains protective. The results shall be provided in table format, comparing of applicable laws, regulations, and standards. [N.J.A.C. 7:26C-7.9(b)2]

- The Remedial Action Protectiveness/Biennial Certification Form shall include an evaluation of whether there are any planned changes within a 25-year water use planning horizon for the aquifer in which the ground water classification exception area is located since the Department established the groundwater classification exception area or the last completed biennial review, whichever is more recent. [N.J.A.C. 7:26C-7.9(b)3]
- The Remedial Action Protectiveness/Biennial Certification Form shall include an evaluation of whether there have been any actual changes in the groundwater use since the Department established the groundwater CEA or the last completed biennial review. The results of the evaluation of the changes in groundwater use include a scaled map identifying all wells (including private wells) and/or waterlines found within one mile from any part of the boundaries of the groundwater CEA. [N.J.A.C. 7:26C-7.9(b)4]
- The permittee (USEPA) shall maintain a maintenance and evaluation log for each monitoring well used to establish the groundwater CEA. The log shall include a description of any well damage or vandalism identified or repairs completed. If any of the damage resulted in the decommissioning of well, provide a copy of the Well Abandonment Report. [N.J.A.C. 7:26C-7.9(b)5]
- The Remedial Action Protectiveness/Biennial Certification Form shall include an evaluation of any land use disturbance that may intercept the water table within the area of the groundwater CEA that could result in a contaminated discharge to surface water. If any such disturbances are identified, sample the groundwater/surface water down-gradient and proximate to the land use disturbance to determine whether the groundwater meets the more stringent of either: (1) The New Jersey Surface Water Quality Standards, N.J.A.C. 7:9B; or (2) The Federal Surface Water Quality Criteria, 40 CFR Part 131. [N.J.A.C.7:26C-7.9(b)6]
- The Remedial Action Protectiveness/Biennial Certification Form shall include an evaluation of the fate and transport of the groundwater contamination plume, including any additional remediation conducted, modification of the remedial action, or proposed revision of the ground water classification exception area, and apply for a modification of the ground water remedial action permit to ensure that the remedial action remains protective of the public health and safety and the environment. [N.J.A.C. 7:26C-7.9(b)7i and (d)2]
- The permittee shall evaluate any changes in property use that may increase the risk of vapor intrusion from volatile ground water contaminants. [N.J.A.C. 7:26C-7.9(b)7ii and (d)2]

A copy of the biennial re-certification shall be included in the subsequent annual monitoring report for the year in which the evaluation occurred. Additional reporting requirements can be found in Section 5 of this report.

3.4 Field Procedures

The following discussion presents a brief summary of the information presented in the template QAPP, included as Appendix A, and does not supersede the QAPP. The reader should refer to Appendix A for a complete description of all field procedures and activities to be conducted under the LTMP.

3.4.1 General Condition Assessment

Upon arrival at each monitoring well location, any site conditions that may affect the quality of the sample shall be documented. Weather conditions shall also be recorded, including temperature, cloud cover (*e.g.,* partly cloudy, full sun, etc.), relative humidity, wind direction and speed, and precipitation (*e.g.,* type and intensity). Other potential field conditions include the presence of airborne particulates such dust or soot from heavy truck traffic, or the presence of unusual odors. Further, the outer protective monument, well casing, and well cap shall be inspected for any signs of damage or vandalism. If there is evidence of damage, or if a lock is missing, this information shall be recorded in the field notebook and reported to the Project Manager (PM). Staff gages will also be assessed for any damages. Wells and gages will be replaced or repaired as needed.

Before on-site traditional bedrock wells are sampled, the headspace shall be screened for the presence of organic gases using a Photo Ionization Detector (PID) or Flame Ionization Detector (FID). No headspace measurements are required at wells where multilevel samplers have been installed. If organic vapors are detected, the instrument reading shall be documented in the field notebook and the gases allowed to dissipate before proceeding.

3.4.2 Water Level Measurements

Water level measurements shall be collected and recorded at all shallow bedrock monitoring wells and all ports as a part of each groundwater sampling event. These measurements shall be obtained at traditionally constructed wells using either manual water level meters or pressure transducers installed within the wells. Additionally, the depth to the bottom of each conventionally-screened well on the former CDE property shall be measured and recorded to determine if screen occlusion due to siltation is/has occurred. This will be accomplished through comparison of the measured value to the bottom depth recorded in the original well construction logs, included in Appendix C.

The water level in FLUTe™ ports shall be determined using a bead-type electric water level meter to measure the water level in the pump tube (refer to Appendix A for the appropriate example SOP; the actual SOP shall be developed by the CONTRACTOR and included in the CONTRACTOR'S QAPP). Surface water measurements shall be collected and recorded at all five staff gages located in Bound Brook and Spring Lake; water levels at the staff gages shall be measured from the gages to the nearest 0.01 feet. If free product, such as NAPL, is detected in the well, its presence and thickness shall also be recorded. Any equipment and/or instruments shall be decontaminated as required according to procedures included in the CONTRACTOR'S QAPP

All recorded water levels and NAPL measurements shall be accompanied by the well number, date, and time. Water level measurements collected during the Louis Berger OU3 RI, including surveyed measuring point reference elevations, has been included for use as a reporting template (Table 4).

3.4.3 Groundwater Sampling

Groundwater samples shall be collected from the screened areas of traditional shallow groundwater wells present on the former CDE facility, as well as from the ports of deep monitoring wells outfitted with multilevel FLUTe™ liners. Traditional screened bedrock monitoring wells shall be purged and sampled in accordance with techniques designed to achieve stable, low-flow conditions with minimal drawdown. The location of the low-flow pump intake shall be recorded during each sampling event and shall remain constant during subsequent sampling events. The position of the low-flow pump intake relative to the screened interval shall be centered in the middle of the screened interval. Dedicated bladder pump heads with associated air and water tubing shall be installed by the CONTRACTOR at each of the 12 on-site traditional bedrock wells for the duration of the LTMP.

Monitoring wells equipped with FLUTe™ multiport systems shall be purged and sampled in accordance with the FLUTe™ 2009 sampling guidelines. Sampling guidelines are attached to the QAPP (Appendix A). In accordance with the QAPP, well sampling shall not be conducted until field water quality parameters have stabilized. These parameters include:

- pH
- Conductivity
- Dissolved Oxygen
- Temperature
- ORP

Field water quality parameters shall be collected using a YSI 556 Multiprobe Water Quality Meter or equivalent connected to a flow-through cell. Readings shall be taken every three minutes for the first 15 minutes and five minutes thereafter until water quality parameters stabilize. Details of this procedure, as well as the requirements for stabilization, are attached to the QAPP (Appendix A).

The frequency of sampling will vary by location and year, with generally more samples collected during the initial years of the monitoring program and decreasing as the program progresses. Samples shall be collected at the frequency and distribution presented in Table 2. Collected water shall be analyzed for the following parameters at the frequency detailed in Table 2:

- Target Compound List (TCL) VOCs;
- TCL SVOCs;

- TCL Pesticides;
- PCB Aroclors;
- Target Analyte List (TAL) Metals;
- Dioxins and Furans; and
- PCB Congeners.

Details of sample analyses are presented in Appendix A.

3.4.4 Sample Management

Sample management is the process by which field samples are handled once collected. This process encompasses sample labeling, preservation, documentation, and shipment to the lab. All samples shall be placed in a cooler at 4°C immediately upon collection. A subset of the samples will also require chemical preservation. The type of chemical preservation shall be defined by the selected analytical laboratory (CLP or private subcontract laboratory, as directed by USACE upon implementation of this LTMP) based on the analytical method(s). Sample containers shall be provided by the analytical laboratory, and shall come pre-preserved for those constituents which require chemical preservation.

Sample custody documentation provides a written record of sample collection and analysis, and sample custody procedures provide for specific identification of samples associated with an exact location, the recording of pertinent information associated with the sample, and a chain of custody (COC) record that serves as physical evidence of sample custody. SCRIBE software developed by the USEPA shall be used to develop chain of custody documentation.

Samples shall be shipped overnight to the laboratory for chemical analysis. Specific guidance on sample management is included in the template QAPP (Appendix A).

3.5 Quality Assurance/Quality Control

Quality assurance/quality control (QA/QC) samples are collected as a "check" on the field and analytical programs, intended to provide an indication of how consistent sample collection and analysis are over the course of the program. The following QA/QC samples shall be collected (at a minimum) as part of the long-term monitoring at the Site:

- Field Duplicates – Field duplicates shall be collected at the rate of 5 percent (1 per 20 field samples). The purpose of these samples is to check the reproducibility of laboratory and field procedures, and indicate non-homogeneity.
- Equipment Blanks – Equipment blanks shall be collected at the rate of one per sampling event for events which are one week in duration or less. For longer events, one equipment blank shall be collected per week of sampling. Equipment blanks are collected to determine if field decontamination procedures are adequate.
- Field Blanks – Field blanks are collected to check cross contamination during sample collection, sample shipment, and in the laboratory. Field blanks shall be collected for each group of samples of similar matrix per day of sampling.

- Matrix Spike/Matrix Spike Duplicates (MS/MSD) – MS/MSD samples shall also be collected as required by CLP methodology. MS/MSD samples are required by the laboratory to evaluate the matrix effect of the sample upon the analytical methodology.
- Trip Blanks – Trip blanks shall be collected at the rate of 1 per 20 VOC samples, and shipped at a rate of 1 per cooler shipment to laboratory. Trip blanks are used to check for contamination of VOC samples during handling, storage, and shipment from field to laboratory.

3.6 Special Training and Certification

Field personnel conducting sample collection, as well as all other individuals on-site, shall have received Occupational Safety and Health Association (OSHA) and other safety training as specified in the Contractor's Site-Specific Health and Safety Plan (SSHP), which shall be submitted by the Contractor prior to commencement of field activities. Field personnel conducting sample management have responsibility for the creation of COC records shall have participated in online USEPA training in the use of SCRIBE software. Prior to commencement of groundwater sampling activities, personnel performing groundwater sampling on FLUTe™ wells shall receive site-specific training (provided by the manufacturer) in the proper techniques for purging, gaging, and sampling of FLUTe™ multiport sampling devices.

3.7 Documentation

Field activities conducted as part of the long-term monitoring shall be documented by field personnel using one or more of the following methods:

- Field Notebook (Field Team Leader) – May be used as a daily record for site activities and shall capture site conditions, including but not limited to the following:
    - Date of activities;
    - Start time;
    - Site conditions;
    - Personnel on site (including subcontractors), and their arrival and departure times;
    - Visitors on site, as well as their arrival and departure times; and
    - Equipment calibration results.
- Photographs (All field personnel) – May be used to document any unusual conditions observed during field activities. The identification number, date, time, the direction the photographer is looking, and a description of what the image is meant to convey shall be recorded in the field notebook.
- Groundwater Sampling Data Forms (All Field Personnel) – May be used to record water quality parameters during well stabilization and sampling, instrument calibration data, water levels, and purge volumes.
- Chain of Custody Forms (Field Sample Manager) – Shall be developed by the Field Sample Manager using SCRIBE software. Includes project information, sample dates and times,

sample type, analyte, project manager, sampling contact, selected lab, lab contact, and lab shipping address.

3.8 Investigation Derived Waste (IDW)

All investigation derived waste shall be containerized, managed, and disposed in accordance with the QAPP (Appendix A).

4. Project Organization

The project management team will consist of representatives from the USEPA, the USACE, and the CONTRACTOR. The USEPA and USACE will provide technical oversight to the project and contract management guidance to CONTRACTOR. CONTRACTOR shall be responsible for implementing the LTMP, and shall conduct primary oversight of any subcontractors. The names and responsibilities of current key project personnel that will be involved in long-term groundwater monitoring at the Site are listed in Figure 1 of the QAPP (Appendix A).

4.1 US Army Corps of Engineers

The USACE Project Manager has yet to be determined. This individual, once assigned, is responsible for technical, schedule, and financial administration of the contract.

4.2 US Environmental Protection Agency

The USEPA Project Manager has yet to be determined. This individual, once assigned, will provide regulatory guidance and review of the LTM activities described herein.

4.3 CONTRACTOR Personnel

The following CONTRACTOR organizational structure is for guidance purposes only; the CONTRACTOR shall be responsible for developing a project structure that satisfies all project requirements.

Project Officer: The Project Officer (PO) shall be responsible for the commitment of resources required to fulfill CONTRACTOR's obligation to the USACE.

Project Manager: The Project Manager (PM) shall be accountable to the PO throughout the duration of the project. The PM shall be the primary point of contact for the USACE. The PM may delegate authority to expedite and facilitate the implementation of the project plan. The PM shall be responsible for:

- Coordination with the USACE.
- Budget control.
- Subcontractor performance.
- Project coordination to implement the LTMP.
- Allocation of staffing and resources to implement the QA/QC program and the CONTRACTOR'S health and safety program, including implementation of the CONTRACTOR'S SSHP.
- Review of CONTRACTOR submittals.

Project Safety Officer: The Project Safety Officer (PSO) shall be knowledgeable in safety and worker protection techniques as they relate to the project. Responsibilities include monitoring daily compliance of work to the SSHP, having the ability and authority to make needed changes

or additions to the SSHP and providing technical assistance to the Project Manager on problems relating to work safety.

The PSO shall be responsible for the development and set-up of emergency procedures and personnel decontamination procedures. The PSO or designee shall complete a daily diary of activities with health and safety relevance. If unsafe work conditions are encountered, the PSO is authorized to stop work. Resolution of all health and safety problems shall be coordinated through the PM with assistance from a Certified Industrial Hygienist (CIH).

Project Quality Assurance / Quality Control Officer: The Project Quality Assurance / Quality Control (QA/QC) Officer shall be responsible for project specific supervision and monitoring of the QC program and reports to the PM. Additional responsibilities include:

- Ensuring that field personnel are familiar with and adhere to proper sampling procedures, field measurement techniques, sample identification, and chain-of-custody procedures.
- Coordinating with the analytical laboratory for the receipt of samples, the reporting of analytical results, and recommending corrective actions to correct deficiencies in the analytical protocol or sampling.
- Preparing QA reports to management.

Field Team Leader: The Field Team Leader shall serve as the contact person for CONTRACTOR for all field activities. The Field Team Leader shall be responsible for the logistics of all field activities. The Field Team Leader shall:

- Inspect and replace equipment.
- Prepare interim field reports.
- Prepare samples for shipment.
- Coordinate field activities.
- Schedule sampling and other field activities.

Data Validator: Qualified data validation specialists shall be assigned as required to validate any non-CLP data from a subcontract laboratory. Any data validation required of USEPA's Division of Environmental Assessment (DESA) laboratory or USEPA Contract Laboratory Program laboratories, should they be utilized by CONTRACTOR, shall be performed by the USEPA.

4.4 Analytical Laboratories

The CONTRACTOR'S selected analytical laboratory(ies) shall be responsible for properly receiving, storing, extracting, and analyzing the samples and reporting the results in accordance with the QAPP (Appendix A).

5. Schedule and Reporting

5.1 Monitoring and Reporting Schedule

The long-term monitoring program shall be executed in accordance with the sampling frequency schedule provided as Table 2. No changes shall be made to the monitoring network or list of analytes without the prior written concurrence of the USEPA and USACE. In addition, the biennial recertification of the CEA will occur every two years following the anniversary of the effective date of the permit.

A register of the required LTMP tasks and submittals, including planning documentation, sampling events, and monitoring reports, is included in Table 7.

5.2 Data Quality Management

5.2.1 Field Activity Quality Control

Descriptions of sampling activities are provided in the framework QAPP provided as a reference (Appendix A). The CONTRACTOR shall prepare a final QAPP for review and approval by USACE prior to the initiation of any LTMP-related field activities. The site-specific QAPP shall include information such as sampling methods, standard operating procedures, sampling equipment specifications, sample preservation requirements, allowable holding times, chain-of-custody procedures, and record-keeping requirements. Specific QC and documentation procedures will also be presented in this document.

Daily Quality Control Reports (DQCR) shall be completed to document all field activities. A copy of the DQCR is included in the framework QAPP. Any deviation from the methods and standard operating procedures detailed herein shall be documented in a Field Modification Form (FMF). A copy of the FMF is included in the framework QAPP.

Reports of substantive non-conformance will be transmitted by the CONTRACTOR's Project QA/QC Officer to the PM via a Non-Conformance QC Report (QCR). Corrective actions, if needed, shall be implemented to address the non-conformance, and measures shall be taken to prevent a recurrence of the original deficiency. During subsequent field activities, the Project QA/QC Officer must review the corrective action and notify the involved parties as to whether it is acceptable. A summary of corrective actions taken shall be included in the progress reports issued to USACE. A copy of the QCR form is included in the QAPP.

5.2.2 Laboratory Quality Control

This LTMP anticipates that a USEPA CLP laboratory will be used for the analyses of all of the required parameters by the methods specified in the CONTRACTOR'S QAPP. Parameter detection capability will be to the Contract Required Quantitation Limits (CRQL's) specific to the CLP lab. The performance of each CLP laboratory shall be assessed through evaluation of field and laboratory

QC samples and laboratory QC procedures by the Project QA/QC Officer. The required field QC samples and QC procedures are specified in the CONTRACTOR'S QAPP. In general, matrix spike/matrix spike duplicate samples shall be collected; the frequency and number of these samples are specified in the framework QAPP and shall be confirmed in the CONTRACTOR'S QAPP. Additional laboratory QC samples include field duplicates, equipment blanks, and laboratory control samples. CONTRACTOR shall prepare one data Quality Control Summary Report (QCRS) for each sampling event in accordance with USACE guidance. The QCSR will describe the results of the data review and evaluation and will include a data usability assessment.

5.2.3 Electronic Deliverable Quality Control

In an effort to streamline the electronic submittal of environmental sampling data, the Superfund Program in EPA Region 2 has adopted a standardized electronic data deliverable (EDD) format that is being required for all data submitted to the region. Please refer to this website for additional details: http://www.epa.gov/region2/superfund/medd.htm

The analytical laboratory will submit all data to the CONTRACTOR in this format to facilitate data archiving and submittal to USEPA. The CONTRACTOR will review each electronic deliverable to confirm adherence to this format prior to adding to data archive or submittal to USEPA.

5.3 Classification Exception Area (CEA) Biennial Filing

The USEPA has determined that the appropriate remedy for groundwater at the Site was a combination of ICs and groundwater monitoring. The ICs are enacted through a CEA to prevent the installation of new drinking water wells and any other disturbance(s) to the subsurface that involves contact with contaminated groundwater.

The NJDEP reporting requirements for filing a biennial recertification report are detailed in various regulations including:

- Ground Water Quality Standards (N.J.A.C. 7:9C-1-6 and 1.9(b));
- Technical Requirements for Site Remediation (N.J.A.C. 7:26E-4.3(a)7 and 4.9(a)7); and
- Administrative Requirements for Remediation of Contaminated Sites (N.J.A.C. 7:26C-7.3, 7.5(c)2 and 7.5(d)2).

A CEA consists of a written and mapped description of the area in which the groundwater quality is not or will not be met; an identification of the contaminants for which the CEA was requested or is being sought; and an estimate of the longevity of the CEA.

The biennial certification filing is due on the anniversary date that the NJDEP established the groundwater CEA. The information required for the biennial certification shall be accompanied by the certifications required in N.J.A.C. 7:26C-1.2 (a) 1. Included with the written monitoring report for the biennial certification is an electronic copy of the report and certification along with the review fee. A breakdown of the monitoring report structure is as follows:

- Site Background Information
    - Facility Name and Location
    - Person responsible for maintaining the CEA and submitting the Biennial Certification
    - All current owner, lessee(s) and operator(s)
    - Case specific information
    - Existing site conditions
- CEA Protectiveness Evaluation
    - Inspection and evaluation of CEA
        - Changes to laws and regulations
        - Evaluation of future water uses
        - Well search
        - Groundwater monitoring wells associated with CEA
        - Land use disturbance
        - CEA status
- Certification
    - Certification, copying and reporting requirement
    - Person responsible for the Biennial Certification

A description of the various sections is previously discussed in Section 3.3 above. A copy of the Biennial Certification form is included as Appendix B.

5.4 LTM Reporting and Project Communication

The long-term monitoring results shall be reported annually to the USEPA, USACE, and NJDEP for the first 15 years of the program. In years 16 through 30, the data evaluation report shall be submitted biennially. The report shall summarize the findings of the monitoring events, and the biennial re-certification of the CEA shall be included once every two years. Each report shall include, but shall not be limited to, the following general content:

- Introduction: describe the scope and objectives of the groundwater LTM program;
- Project Background: provide a brief summary of the site and project history;
- Well Condition Assessment: provide the results of the well assessment and describe any well repair activities required, including the need for new well installation or well abandonment, as appropriate;
- Monitoring Activities: describe the sampling activities conducted and document any deviations from the prescribed plan;

- Precipitation Monitoring: present available precipitation data recorded by agency-regulated (*e.g.,* United States Geological Survey, National Oceanographic and Atmospheric Administration, NJDEP, etc.) precipitation and weather stations near the Site, highlighting extreme precipitation events and their potential effect on potentiometric heads at the Site.
- Data Evaluation and Discussion: present the most recent data, compare the data to regulatory levels as presented in Table 5, describe the statistical treatment of the data (Mann-Kendall) and any statistically significant trends that are observed, evaluate the effectiveness of the remedy, and present recommendations for suggested changes in the monitoring protocols; and
- Summary and Conclusions: provides a summary of the major findings and conclusions; including recommendations for retention/elimination of sampling locations/analytes or increased/decreased monitoring frequency in accordance with the proposed management decision rules.
- Tables: present all data in a tabular format.
- Figures: groundwater potentiometric surface(s) incorporating surface water elevations, plume concentration (iso-contour or data box plots), and data summary figures as needed.
- Appendices to include:
    - Cumulative data tables per well, including head measurements;
    - Plot new results against baseline, previous round(s) of monitoring results (if applicable), and apply Mann-Kendall Test to evaluate trends at each well or port;
    - Field documentation;
    - QCSRs; and
    - IDW management documentation.

During years where no samples are collected, a letter will be submitted which specifies that no samples were collected, as well as when the next full LTM report will be developed. Additional project communications (interim progress reporting, recurring conference calls, etc.) shall be conducted at a frequency to be established by the CONTRACTOR and USACE.

6. References

Foster Wheeler Environmental Corporation (FWENC), 2002. Final Remedial Investigation Report for Operable Unit 2 (OU-2) Facility Soils and Buildings for Cornell-Dubilier Electronics Superfund Site in South Plainfield, Middlesex County, New Jersey.

Herman, G.C., 2001. Hydrogeologic framework of bedrock aquifers in the Newark Basin, New Jersey: Field Guide and Proceedings. Geology in Service to Public Health, 18th Annual Meeting, Geologic Association of New Jersey, p 6 – 45.

Interstate Technology and Regulatory Council (ITRC), December 2013. Groundwater Statistics and Monitoring Compliance – Statistical Tools for the Project Life Cycle. http://www.itrcweb.org/gsmc-1/Content/Resources/GSMCPDF.pdf

Michalski, A., 1990. Hydrogeology of the Brunswick (Passaic) Formation and implications for ground water monitoring practice. Ground Water Monitoring Review, X (4): 134-143.

Parker, B.L., 2007. Investigating contaminated sites on fractured rock using the DFN approach. 2007 NGWA/USEPA Fractured Rock Conference: State of the Science and Measuring Success in Remediation, Portland, ME, September 24-27, pp. 150-168.

The Louis Berger Group, Inc. and ARCADIS/Malcolm Pirnie, June 2012. Final Remedial Investigation Report (RI), Operable Unit 3: Groundwater. Cornell-Dubilier Electronics Superfund Site, South Plainfield, New Jersey.

The Louis Berger Group, Inc. and ARCADIS/Malcolm Pirnie, June 2012. Final Feasibility Study (FS) Report, Operable Unit 3: Groundwater. Cornell-Dubilier Electronics Superfund Site, South Plainfield, New Jersey.

The Louis Berger Group, Inc. and ARCADIS/Malcolm Pirnie, June 2012. Final Technical Impracticability Evaluation Report (TIER), Operable Unit 3: Groundwater. Cornell-Dubilier Electronics Superfund Site, South Plainfield, New Jersey.

The Louis Berger Group, Inc., June 2014. Final Remedial Investigation Report, Operable Unit 4: Bound Brook. Cornell-Dubilier Electronics Superfund Site, South Plainfield, New Jersey.

USEPA, 2000. Guidance for the Data Quality Objectives Process, EPA/600/R-96/055, August 2000.

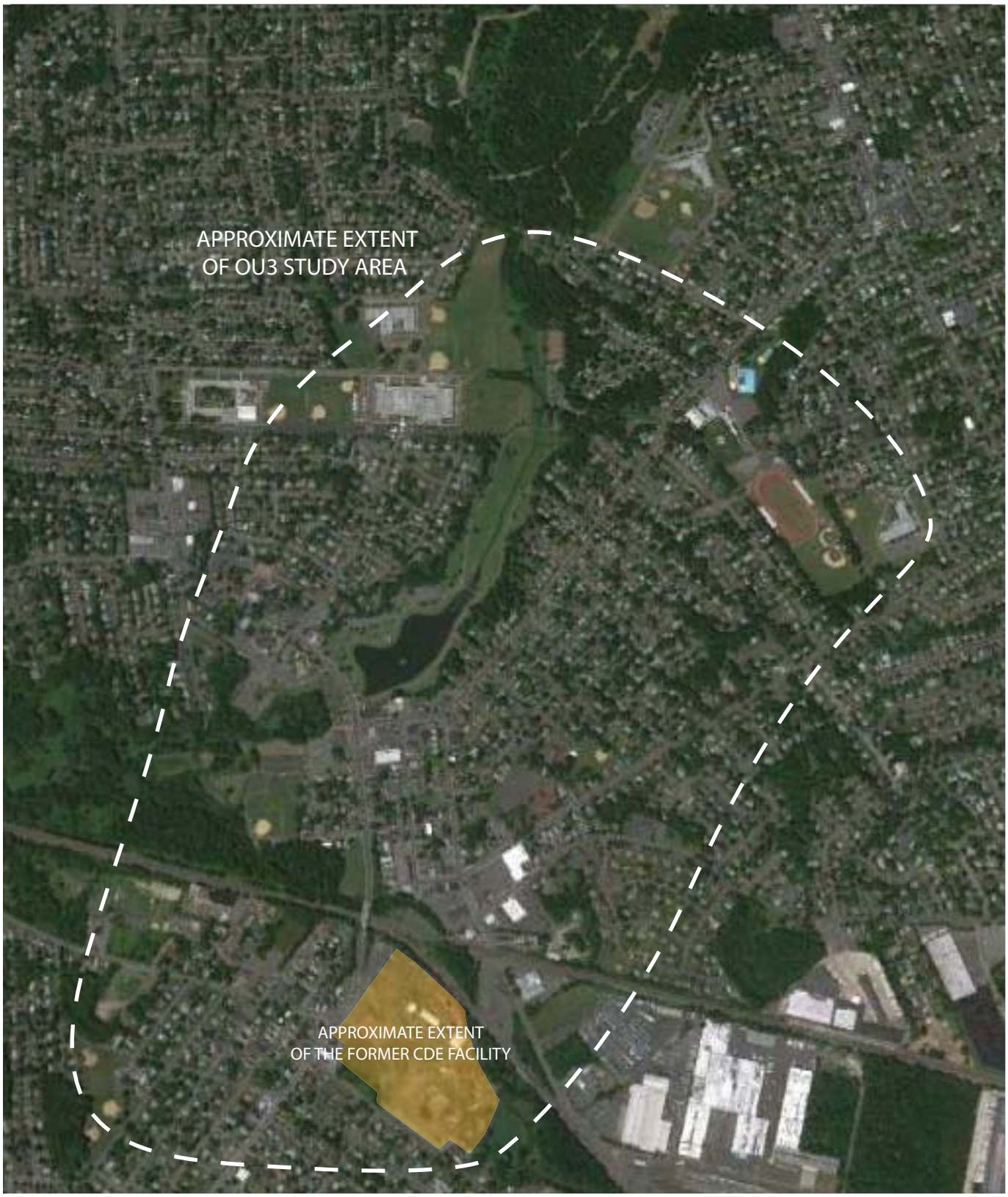
USEPA, January 2004. Guidance for Monitoring at Hazardous Waste Sites: Framework for Monitoring Plan Development and Implementation. OSWER Directive No. 9355.4-28.

USEPA, September 2012. Record of Decision (ROD), Operable Unit 3 Groundwater. Cornell-Dubilier Electronics, Inc. Site. South Plainfield Borough, Middlesex County, New Jersey. Region 2.

Valinski, R.B. Green Brook Flood Control Project: Saving Bound Brook. Master of Environmental Studies, University of PennsylvaniaSpring 2012

http://en.wikipedia.org/wiki/Bound_Brook,_New_Jersey#Flooding.

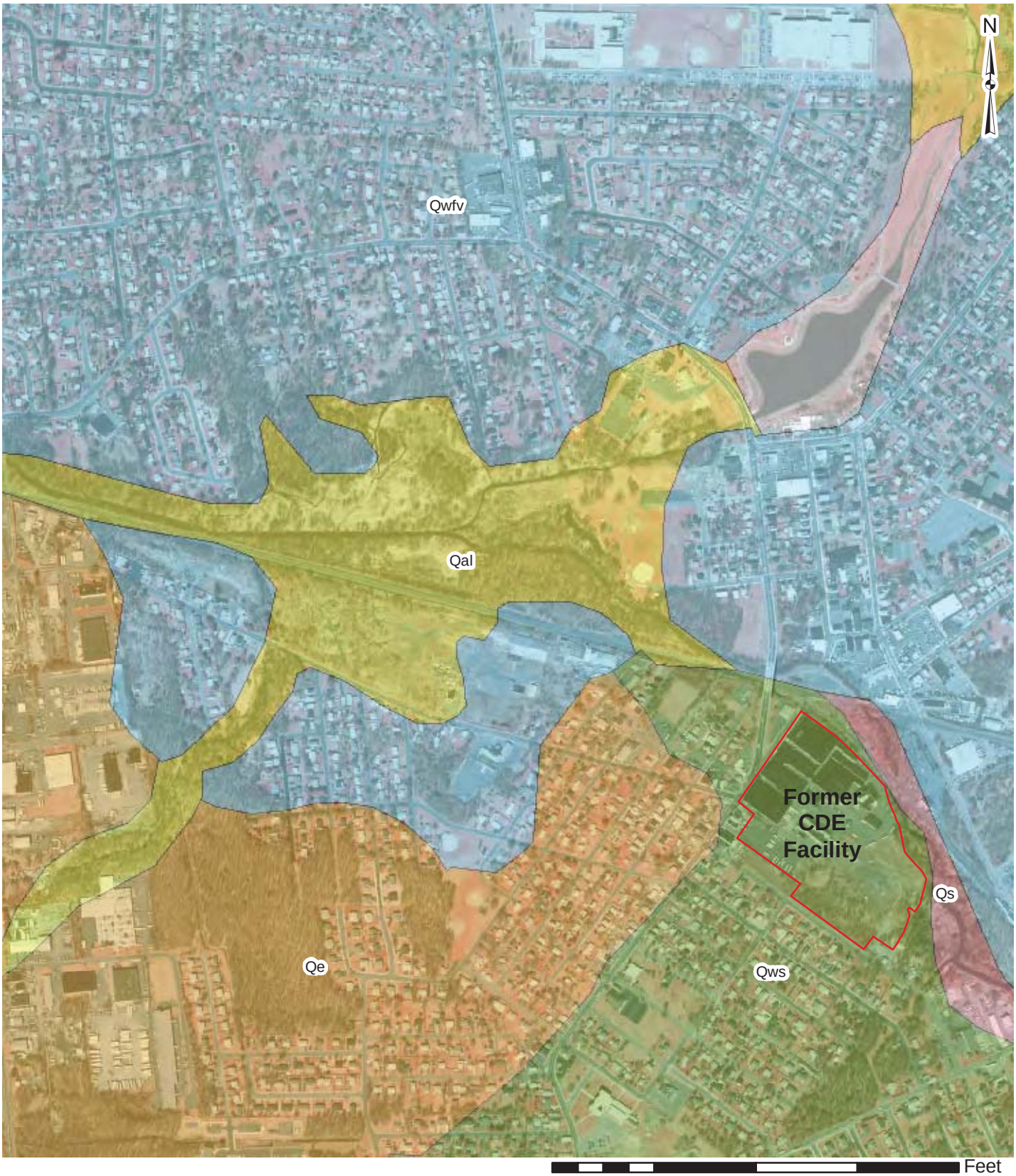
FIGURES



Source: Google Earth

750 0 750 1500 2250 3000 3750 FEET

LOUIS BERGER	Cornell-Dubilier Electronics Superfund Site South Plainfield, New Jersey	SITE LOCATION AREA	FIGURE 1

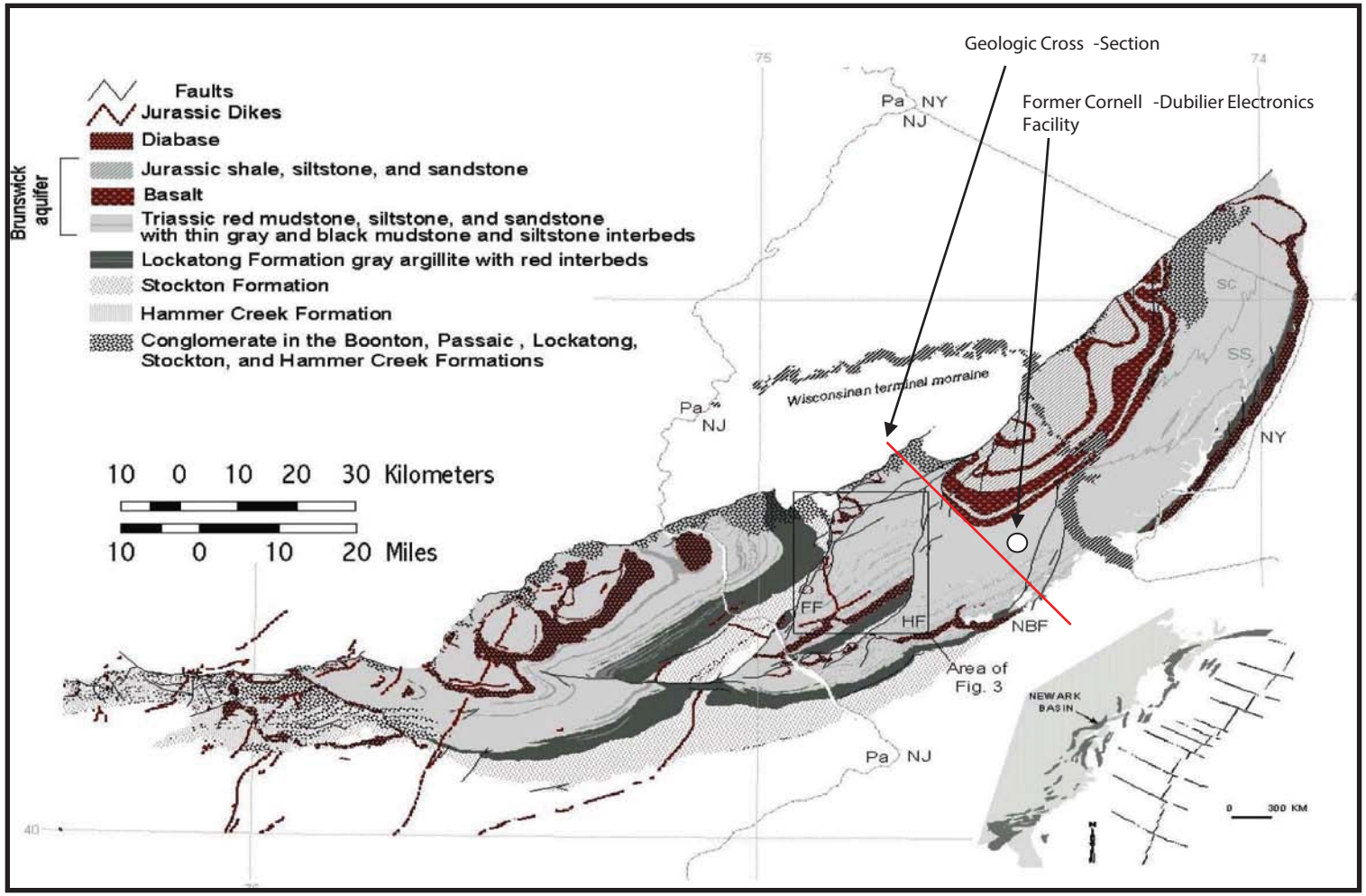


Feet
0 310 620 1,240 1,860 2,480

Qal = Alluvium
Qe = Eolian Deposits
Qs = Swamp and Marsh Deposits
Qwfv = Late Wisconsinan Glaciofluvial Plain Deposits
Qws = Weathered Shale, Mudstone, and Sandstone

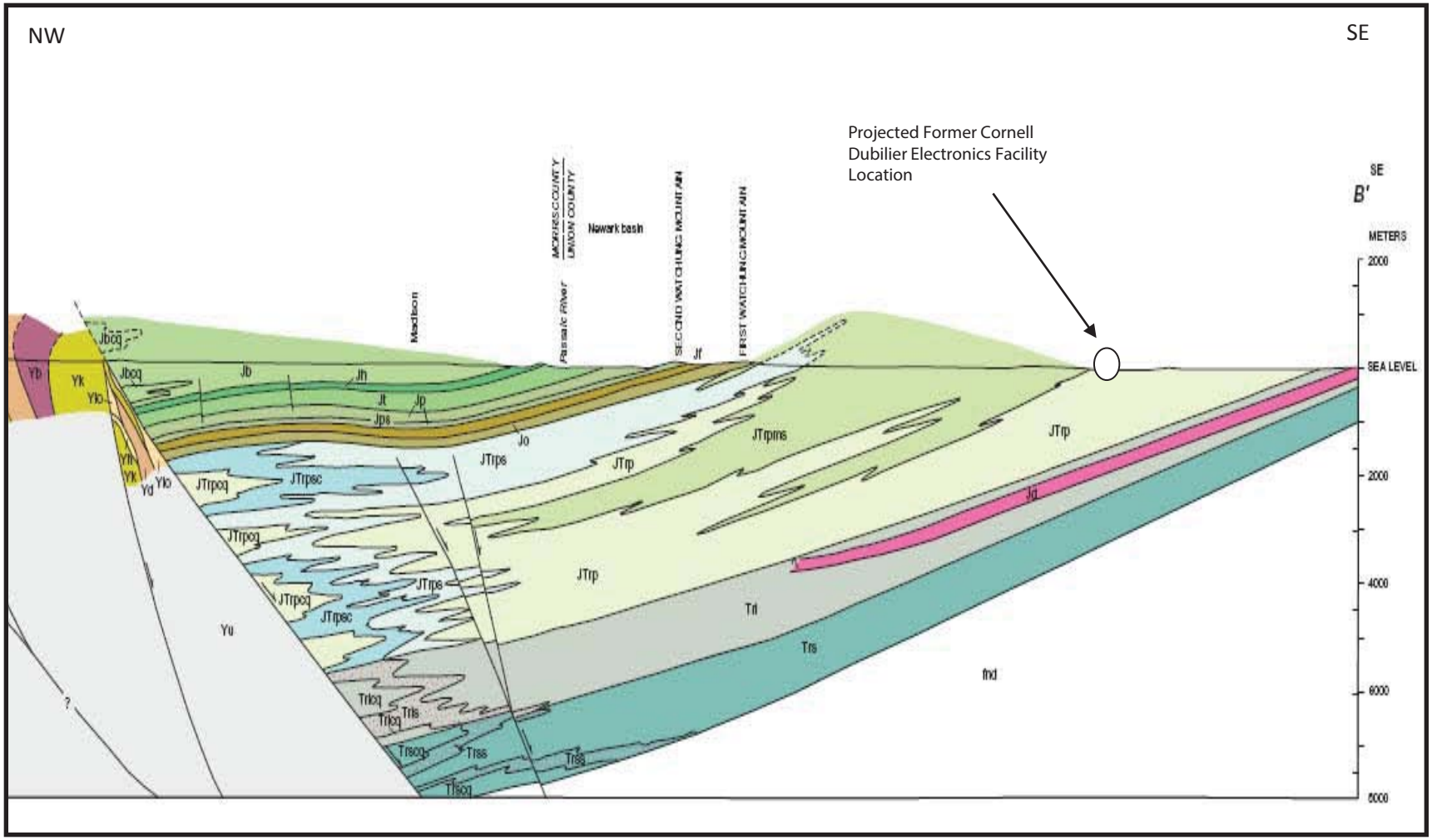
Source: NJDEP GIS Database

LOUIS BERGER	Cornell-Dubilier Electronics Superfund Site South Plainfield, New Jersey	Surface Geology Map	FIGURE 2



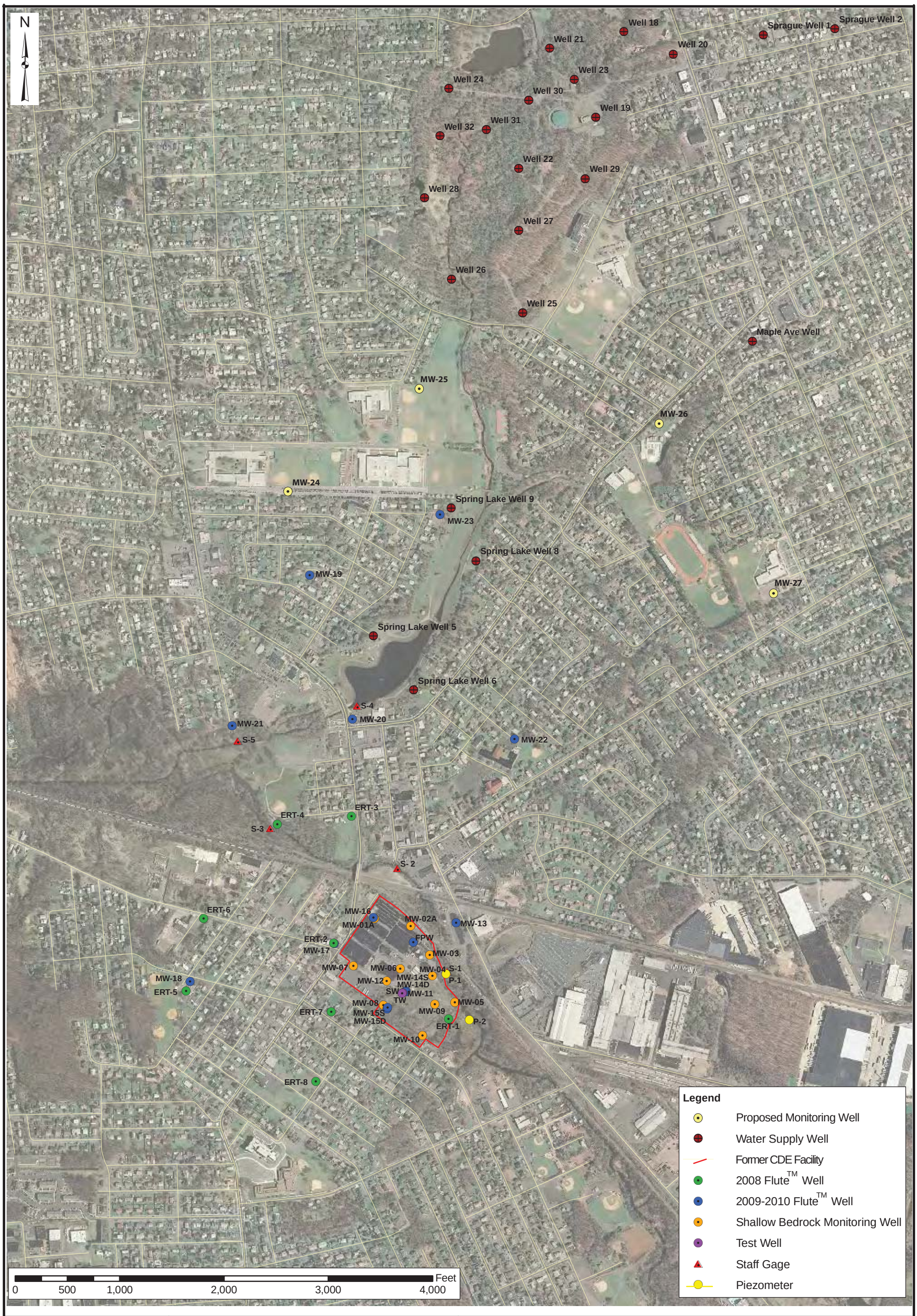
Source: Herman, 2001

LOUIS BERGER	Cornell-Dubilier Electronics Superfund Site South Plainfield, New Jersey	Generalized Geologic Map of the Newark Basin	FIGURE 3



Source: NJDEP GIS Database

LOUIS BERGER	Cornell-Dubilier Electronics Superfund Site South Plainfield, New Jersey	Cross-Section of a Selected Portion of the Newark Basin	FIGURE 4



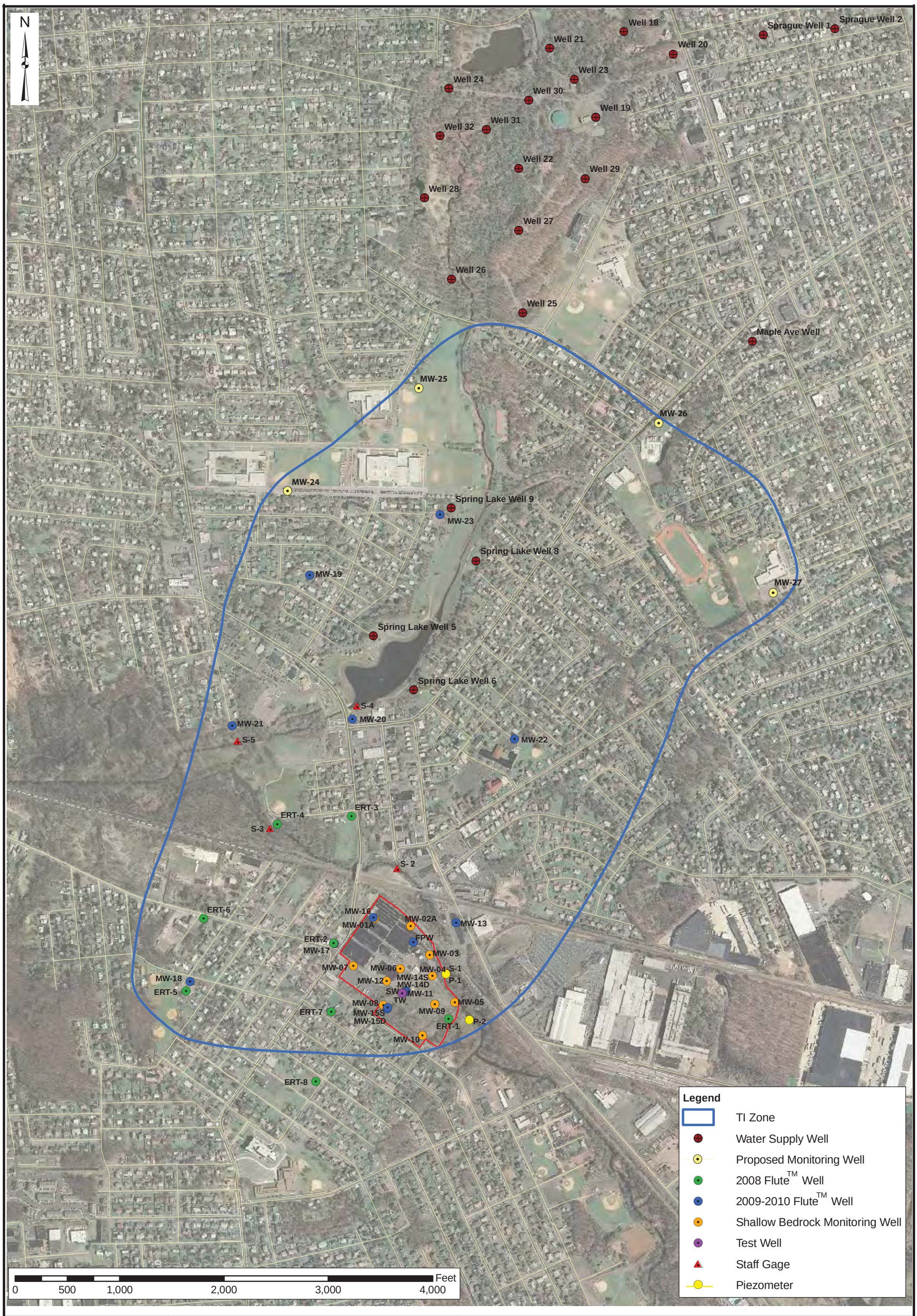
LOUIS BERGER

Cornell-Dubilier Electronics Superfund Site

South Plainfield, New Jersey

MONITORING WELL AND STAFF GAGE LOCATIONS

Figure 5



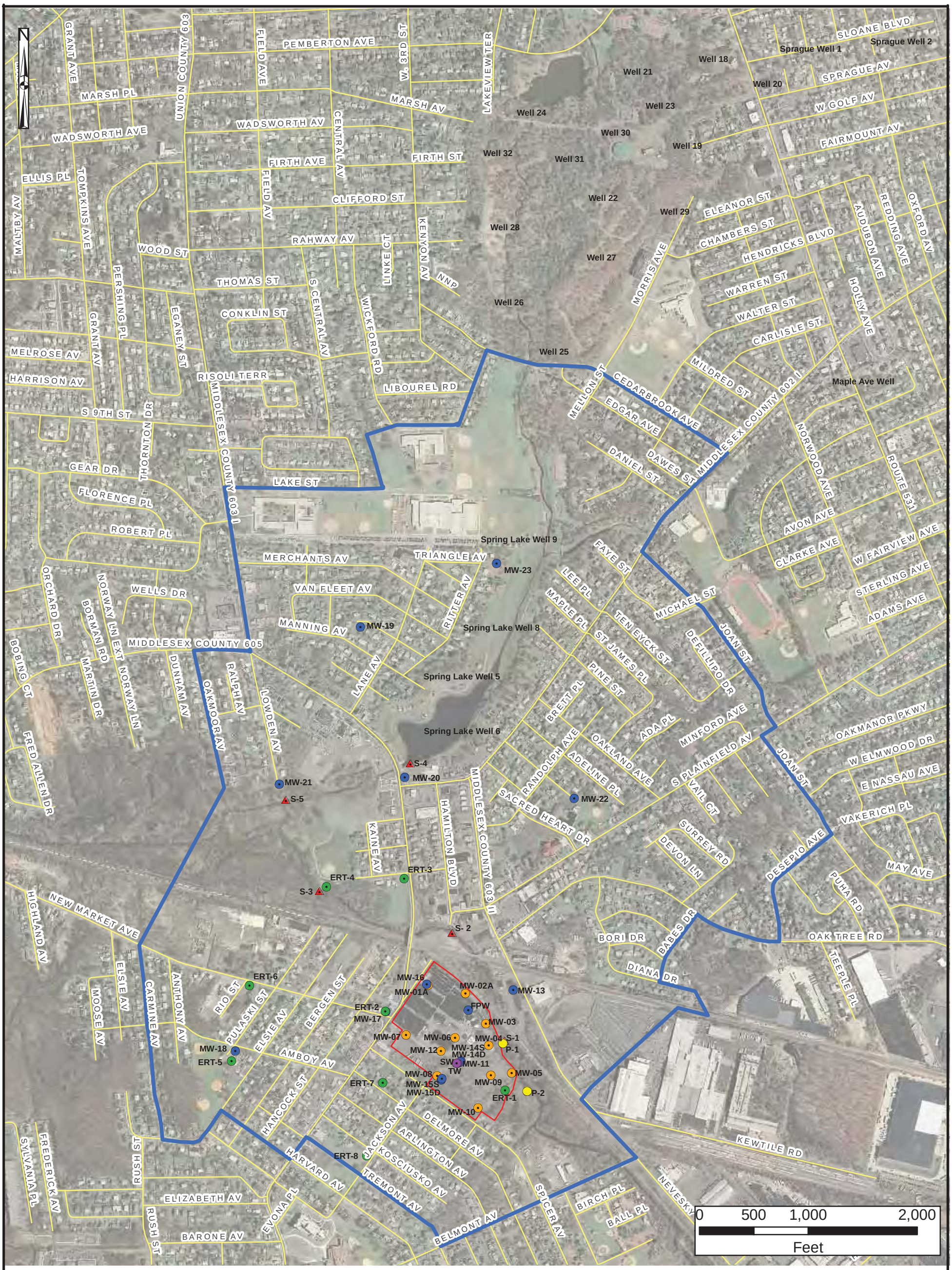
LOUIS BERGER

Cornell-Dubilier Electronics Superfund Site

South Plainfield, New Jersey

OU3 TI ZONE

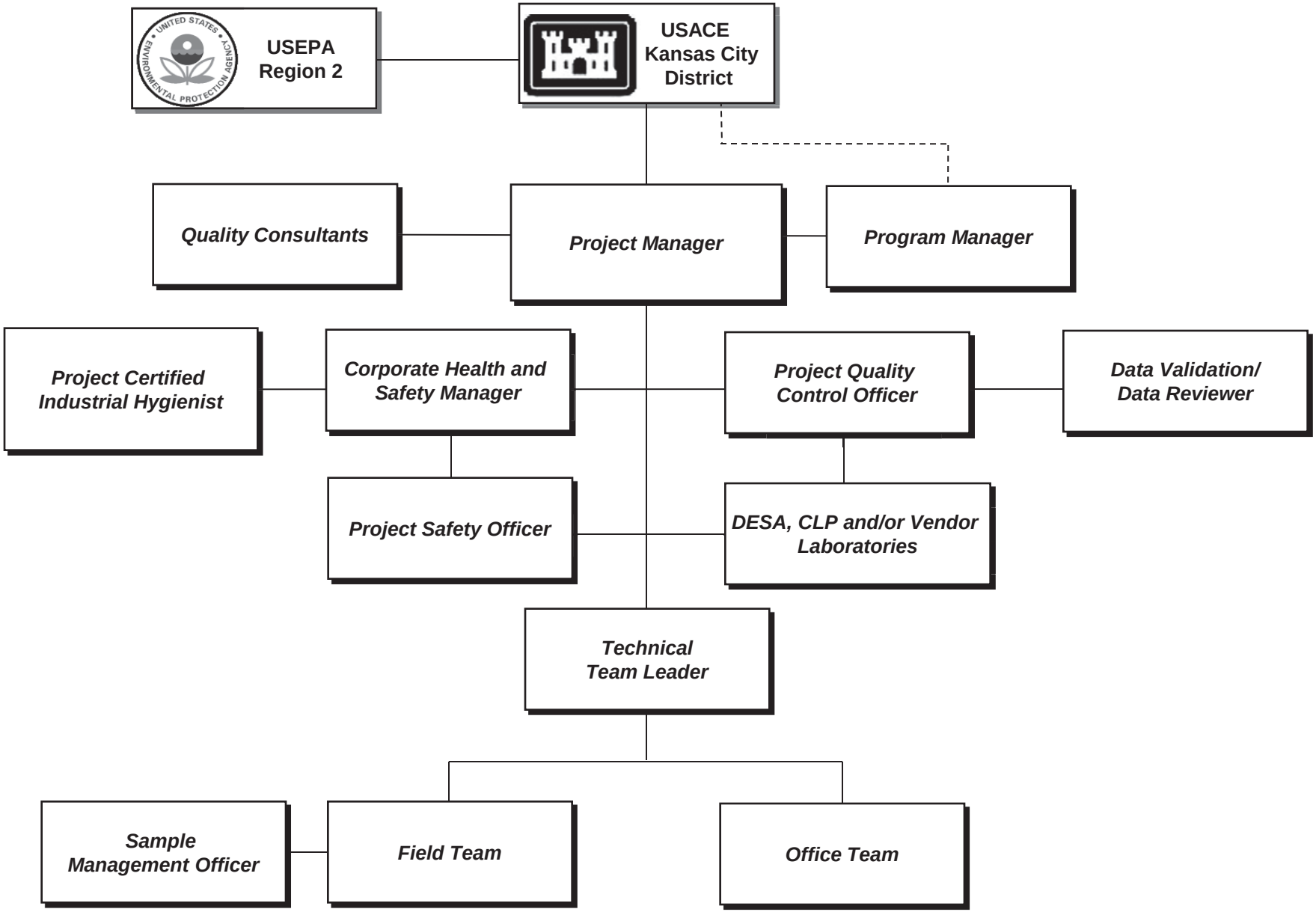
Figure 6



Legend

- Former CDE Facility
- CLASSIFICATION EXEMPTION AREA (CEA)
- 2008 Flute™ Well
- 2009-2010 Flute™ Well
- Shallow Bedrock Monitoring Well
- Test Well
- Staff Gage
- Piezometer
- Roads

LOUIS BERGER	Cornell-Dubilier Electronics Superfund Site South Plainfield, New Jersey	OU3 EXAMPLE CLASSIFICATION EXEMPTION AREA (CEA)	Figure 7



Contractor Name	Cornell-Dubilier Electronics Superfund Site South Plainfield, New Jersey	Example Project Team Organization Chart	FIGURE 8

TABLES

TABLE 1
MONITORING WELL CONSTRUCTION SUMMARY
Cornell-Dubilier Electronics Superfund Site
South Plainfield, New Jersey

Well ID	FLUTe™ Well Port #	Sample Interval (ft bgs)			Construction note: Port/depth selection rationale
		Top	Bottom	Pump Intake Depth	
Shallow Bedrock Monitoring Wells					
MW-01A	1	24	49	37	Not Applicable
MW-02A	1	24	49	37	Not Applicable
MW-03	1	17	32	25	Not Applicable
MW-04	1	29	49	39	Not Applicable
MW-05	1	25	45.5	35	Not Applicable
MW-06	1	29	44	37	Not Applicable
MW-07	1	43	58	51	Not Applicable
MW-08	1	42	57.5	50	Not Applicable
MW-09	1	29	54	42	Not Applicable
MW-10	1	37	52	45	Not Applicable
MW-11	1	34	59	47	Not Applicable
MW-12	1	35	60	48	Not Applicable
Test Wells					
SW	1	35	58	55	Not Applicable; SW and TW were installed for use during RI pump testing to evaluate contaminant mass flux. Wells will NOT be sampled during LTM.
TW	1	63	91	87	
Deep Bedrock Multi-Port Monitoring Wells					
ERT-1	1	24	29	Not Applicable	High borehole transmissivity, shallowest interval
	2	33	43	Not Applicable	High borehole transmissivity, fracture at 40' bgs
	3	46	56	Not Applicable	High borehole transmissivity, fractures at 49' and 51' bgs
	4	59	64	Not Applicable	High borehole transmissivity, fracture at 61' bgs
	5	67	77	Not Applicable	Fractures at 71' and 75' bgs
	6	100	105	Not Applicable	Moderate borehole transmissivity, fracture at 103' bgs
	7	112	117	Not Applicable	Moderate borehole transmissivity, fracture at 114' bgs
	8	135	140	Not Applicable	Deepest interval, fracture at 137' bgs
ERT-2	1	25	35	Not Applicable	Shallowest interval, fracture at 33' bgs
	2	40	50	Not Applicable	Moderate borehole transmissivity, fracture at 48' bgs
	3	54	59	Not Applicable	Moderate borehole transmissivity
	4	70	75	Not Applicable	High borehole transmissivity
	5	97	107	Not Applicable	High borehole transmissivity, fracture at 105' bgs
	6	113	123	Not Applicable	Moderate borehole transmissivity, fractures at 114' and 119' bgs
	7	127	137	Not Applicable	High borehole transmissivity, fracture at 131' bgs
ERT-3	1	27	37	Not Applicable	High borehole transmissivity, fracture at 33' bgs
	2	55	65	Not Applicable	Fractures at 56' and 65' bgs
	3	90	105	Not Applicable	High borehole transmissivity, fractures at 93', 95', 100, and 105' bgs
	4	110	120	Not Applicable	Moderate borehole transmissivity
	5	124	134	Not Applicable	Moderate borehole transmissivity
	6	138	148	Not Applicable	Deepest interval, high resistivity
ERT-4	1	27	37	Not Applicable	Shallowest interval, fracture at 35' bgs
	2	46	56	Not Applicable	Fractures at 48' and 55' bgs
	3	61	66	Not Applicable	Fracture at 65' bgs
	4	83	88	Not Applicable	Moderate borehole transmissivity, fracture at 86' bgs
	5	91	106	Not Applicable	High borehole transmissivity, fractures at 94', 97', and 100' bgs
	6	111	116	Not Applicable	Moderate borehole transmissivity, high resistivity
	7	128	138	Not Applicable	Fracture at 134' bgs
ERT-5	1	24	34	Not Applicable	Shallowest interval, fracture at 32' bgs
	2	37	47	Not Applicable	Fracture at 45' bgs, high resistivity
	3	50	60	Not Applicable	Fractures at 54' and 58' bgs
	4	77	87	Not Applicable	Fracture at 85' bgs
	5	93	98	Not Applicable	Fracture at 97' bgs
	6	120	130	Not Applicable	Fracture at 128' bgs, high resistivity

TABLE 1
MONITORING WELL CONSTRUCTION SUMMARY
Cornell-Dubilier Electronics Superfund Site
South Plainfield, New Jersey

Well ID	FLUTe™ Well Port #	Sample Interval (ft bgs)			Construction note: Port/depth selection rationale
		Top	Bottom	Pump Intake Depth	
ERT-6	1	26	36	Not Applicable	Fractures at 32' and 35' bgs, high resistivity
	2	75	85	Not Applicable	High borehole transmissivity, fracture at 76' bgs
	3	93	103	Not Applicable	Fracture at 98' bgs
	4	107	117	Not Applicable	Moderate borehole transmissivity, fraqcture at 115' bgs
	5	128	138	Not Applicable	Deepest interval, moderate resistivity
ERT-7	1	25	35	Not Applicable	Shallowest interval, fractures at 26' and 33' bgs
	2	45	55	Not Applicable	Fracture at 52' bgs
	3	65	75	Not Applicable	High borehole transmissivity, fractures at 68' and 69' bgs
	4	100	110	Not Applicable	High borehole transmissivity
	5	130	140	Not Applicable	Deepest interval, fracture at 135' bgs
ERT-8	1	17	27	Not Applicable	Shallowest interval, caliper log
	2	31	41	Not Applicable	High borehole transmissivity
	3	44	54	Not Applicable	High borehole transmissivity, caliper log
	4	57	62	Not Applicable	High borehole transmissivity, caliper log
	5	87	97	Not Applicable	Moderate borehole transmissivity, caliper log, inflection in resisitivity
	6	107	112	Not Applicable	Caliper log
	7	135	145	Not Applicable	Deepest interval, caliper log
MW-13	1	18	28	Not Applicable	Shallowest interval, moderate borehole transmissivity, fractures at 20' bgs
	2	35	45	Not Applicable	Moderate borehole transmissivity, fracture at 38' bgs
	3	63	73	Not Applicable	Moderate borehole transmissivity, inflection in resistivity
	4	95	105	Not Applicable	Moderate borehole transmissivity, fractures at 98', 99' 100', 101' and 102' bgs
	5	115	125	Not Applicable	Moderate borehole transmissivity, fracture at 123' bgs
	6	150	160	Not Applicable	Moderate borehole transmissivity
	7	230	240	Not Applicable	Deepest interval
MW-14S	1	30	35	Not Applicable	Shallowest interval
	2	41	46	Not Applicable	Inflection in resistivity
	3	55	60	Not Applicable	Rock matrix results
	4	65	70	Not Applicable	Deepest interval, moderate borehole transmissivity
MW-14D	1	80	85	Not Applicable	Rock matrix results
	2	123	133	Not Applicable	Rock matrix results
	3	199	209	Not Applicable	Rock matrix results
MW-15S	1	30	40	Not Applicable	Shallowest interval, moderate borehole transmissivity
	2	70	80	Not Applicable	High borehole transmissivity, fracture at 75' bgs
MW-15D	1	125	135	Not Applicable	Moderate borehole transmissivity, inflection in resistivity
	2	185	195	Not Applicable	Fracture at 185' and 187' bgs
MW-16	1	20	30	Not Applicable	Shallowest interval, fracture at 21' and 24' bgs
	2	40	50	Not Applicable	Fractures at 44' and 49' bgs
	3	85	95	Not Applicable	Fracture at 94' bgs
	4	108	118	Not Applicable	Inflection in resistivity, temperature
	5	135	145	Not Applicable	Rock matrix results
	6	170	180	Not Applicable	Rock matrix results
	7	195	205	Not Applicable	Caliper log, inflection in resistivity
MW-17	1	170	180	Not Applicable	Moderate borehole tyransmissivity, fracture at 173' bgs
	2	205	215	Not Applicable	High borehole transmissivity
	3	235	245	Not Applicable	Deepest interval, inflection in resistivity
MW-18	1	160	170	Not Applicable	Fracture at 163' bgs
	2	210	220	Not Applicable	Deepest interval
MW-19	1	65	75	Not Applicable	Shallowest interval, fracture at 65' bgs
	2	132	142	Not Applicable	Inflection in resistivity, fracture at 141' bgs
	3	200	210	Not Applicable	Fracture at 204' bgs
	4	257	267	Not Applicable	Moderate borehole transmissivity
	5	367	377	Not Applicable	Caliper log
	6	480	490	Not Applicable	Inflection in resistivity, fractures at 481' and 488' bgs
	7	545	555	Not Applicable	Deepest interval, caliper log, inflection in temperature

TABLE 1
MONITORING WELL CONSTRUCTION SUMMARY
Cornell-Dubilier Electronics Superfund Site
South Plainfield, New Jersey

Well ID	FLUTe™ Well Port #	Sample Interval (ft bgs)			Construction note: Port/depth selection rationale
		Top	Bottom	Pump Intake Depth	
MW-20	1	25	35	Not Applicable	Shallowest interval, moderate borehole transmissivity
	2	85	95	Not Applicable	Moderate borehole transmissivity, fracture at 93' bgs
	3	125	135	Not Applicable	Moderate borehole transmissivity
	4	175	185	Not Applicable	Fracture at 177' bgs
	5	205	215	Not Applicable	Moderate borehole transmissivity
	6	250	260	Not Applicable	Fracture at 257' and 258' bgs
	7	297	307	Not Applicable	High borehole transmissivity, fractures at 300' and 301' bgs
	8	355	365	Not Applicable	Fracture at 363' bgs
MW-21	1	50	60	Not Applicable	Moderate borehole transmissivity
	2	87	97	Not Applicable	High borehole transmissivity
	3	150	160	Not Applicable	Moderate borehole transmissivity, fracture at 155' bgs
	4	205	215	Not Applicable	Moderate borehole transmissivity, fracture at 214' bgs
	5	260	270	Not Applicable	Fracture at 266' bgs, intra-borehole flow velocity
	6	428	438	Not Applicable	Moderate borehole transmissivity, inflection in resistivity
	7	485	495	Not Applicable	Caliper log, fractgure at 494' bgs
	8	505	515	Not Applicable	Deepest interval, inflection in resistivity
MW-22	1	45	55	Not Applicable	Moderate borehole transmissivity, inflection in resistivity, several fractures
	2	125	135	Not Applicable	Caliper log
	3	210	220	Not Applicable	Fractures at 213', 215', and 219' bgs
	4	305	315	Not Applicable	Deepest interval, fracture at 310' bgs
MW-23	1	60	70	Not Applicable	Fracture at 62' bgs, inflection in resistivity
	2	120	130	Not Applicable	Fracture at 122' bgs, inflection in resistivity
	3	170	180	Not Applicable	Fracture at 174' bgs
	4	226	236	Not Applicable	Fractures at 234' and 235' bgs
	5	258	268	Not Applicable	Moderate (relative) borehole transmissivity
	6	316	326	Not Applicable	Fracture at 321' bgs
	7	350	360	Not Applicable	Fracture at 353' bgs, inflection in resistivity
	8	406	416	Not Applicable	Moderate (relative) borehole transmissivity
	9	444	454	Not Applicable	Deepest interval, inflection in resistivity
Former Production Well (FPW)	1	31	41	Not Applicable	Shallowest interval, fracture at 37' bgs
	2	46	51	Not Applicable	Moderate borehole transmissivity, several fractures
	3	100	110	Not Applicable	Moderate borehole transmissivity, fractures at 105' and 106' bgs
	4	125	135	Not Applicable	Fractures at 127' and 130' bgs
	5	180	190	Not Applicable	Fractures at 185', 186', and 187' bgs
	6	200	205	Not Applicable	Fracture at 202' bgs
	7	235	245	Not Applicable	Fracture at 238' bgs
	8	268	278	Not Applicable	Fractures at 269', 270', 273', and 274' bgs
	9	300	310	Not Applicable	Deepest interval, fractures at 303', 305', and 309' bgs
MW-24	1	TBD	TBD	Not Applicable	
	2	TBD	TBD	Not Applicable	
	3	TBD	TBD	Not Applicable	
	4	TBD	TBD	Not Applicable	
	5	TBD	TBD	Not Applicable	
	6	TBD	TBD	Not Applicable	
	7	TBD	TBD	Not Applicable	
	8	TBD	TBD	Not Applicable	
	9	TBD	TBD	Not Applicable	

TABLE 1
MONITORING WELL CONSTRUCTION SUMMARY
Cornell-Dubilier Electronics Superfund Site
South Plainfield, New Jersey

Well ID	FLUTe™ Well Port #	Sample Interval (ft bgs)			Construction note: Port/depth selection rationale
		Top	Bottom	Pump Intake Depth	
MW-25	1	TBD	TBD	Not Applicable	
	2	TBD	TBD	Not Applicable	
	3	TBD	TBD	Not Applicable	
	4	TBD	TBD	Not Applicable	
	5	TBD	TBD	Not Applicable	
	6	TBD	TBD	Not Applicable	
	7	TBD	TBD	Not Applicable	
	8	TBD	TBD	Not Applicable	
	9	TBD	TBD	Not Applicable	
MW-26	1	TBD	TBD	Not Applicable	
	2	TBD	TBD	Not Applicable	
	3	TBD	TBD	Not Applicable	
	4	TBD	TBD	Not Applicable	
	5	TBD	TBD	Not Applicable	
	6	TBD	TBD	Not Applicable	
	7	TBD	TBD	Not Applicable	
	8	TBD	TBD	Not Applicable	
	9	TBD	TBD	Not Applicable	
MW-27	1	TBD	TBD	Not Applicable	
	2	TBD	TBD	Not Applicable	
	3	TBD	TBD	Not Applicable	
	4	TBD	TBD	Not Applicable	
	5	TBD	TBD	Not Applicable	
	6	TBD	TBD	Not Applicable	
	7	TBD	TBD	Not Applicable	
	8	TBD	TBD	Not Applicable	
	9	TBD	TBD	Not Applicable	

TABLE 2
LONG-TERM MONITORING PLAN - SAMPLE FREQUENCY SCHEDULE
Cornell-Dubilier Electronics Superfund Site
South Plainfield, New Jersey

Well ID	Single Screen or Water FLUTe Port #	Depth Interval (ft bgs)		Pump Intake Depth (ft)	Years 1 to 2 (per year)							Years 3 to 5 (per year)							Years 6 to 15 (per year)							Years 16 to 30 (per year)						
					Trace Volatiles	Semi-Volatiles	Pesticides	PCB Aroclors	TAL Metals (ICP- MS)	Dioxins and Furans	PCB Congeners	Trace Volatiles	Semi-Volatiles	Pesticides	PCB Aroclors	TAL Metals (ICP- MS)	Dioxins and Furans	PCB Congeners	Trace Volatiles	Semi-Volatiles	Pesticides	PCB Aroclors	TAL Metals (ICP- MS)	Dioxins and Furans	PCB Congeners	Trace Volatiles	Semi-Volatiles	Pesticides	PCB Aroclors	TAL Metals (ICP- MS)	Dioxins and Furans	PCB Congeners
Shallow Bedrock Monitoring Wells																																
MW-01A	1	24	49	37	4	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5
MW-02A	1	24	49	37	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
MW-03	1	17	32	25	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
MW-04	1	29	49	39	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
MW-05	1	25	45.5	35	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
MW-06	1	29	44	37	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
MW-07	1	43	58	51	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
MW-08	1	42	57.5	50	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
MW-09	1	29	54	42	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
MW-10	1	37	52	45	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
MW-11	1	34	59	47	4	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5
MW-12	1	35	60	48	4	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Deep Bedrock Multi-Port Monitoring Wells																																
ERT-1	1	24	29	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	2	33	43	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	3	46	56	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	4	59	64	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	5	67	77	Not Applicable	4	2	2	2	2			2	2	2	2	2				1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	6	100	105	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	7	112	117	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	8	135	140	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
ERT-2	1	25	35	Not Applicable	4	2	2	2	2			2	2	2	1	1			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	2	40	50	Not Applicable	4	2	2	2	2			2	2	2	1	1			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	3	54	59	Not Applicable	4	2	2	2	2			2	2	2	1	1			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	4	70	75	Not Applicable	4	2	2	2	2			2	2	2	1	1			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	5	97	107	Not Applicable	4	2	2	2	2			2	2	2	1	1			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	6	113	123	Not Applicable	4	2	2	2	2			2	2	2	1	1			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	7	127	137	Not Applicable	4	2	2	2	2			2	2	2	1	1			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
ERT-3	1	27	37	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	2	55	65	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	3	90	105	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	4	110	120	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	5	124	134	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	6	138	148	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
ERT-4	1	27	37	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	2	46	56	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	3	61	66	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	4	83	88	Not Applicable	4			1	1	1	1	2			1	1	1	1	1			1	1	1	1	0.5			0.5	0.5	0.5	0.5
	5	91	106	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	6	111	116	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	7	128	138	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
ERT-5	1	24	34	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	2	37	47	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	3	50	60	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	4	77	87	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	5	93	98	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	6	120	130	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
ERT-6	1	26	36	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	2	75	85	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	3	93	103	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	4	107	117	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	5	128	138	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
ERT-7	1	25	35	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	2	45	55	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	3	65	75	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	4	100	110	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	5	130	140	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
ERT-8	1	17	27	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	2	31	41	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	3	44	54	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	4	57	62	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	5	87	97	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	6	107	112	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	7	135	145	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		

TABLE 2
LONG-TERM MONITORING PLAN - SAMPLE FREQUENCY SCHEDULE
Cornell-Dubilier Electronics Superfund Site
South Plainfield, New Jersey

Well ID	Single Screen or Water FLUTe Port #	Depth Interval (ft bgs)		Pump Intake Depth (ft)	Years 1 to 2 (per year)							Years 3 to 5 (per year)							Years 6 to 15 (per year)							Years 16 to 30 (per year)						
					Trace Volatiles	Semi-Volatiles	Pesticides	PCB Aroclors	TAL Metals (ICP- MS)	Dioxins and Furans	PCB Congeners	Trace Volatiles	Semi-Volatiles	Pesticides	PCB Aroclors	TAL Metals (ICP- MS)	Dioxins and Furans	PCB Congeners	Trace Volatiles	Semi-Volatiles	Pesticides	PCB Aroclors	TAL Metals (ICP- MS)	Dioxins and Furans	PCB Congeners	Trace Volatiles	Semi-Volatiles	Pesticides	PCB Aroclors	TAL Metals (ICP- MS)	Dioxins and Furans	PCB Congeners
MW-13	1	18	28	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	2	35	45	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	3	63	73	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	4	95	105	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	5	115	125	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	6	150	160	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	7	230	240	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
MW-14S	1	30	35	Not Applicable	4	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5
	2	41	46	Not Applicable	4	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5
	3	55	60	Not Applicable	4	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5
	4	65	70	Not Applicable	4	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5
MW-14D	1	80	85	Not Applicable	4	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5
	2	123	133	Not Applicable	4	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5
	3	199	209	Not Applicable	4	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5
MW-15S	1	30	40	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	2	70	80	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
MW-15D	1	125	135	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	2	185	195	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
MW-16	1	20	30	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	2	40	50	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	3	85	95	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	4	108	118	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	5	135	145	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	6	170	180	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	7	195	205	Not Applicable	4	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5
MW-17	1	170	180	Not Applicable	4	2	2	2	2			2	2	2	1	1			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	2	205	215	Not Applicable	4	2	2	2	2			2	2	2	1	1			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	3	235	245	Not Applicable	4	2	2	2	2			2	2	2	1	1			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
MW-18	1	160	170	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	2	210	220	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
MW-19	1	65	75	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	2	132	142	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	3	200	210	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	4	257	267	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	5	367	377	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	6	480	490	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	7	545	555	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
MW-20	1	25	35	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	2	85	95	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	3	125	135	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	4	175	185	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	5	205	215	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	6	250	260	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	7	297	307	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	8	355	365	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
MW-21	1	50	60	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	2	87	97	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	3	150	160	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	4	205	215	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	5	260	270	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	6	428	438	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	7	485	495	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	8	505	515	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
MW-22	1	45	55	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	2	125	135	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	3	210	220	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	4	305	315	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
MW-23	1	60	70	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	2	120	130	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	3	170	180	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	4	226	236	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	5	258	268	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	6	316	326	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	7	350	360	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	8	406	416	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	9	444	454	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		

TABLE 2
LONG-TERM MONITORING PLAN - SAMPLE FREQUENCY SCHEDULE
Cornell-Dubilier Electronics Superfund Site
South Plainfield, New Jersey

Well ID	Single Screen or Water FLUTe Port #	Depth Interval (ft bgs)		Pump Intake Depth (ft)	Years 1 to 2 (per year)							Years 3 to 5 (per year)							Years 6 to 15 (per year)							Years 16 to 30 (per year)						
					Trace Volatiles	Semi-Volatiles	Pesticides	PCB Aroclors	TAL Metals (ICP- MS)	Dioxins and Furans	PCB Congeners	Trace Volatiles	Semi-Volatiles	Pesticides	PCB Aroclors	TAL Metals (ICP- MS)	Dioxins and Furans	PCB Congeners	Trace Volatiles	Semi-Volatiles	Pesticides	PCB Aroclors	TAL Metals (ICP- MS)	Dioxins and Furans	PCB Congeners	Trace Volatiles	Semi-Volatiles	Pesticides	PCB Aroclors	TAL Metals (ICP- MS)	Dioxins and Furans	PCB Congeners
Former Production Well	1	31	41	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	2	46	51	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	3	100	110	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	4	125	135	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	5	180	190	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	6	200	205	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	7	235	245	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	8	268	278	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	9	300	310	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
MW-24	1	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	2	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	3	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	4	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	5	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	6	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	7	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	8	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	9	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
MW-25	1	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	2	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	3	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	4	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	5	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	6	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	7	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	8	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	9	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
MW-26	1	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	2	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	3	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	4	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	5	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	6	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	7	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	8	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	9	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
MW-27	1	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	2	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	3	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	4	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	5	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	6	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	7	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	8	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	9	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
SUBTOTAL (per year)					**696**	**114**	**114**	**231**	**231**	**23**	**23**	**348**	**114**	**114**	**221**	**221**	**12**	**12**	**173**	**57**	**57**	**174**	**174**	**12**	**12**	**87**	**29**	**29**	**87**	**87**	**6**	**6**
FIELD QC SAMPLES																																
Duplicate	5% for all analyses				35	6	6	12	12	1	1	17	6	6	11	11	1	1	9	3	3	9	9	1	1	4	1	1	4	4	0	0
MS/MSD	5% for all analyses				35	6	6	12	12	1	1	17	6	6	11	11	1	1	9	3	3	9	9	1	1	4	1	1	4	4	0	0
Field Blank	1 per event				4	4	4	4	4	4	4	2	2	2	2	2	2	2	1	1	1	1	1	1	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Trip Blank	1 per shipment				4	4	4	4	4	4	4	2	2	2	2	2	2	2	1	1	1	1	1	1	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5
TOTAL NO. OF SAMPLES (per year)					**774**	**133**	**133**	**262**	**262**	**33**	**33**	**387**	**129**	**129**	**247**	**247**	**17**	**17**	**192**	**65**	**65**	**193**	**193**	**15**	**15**	**97**	**32**	**32**	**97**	**97**	**8**	**8**

Notes:
Assume one sample will be collected for the applicable analytes during each sampling event. Not all analytes will be quantified during all sampling events.
The maximum number of samples corresponds to the number of events.

TABLE 3
LONG-TERM MONITORING PLAN - SAMPLE SUMMARY
Cornell-Dubilier Electronics Superfund Site
South Plainfield, New Jersey

Time Period	Years in Time Period	Sample Type	Field	Duplicate	MS/MSD	Field Blank	Trip Blank	Total Samples, by Analyte	Total Samples, by Analyte
		Frequency	*(per Year)*	*(5% for all analyses)*	*(5% for all analyses)*	*(1 per event)*	*(1 per shipment)*	*(per Year)*	*Time Period*
Years 1 to 2	2	Trace Volatiles	696	35	35	4	4	774	1547
		Semi-Volatiles	114	6	6			133	267
		Pesticides	114	6	6			133	267
		PCB Aroclors	231	12	12			262	524
		TAL Metals (ICP- MS)	231	12	12			262	524
		Dioxins and Furans	23	1	1			33	67
		PCB Congeners	23	1	1			33	67
		GRAND TOTALS	**1432**	**72**	**72**	**4**	**4**	**1631**	**3262**
Years 3 to 5	3	Trace Volatiles	348	17	17	2	2	387	1160
		Semi-Volatiles	114	6	6			129	388
		Pesticides	114	6	6			129	388
		PCB Aroclors	221	11	11			247	741
		TAL Metals (ICP- MS)	221	11	11			247	741
		Dioxins and Furans	12	1	1			17	52
		PCB Congeners	12	1	1			17	52
		GRAND TOTALS	**1042**	**52**	**52**	**2**	**2**	**1174**	**3523**
Years 6 to 15	10	Trace Volatiles	173	9	9	1	1	192	1923
		Semi-Volatiles	57	3	3			65	647
		Pesticides	57	3	3			65	647
		PCB Aroclors	174	9	9			193	1934
		TAL Metals (ICP- MS)	174	9	9			193	1934
		Dioxins and Furans	12	1	1			15	152
		PCB Congeners	12	1	1			15	152
		GRAND TOTALS	**659**	**33**	**33**	**1**	**1**	**739**	**7389**
Years 16 to 30	15	Trace Volatiles	87	4	4	0.5	0.5	97	1451
		Semi-Volatiles	29	1	1			32	485
		Pesticides	29	1	1			32	485
		PCB Aroclors	87	4	4			97	1451
		TAL Metals (ICP- MS)	87	4	4			97	1451
		Dioxins and Furans	6	0	0			8	114
		PCB Congeners	6	0	0			8	114
		GRAND TOTALS	**330**	**17**	**17**	**0.5**	**0.5**	**370**	**5550**

LONG TERM MONITORING PROGRAM TOTAL: 19,724

Notes:
Assume maximum of events per year as:

Years 1 and 2	4	
Years 3 to 5	2	
Years 6 to 15	1	
Year 16 to 30	0.5	denotes sampling every other year

Assume one shipment per event

TABLE 4
LOUIS BERGER OU3 REMEDIAL INVESTIGATION WATER LEVEL MEASUREMENTS
Cornell-Dubilier Electronics Superfund Site
South Plainfield, New Jersey

Location	Port	PVC Elevation (ft)	Casing Elevation (ft)	Ground Elevation (ft)	7/9/2010		3/19/2010		10/12/2009	
					Depth to Water (ft)	Water Level Elevation (MSL)	Depth to Water (ft)	Water Level Elevation (MSL)	Depth to Water (ft)	Water Level Elevation (MSL)
MW-1A	-	70.43	70.70	70.70	9.99	60.44	7.41	63.02	9.69	60.74
MW-2A	-	70.98	71.44	71.44	10.60	60.38	8.57	62.41	9.50	61.48
MW-3	-	70.53	71.11	71.11	10.71	59.82	8.73	61.80	10.35	60.18
MW-4	-	71.65	72.59	72.59	11.23	60.42	NR	NR	10.60	61.05
MW-5	-	72.79	73.92	70.84	12.50	60.29	NR	NR	12.00	60.79
MW-6	-	74.38	74.73	74.73	13.62	60.76	9.74	64.64	13.21	61.17
MW-7	-	81.35	82.14	81.28	20.43	60.92	17.12	64.23	20.01	61.34
MW-8	-	77.57	77.90	75.23	17.08	60.49	NR	NR	16.24	61.33
MW-9	-	75.76	76.79	75.09	15.25	60.52	NR	NR	14.61	61.16
MW-10	-	74.41	75.44	72.94	13.63	60.78	NR	NR	13.05	61.36
MW-11	-	77.04	77.23	75.09	16.30	60.74	NR	NR	15.68	61.36
MW-12	-	75.63	75.90	75.90	14.63	61.00	NR	NR	13.94	61.69
Former Production Well	1	71.64	72.43	72.43	11.99	60.44	9.26	63.17	11.49	60.94
	2	71.64	72.43	72.43	12.00	60.43	9.14	63.29	11.58	60.85
	3	71.64	72.43	72.43	11.96	60.47	9.01	63.42	11.65	60.78
	4	71.64	72.43	72.43	11.76	60.67	8.77	63.66	11.48	60.95
	5	71.64	72.43	72.43	11.66	60.77	8.71	63.72	11.22	61.21
	6	71.64	72.43	72.43	11.67	60.76	8.72	63.71	11.25	61.18
	7	71.64	72.43	72.43	11.65	60.78	8.42	64.01	11.14	61.29
	8	71.64	72.43	72.43	11.60	60.83	8.36	64.07	11.25	61.18
	9	71.64	72.43	72.43	11.51	60.92	8.28	64.15	11.15	61.28
MW-13	1	66.49	67.23	67.23	6.94	60.29	4.19	63.04	6.22	60.58
	2	66.49	67.23	67.23	7.22	60.01	4.3	62.93	6.21	60.63
	3	66.49	67.23	67.23	6.80	60.43	4.24	62.99	6.25	60.59
	4	66.49	67.23	67.23	6.56	60.67	3.91	63.32	5.86	61.02
	5	66.49	67.23	67.23	6.46	60.77	3.79	63.44	5.92	61.00
	6	66.49	67.23	67.23	6.46	60.77	3.89	63.34	5.73	61.08
	7	66.49	67.23	67.23	6.43	60.80	3.67	63.56	5.54	61.32
MW-14S	1	77.05	77.91	75.08	17.03	60.88	13.82	64.09	16.61	61.30
	2	77.05	77.91	75.08	17.09	60.82	13.93	63.98	16.63	61.28
	3	77.05	77.91	75.08	17.25	60.66	14.12	63.79	16.83	61.08
	4	77.05	77.91	75.08	17.22	60.69	14.09	63.82	16.42	61.49
MW-14D	1	76.79	77.92	75.29	17.26	60.66	14.13	63.79	16.71	61.21
	2	76.79	77.92	75.29	17.26	60.66	14.25	63.67	16.72	61.20
	3	76.79	77.92	75.29	17.21	60.71	14.13	63.79	16.68	61.24
MW-15S	1	77.46	78.14	75.42	17.58	60.56	13.78	64.36	16.50	61.40
	2	77.46	78.14	75.42	17.60	60.54	14.48	63.66	16.65	61.24
MW-15D	1	77.35	78.17	75.26	17.57	60.60	14.42	63.75	16.30	61.45
	2	77.35	78.17	75.26	17.59	60.58	14.28	63.89	16.47	61.26
MW-16	1	69.87	70.73	70.73	10.24	60.49	7.09	63.64	9.48	60.68
	2	69.87	70.73	70.73	10.30	60.43	7.11	63.62	9.55	60.65
	3	69.87	70.73	70.73	10.38	60.35	7.06	63.67	9.44	60.72
	4	69.87	70.73	70.73	10.34	60.39	6.92	63.81	9.35	60.84
	5	69.87	70.73	70.73	10.22	60.51	6.95	63.78	9.29	60.84
	6	69.87	70.73	70.73	10.32	60.41	7.01	63.72	9.24	60.86
	7	69.87	70.73	70.73	10.17	60.56	6.97	63.76	9.08	61.03
MW-17	1	80.14	81.03	81.03	20.60	60.43	17.23	63.8	19.59	60.94
	2	80.14	81.03	81.03	20.67	60.36	17.29	63.74	19.58	60.83
	3	80.14	81.03	81.03	20.64	60.39	17.15	63.88	19.68	60.82
MW-18	1	67.38	68.24	68.24	9.62	58.62	4.83	63.41	8.14	59.59
	2	67.38	68.24	68.24	9.95	58.29	5.24	63	8.50	59.22
MW-19	1	63.78	64.53	64.53	12.75	51.78	10.49	54.04	12.70	51.83
	2	63.78	64.53	64.53	12.48	52.05	9.56	54.97	12.34	52.19
	3	63.78	64.53	64.53	11.28	53.25	8.46	56.07	11.14	53.39
	4	63.78	64.53	64.53	11.02	53.51	8	56.53	10.81	53.72
	5	63.78	64.53	64.53	11.11	53.42	7.95	56.58	10.84	53.69
	6	63.78	64.53	64.53	8.63	55.90	5.5	59.03	8.35	56.18
	7	63.78	64.53	64.53	5.90	58.63	2.92	61.61	5.71	58.82
MW-20	1	65.42	66.22	66.22	10.46	55.76	8.5	57.72	10.10	55.64
	2	65.42	66.22	66.22	10.22	56.00	7.68	58.54	9.90	55.80
	3	65.42	66.22	66.22	9.52	56.70	6.56	59.66	8.94	56.81
	4	65.42	66.22	66.22	9.76	56.46	7.06	59.16	9.30	56.46
	5	65.42	66.22	66.22	9.72	56.50	6.85	59.37	9.31	56.47
	6	65.42	66.22	66.22	7.60	58.62	4.61	61.61	6.83	58.90
	7	65.42	66.22	66.22	7.04	59.18	3.96	62.26	6.47	59.31
	8	65.42	66.22	66.22	6.93	59.29	3.89	62.33	6.24	59.54

TABLE 4
LOUIS BERGER OU3 REMEDIAL INVESTIGATION WATER LEVEL MEASUREMENTS
Cornell-Dubilier Electronics Superfund Site
South Plainfield, New Jersey

Location	Port	PVC Elevation (ft)	Casing Elevation (ft)	Ground Elevation (ft)	7/9/2010		3/19/2010		10/12/2009	
					Depth to Water (ft)	Water Level Elevation (MSL)	Depth to Water (ft)	Water Level Elevation (MSL)	Depth to Water (ft)	Water Level Elevation (MSL)
MW-21	1	58.50	59.17	59.17	5.18	53.99	2.225	56.945	5.24	53.93
	2	58.50	59.17	59.17	4.90	54.27	2.31	56.86	4.92	54.25
	3	58.50	59.17	59.17	4.70	54.47	2.21	56.96	4.50	54.67
	4	58.50	59.17	59.17	4.74	54.43	2.26	56.91	4.41	54.76
	5	58.50	59.17	59.17	4.62	54.55	1.68	57.49	4.10	55.07
	6	58.50	59.17	59.17	0.90	58.27	0.32	58.85	0.31	58.86
	7	58.50	59.17	59.17	0.98	58.19	0.33	58.84	0.40	58.77
	8	58.50	59.17	59.17	0.95	58.22	0.42	58.75	0.42	58.75
MW-22	1	68.52	69.28	69.28	8.30	60.98	5.62	63.66	8.52	60.76
	2	68.52	69.28	69.28	8.60	60.68	5.87	63.41	8.44	60.84
	3	68.52	69.28	69.28	8.46	60.82	5.61	63.67	8.29	60.99
	4	68.52	69.28	69.28	8.33	60.95	5.27	64.01	7.79	61.49
ERT-1	1	72.84	73.46	70.47	12.59	60.43	NR	NR	12.10	60.92
	2	72.84	73.46	70.47	12.57	60.46	NR	NR	12.02	61.01
	3	72.84	73.46	70.47	12.56	60.46	NR	NR	12.15	60.87
	4	72.84	73.46	70.47	12.55	60.47	NR	NR	12.05	60.97
	5	72.84	73.46	70.47	12.51	60.52	NR	NR	12.04	60.99
	6	72.84	73.46	70.47	12.40	60.61	NR	NR	11.84	61.17
	7	72.84	73.46	70.47	12.40	60.63	NR	NR	11.82	61.21
	8	72.84	73.46	70.47	12.41	60.61	NR	NR	11.87	61.15
ERT-2	1	80.36	80.99	80.99	19.25	61.74	16.59	64.4	19.23	61.33
	2	80.36	80.99	80.99	20.24	60.75	17.42	63.57	19.79	60.78
	3	80.36	80.99	80.99	20.30	60.69	17.08	63.91	19.53	61.03
	4	80.36	80.99	80.99	20.45	60.54	17.05	63.94	19.47	61.08
	5	80.36	80.99	80.99	20.29	60.70	17.19	63.8	19.59	60.91
	6	80.36	80.99	80.99	20.52	60.47	17.23	63.76	19.54	61.01
	7	80.36	80.99	80.99	20.54	60.45	17.22	63.77	19.50	61.06
ERT-3	1	68.69	69.10	65.84	11.27	57.63	8.28	61.04	11.33	57.57
	2	68.69	69.10	65.84	11.26	57.70	8.55	60.85	11.31	57.66
	3	68.69	69.10	65.84	11.01	57.90	8.28	61.07	11.00	57.98
	4	68.69	69.10	65.84	10.98	57.90	8.05	61.27	10.91	58.00
	5	68.69	69.10	65.84	9.24	59.70	6.1	63.25	9.00	59.95
	6	68.69	69.10	65.84	9.23	59.77	6.03	63.36	8.94	60.02
ERT-4	1	61.77	62.43	59.21	6.37	55.61	2.65	60.02	6.63	55.41
	2	61.77	62.43	59.21	5.43	56.56	2.5	60.17	5.17	56.86
	3	61.77	62.43	59.21	5.31	56.65	2.33	60.31	5.08	56.93
	4	61.77	62.43	59.21	5.34	56.68	2.28	60.43	5.17	57.00
	5	61.77	62.43	59.21	5.35	56.74	2.27	60.52	5.19	56.97
	6	61.77	62.43	59.21	5.21	56.86	2.22	60.57	5.13	57.04
	7	61.77	62.43	59.21	5.14	56.86	2.05	60.76	4.97	57.22
ERT-5	1	69.03	69.72	69.72	11.44	58.28	6.58	63.14	10.42	58.81
	2	69.03	69.72	69.72	11.80	57.92	7.12	62.60	10.73	58.50
	3	69.03	69.72	69.72	10.50	59.22	5.31	64.41	9.15	60.09
	4	69.03	69.72	69.72	10.10	59.62	4.87	64.85	8.64	60.51
	5	69.03	69.72	69.72	10.69	59.03	5.61	64.11	9.27	59.97
	6	69.03	69.72	69.72	10.60	59.12	5.51	64.21	9.19	60.05
ERT-6	1	67.52	68.04	65.49	10.45	57.28	6.67	61.37	10.13	57.60
	2	67.52	68.04	65.49	9.85	57.88	5.97	62.07	9.52	58.19
	3	67.52	68.04	65.49	9.73	57.98	5.93	62.11	9.42	58.30
	4	67.52	68.04	65.49	10.11	57.62	6.28	61.76	9.79	57.93
	5	67.52	68.04	65.49	9.62	58.10	5.8	62.24	9.26	58.46
ERT-7	1	80.19	81.00	81.00	20.20	60.80	15.9	65.1	19.28	61.72
	2	80.19	81.00	81.00	21.17	59.83	16.22	64.78	19.52	61.48
	3	80.19	81.00	81.00	22.50	58.50	16.84	64.16	19.78	61.22
	4	80.19	81.00	81.00	20.48	60.52	16.62	64.38	19.39	61.61
	5	80.19	81.00	81.00	20.60	60.40	16.71	64.29	19.86	61.14
ERT-8	1	82.74	83.36	83.36	21.80	61.56	18.52	64.84	20.98	62.38
	2	82.74	83.36	83.36	22.42	60.94	18.23	65.13	21.48	61.88
	3	82.74	83.36	83.36	22.50	60.86	18.29	65.07	21.59	61.77
	4	82.74	83.36	83.36	113.60	-30.24	93.2*	-9.84	22.62	60.74
	5	82.74	83.36	83.36	22.40	60.96	18.19	65.17	21.63	61.73
	6	82.74	83.36	83.36	22.44	60.92	18.24	65.12	21.65	61.71
	7	82.74	83.36	83.36	22.50	60.86	18.3	65.06	21.78	61.58

TABLE 4
LOUIS BERGER OU3 REMEDIAL INVESTIGATION WATER LEVEL MEASUREMENTS
Cornell-Dubilier Electronics Superfund Site
South Plainfield, New Jersey

Location	**Port**	**PVC Elevation (ft)**	**Casing Elevation (ft)**	**Ground Elevation (ft)**	**7/9/2010**		**3/19/2010**		**10/12/2009**	
					Depth to Water (ft)	**Water Level Elevation (MSL)**	**Depth to Water (ft)**	**Water Level Elevation (MSL)**	**Depth to Water (ft)**	**Water Level Elevation (MSL)**
STAFF GAGE 1	Upstream	64.61[1]	-	-	0.58	58.59	1.18	59.19	0.66	58.67
STAFF GAGE 2[I]	Midstream	62.30[1]	-	-	-	-	NR	NR	1.50	57.20
STAFF GAGE 2[R]	Midstream	62.74[1]	-	-	0.41	56.55	-	-	-	-
STAFF GAGE 3[I]	Downstream	61.62[1]	-	-	-	-	NR	NR	1.58	56.60
STAFF GAGE 3[R]	Downstream	57.60[1]	-	-	1.24	52.24	-	-	-	-
STAFF GAGE 4	Trib	59.25[1]	-	-	0.72	53.37	-	-	-	-
STAFF GAGE 5	Spring Lake	58.14[1]	-	-	1.43	52.97	-	-	-	-

Location	Port	PVC Elevation (ft)	Casing Elevation (ft)	Ground Elevation (ft)	03/21/11		12/20/10	
					Depth to Water (ft)	Water Level Elevation (MSL)	Depth to Water (ft)	Water Level Elevation (MSL)
MW-23	1	69.68	70.43	70.43	14.87	55.56	18.68	51.75
	2	69.68	70.43	70.43	15.52	54.91	18.04	52.39
	3	69.68	70.43	70.43	15.63	54.8	17.49	52.94
	4	69.68	70.43	70.43	14.06	56.37	18.85	51.58
	5	69.68	70.43	70.43	14.42	56.01	18.61	51.82
	6	69.68	70.43	70.43	16.64	53.79	18.66	51.77
	7	69.68	70.43	70.43	13.48	56.95	17.53	52.9
	8	69.68	70.43	70.43	17.45	52.98	19.81	50.62
	9	69.68	70.43	70.43	10.41	60.02	12.42	58.01

Notes:

MSL = Feet above mean sea level
NR = Not recorded during measurement period
* Well dry during measurement period
[1] These values are the elevations of the top of the staff gages (6.6 ft).
[R] Staff gages reinstalled (5/21/2010) and resurveyed (7/26/2010) after original gages were damaged due to winter condtions
[I] Staff gages were damaged and are no longer in use

Depth to water measurements are in feet below mesuring point.
Horizontal Datum: NJ State Plane NAD83 feet. Vertical Datum: NAVD 88 feet mean sea level.

TABLE 5
REMEDIATION GOALS
Cornell-Dubilier Electronics Superfund Site
South Plainfield, New Jersey

Chemical of Concern	CAS No.	NJDEP Remediation Standards for Groundwater (ug/L)	NJDEP PQL (ug/L)	NJDEP Modified* Remediation Standards for Groundwater (ug/L)	Federal MCLs (ug/L)	NJDEP Drinking Water MCLs (ug/L)	Preliminary Remediation Goal (ug/L)
Volatile Organic Compounds							
1,1,2-Trichloroethane	79-00-5	3	2	3	5	3	3
1,1-Dichloroethene	75-35-4	1	1	1	7	2	1
1,2,4-Trichlorobenzene	120-82-1	9	1	9	70	9	9
1,2-Dibromo-3-chloropropane	96-12-8	0.02	0.02	0.02	0.2	0.2	0.02
1,2-Dichloroethane	107-06-2	0.3	2	2	5	2	2
1,4-Dichlorobenzene	106-46-7	75	5	75	75	75	75
Benzene	71-43-2	0.2	1	1	5	1	1
Bromodichloromethane	75-27-4	0.6	1	1	80	NA	1
Chlorobenzene	108-90-7	50	1	50	100	50	50
Chloroform	67-66-3	70	1	70	80	NA	70
cis-1,2-Dichloroethene	156-59-2	70	1	70	70	70	70
Dibromochloromethane	124-48-1	0.4	1	1	80	NA	1
Methyl tert-butyl ether	1634-04-4	70	1	70	NA	70	70
Methylene chloride	75-09-2	3	1	3	5	3	3
Tetrachloroethene	127-18-4	0.4	1	1	5	1	1
trans-1,2-Dichloroethene	156-60-5	100	1	100	100	100	100
Trichloroethene	79-01-6	1	1	1	5	1	1
Vinyl chloride	75-01-4	0.08	1	1	2	2	1
Semi-Volatile Organic Compounds							
Benzo(a)anthracene	56-55-3	0.05	0.1	0.1	NA	NA	0.1
Benzo(a)pyrene	50-32-8	0.005	0.1	0.1	0.2	0.2	0.1
Benzo(b)fluoranthene	205-99-2	0.05	0.2	0.2	NA	NA	0.2
Benzo(k)fluoranthene	207-08-9	0.5	0.3	0.5	NA	NA	0.5
bis(2-Ethylhexyl)phthalate	117-81-7	2	3	3	6	6	3
Dibenzo(a,h)anthracene	53-70-3	0.005	0.3	0.3	NA	NA	0.3
Indeno(1,2,3-cd)pyrene	193-39-5	0.05	0.2	0.2	NA	NA	0.2
Polychlorinated Biphenyls and Dioxins							
Aroclor 1016***	12674-11-2	0.02	0.5	0.5	0.5	0.5	0.5
Aroclor 1248***	12672-29-6	0.02	0.5	0.5	0.5	0.5	0.5
Aroclor 1254***	11097-69-1	0.02	0.5	0.5	0.5	0.5	0.5
2,3,7,8-TCDD Toxic Equivalence (TEQ)	1746-01-6	0.0000002	0.00001	0.00001	0.00003	0.00003	0.00001
Pesticides							
4,4'-DDD	72-54-8	0.1	0.02	0.1	NA	NA	0.1
4,4'-DDE	72-55-9	0.1	0.01	0.1	NA	NA	0.1
4,4'-DDT	50-29-3	0.1	0.1	0.1	NA	NA	0.1
alpha-BHC	319-84-6	0.006	0.02	0.02	NA	NA	0.02
beta-BHC	319-85-7	0.02	0.04	0.04	NA	NA	0.04
Dieldrin	60-57-1	0.002	0.03	0.03	NA	NA	0.03
Endosulfan II	33213-65-9	40	0.04	40	NA	NA	40
Endosulfan sulfate	1031-07-8	40	0.02	40	NA	NA	40
gamma-BHC	58-89-9	0.03	0.02	0.03	0.2	0.2	0.03
gamma-Chlordane**	5103-74-2	0.01	0.5	0.5	2	0.5	0.5
Heptachlor	76-44-8	0.008	0.05	0.05	0.4	0.4	0.05
Heptachlor epoxide	1024-57-3	0.004	0.2	0.2	0.2	0.2	0.2
Methoxychlor	72-43-5	40	0.1	40	40	40	40
Inorganics							
Aluminum	7429-90-5	200	30	200	50-200	200	50
Arsenic	7440-38-2	0.02	3	3	10	5	3
Barium	7440-39-3	6,000	200	6,000	2,000	2,000	2,000
Cadmium	7440-43-9	4	0.5	4	5	5	4
Chromium	7440-47-3	70	1	70	100	100	70
Iron	7439-89-6	300	20	300	300	300	300
Lead	7439-92-1	5	5	5	15	NA	5
Manganese	7439-96-5	50	0.4	50	50	50	50

*'Modified' is defined as the higher of the Remediation Standard for Groundwater and PQL
**Standards for gamma-Chlordane come from "Total" Chlordane standard that includes alpha- and gamma-Chlordane
***Aroclor standards are for "PCBs (Polychlorinated biphenyls)" which include all PCB Aroclors

TABLE 6
LONG-TERM MONITORING PLAN - TREND PLOT SUMMARY
Cornell-Dubilier Electronics Superfund Site
South Plainfield, New Jersey

Well ID	Single Screen or Water FLUTe Port #	Depth Interval (ft bgs)		Volatile Organic Compounds					Semi-Volatile Organic Compounds								Pesticides				Inorganics					Polychlorinated Biphenyls and Dioxins					
				cis-1,2-Dichloroethene	Tetrachloroethene	Trichloroethene	Vinyl Chloride	Trend Plots	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	bis(2-Ethylhexyl)phthalate	Dibenzo(a,h)anthracene	Indeno(1,2,3-cd)pyrene	Trend Plots	4, 4'-DDE	4, 4'-DDT	Heptachlor	Trend Plots	Barium	Cadmium	Chromium	Lead	Trend Plots	Aroclor 1016	Aroclor 1248	Aroclor 1254	Total TEQ	Trend Plots	PCB and Dioxin Notes
Shallow Bedrock Monitoring Wells				**RI exceedance?**					**RI Exceedance?**								**RI Exceedance?**				**RI Exceedance?**					**RI Exceedance?**					
MW-01A	1	24	49	X	X	X	X	**X**																			X	X	X		
MW-02A	1	24	49			X		**X**		X								X										X			
MW-03	1	17	32	X	X	X	X	**X**																X			X	X	X	**X**	Plot PCBs only
MW-04	1	29	49	X	X	X	X	**X**											X			X				X	X	X			
MW-05	1	25	45.5		X	X		**X**															X				X	X	X		
MW-06	1	29	44	X	X	X	X	**X**	X	X	X			X	X		X							X				X			
MW-07	1	43	58	X	X	X	X	**X**																							
MW-08	1	42	57.5	X	X	X	X	**X**									X	X	X												
MW-09	1	29	54		X	X		**X**									X	X	X												
MW-10	1	37	52			X		**X**																							
MW-11	1	34	59	X	X	X	X	**X**									X	X	X		X						X	X	X	**X**	Plot PCBs and TEQ
MW-12	1	35	60	X	X	X	X	**X**	X	X	X	X			X	**X**	X	X	X	**X**				X	**X**			X	X	**X**	Plot PCBs and TEQ
Bedrock Multi-Port Monitoring Wells				**RI exceedance?**					**RI Exceedance?**								**RI Exceedance?**				**RI Exceedance?**					**RI Exceedance?**					
ERT-1	1	24	29			X		**X**					X																		
	2	33	43			X							X																		
	3	46	56			X							X															X			
	4	59	64										X																		
	5	67	77																												
	6	100	105							X	X	X	X		X	**X**															
	7	112	117										X																		
	8	135	140			X		**X**																							
ERT-2	1	25	35		X	X		**X**													X				**X**		X				
	2	40	50		X	X																									
	3	54	59			X																									
	4	70	75	X		X																									
	5	97	107		X	X				X	X			X	X	**X**															
	6	113	123	X	X	X																X			**X**						
	7	127	137	X	X	X		**X**																							
ERT-3	1	27	37																												
	2	55	65			X																									
	3	90	105			X				X		X	X																		
	4	110	120	X		X																									
	5	124	134	X	X	X		**X**																							
	6	138	148	X		X																									
ERT-4	1	27	37			X							X					X													
	2	46	56		X	X		**X**																							
	3	61	66																												
	4	83	88	X	X	X																									
	5	91	106	X	X	X																									
	6	111	116	X	X	X																									
	7	128	138	X	X	X		**X**																							
ERT-5	1	24	34																												
	2	37	47																												
	3	50	60																												
	4	77	87																												
	5	93	98										X																		
	6	120	130			X		**X**																							
ERT-6	1	26	36																												
	2	75	85																												
	3	93	103																												
	4	107	117			X																									
	5	128	138			X		**X**																							
ERT-7	1	25	35											X																	
	2	45	55																												
	3	65	75																					X							
	4	100	110			X																									
	5	130	140			X		**X**																X							
ERT-8	1	17	27																												
	2	31	41																												
	3	44	54										X																		
	4	57	62																												
	5	87	97										X					X										X			
	6	107	112										X					X										X			
	7	135	145							X	X	X	X																		

TABLE 6
LONG-TERM MONITORING PLAN - TREND PLOT SUMMARY
Cornell-Dubilier Electronics Superfund Site
South Plainfield, New Jersey

Well ID	Single Screen or Water FLUTe Port #	Depth Interval (ft bgs)		Volatile Organic Compounds					Semi-Volatile Organic Compounds								Pesticides				Inorganics					Polychlorinated Biphenyls and Dioxins					
				cis-1,2-Dichloroethene	Tetrachloroethene	Trichloroethene	Vinyl Chloride	Trend Plots	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	bis(2-Ethylhexyl) phthalate	Dibenzo(a,h)anthracene	Indeno(1,2,3-cd)pyrene	Trend Plots	4, 4'-DDE	4, 4'-DDT	Heptachlor	Trend Plots	Barium	Cadmium	Chromium	Lead	Trend Plots	Aroclor 1016	Aroclor 1248	Aroclor 1254	Total TEQ	Trend Plots	PCB and Dioxin Notes
MW-13	1	18	28			X		**X**																X							
	2	35	45	X		X																		X							
	3	63	73	X		X	X																								
	4	95	105	X	X	X	X	**X**																							
	5	115	125	X		X	X																								
	6	150	160			X																									
	7	230	240			X		**X**																							
MW-14S	1	30	35	X		X	X	**X**									X	X	X	**X**				X	**X**	X	X	X			
	2	41	46	X	X	X	X										X	X	X					X		X	X	X			
	3	55	60	X		X	X										X	X	X					X		X	X	X			
	4	65	70	X	X	X	X	**X**		X							X	X	X	**X**				X	**X**	X	X	X	X	**X**	Plot PCBs and TEQ
MW-14D	1	80	85	X		X	X	**X**										X									X	X			
	2	123	133	X		X	X											X									X	X			
	3	199	209	X		X	X	**X**																		X	X	X			
MW-15S	1	30	40	X	X	X		**X**																							
	2	70	80	X	X	X																									
MW-15D	1	125	135			X												X													
	2	185	195			X		**X**																							
MW-16	1	20	30	X		X	X	**X**																							
	2	40	50	X		X	X											X		**X**											
	3	85	95	X		X	X								X																
	4	108	118	X		X	X								X																
	5	135	145	X		X	X																								
	6	170	180	X		X	X																								
	7	195	205	X		X	X	**X**																							
MW-17	1	170	180	X		X																									
	2	205	215	X		X																									
	3	235	245	X		X		**X**																X	**X**						
MW-18	1	160	170			X								X	X																
	2	210	220			X		**X**																							
MW-19	1	65	75			X		**X**																							
	2	132	142			X											X	X									X		X	**X**	Plot PCBs only
	3	200	210		X	X		**X**										X													
	4	257	267																												
	5	367	377			X		**X**																X	**X**						
	6	480	490															X													
	7	545	555										X																		
MW-20	1	25	35	X		X		**X**									X	X	X								X	X			
	2	85	95	X		X																					X	X			
	3	125	135	X		X																									
	4	175	185	X		X																									
	5	205	215	X		X																									
	6	250	260	X		X																									
	7	297	307	X		X		**X**																							
	8	355	365			X																									
MW-21	1	50	60			X		**X**																X	**X**						
	2	87	97			X																		X							
	3	150	160			X		**X**																							
	4	205	215			X																		X							
	5	260	270			X																		X							
	6	428	438			X		**X**																							
	7	485	495			X							X											X							
	8	505	515			X																		X	**X**						
MW-22	1	45	55																												
	2	125	135																												
	3	210	220	X		X		**X**																							
	4	305	315	X		X		**X**																							

TABLE 6
LONG-TERM MONITORING PLAN - TREND PLOT SUMMARY
Cornell-Dubilier Electronics Superfund Site
South Plainfield, New Jersey

Well ID	Single Screen or Water FLUTe Port #	Depth Interval (ft bgs)		Volatile Organic Compounds					Semi-Volatile Organic Compounds								Pesticides				Inorganics					Polychlorinated Biphenyls and Dioxins					
				cis-1,2-Dichloroethene	Tetrachloroethene	Trichloroethene	Vinyl Chloride	Trend Plots	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	bis(2-Ethylhexyl)phthalate	Dibenzo(a,h)anthracene	Indeno(1,2,3-cd)pyrene	Trend Plots	4, 4'-DDE	4, 4'-DDT	Heptachlor	Trend Plots	Barium	Cadmium	Chromium	Lead	Trend Plots	Aroclor 1016	Aroclor 1248	Aroclor 1254	Total TEQ	Trend Plots	PCB and Dioxin Notes
MW-23	1	60	70			X		**X**																							
	2	120	130			X		**X**					X																		
	3	170	180			X																									
	4	226	236			X		**X**					X																		
	5	258	268			X																		X							
	6	316	326			X																									
	7	350	360			X																									
	8	406	416			X																									
	9	444	454			X		**X**					X																		
Former Production Well	1	31	41	X		X	X	**X**																				X			
	2	46	51	X		X	X																								
	3	100	110	X		X		**X**																							
	4	125	135	X		X	X						X																		
	5	180	190	X		X	X																								
	6	200	205	X		X	X	**X**					X											X							
	7	235	245	X		X	X																								
	8	268	278	X		X																									
	9	300	310			X							X											X	**X**			X			
MW-24	1	TBD	TBD																												
	2	TBD	TBD																												
	3	TBD	TBD																												
	4	TBD	TBD																												
	5	TBD	TBD																												
	6	TBD	TBD																												
	7	TBD	TBD																												
	8	TBD	TBD																												
	9	TBD	TBD																												
MW-25	1	TBD	TBD																												
	2	TBD	TBD																												
	3	TBD	TBD																												
	4	TBD	TBD																												
	5	TBD	TBD																												
	6	TBD	TBD																												
	7	TBD	TBD																												
	8	TBD	TBD																												
	9	TBD	TBD																												
MW-26	1	TBD	TBD																												
	2	TBD	TBD																												
	3	TBD	TBD																												
	4	TBD	TBD																												
	5	TBD	TBD																												
	6	TBD	TBD																												
	7	TBD	TBD																												
	8	TBD	TBD																												
	9	TBD	TBD																												
MW-27	1	TBD	TBD																												
	2	TBD	TBD																												
	3	TBD	TBD																												
	4	TBD	TBD																												
	5	TBD	TBD																												
	6	TBD	TBD																												
	7	TBD	TBD																												
	8	TBD	TBD																												
	9	TBD	TBD																												
TOTAL TREND ANALYSES PER CONTAMINANT TYPE								**52**								**3**				**4**					**10**					**5**	

Notes

Denotes a sentinel well at the periphery of the Technical Impracticability (TI) Zone/CEA.

TABLE 7
LONG-TERM MONITORING PLAN - SUBMITTAL REGISTER
Cornell-Dubilier Electronics Superfund Site
South Plainfield, NJ

SUBMITTAL REGISTER

TITLE AND LOCATION *Cornell-Dubilier Electronics Superfund Site - OU3*			CONTRACTOR											
			CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY					
ACTIVITY NUMBER	TRANSMITTAL NUMBER	DESCRIPTION ITEM SUBMITTED/TASK	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTHER REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FROM APPR AUTH	REMARKS
01		DRAFT QAPP												
02		DRAFT FINAL QAPP												
03		FINAL QAPP												
04		DRAFT SSHP												
05		DRAFT FINAL SSHP												
06		FINAL SSHP												
07		LTMP SAMPLING												
08		QUARTERLY (YEARS 1-2)												
09		SEMI-ANNUALLY (YEARS 3-5)												
10		ANNUALLY (YEARS 6-15)												
11		BIENNALLY (YEARS 16-30)												
12		ANNUAL REPORT (YEARS 1-15)												
13		BIENNAL REPORT (YEARS 16-30)												
14		BIENNAL LETTER (YEARS 16-30; NON-REPORTING YEARS)												

APPENDIX A

Quality Assurance Project Plan (QAPP) for the Groundwater Long-Term Monitoring Plan at Operable Unit 03 Cornell-Dubilier Electronics Superfund Site

FINAL FRAMEWORK

QUALITY ASSURANCE PROJECT PLAN
for the Groundwater Long-Term Monitoring Plan at OU3

Cornell-Dubilier Electronics Superfund Site
South Plainfield, New Jersey

Prepared for:

United States Environmental Protection Agency Region II

Prepared By:

The Louis Berger Group Domestic, Incorporated
565 Taxter Road, Suite 510
Elmsford, NY 10523

Version: 02

01 April 2015

DRAFT

NOTE: THIS QAPP DOCUMENT IS A FRAMEWORK FOR USE BY THE CONTRACTOR SELECTED TO PERFORM LONG-TERM MONITORING AT OU3. THE SELECTED CONTRACTOR SHALL COMPLETE THIS QAPP AND SUBMIT FOR APPROVAL IN ACCORDANCE WITH THE LONG-TERM MONITORING PLAN. ALL INFORMATION OUTSIDE OF KNOWN PROJECT-SPECIFICS OR REQUIREMENTS IS PROVIDED SOLELY AS RECOMMENDATIONS TO THE CONTRACTOR, INCLUDING USE OF THE USEPA'S CLP PROGRAM FOR LABORATORY ANALYSES, AND SHALL BE REVIEWED AND UPDATED, AS APPROPRIATE, BY THE CONTRACTOR AS PART OF THE QAPP SUBMITTAL PRIOR TO COMMENCEMENT OF LONG-TERM MONITORING ACTIVITIES.

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Attachment 1.2: Data Needs
Attachment 2: Example Field Modification Form
Attachment 3: Example Field Standard Operating Procedures
Attachment 4: Example Chain of Custody Form
Attachment 5: Example Non-Conformance Quality Control Report
Attachment 6 Example Daily Quality Control Report

QAPP Worksheet 1
Title and Approval Page

Site Name/Project Name: Cornell-Dubilier Electronics Superfund Site/Cornell-Dubilier Operable Unit 03

Site Location: South Plainfield, New Jersey

Document Title: Quality Assurance Project Plan for the Groundwater Long-Term Monitoring Plan at Operable Unit 03 of the Cornell-Dubilier Electronics Superfund Site

Lead Organization: United States Environmental Protection Agency

Preparer's Name and Organizational Affiliation: *To be provided in the future*

Name of Document Preparer and Company Affiliation: To be provided in the future

Preparer's Address, Telephone Number, and E-mail Address: To be provided in the future; contact information for the individual who prepared the document

Preparation Date (Day/Month/Year): Specific Preparation Date of Document

CONTRACTOR'S Project Manager:

_____
Individual's Name (Company Affiliation)

CONTRACTOR'S Quality Consultant:

_____
Individual's Name (Company Affiliation)

CONTRACTOR'S Site Quality Control Officer:

_____
Individual's Name (Company Affiliation)

Lead Agency's Project Manager (Approval Authority):

_____
Individual's Name (Company Affiliation)

QAPP Worksheet 2
QAPP Identifying Information

Site Name/Project Name: Cornell-Dubilier Electronics Superfund Site/Cornell-Dubilier Operable Unit 03

Title: Quality Assurance Project Plan for the Groundwater Long-Term Monitoring Plan at Operable Unit 03 of the Cornell-Dubilier Electronics Superfund Site

Site Location: South Plainfield, New Jersey

Version Number: 01

Site Number/Code: EPA ID # NJD981557879

Version Date: Date document issued

Operable Unit: 03

Contractor Name: Company implementing the program

Contract #: Number assigned by lead agency

Registration #: Number assigned by lead agency. (May or may not be applicable.)

Contract Title: Title assigned by lead agency.

Work Assignment Number: Number assigned by lead agency. (May or may not be applicable.)

1. Identify regulatory program:

   United States Environmental Protection Agency (USEPA) Region 2; Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). QAPP prepared following the "Uniform Federal Policy for Quality Assurance Project Plans" (USPEA Document No. 505-B-04-900A, Final Version 1. March 2005).

2. Identify approval entity: United States Army Corps of Engineers
3. The QAPP is (select one): ☐Generic ☒Project Specific
4. Dates of scoping discussions that have been held: To be provided in the future.
5. List dates and titles of QAPP documents written for previous site work, if applicable:

Title	Approval Date
Malcolm Pirnie, Inc., 2008. "Final Quality Assurance Project Plan, OU3 Groundwater." Prepared by Malcolm Pirnie, Inc. December 2008.	December 19, 2008
The Louis Berger Group, Inc., 2015. "Final Quality Assurance Project Plan for the Groundwater Long-Term Monitoring Plan at OU3." Prepared by the Louis Berger Group.	Not yet approved

6. List organizational partners (stakeholders) and connection with lead organization:
   - United States Environmental Protection Agency (USEPA) – Lead Organization
   - The United States Army Corps of Engineers (USACE) – Manage work for Lead Organization
   - New Jersey Department of Environmental Preservation (NJDEP) – No connection. Interested party only.
7. List data users:

   The USEPA, USACE, NJDEP, CONTRACTOR, and any local or regional environmental stakeholders (*e.g.,* active environmental groups or local governments).

8. If any required QAPP elements and required information are not applicable to the project, then circle the omitted QAPP elements and required information on the attached table. Provide an explanation for their exclusion below:

   NONE

QAPP Worksheet 3
Distribution List

QAPP Recipients	Title	Organization	Telephone Number	E-mail Address	Document Control Number
TBD	USEPA Project Manager	USEPA	TBD	TBD	Electronic copy of Document Control
TBD	USACE Project Manager	USACE	TBD	TBD	Electronic copy of Document Control
	NJDEP Project Manager	NJDEP			Electronic copy of Document Control
	CONTRACTOR'S Project Manager				Electronic copy of Document Control
	CONTRACTOR'S Quality Consultant				Electronic copy of Document Control
	Site Quality Control Officer				Electronic copy of Document Control
	CONTRACTOR'S Technical Expert				Electronic copy of Document Control
	Analytical Services Laboratory Project Manager				Electronic copy of Document Control
	Data Validation Services Project Manager or Contact(s)				Electronic copy of Document Control
	CONTRACTOR'S Field Team Leader				Electronic copy of Document Control
	CONTRACTOR'S Field Team Members				Electronic copy of Document Control

QAPP Worksheet 4
Project Personnel Sign-Off Sheet[1]

Project Personnel	Title	Telephone Number	Signature	Date QAPP Read
TBD	USEPA Project Manager	TBD		
TBD	USACE Project Manager	TBD		
	NJDEP Project Manager			
	CONTRACTOR'S Project Manager			
	CONTRACTOR'S Project Quality Consultant			
	CONTRACTOR'S Technical Expert			
	CONTRACTOR'S Site Control Officer			

QAPP Worksheet 5
Project Organization Chart

Refer to the Example Project Organization Chart in Figure 1.

QAPP Worksheet 6
Communication Pathways

Communication Drivers	Responsible Entity	Name	Phone Number	Procedure (Timing, Pathways, etc.)
Real time modification, notifications, and approval	CONTRACTOR	Recommend Site Quality Control Officer with Project Manager approval		Real time modification to the project will require the approval of the Site Quality Control Officer and Project Manager and will be documented using a Field Modification Form, an example of which is included as Attachment 2. Submit documented modifications to the USACE and USEPA for review.
Approval of amendments and field modifications to the QAPP	CONTRACTOR	Recommend Project Manager		USACE and USEPA will approve all field modifications.
Document control	CONTRACTOR	Recommend Project Manager		Prepare project documentation and distribute to the USACE and USEPA for review and approval.
Stop work and initiation of corrective action	CONTRACTOR	Recommend Project Manager		Communicate the stop work order and initiation of corrective action to the project team and the USACE and USEPA within 24 hours of issuance via phone with email confirmation. Specific serious issues will be reported to the USACE, USEPA, and other concerned parties.
Reporting of serious issues	CONTRACTOR	Recommend Field Team Leader and Project Manager		Field Team Members will report serious issues to the Field Team Leader, who will then inform the Project Manager. The Project Manager will report any serious issues to the USACE, USEPA, and other concerned parties.
Corrective action and audit finding	CONTRACTOR	Recommend Site Quality Control Officer		Site Quality Control Officer will report problems or negative audit findings to the Project Manager by e-mail or phone. The Project Manager will report nonconformance and corrective action to the USACE, USEPA, and other concerned parties.

Communication Drivers	Responsible Entity	Name	Phone Number	Procedure (Timing, Pathways, etc.)
Field communication	CONTRACTOR	Recommend Field Team Leader		The Field Team Leader will coordinate field activities, sample collection, and sample shipment with field staff, as well as summarize daily activity using a Daily Quality Control Report (DQCR; example provided in Attachment 6).
Communication with USACE and USEPA	CONTRACTOR	Recommend Project Manager		The Project Manager will provide daily field activity summaries to the USACE and USEPA. If the USACE and USEPA do not require daily summaries, the Project Manager will provide summaries at the frequency requested by those agencies.
Communication with laboratories	CONTRACTOR	Recommend Site Quality Control Officer		The Site Quality Control Officer will communicate with laboratories to notify them of anticipated sample shipment, verify receipt of samples, and communicate any analytical issues. The Site Quality Control Officer will also communicate with the Project Manager on any analytical issues that arise.

QAPP Worksheet 7
Personnel Responsibilities and Qualification Table

Name	Title	Organizational Affiliation	Responsibilities	Education and Experience Qualifications
TBD	USEPA Project Manager	USEPA	USEPA Project Manager	
TBD	USACE Project Manager	USACE	USACE Project Manager	
		CONTRACTOR	CONTRACTOR'S Project Manager	
		CONTRACTOR	CONTRACTOR'S Quality Consultant	
		CONTRACTOR	CONTRACTOR'S Site Quality Control Officer	
		CONTRACTOR	CONTRACTOR'S Technical Expert	
		CONTRACTOR	CONTRACTOR'S Project Hydrogeologist	
		CONTRACTOR	CONTRACTOR'S Field Team leader	
		CONTRACTOR	CONTRACTOR'S Health and Safety Manager	

Note that CONTRACTOR will provide copies of resumes and certifications, or list where files are stored.

QAPP Worksheet 8
Special Personnel Training Requirements Table

Project Function	Specialized Training Title or Description of Course	Training Provider	Training Date	Personnel and Groups Receiving Training	Personnel Titles and Organizational Affiliation	Location of Training Records/Certificates
Field investigation and on-site personnel	Safety and OSHA training as specified in the Site-Specific Health and Safety Plan (to be provided by the CONTRACTOR)	CONTRACTOR	Training dates kept in CONTRACTOR training records	All field team members working on-site	CONTRACTOR	CONTRACTOR project files
Field investigation and on-site personnel	Training in the sampling of the specialized FLUTe™ wells present in the monitoring network.	FLUTe, LLC	Training dates kept in CONTRACTOR training records	All field team members working on-site	CONTRACTOR	CONTRACTOR project files
Sample management and creation of COC records[1]	SCRIBE software training	USEPA online training	Training dates kept in CONTRACTOR training records	Sample management team	CONTRACTOR	CONTRACTOR project files

1: SCRIBE software will be used to manage samples and create COC; however, depending on field conditions, staff can generate a hand-written COC for sample shipment.

QAPP Worksheet 9
Project Scoping Session Participants Sheet

Project Name: Groundwater Long-Term Monitoring at Operable Unit 3 of the Cornell-Dubilier Electronics Superfund Site **Projected Date(s) of Sampling:** To be determined **Project Managers**: TBD (USEPA), TBD (USACE), Individual from CONTRACTOR	**Site Name**: Cornell-Dubilier Electronics Superfund Site **Site Location**: South Plainfield, New Jersey

Date of Session: Date(s) meeting(s) took place.

Scoping Session Purpose: Discussion topic

Name	Title	Affiliation	Phone #	E-mail Address

Comments/Decisions: To be provided in the future

[NOTE: IF MULTIPLE SCOPING SESSIONS ARE HELD, WORKSHEET 9 CAN BE REPLICATED.]

QAPP Worksheet 10
Problem Definition

The problems to be addressed by the project:

The purpose of this program is to conduct long-term monitoring of the nature and extent of contamination in groundwater attributable to historical site activities at the Cornell-Dubilier Electronics (CDE) Superfund Site, as specified by the Record of Decision (ROD).

Based on the findings of the Remedial Investigation (RI), Feasibility Study (FS), and Technical Impracticability Evaluation Reports, a ROD was issued for OU3 Groundwater in September 2012. In this ROD, the USEPA determined that the appropriate remedy for groundwater was comprised of a combination of Institutional Controls and Groundwater Monitoring. The selected remedy includes the following components:

- Prevention of exposure to Site groundwater contamination by continuing efforts to identify existing private wells within the OU3 study area and by placing institutional controls in the form of a Classification Exception Area (CEA), as defined by the extent of the delineated TI zone, to prevent the installation of new drinking water wells;
- Implementation of a long-term sampling and analysis program to monitor the groundwater contamination at the site in order to prevent exposure and assess groundwater migration; and
- Implementation of a long-term vapor intrusion monitoring program.

The program described in this QAPP document applies specifically to groundwater monitoring; vapor intrusion monitoring is addressed in a separate program (and therefore a separate QAPP document).

The environmental questions being asked:

The objective of the long-term monitoring program is to answer the following questions:

- Does the institutional control prevent or minimize potential risks to human and ecological receptors from exposure by contact or ingestion of contaminants in groundwater attributable to the Site?
- Is the extent of groundwater contamination attributable to the Site remaining stable and not expanding beyond the TI zone (CEA)?

Observations from any site reconnaissance reports:

To be provided in the future by CONTRACTOR

A synopsis of secondary data or information from site reports:

Worksheet 13 will be updated in the future to summarize the secondary data sources for OU3 of the CDE Superfund Site.

The possible affected matrices and classes of contaminants:

Affected Matrix: Groundwater

Contaminant Classes: Volatile Organic Compounds (VOC), Semi-volatile Organic Compounds (SVOC), Polychlorinated Biphenyls (PCB) Congeners and Aroclors, Polychlorodibenzodioxin/furans (PCDD/F), Pesticides (PEST), and Metals.

The rationale for inclusion of chemical and non-chemical analyses:

Chemical analyses are necessary to monitor any change, particularly an increase, in contaminant concentrations from the baseline established prior to monitoring. The contaminants that will be monitored during the program include:

- VOC: Previous work done during the RI establishes VOC parameters as a contaminant of concern (COC) in OU3 groundwater. Constituents in this class were detected during previous sampling events. VOC analysis will include Target Compound List (TCL) VOC; concentrations will be reported on whole water samples. Proposed method is USEPA CLP SOW SOM02.2.
- SVOC: Previous work done during the RI establishes SVOC parameters as a COC in OU3 groundwater. Constituents in this class were detected during previous sampling events. SVOC analysis will include TCL SVOC; concentrations will be reported on whole water samples. Proposed method is USEPA CLP SOW SOM02.2.
- PCB: Previous work done during the RI establishes PCB compounds as a COC in OU3 groundwater. Constituents in this class were detected during previous sampling events. Samples will be analyzed for PCB Aroclors and PCB Congeners; concentrations will be reported on whole water samples. Proposed methods are USEPA CLP SOW SOM02.2 and USEPA CLP SOW CBC01.2, respectively.
- Pesticides: Previous work done during the RI establishes chlorinated pesticides as a COC in OU3 groundwater. Constituents in this class were detected during previous sampling events. Pesticide analysis will include TCL Pesticides; concentrations will be reported on whole water samples. Proposed method is USEPA CLP SOW SOM02.2
- PCDD/F: Previous work done during the RI establishes PCDD/F as COCs in OU3 groundwater. Constituents in this class were detected during previous sampling events. PCDD/F concentrations will be reported on whole water samples. Proposed method is USEPA CLP SOW DLM02.2
- Metals: Previous work done during the RI establishes Metals as a COC in OU3 groundwater. Constituents in this class were detected during previous sampling events. Metals analysis will include Target Analyte List (TAL) Metals; concentrations will be reported on whole water sample. Proposed methods USEPA CLP SOW ISM02.2

Non-chemical measurements will be conducted at each well to evaluate groundwater stabilization during long-term monitoring. Non-chemical parameters include:

- Groundwater water quality parameters (pH, Temperature, Conductivity, Dissolved Oxygen, ORP, and Flow Rate) will be measured at each well at the time of sampling with a water quality meter (equivalent to the YSI 566 Multiprobe Water Quality Meter). Actual equipment will be determined by the CONTRACTOR implementing the monitoring program.
- Water level measurements will be collected from traditional screened wells using manual water level meters or pressure transducers previously installed in the well. The water level in FLUTe™ wells will be determined using a bead-type electric water level meter to measure the water level in the existing pump tube. Surface water measurements will be collected and recorded at all five staff gages located in Bound Brook and Spring Lake; water levels at the staff gages will be measured from the gages to the nearest 0.01 feet.
- If free product, such as non-aqueous phase liquid (NAPL), is detected in the well, its presence and thickness will also be recorded with an interface probe.

Program decision conditions:

- If the measured concentration of the groundwater contamination within or downgradient of the CEA is less than the preliminary remedial goals shown in Table 1, or anthropogenic background levels, whichever is higher, an unacceptable ecological or human health risk is not present and no evaluation of the protectiveness of the remedy will be performed.
- If the concentration trend, as determined by using the Mann-Kendall Test, at a location within or downgradient of the CEA is not stable (rising) with statistical significance as indicated by evaluating the Mann-Kendall statistic (S) magnitude relative to the critical value of S, then the protectiveness of the remedy will be evaluated.

QAPP Worksheet 11
Project Quality Objectives/Systematic Planning Process Statements

Who will use the data?

USEPA, USACE, and stakeholders

What will the data be used for?

The data obtained from this monitoring program will be used to:

- Evaluate whether or not the institutional control prevents or minimizes potential risks to human and ecological receptors from exposure by contact or ingestion of contaminants in groundwater attributable to the Site.
- Evaluate whether or not the extent of groundwater contamination attributable to the Site is remaining stable and not expanding beyond the TI zone (CEA)?

A detailed description of the data quality objectives (DQOs) is presented in Attachment 1.1.

What type of data are needed?

The goal of this program includes the long-term monitoring of the nature and extent of groundwater contamination, attributable to the Site, within and downgradient of the CEA. The program is expected to last 30 years. Data that will be collected during the monitoring program includes:

- Groundwater sampling for chemical analysis at 38 locations at varying frequencies over the course of 30 years.
- Groundwater water quality parameters at each well at the time of sampling to evaluate well stabilization.
- Water level measurements will be collected from each well and surface water gauging stations at the time of sampling.

A detailed description of the data needs is presented in Attachment 1.2.

How "good" do the data need to be in order to support the environmental decision?

Data must be technically defensible and of sufficient quality to support the program objectives. Field equipment will be calibrated (calibration requirements will be determined in the future based on selected instrumentation; refer to Worksheet 22). All analytical data will be validated through the CLP program; validation guidelines will be provided in the future in Worksheets 35 and 36. Refer to Worksheet 15 for summary of analytical parameters and project quantitation limits.

How much data are needed (i.e., the number of samples for each analytical group, matrix, and concentration)?

Refer to Worksheet 20 for anticipated number of field samples and quality control samples to be shipped to the laboratory.

Where, when, and how should the data be collected/generated? Where: OU3 of the CDE Superfund Site, South Plainfield, NJ When: 2017 through 2047 (anticipated) How: Refer to field SOPs (Attachment 3).
Who will collect and generate the data? Data will be collected by the CONTRACTOR selected by the lead organization and any associated subcontractors (if applicable). The groundwater sampling team will generate the field data (*i.e.,* water quality parameters, water level measurements, and oil-water thickness if encountered in the well). The USEPA CLP program will analyze the samples and validate the data.
How will the data be reported? At a minimum, field data will be verified and reported according to Worksheet 34. At a minimum, analytical data will be reported according to the requirements in Worksheet 29. Data validation will follow requirements provided in Worksheets 35 and 36. Validated sample data will be provided to the USEPA as a MEDD deliverable. Validation reports and laboratory data packages will be provided in PDF format.
How will the data be archived? Electronic data will be provided in USEPA Region 2 standardized electronic data deliverable (EDD) format, per CLP lab reporting requirements. Electronic data in this format, applicable MS Excel spreadsheets containing validated data, and hard copies of laboratory data reports will be kept in CONTRACTOR project files.

Worksheet 12-1
Measurement Performance Criteria Table

Matrix	Aqueous (Groundwater)
Analytical Group	TCL VOC
Concentration Level	Trace

Sampling Procedure	Analytical Method/SOP[1]	Data Quality Indicators (DQIs)	Measurement Performance Criteria [1]	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)
SOP No. 04	USEPA-CLP SOW SOM02.2	Sensitivity	Less than QL	Field Blank	S & A
		Precision	RPD ≤ 40% for duplicate values greater than or equal to 5 times the QL	Field Duplicate	S & A
		Accuracy/Bias/ Precision	Per recovery and RPD requirements in SOM02.2, Exhibit D, Section 17, Table 11 (p. D-54/Trace VOC)	MS/MSD	A
		Accuracy/Bias	Recoveries per requirements in SOM02.2, Exhibit D, Section 17, Table 10 (p. D-54/Trace VOC)	Deuterated Monitoring Compounds	A
		Sensitivity	Less than QLs	MB	A
		Sensitivity	Less than QLs	Trip Blank	S & A
		Completeness	>90% sample collection and >90% laboratory analysis	Data Completeness Check	S & A

1. The assigned laboratory must perform and meet all of the measurement performance criteria that assess the analytical DQIs specified in USEPA CLP SOW SOM02.2.

QAPP Worksheet #12-2

Measurement Performance Criteria Table

Matrix	Aqueous (Groundwater)
Analytical Group	SVOC
Concentration Level	Low

Sampling Procedure	Analytical Method/SOP[1]	Data Quality Indicators (DQIs)	Measurement Performance Criteria [1]	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)
SOP No. 04	USEPA-CLP SOW SOM02.2	Sensitivity	Less than QLs	Field Blank	S & A
		Precision	RPD ≤ 40% for duplicate values greater than or equal to 5 times the QL	Field Duplicate	S & A
		Accuracy/Bias/ Precision	Per recovery and RPD requirements in SOM02.2, Exhibit D, Section 17, Table 12 (p. D-76/SVOC)	MS/MSD	A
		Accuracy/Bias	Recoveries per requirements in SOM02.2, Exhibit D, Section 17, Table 11 (p. D-76/SVOC)	Deuterated Monitoring Compounds	A
		Sensitivity	Less than QLs	MB	A
		Completeness	>90% soil collection and >90% laboratory analysis	Data Completeness Check	S & A

1. The assigned laboratory must perform and meet all of the measurement performance criteria that assess the analytical DQIs specified in USEPA CLP SOW SOM02.2.

QAPP Worksheet 12-3
Measurement Performance Criteria Table

Matrix	Aqueous (Groundwater)
Analytical Group	PCB Congeners
Concentration Level	Low

Sampling Procedure	Analytical Method/SOP[1]	Data Quality Indicators (DQIs)	Measurement Performance Criteria [1]	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)
SOP No. 04	USEPA-CLP SOW CBC01.2	Sensitivity	Less than QLs	Field Blank	S & A
		Precision	RPD ≤ 40% for duplicate values greater than or equal to 5 times the QL	Field Duplicate	S & A
		Accuracy/Bias/ Precision	Per recoveries given in CBC01.2, Exhibit D, Section 17, Table 6 (p. D-78) LCSD: RPD ≤ 40%	LCS/LCSD (LCSD in lieu of laboratory replicate; refer to Footnote 2)	A
		Accuracy/Bias	RRT within limits of CBC01.2, Exhibit D, Section 17, Table 2 (p. D-71)	RRT	
		Sensitivity	Less than QL	MB	A
		Precision	RPD ≤ 40% if reported values are > 5x QL, otherwise use professional judgment	Laboratory Replicate	A
		Completeness	>90% collection and >90% laboratory analysis	Data Completeness Check	S & A

1 The assigned laboratory must perform and meet all of the measurement performance criteria that assess the analytical DQIs specified in USEPA CLP SOW CBC01.2.
2 Laboratory will perform a laboratory replicate to access precision; in lieu of laboratory replicate, laboratory may analyze a LCSD.

QAPP Worksheet 12-4
Measurement Performance Criteria Table

Matrix	Aqueous (Groundwater)
Analytical Group	PCB Aroclors
Concentration Level	Low

Sampling Procedure	Analytical Method/SOP	Data Quality Indicators (DQIs)	Measurement Performance Criteria[1]	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)
SOP No. 04	USEPA CLP SOW SOM02.2	Sensitivity	Less than QLs	Field Blank	S & A
		Precision	RPD ≤ 40% for duplicate values greater than or equal to 5 times the QL	Field Duplicate	S & A
		Accuracy	Recoveries per SOM02.2, Exhibit D, Section 17, Table 6 (p. D65/ARO)	Surrogates	A
		Accuracy/Bias/ Precision	Per recovery and RPD requirements in SOM02.2, Exhibit D, Section 17, Table 7 (p. D-65/ARO)	MS/MSD	A
		Accuracy/Bias	Per recovery requirements in SOM02.2Exhibit D, Section 17, Table 8 (p. D-65/ARO)	LCS	A
		Sensitivity	Less than QLs	MB	A
		Completeness	>90% sample collection and >90% laboratory analysis	Data Completeness Check	S & A

1. The assigned laboratory must perform and meet all of the measurement performance criteria that assess the analytical DQIs specified in USEPA CLP SOW SOM02.2.

QAPP Worksheet 12-5

Measurement Performance Criteria Table

Matrix	Aqueous (Groundwater)
Analytical Group	Pesticides
Concentration Level	Low

Sampling Procedure	Analytical Method/SOP[1]	Data Quality Indicators (DQIs)	Measurement Performance Criteria [1]	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)
SOP No. 04	USEPA-CLP SOW SOM02.2	Sensitivity	Less than QLs	Field Blank	S & A
		Precision	RPD ≤ 40% for duplicate values greater than or equal to 5 times the QL	Field Duplicate	S & A
		Accuracy	Recoveries per SOM02.2, Exhibit D, Section 17, Table 10 (p. D-77/PEST)	Surrogates	A
		Accuracy/Bias/ Precision	Per recovery and RPD% requirements in SOM02.2, Exhibit D, Section 17, Table 11 (p. D-77/PEST)	MS/MSD	A
		Accuracy/Bias	Per recovery requirements in SOM02.2, Exhibit D, Section 17, Table 12 (p. D-77/PEST)	LCS	A
		Sensitivity	Less than QLs	MB	A
		Completeness	>90% collection and >90% laboratory analysis	Data Completeness Check	S & A

1 The assigned laboratory must perform and meet all of the measurement performance criteria that assess the analytical DQIs specified in USEPA CLP SOW SOM02.2 [including gel permeation chromatography (GPC) verification, if implemented].

QAPP Worksheet 12-6
Measurement Performance Criteria Table

Matrix	Aqueous (Groundwater)
Analytical Group	PCDD/F
Concentration Level	Low

Sampling Procedure	Analytical Method/SOP[1]	Data Quality Indicators (DQIs)	Measurement Performance Criteria [1]	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)
SOP No. 04	USEPA-CLP SOW DLM02.2	Sensitivity	Less than QLs	Field Blank	S & A
		Precision	RPD ≤ 40% for duplicate values greater than or equal to 5 times the QL	Field Duplicate	S & A
		Accuracy/Bias/ Precision	Per recoveries given in DLM02.2, Exhibit D, Section 17, Table 6 (p. D-66) LCSD: RPD ≤ 40%	LCS/LCSD (LCSD in lieu of laboratory replicate; refer to Footnote 2)	A
		Accuracy/Bias	RRT within limits given in DLM02.2, Exhibit D, Section 17, Table 2 (p. D-61)	RRT	
		Sensitivity	Less than QLs	MB	A
		Precision	RPD ≤ 40% if reported values are > 5x QL, otherwise use professional judgment	Laboratory Replicates (when sample volume is available)	A
		Completeness	>90% collection and >90% laboratory analysis	Data Completeness Check	S & A

1 The assigned laboratory must perform and meet all of the measurement performance criteria that assess the analytical DQIs specified in USEPA CLP SOW DLM02.2.
2 Laboratory will perform a laboratory replicate to access precision; in lieu of laboratory replicate, laboratory may analyze a LCSD.

QAPP Worksheet 12-7

Measurement Performance Criteria Table

Matrix	Aqueous (Groundwater)
Analytical Group	TAL Metals
Concentration Level	Low

Sampling Procedure	Analytical Method/SOP	Data Quality Indicators (DQIs)	Measurement Performance Criteria[1]	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)
SOP No. 04	USEPA CLP SOW ISM02.2	Sensitivity	Less than QLs	Field Blank	S & A
		Precision	RPD ≤ 30% for duplicate values greater than or equal to 5x the QL	Field Duplicate	S & A
		Accuracy/Bias	70 – 130% Recovery per ISMO2.2 (except for Ag and Sb, which are 50 – 150% Recovery)	LCS	A
		Sensitivity	Less than QLs	MB	A
		Accuracy/Bias	75-125% Recovery per ISM02.2	MS	A
		Precision	RPD ≤ 20% for reported values greater than or equal to 5x the QL	Laboratory Replicates	A
		Completeness	>90% sample collection and >90% laboratory analysis	Data Completeness Check	S & A

1. The assigned laboratory must perform and meet all of the measurement performance criteria that assess the analytical DQIs specified in the applicable USEPA CLP SOW ISM02.2 (including ICP-AES serial dilution and interference check sample).

QAPP Worksheet 13
Secondary Data Criteria and Limitations Table

Secondary Data	Data Source (Originating Organization, Report Title, and Date)	Data Generator(s) (Originating Org., Data Types, Data Generation/ Collection Dates)	How Data Will Be Used	Limitations on Data Use
Historical Data: Pitt Street Private Well Study	New Jersey Department of Environmental Protection (NJDEP) Pitt Street Private Wells, South Plainfield Borough, Middlesex County, Interim Ground-Water Impact Area, 1990.	NJDEP, late 1980s	To describe the historical nature and extent of contamination within study area and to the south and west of OU3.	Relatively older data that describe a subset of the current OU3 study area.
Historical Data: Foster Wheeler 2001 Data Evaluation Report groundwater quality data	Foster Wheeler Environmental Corporation (FWENC). Data Evaluation Report for Cornell-Dubilier Electronics Superfund Site in South Plainfield, Middlesex County, New Jersey, 2001.	Foster Wheeler, 2000	To describe the historical nature and extent of contamination within study area.	Relatively older data that describe historical conditions at the former CDE facility.
Historical Data: Foster Wheeler 2002 RI	Foster Wheeler Environmental Corporation (FWENC), Final Remedial Investigation Report for Operable Unit 2 (OU-2) Facility Soils and Buildings for Cornell-Dubilier Electronics Superfund Site in South Plainfield, Middlesex County, New Jersey, 2002.	Foster Wheeler, 2000	To describe OU3-specific geology and historical nature and extent of known contamination.	Relatively older data that describes historical conditions at, and immediately adjacent to, the former CDE facility.
Water Level Measurements	The Louis Berger Group, Inc. and ARCADIS/Malcolm Pirnie, Final Remedial Investigation Report (RI), Operable Unit 3: Groundwater. Cornell-Dubilier Electronics Superfund Site, South Plainfield, New Jersey, June 2012.	The Louis Berger Group, Inc. and ARCADIS/Malcolm Pirnie, 2008	To characterize hydrogeologic conditions at OU3 Site, and make comparisons with historic groundwater elevations.	Three synoptic rounds collected in 2009 and 2010.
Subsurface Geologic Characterization Data	Geophysical logs, hydrophysical logs, and bedrock coring logs from The Louis Berger Group, Inc. and ARCADIS/Malcolm Pirnie, Final Remedial Investigation Report (RI), Operable Unit 3: Groundwater. Cornell-Dubilier Electronics Superfund Site, South Plainfield, New Jersey, June 2012.	The Louis Berger Group, Inc. and ARCADIS/Malcolm Pirnie, 2008	To characterize fracture zones in the bedrock	None

Secondary Data	Data Source (Originating Organization, Report Title, and Date)	Data Generator(s) (Originating Org., Data Types, Data Generation/ Collection Dates)	How Data Will Be Used	Limitations on Data Use
Groundwater Sampling Results for Contaminant of Concern (COC)	The Louis Berger Group, Inc. and ARCADIS/Malcolm Pirnie, Final Remedial Investigation Report (RI), Operable Unit 3: Groundwater. Cornell-Dubilier Electronics Superfund Site, South Plainfield, New Jersey, June 2012.	The Louis Berger Group, Inc. and ARCADIS/Malcolm Pirnie, 2008	To delineate the nature and extent of groundwater contamination.	Delineated the aerial and vertical extent of contamination emanating from the former CDE facility; other sources of contamination in the area have been identified.
Groundwater MODFLOW modeling	Final Groundwater Modeling Report: Operable Unit 3: Groundwater, June 2012, Appendix P of the LBG OU3 RI.	The Louis Berger Group, Inc. and ARCADIS/Malcolm Pirnie, 2008	To analyze the OU3-specific hydrogeology under various historical and current regional pumping scenarios; to provide hydrogeologic inputs for the contaminant fate and transport modeling.	Model was calibrated using 2009 and 2010 synoptic groundwater level measurements.
Description and analysis of potential remedies	The Louis Berger Group, Inc. and ARCADIS/Malcolm Pirnie, Final Feasibility Study Report (FS), Operable Unit 3: Groundwater. Cornell-Dubilier Electronics Superfund Site, South Plainfield, New Jersey, June 2012.	The Louis Berger Group, Inc. and ARCADIS/Malcolm Pirnie, 2012	To evaluate the feasibility of potential bedrock groundwater remedies.	None
MODFLOW and FRACTRAN modeling results	Report on Discrete Fracture Network (DFN) Contaminant Transport Modeling Cornell-Dubilier Electronics Superfund Site – OU3 Groundwater, Appendix B of the FS.	The Louis Berger Group, Inc. and ARCADIS/Malcolm Pirnie, 2012	To evaluate the feasibility of potential bedrock groundwater remedies.	Model truncated at distal end of known plume.

QAPP Worksheet 14
Summary of Project Tasks

Sampling Tasks: Refer to Worksheet 10 for Problem Definition and Worksheet 11 for Project Quality Objectives.
Analysis Tasks: USEPA CLP laboratories will conduct analyses on the field samples (at a minimum) according to requirements provided on Worksheets 12 and corresponding corrective action in Worksheet 28. Once field equipment has been selected, calibration requirements will be provided in Worksheet 22 and field data verification steps will be provided Worksheet 34.
Quality Control Tasks: USEPA CLP laboratories will conduct analyses on quality control samples (both external quality control samples shipped from the field and internal method-required quality control samples) according to the selected methods. Quality control requirements will be selected and provided on Worksheets 12 and 28. Number of estimated quality control samples is listed in Worksheet 20.
Secondary Data: Secondary data sources will be updated in the future and listed in Worksheet 13.
Data Management Tasks: The CONTRACTOR field personnel (and subcontractors, if applicable) will conduct sampling and generate field data. Groundwater samples will be analyzed for chemical analytical parameters by USEPA CLP laboratories. All data will be maintained in the project files of the CONTRACTOR. Refer to Worksheet 29 for the minimum requirements for data management.
Documentation and Records: All hardcopy data (field notebooks, photographs, and COCs) will be maintained in the project files of the CONTRACTOR. Field subcontractors (if applicable) will be responsible for maintaining a copy of field records and providing the CONTRACTOR with electronic copies.
Assessment/Audit Tasks: At a minimum, Technical System Audits will be performed on field activities as described in Worksheet 31.
Data Review Tasks: At a minimum, field data will be verified and reported according to Worksheet 34. At a minimum, analytical data will be reported according to the requirements in Worksheet 29. Data validation requirements will be provided in Worksheets 35 and 36.

QAPP Worksheet 15-1
Reference Limits and Evaluation Table

Matrix: Aqueous (Groundwater)

Analytical Group: TCL VOC (CLP SOM2.2)

Concentration Level: Trace

Analyte	CAS Number	Project Action Level: Preliminary Remedial Goals (µg/L)	Project Quantitation Limit (µg/L)	Analytical Method		Achievable Laboratory Limits	
				MDLs (µg/L)	QLs (µg/L)	MDLs (µg/L)	QLs (µg/L)
Dichlorodifluoromethane	75-71-8	No Action	No Action	Per CLP SOM2.2	0.50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Chloromethane	74-87-3	No Action	No Action	Per CLP SOM2.2	0.50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Vinyl Chloride	75-01-4	1	1	Per CLP SOM2.2	0.50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Bromomethane	74-83-9	No Action	No Action	Per CLP SOM2.2	0.50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Chloroethane	75-00-3	No Action	No Action	Per CLP SOM2.2	0.50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Trichlorofluoromethane	75-69-4	No Action	No Action	Per CLP SOM2.2	0.50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
1,1-Dichloroethene	75-35-4	1	1	Per CLP SOM2.2	0.50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	No Action	No Action	Per CLP SOM2.2	0.50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Acetone	67-64-1	No Action	No Action	Per CLP SOM2.2	5.0	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Carbon Disulfide	75-15-0	No Action	No Action	Per CLP SOM2.2	0.50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method

QAPP Worksheet 15-1
Reference Limits and Evaluation Table

Matrix: Aqueous (Groundwater)

Analytical Group: TCL VOC (CLP SOM2.2)

Concentration Level: Trace

Analyte	CAS Number	Project Action Level: Preliminary Remedial Goals (µg/L)	Project Quantitation Limit (µg/L)	Analytical Method		Achievable Laboratory Limits	
				MDLs (µg/L)	QLs (µg/L)	MDLs (µg/L)	QLs (µg/L)
Methyl Acetate	79-20-9	No Action	No Action	Per CLP SOM2.2	0.50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Methylene Chloride	75-09-2	3	3	Per CLP SOM2.2	0.50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
trans-1,2-Dichloroethene	156-60-5	100	100	Per CLP SOM2.2	0.50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Methyl tert-Butyl Ether	1634-04-4	70	70	Per CLP SOM2.2	0.50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
1,1-Dichloroethane	75-34-3	No Action	No Action	Per CLP SOM2.2	0.50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
cis-1,2-Dichloroethene	156-59-2	70	70	Per CLP SOM2.2	0.50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
2-Butanone	78-93-3	No Action	No Action	Per CLP SOM2.2	5.0	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Bromochloromethane	74-97-5	No Action	No Action	Per CLP SOM2.2	0.50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Chloroform	67-66-3	70	70	Per CLP SOM2.2	0.50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
1,1,1-Trichloroethane	71-55-6	No Action	No Action	Per CLP SOM2.2	0.50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method

QAPP Worksheet 15-1
Reference Limits and Evaluation Table

Matrix: Aqueous (Groundwater)

Analytical Group: TCL VOC (CLP SOM2.2)

Concentration Level: Trace

Analyte	CAS Number	Project Action Level: Preliminary Remedial Goals (µg/L)	Project Quantitation Limit (µg/L)	Analytical Method		Achievable Laboratory Limits	
				MDLs (µg/L)	QLs (µg/L)	MDLs (µg/L)	QLs (µg/L)
Cyclohexane	110-82-7	No Action	No Action	Per CLP SOM2.2	0.50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Carbon Tetrachloride	56-23-5	No Action	No Action	Per CLP SOM2.2	0.50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Benzene	71-43-2	1	1	Per CLP SOM2.2	0.50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
1,2-Dichloroethane	107-06-2	2	2	Per CLP SOM2.2	0.50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Trichloroethene	79-01-6	1	1	Per CLP SOM2.2	0.50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Methylcyclohexane	108-87-2	No Action	No Action	Per CLP SOM2.2	0.50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
1,2-Dichloropropane	78-87-5	No Action	No Action	Per CLP SOM2.2	0.50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Bromodichloromethane	75-27-4	1	1	Per CLP SOM2.2	0.50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
cis-1,3-Dichloropropene	10061-01-5	No Action	No Action	Per CLP SOM2.2	0.50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
4-Methyl-2-pentanone	108-10-1	No Action	No Action	Per CLP SOM2.2	5.0	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method

QAPP Worksheet 15-1
Reference Limits and Evaluation Table

Matrix: Aqueous (Groundwater)

Analytical Group: TCL VOC (CLP SOM2.2)

Concentration Level: Trace

Analyte	CAS Number	Project Action Level: Preliminary Remedial Goals (µg/L)	Project Quantitation Limit (µg/L)	Analytical Method		Achievable Laboratory Limits	
				MDLs (µg/L)	QLs (µg/L)	MDLs (µg/L)	QLs (µg/L)
Toluene	108-88-3	No Action	No Action	Per CLP SOM2.2	0.50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
trans-1,3-Dichloropropene	10061-02-6	No Action	No Action	Per CLP SOM2.2	0.50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
1,1,2-Trichloroethane	79-00-5	3	3	Per CLP SOM2.2	0.50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Tetrachloroethene	127-18-4	1	1	Per CLP SOM2.2	0.50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
2-Hexanone	591-78-6	No Action	No Action	Per CLP SOM2.2	5.0	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Dibromochloromethane	124-48-1	0.4	0.4	Per CLP SOM2.2	0.50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
1,2-Dibromoethane	106-93-4	No Action	No Action	Per CLP SOM2.2	0.50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Chlorobenzene	108-90-7	50	50	Per CLP SOM2.2	0.50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Ethylbenzene	100-41-4	No Action	No Action	Per CLP SOM2.2	0.50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
o-Xylene	95-47-6	No Action	No Action	Per CLP SOM2.2	0.50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method

QAPP Worksheet 15-1
Reference Limits and Evaluation Table

Matrix: Aqueous (Groundwater)

Analytical Group: TCL VOC (CLP SOM2.2)

Concentration Level: Trace

Analyte	CAS Number	Project Action Level: Preliminary Remedial Goals (µg/L)	Project Quantitation Limit (µg/L)	Analytical Method		Achievable Laboratory Limits	
				MDLs (µg/L)	QLs (µg/L)	MDLs (µg/L)	QLs (µg/L)
m,p-Xylenes	N/A	No Action	No Action	Per CLP SOM2.2	0.50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Styrene	100-42-5	No Action	No Action	Per CLP SOM2.2	0.50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Bromoform	75-25-2	No Action	No Action	Per CLP SOM2.2	0.50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Isopropylbenzene	98-82-8	No Action	No Action	Per CLP SOM2.2	0.50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
1,1,2,2-Tetrachloroethane	79-34-5	No Action	No Action	Per CLP SOM2.2	0.50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
1,3-Dichlorobenzene	541-73-1	No Action	No Action	Per CLP SOM2.2	0.50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
1,4-Dichlorobenzene	106-46-7	75	75	Per CLP SOM2.2	0.50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
1,2-Dichlorobenzene	95-50-1	No Action	No Action	Per CLP SOM2.2	0.50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
1,2-Dibromo-3-chloropropane	96-12-8	0.02	0.02	Per CLP SOM2.2	0.50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
1,2,4-Trichlorobenzene	120-82-1	9	9	Per CLP SOM2.2	0.50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method

QAPP Worksheet 15-1
Reference Limits and Evaluation Table

Matrix: Aqueous (Groundwater)

Analytical Group: TCL VOC (CLP SOM2.2)

Concentration Level: Trace

Analyte	CAS Number	Project Action Level: Preliminary Remedial Goals (µg/L)	Project Quantitation Limit (µg/L)	Analytical Method		Achievable Laboratory Limits	
				MDLs (µg/L)	QLs (µg/L)	MDLs (µg/L)	QLs (µg/L)
1,2,3-Trichlorobenzene	87-61-6	No Action	No Action	Per CLP SOM2.2	0.50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method

Notes:

1. The Method Detection Levels (MDLs) should meet the criteria given in USEPA CLP SOW SOM02.2. The MDL will be confirmed by the laboratory annually. The most current MDL will be reported at time of sample collection.
2. The Achievable Laboratory Quality Limits (QLs) must be equal to or less than the Analytical Method QLs. Trace level VOC analysis will be implemented to achieve project QLs [which equal Preliminary Remedial Goals (PRG) for the project].

QAPP Worksheet 15-2
Reference Limits and Evaluation Table

Matrix: Aqueous (Groundwater)

Analytical Group: TCL SVOC (CLP SOM2.2)

Concentration Level: Low

Analyte	CAS Number	Project Action Level: Preliminary Remedial Goals (µg/L)	Project Quantitation Limit (µg/L)	Analytical Method		Achievable Laboratory Limits	
				MDLs (µg/L)	QLs (µg/L)	MDLs (µg/L)	QLs (µg/L)
1,4-Dioxane	123-91-1	No Action	No Action	Per CLP SOM02.2	2.0	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Benzaldehyde	100-52-7	No Action	No Action	Per CLP SOM02.2	10	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Phenol	108-95-2	No Action	No Action	Per CLP SOM02.2	10	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
bis(2-Chloroethyl) ether	111-44-4	No Action	No Action	Per CLP SOM02.2	10	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
2-Chlorophenol	95-57-8	No Action	No Action	Per CLP SOM02.2	5.0	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
2-Methylphenol	95-48-7	No Action	No Action	Per CLP SOM02.2	10	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
3-Methylphenol	108-39-4	No Action	No Action	Per CLP SOM02.2	5.0	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
2,2'-oxybis(1-Chloropropane)	108-60-1	No Action	No Action	Per CLP SOM02.2	10	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Acetaphenone	98-86-2	No Action	No Action	Per CLP SOM02.2	10	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
4-Methylphenol	106-44-5	No Action	No Action	Per CLP SOM02.2	10	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method

QAPP Worksheet 15-2
Reference Limits and Evaluation Table

Matrix: Aqueous (Groundwater)

Analytical Group: TCL SVOC (CLP SOM2.2)

Concentration Level: Low

Analyte	CAS Number	Project Action Level: Preliminary Remedial Goals (µg/L)	Project Quantitation Limit (µg/L)	Analytical Method		Achievable Laboratory Limits	
				MDLs (µg/L)	QLs (µg/L)	MDLs (µg/L)	QLs (µg/L)
N-Nitroso-di-n-propylamine	621-64-7	No Action	No Action	Per CLP SOM02.2	5.0	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Hexachloroethane	67-72-1	No Action	No Action	Per CLP SOM02.2	5.0	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Nitrobenzene	98-95-3	No Action	No Action	Per CLP SOM02.2	5.0	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Isophorone	78-59-1	No Action	No Action	Per CLP SOM02.2	5.0	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
2-Nitrophenol	88-75-5	No Action	No Action	Per CLP SOM02.2	5.0	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
2,4-Dimethylphenol	105-67-9	No Action	No Action	Per CLP SOM02.2	5.0	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
bis(2-Chloroethoxy) methane	111-91-1	No Action	No Action	Per CLP SOM02.2	5.0	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
2,4-Dichlorophenol	120-83-2	No Action	No Action	Per CLP SOM02.2	5.0	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Naphthalene	91-20-3	No Action	No Action	Per CLP SOM02.2	0.10 (SIM)	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
4-Chloroaniline	106-47-8	No Action	No Action	Per CLP SOM02.2	10	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method

QAPP Worksheet 15-2
Reference Limits and Evaluation Table

Matrix: Aqueous (Groundwater)

Analytical Group: TCL SVOC (CLP SOM2.2)

Concentration Level: Low

Analyte	CAS Number	Project Action Level: Preliminary Remedial Goals (µg/L)	Project Quantitation Limit (µg/L)	Analytical Method		Achievable Laboratory Limits	
				MDLs (µg/L)	QLs (µg/L)	MDLs (µg/L)	QLs (µg/L)
Hexachlorobutadiene	87-68-3	No Action	No Action	Per CLP SOM02.2	5.0	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Caprolactam	105-60-2	No Action	No Action	Per CLP SOM02.2	10	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
4-Chloro-3-methyphenol	59-50-7	No Action	No Action	Per CLP SOM02.2	5.0	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
2-Methylnaphthalene	91-57-6	No Action	No Action	Per CLP SOM02.2	0.10 (SIM)	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Hexachlorocyclopentadiene	77-47-4	No Action	No Action	Per CLP SOM02.2	10	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
2,4,6-Trichlorophenol	88-06-2	No Action	No Action	Per CLP SOM02.2	5.0	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
2,4,5-Trichlorophenol	95-95-4	No Action	No Action	Per CLP SOM02.2	5.0	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
1,1'-Biphenyl	92-52-4	No Action	No Action	Per CLP SOM02.2	5.0	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
2-Chloronapthalene	91-58-7	No Action	No Action	Per CLP SOM02.2	5.0	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
2-Nitroaniline	88-74-4	No Action	No Action	Per CLP SOM02.2	5	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method

QAPP Worksheet 15-2
Reference Limits and Evaluation Table

Matrix: Aqueous (Groundwater)

Analytical Group: TCL SVOC (CLP SOM2.2)

Concentration Level: Low

Analyte	CAS Number	Project Action Level: Preliminary Remedial Goals (µg/L)	Project Quantitation Limit (µg/L)	Analytical Method		Achievable Laboratory Limits	
				MDLs (µg/L)	QLs (µg/L)	MDLs (µg/L)	QLs (µg/L)
Dimethylphthalate	131-11-3	No Action	No Action	Per CLP SOM02.2	5.0	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
2,6-Dinitrotoluene	606-20-2	No Action	No Action	Per CLP SOM02.2	5.0	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Acenaphthylene	208-96-8	No Action	No Action	Per CLP SOM02.2	0.1 (SIM)	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
3-Nitroaniline	99-09-2	No Action	No Action	Per CLP SOM02.2	10	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Acenaphthene	83-32-9	No Action	No Action	Per CLP SOM02.2	5.0	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
2,4-Dinitrophenol	51-28-5	No Action	No Action	Per CLP SOM02.2	10	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
4-Nitrophenol	100-02-7	No Action	No Action	Per CLP SOM02.2	10	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Dibenzofuran	132-64-9	No Action	No Action	Per CLP SOM02.2	5.0	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
2,4-Dinitrotoluene	121-14-2	No Action	No Action	Per CLP SOM02.2	5.0	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Diethylphthalate	84-66-2	No Action	No Action	Per CLP SOM02.2	5.0	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method

QAPP Worksheet 15-2
Reference Limits and Evaluation Table

Matrix: Aqueous (Groundwater)

Analytical Group: TCL SVOC (CLP SOM2.2)

Concentration Level: Low

Analyte	CAS Number	Project Action Level: Preliminary Remedial Goals (µg/L)	Project Quantitation Limit (µg/L)	Analytical Method		Achievable Laboratory Limits	
				MDLs (µg/L)	QLs (µg/L)	MDLs (µg/L)	QLs (µg/L)
4-Chlorophenyl-phenylether	7005-72-3	No Action	No Action	Per CLP SOM02.2	5.0	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Fluorene	86-73-7	No Action	No Action	Per CLP SOM02.2	0.10 (SIM)	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
4-Nitroaniline	100-01-6	No Action	No Action	Per CLP SOM02.2	10	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
4,6-Dinitro-2-methylphenol	534-52-1	No Action	No Action	Per CLP SOM02.2	10	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
N-Nitrosodiphenylamine	86-30-6	No Action	No Action	Per CLP SOM02.2	5.0	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
1,2,4,5-Tetrachlorobenzene	95-94-3	No Action	No Action	Per CLP SOM02.2	5.0	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
4-Bromophenyl-phenylether	101-55-3	No Action	No Action	Per CLP SOM02.2	5.0	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Hexachlorobenzene	118-74-1	No Action	No Action	Per CLP SOM02.2	5.0	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Atrazine	1912-24-9	No Action	No Action	Per CLP SOM02.2	10	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Pentachlorophenol	87-86-5	No Action	No Action	Per CLP SOM02.2	0.20 (SIM)	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method

QAPP Worksheet 15-2
Reference Limits and Evaluation Table

Matrix: Aqueous (Groundwater)

Analytical Group: TCL SVOC (CLP SOM2.2)

Concentration Level: Low

Analyte	CAS Number	Project Action Level: Preliminary Remedial Goals (µg/L)	Project Quantitation Limit (µg/L)	Analytical Method		Achievable Laboratory Limits	
				MDLs (µg/L)	QLs (µg/L)	MDLs (µg/L)	QLs (µg/L)
Phenathrene	85-01-8	No Action	No Action	Per CLP SOM02.2	0.10 (SIM)	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Anthracene	120-12-7	No Action	No Action	Per CLP SOM02.2	0.10 (SIM)	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Carbazole	86-74-8	No Action	No Action	Per CLP SOM02.2	10	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Di-n-butylphthalate	84-74-2	No Action	No Action	Per CLP SOM02.2	5.0	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Fluoranthene	206-44-0	No Action	No Action	Per CLP SOM02.2	0.1	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Pyrene	129-00-0	No Action	No Action	Per CLP SOM02.2	0.1	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Butylbenzylphthalate	85-68-7	No Action	No Action	Per CLP SOM02.2	5.0	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
3,3'-Dichlorobenzidene	91-94-1	No Action	No Action	Per CLP SOM02.2	10	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Benzo(a)anthracene	56-55-3	0.1	0.1	Per CLP SOM02.2	0.10 (SIM)	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Chrysene	218-01-9	No Action	No Action	Per CLP SOM02.2	0.10 (SIM)	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method

QAPP Worksheet 15-2
Reference Limits and Evaluation Table

Matrix: Aqueous (Groundwater)

Analytical Group: TCL SVOC (CLP SOM2.2)

Concentration Level: Low

Analyte	CAS Number	Project Action Level: Preliminary Remedial Goals (µg/L)	Project Quantitation Limit (µg/L)	Analytical Method		Achievable Laboratory Limits	
				MDLs (µg/L)	QLs (µg/L)	MDLs (µg/L)	QLs (µg/L)
bis-(2-Ethylhexyl)phthalate[6]	117-81-7	3	3	Per CLP SOM02.2	5.0	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Di-n-octylphthalate	117-84-0	No Action	No Action	Per CLP SOM02.2	10	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Benzo(b)fluoranthene	205-99-2	0.2	0.2	Per CLP SOM02.2	0.10 (SIM)	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Benzo(k)fluoranthene	207-08-9	0.5	0.5	Per CLP SOM02.2	0.10 (SIM)	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Benzo(a)pyrene	50-32-8	0.1	0.1	Per CLP SOM02.2	0.10 (SIM)	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Indeno(1,2,3-cd)pyrene	193-39-5	0.2	0.2	Per CLP SOM02.2	0.10 (SIM)	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Dibenzo(a,h)anthracene	53-70-3	0.3	0.3	Per CLP SOM02.2	0.10 (SIM)	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Benzo(g,h,i)perylene	191-24-2	No Action	No Action	Per CLP SOM02.2	0.10 (SIM)	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
2,3,4,6-Tetrachlorphenol	58-90-2	No Action	No Action	Per CLP SOM02.2	5.0	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method

Notes:

1. The MDLs should meet the criteria given in USEPA CLP SOW SOM02.2. The MDL will be confirmed by the laboratory annually. The most current MDL will be reported at time of sample collection.
2. The Achievable Laboratory Quality Limits (QLs) must be equal to or less than the Analytical Method QLs. SIM SVOC analysis will be implemented to achieve project QLs [which equal Preliminary Remedial Goals (PRG) for the project].
3. Simultaneous Ion Monitoring (SIM) will be used to report Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, bis(2-Ethyl)phathalate, Dibenzo(a,h)anthracene, and Indeno(1,2,3-cd)pyrene.

QAPP Worksheet 15-3
Reference Limits and Evaluation Table

Matrix: Aqueous (Groundwater)

Analytical Group: PCB Congeners (CLP SOW CBC01.2)

Concentration Level: Low

Analyte	CAS Number	Project Action Level: Preliminary Remedial Goals (pg/L)[1]	Project Quantitation Limit (pg/L)	Analytical Method		Achievable Laboratory Limits	
				MDLs (pg/L)	QLs (pg/L)	MDLs (pg/L)	QLs (pg/L)
Monochlorobiphenyls							
PCB-1	2051-60-7	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-2	2051-61-8	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-3	2051-62-9	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Dichlorobiphenyls							
PCB-4	13029-08-8	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-5	16605-91-7	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-6	25569-80-6	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-7	33284-50-3	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-8	34883-43-7	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-9	34883-39-1	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method

QAPP Worksheet 15-3
Reference Limits and Evaluation Table

Matrix: Aqueous (Groundwater)

Analytical Group: PCB Congeners (CLP SOW CBC01.2)

Concentration Level: Low

Analyte	CAS Number	Project Action Level: Preliminary Remedial Goals (pg/L)[1]	Project Quantitation Limit (pg/L)	Analytical Method		Achievable Laboratory Limits	
				MDLs (pg/L)	QLs (pg/L)	MDLs (pg/L)	QLs (pg/L)
PCB-10	33146-45-1	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-11	2050-67-1	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-12	2974-92-7	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-13	2974-90-5	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-14	34883-41-5	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-15	2050-68-2	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Trichlorobiphenyls							
PCB-16	38444-78-9	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-17	37680-66-3	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-18	37680-65-2	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-19	38444-73-4	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method

QAPP Worksheet 15-3
Reference Limits and Evaluation Table

Matrix: Aqueous (Groundwater)

Analytical Group: PCB Congeners (CLP SOW CBC01.2)

Concentration Level: Low

Analyte	CAS Number	Project Action Level: Preliminary Remedial Goals (pg/L)[1]	Project Quantitation Limit (pg/L)	Analytical Method		Achievable Laboratory Limits	
				MDLs (pg/L)	QLs (pg/L)	MDLs (pg/L)	QLs (pg/L)
PCB-20	38444-84-7	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-21	55702-46-0	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-22	38444-85-8	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-23	55720-44-0	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-24	55702-45-9	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-25	55712-37-3	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-26	38444-81-4	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-27	38444-76-7	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-28	7012-37-5	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-29	15862-07-4	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method

QAPP Worksheet 15-3
Reference Limits and Evaluation Table

Matrix: Aqueous (Groundwater)

Analytical Group: PCB Congeners (CLP SOW CBC01.2)

Concentration Level: Low

Analyte	CAS Number	Project Action Level: Preliminary Remedial Goals (pg/L)[1]	Project Quantitation Limit (pg/L)	Analytical Method		Achievable Laboratory Limits	
				MDLs (pg/L)	QLs (pg/L)	MDLs (pg/L)	QLs (pg/L)
PCB-30	35693-92-6	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-31	16606-02-3	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-32	38444-77-8	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-33	38444-86-9	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-34	37680-68-5	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-35	37680-69-6	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-36	38444-87-0	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-37	38444-90-5	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-38	53555-66-1	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-39	38444-88-1	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method

QAPP Worksheet 15-3
Reference Limits and Evaluation Table

Matrix: Aqueous (Groundwater)

Analytical Group: PCB Congeners (CLP SOW CBC01.2)

Concentration Level: Low

Analyte	CAS Number	Project Action Level: Preliminary Remedial Goals (pg/L)[1]	Project Quantitation Limit (pg/L)	Analytical Method		Achievable Laboratory Limits	
				MDLs (pg/L)	QLs (pg/L)	MDLs (pg/L)	QLs (pg/L)
Tetrachlorobiphenyls							
PCB-40	38444-93-8	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-41	52663-59-9	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-42	36559-22-5	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-43	70362-46-8	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-44	41464-39-5	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-45	70362-45-7	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-46	41464-47-5	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-47	2437-79-8	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-48	70362-47-9	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-49	41464-40-8	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method

QAPP Worksheet 15-3
Reference Limits and Evaluation Table

Matrix: Aqueous (Groundwater)

Analytical Group: PCB Congeners (CLP SOW CBC01.2)

Concentration Level: Low

Analyte	CAS Number	Project Action Level: Preliminary Remedial Goals (pg/L)[1]	Project Quantitation Limit (pg/L)	Analytical Method		Achievable Laboratory Limits	
				MDLs (pg/L)	QLs (pg/L)	MDLs (pg/L)	QLs (pg/L)
PCB-50	62796-65-0	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-51	68194-04-7	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-52	35693-99-3	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-53	41464-41-9	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-54	15968-05-5	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-55	74338-24-2	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-56	41464-43-1	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-57	70424-67-8	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-58	41464-49-7	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-59	74472-33-6	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method

QAPP Worksheet 15-3
Reference Limits and Evaluation Table

Matrix: Aqueous (Groundwater)

Analytical Group: PCB Congeners (CLP SOW CBC01.2)

Concentration Level: Low

Analyte	CAS Number	Project Action Level: Preliminary Remedial Goals (pg/L)[1]	Project Quantitation Limit (pg/L)	Analytical Method		Achievable Laboratory Limits	
				MDLs (pg/L)	QLs (pg/L)	MDLs (pg/L)	QLs (pg/L)
PCB-60	33025-41-1	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-61	33284-53-6	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-62	54230-22-7	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-63	74472-34-7	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-64	52663-58-8	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-65	33284-54-7	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-66	32598-10-0	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-67	73575-53-8	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-68	73575-52-7	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-69	60233-24-1	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method

QAPP Worksheet 15-3
Reference Limits and Evaluation Table

Matrix: Aqueous (Groundwater)

Analytical Group: PCB Congeners (CLP SOW CBC01.2)

Concentration Level: Low

Analyte	CAS Number	Project Action Level: Preliminary Remedial Goals (pg/L)[1]	Project Quantitation Limit (pg/L)	Analytical Method		Achievable Laboratory Limits	
				MDLs (pg/L)	QLs (pg/L)	MDLs (pg/L)	QLs (pg/L)
PCB-70	32598-11-1	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-71	41464-46-4	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-72	41464-42-0	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-73	74338-23-1	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-74	32690-93-0	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-75	32598-12-2	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-76	70362-48-0	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-77	32598-13-3	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-78	70362-49-1	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-79	41464-48-6	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method

QAPP Worksheet 15-3
Reference Limits and Evaluation Table

Matrix: Aqueous (Groundwater)

Analytical Group: PCB Congeners (CLP SOW CBC01.2)

Concentration Level: Low

Analyte	CAS Number	Project Action Level: Preliminary Remedial Goals (pg/L)[1]	Project Quantitation Limit (pg/L)	Analytical Method		Achievable Laboratory Limits	
				MDLs (pg/L)	QLs (pg/L)	MDLs (pg/L)	QLs (pg/L)
PCB-80	33284-52-5	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-81	70362-50-4	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Pentachlorobiphenyls							
PCB-82	52663-62-4	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-83	60145-20-2	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-84	52663-60-2	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-85	65510-45-4	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-86	55312-69-1	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-87	38380-02-8	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-88	55215-17-3	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-89	73575-57-2	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method

QAPP Worksheet 15-3
Reference Limits and Evaluation Table

Matrix: Aqueous (Groundwater)

Analytical Group: PCB Congeners (CLP SOW CBC01.2)

Concentration Level: Low

Analyte	CAS Number	Project Action Level: Preliminary Remedial Goals (pg/L)[1]	Project Quantitation Limit (pg/L)	Analytical Method		Achievable Laboratory Limits	
				MDLs (pg/L)	QLs (pg/L)	MDLs (pg/L)	QLs (pg/L)
PCB-90	68194-07-0	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-91	68194-05-8	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-92	52663-61-3	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-93	73575-56-1	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-94	73575-55-0	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-95	38379-99-6	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-96	73575-54-9	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-97	41464-51-1	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-98	60233-25-2	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-99	38380-01-7	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method

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Reference Limits and Evaluation Table

Matrix: Aqueous (Groundwater)

Analytical Group: PCB Congeners (CLP SOW CBC01.2)

Concentration Level: Low

Analyte	CAS Number	Project Action Level: Preliminary Remedial Goals (pg/L)[1]	Project Quantitation Limit (pg/L)	Analytical Method		Achievable Laboratory Limits	
				MDLs (pg/L)	QLs (pg/L)	MDLs (pg/L)	QLs (pg/L)
PCB-100	39485-83-1	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-101	37680-73-2	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-102	68194-06-9	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-103	60145-21-3	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-104	56558-16-8	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-105	32598-14-4	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-106	70424-69-0	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-107	70424-68-9	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-108	70362-41-3	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-109	74472-35-8	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method

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Reference Limits and Evaluation Table

Matrix: Aqueous (Groundwater)

Analytical Group: PCB Congeners (CLP SOW CBC01.2)

Concentration Level: Low

Analyte	CAS Number	Project Action Level: Preliminary Remedial Goals (pg/L)[1]	Project Quantitation Limit (pg/L)	Analytical Method		Achievable Laboratory Limits	
				MDLs (pg/L)	QLs (pg/L)	MDLs (pg/L)	QLs (pg/L)
PCB-110	38380-03-9	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-111	39635-32-0	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-112	74472-36-9	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-113	68194-10-5	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-114	74472-37-0	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-115	74472-38-1	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-116	18259-05-7	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-117	68194-11-6	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-118	31508-00-6	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-119	56558-17-9	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method

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Reference Limits and Evaluation Table

Matrix: Aqueous (Groundwater)

Analytical Group: PCB Congeners (CLP SOW CBC01.2)

Concentration Level: Low

Analyte	CAS Number	Project Action Level: Preliminary Remedial Goals (pg/L)[1]	Project Quantitation Limit (pg/L)	Analytical Method		Achievable Laboratory Limits	
				MDLs (pg/L)	QLs (pg/L)	MDLs (pg/L)	QLs (pg/L)
PCB-120	68194-12-7	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-121	56558-18-0	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-122	76842-07-4	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-123	65510-44-3	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-124	70424-70-3	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-125	74472-39-2	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-126	57465-28-8	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-127	39635-33-1	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Hexachlorobiphenyls							
PCB-128	38380-07-3	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-129	55215-18-4	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method

QAPP Worksheet 15-3
Reference Limits and Evaluation Table

Matrix: Aqueous (Groundwater)

Analytical Group: PCB Congeners (CLP SOW CBC01.2)

Concentration Level: Low

Analyte	CAS Number	Project Action Level: Preliminary Remedial Goals (pg/L)[1]	Project Quantitation Limit (pg/L)	Analytical Method		Achievable Laboratory Limits	
				MDLs (pg/L)	QLs (pg/L)	MDLs (pg/L)	QLs (pg/L)
PCB-130	52663-66-8	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-131	61798-70-7	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-132	38380-05-1	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-133	35694-04-3	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-134	52704-70-8	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-135	52744-13-5	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-136	38411-22-2	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-137	35694-06-5	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-138	35065-28-2	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-139	56030-56-9	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method

QAPP Worksheet 15-3
Reference Limits and Evaluation Table

Matrix: Aqueous (Groundwater)

Analytical Group: PCB Congeners (CLP SOW CBC01.2)

Concentration Level: Low

Analyte	CAS Number	Project Action Level: Preliminary Remedial Goals (pg/L)[1]	Project Quantitation Limit (pg/L)	Analytical Method		Achievable Laboratory Limits	
				MDLs (pg/L)	QLs (pg/L)	MDLs (pg/L)	QLs (pg/L)
PCB-140	59291-64-4	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-141	52712-04-6	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-142	41411-61-4	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-143	68194-15-0	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-144	68194-14-9	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-145	74472-40-5	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-146	51908-16-8	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-147	68194-13-8	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-148	74472-41-6	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-149	38380-04-0	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method

QAPP Worksheet 15-3
Reference Limits and Evaluation Table

Matrix: Aqueous (Groundwater)

Analytical Group: PCB Congeners (CLP SOW CBC01.2)

Concentration Level: Low

Analyte	CAS Number	Project Action Level: Preliminary Remedial Goals (pg/L)[1]	Project Quantitation Limit (pg/L)	Analytical Method		Achievable Laboratory Limits	
				MDLs (pg/L)	QLs (pg/L)	MDLs (pg/L)	QLs (pg/L)
PCB-150	68194-08-1	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-151	52663-63-5	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-152	68194-09-2	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-153	35065-27-1	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-154	60145-22-4	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-155	33979-03-2	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-156	38380-08-4	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-157	69782-90-7	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-158	74472-42-7	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-159	39635-35-3	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method

QAPP Worksheet 15-3
Reference Limits and Evaluation Table

Matrix: Aqueous (Groundwater)

Analytical Group: PCB Congeners (CLP SOW CBC01.2)

Concentration Level: Low

Analyte	CAS Number	Project Action Level: Preliminary Remedial Goals (pg/L)[1]	Project Quantitation Limit (pg/L)	Analytical Method		Achievable Laboratory Limits	
				MDLs (pg/L)	QLs (pg/L)	MDLs (pg/L)	QLs (pg/L)
PCB-160	41411-62-5	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-161	74472-43-8	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-162	39635-34-2	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-163	74472-44-9	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-164	74472-45-0	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-165	74472-46-1	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-166	41411-63-6	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-167	52663-72-6	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-168	59291-65-5	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-169	32774-16-6	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Heptachlorobiphenyls							

QAPP Worksheet 15-3
Reference Limits and Evaluation Table

Matrix: Aqueous (Groundwater)

Analytical Group: PCB Congeners (CLP SOW CBC01.2)

Concentration Level: Low

Analyte	CAS Number	Project Action Level: Preliminary Remedial Goals (pg/L)[1]	Project Quantitation Limit (pg/L)	Analytical Method		Achievable Laboratory Limits	
				MDLs (pg/L)	QLs (pg/L)	MDLs (pg/L)	QLs (pg/L)
PCB-170	35065-30-6	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-171	52663-71-5	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-172	52663-74-8	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-173	68194-16-1	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-174	38411-25-5	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-175	40186-70-7	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-176	52663-65-7	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-177	52663-70-4	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-178	52663-67-9	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-179	52663-64-6	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method

QAPP Worksheet 15-3
Reference Limits and Evaluation Table

Matrix: Aqueous (Groundwater)

Analytical Group: PCB Congeners (CLP SOW CBC01.2)

Concentration Level: Low

Analyte	CAS Number	Project Action Level: Preliminary Remedial Goals (pg/L)[1]	Project Quantitation Limit (pg/L)	Analytical Method		Achievable Laboratory Limits	
				MDLs (pg/L)	QLs (pg/L)	MDLs (pg/L)	QLs (pg/L)
PCB-180	35065-29-3	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-181	74472-47-2	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-182	60145-23-5	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-183	52663-69-1	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-184	74472-48-3	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-185	52712-05-7	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-186	74472-49-4	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-187	52663-68-0	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-188	74487-85-7	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-189	39635-31-9	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method

QAPP Worksheet 15-3
Reference Limits and Evaluation Table

Matrix: Aqueous (Groundwater)

Analytical Group: PCB Congeners (CLP SOW CBC01.2)

Concentration Level: Low

Analyte	CAS Number	Project Action Level: Preliminary Remedial Goals (pg/L)[1]	Project Quantitation Limit (pg/L)	Analytical Method		Achievable Laboratory Limits	
				MDLs (pg/L)	QLs (pg/L)	MDLs (pg/L)	QLs (pg/L)
PCB-190	41411-64-7	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-191	74472-50-7	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-192	74472-51-8	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-193	69782-91-8	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Octachlorobiphenyls							
PCB-194	35694-08-7	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-195	52663-78-2	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-196	42740-50-1	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-197	33091-17-7	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-198	68194-17-2	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-199	52663-75-9	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method

QAPP Worksheet 15-3
Reference Limits and Evaluation Table

Matrix: Aqueous (Groundwater)

Analytical Group: PCB Congeners (CLP SOW CBC01.2)

Concentration Level: Low

Analyte	CAS Number	Project Action Level: Preliminary Remedial Goals (pg/L)[1]	Project Quantitation Limit (pg/L)	Analytical Method		Achievable Laboratory Limits	
				MDLs (pg/L)	QLs (pg/L)	MDLs (pg/L)	QLs (pg/L)
PCB-200	52663-73-7	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-201	40186-71-8	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-202	2136-99-4	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-203	52663-76-0	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-204	74472-52-9	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-205	74472-53-0	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Nonachlorobiphenyls							
PCB-206	40186-72-9	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-207	52663-79-3	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
PCB-208	52663-77-1	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method

QAPP Worksheet 15-3
Reference Limits and Evaluation Table

Matrix: Aqueous (Groundwater)

Analytical Group: PCB Congeners (CLP SOW CBC01.2)

Concentration Level: Low

Analyte	CAS Number	Project Action Level: Preliminary Remedial Goals (pg/L)[1]	Project Quantitation Limit (pg/L)	Analytical Method		Achievable Laboratory Limits	
				MDLs (pg/L)	QLs (pg/L)	MDLs (pg/L)	QLs (pg/L)
Decachlorobiphenyls							
PCB-209	2051-24-3	No Action	No Action	Per CLP SOW CBC01.2	20	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method

Notes:

1. The MDLs should meet the criteria given in USEPA CLP SOW CBC01.2. The MDL will be confirmed by the laboratory annually. The most current MDL will be reported at time of sample collection.
2. The Achievable Laboratory Quality Limits (QLs) must be equal to or less than the Analytical Method QLs.
3. Laboratory summations of PCB homologues are not required.
4. Laboratory will define in laboratory narrative the PCB co-elution patterns. Co-eluting PCB congeners will be flagged in the database.

QAPP Worksheet 15-4
Reference Limits and Evaluation Table

Matrix: Aqueous (Groundwater)

Analytical Group: PCB Aroclors (CLP SOW SOM02.2)

Concentration Level: Low

Analyte	CAS Number	Project Action Level: Preliminary Remedial Goals (µg/L)	Project Quantitation Limit (µg/L)	Analytical Method		Achievable Laboratory Limits	
				MDLs (µg/L)	QLs (µg/L)	MDLs (µg/L)	QLs (µg/L)
Aroclor 1016	12674-11-2	0.5	0.5	Per CLP SOW SOM02.2	1	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Aroclor 1221	11104-28-2	No Action	No Action	Per CLP SOW SOM02.2	1	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Aroclor 1232	11141-16-5	No Action	No Action	Per CLP SOW SOM02.2	1	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Aroclor 1242	53469-21-9	No Action	No Action	Per CLP SOW SOM02.2	1	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Aroclor 1248	12672-29-6	0.5	0.5	Per CLP SOW SOM02.2	1	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Aroclor 1254	11097-69-1	0.5	0.5	Per CLP SOW SOM02.2	1	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Aroclor 1260	11096-82-5	No Action	No Action	Per CLP SOW SOM02.2	1	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Aroclor 1262	37324-23-5	No Action	No Action	Per CLP SOW SOM02.2	1	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Aroclor 1268	11100-14-4	No Action	No Action	Per CLP SOW SOM02.2	1	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method

Notes:

1. The Method Detection Levels (MDLs) should meet the criteria given in USEPA CLP SOW SOM02.2. The MDL will be confirmed by the laboratory annually. The most current MDL will be reported at time of sample collection.
2. The Achievable Laboratory Quality Limits (QLs) must be equal to or less than the Analytical Method QLs.
3. Preliminary Remedial Goals (PRG) are based on Total PCB Aroclor.

QAPP Worksheet 15-5
Reference Limits and Evaluation Table

Matrix: Aqueous (Groundwater)

Analytical Group: TCL Pesticides (CLP SOW SOM02.2)

Concentration Level: Low

Analyte	CAS Number	Project Action Level: Preliminary Remedial Goals (µg/L)	Project Quantitation Limit (ug/L)	Analytical Method		Achievable Laboratory Limits	
				MDLs	QLs (ug/L)	MDLs	QLs (ug/L)
alpha-BHC	319-84-6	0.02	0.02	Per CLP SOW SOM02.2	0.05	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
beta-BHC	319-85-7	0.04	0.04	Per CLP SOW SOM02.2	0.05	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
delta-BHC	319-86-8	No Action	No Action	Per CLP SOW SOM02.2	0.05	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
gamma-BHC (Lindane)	58-89-9	0.03	0.03	Per CLP SOW SOM02.2	0.05	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Heptachlor	76-44-8	0.05	0.05	Per CLP SOW SOM02.2	0.05	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Aldrin	309-00-2	No Action	No Action	Per CLP SOW SOM02.2	0.05	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Heptachlor epoxide	1024-57-3	0.2	0.2	Per CLP SOW SOM02.2	0.05	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Endosulfan I	959-98-8	No Action	No Action	Per CLP SOW SOM02.2	0.05	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Dieldrin	60-57-1	0.03	0.03	Per CLP SOW SOM02.2	0.10	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
4,4'-DDE	72-55-9	0.1	0.1	Per CLP SOW SOM02.2	0.10	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method

QAPP Worksheet 15-5
Reference Limits and Evaluation Table

Matrix: Aqueous (Groundwater)

Analytical Group: TCL Pesticides (CLP SOW SOM02.2)

Concentration Level: Low

Analyte	CAS Number	Project Action Level: Preliminary Remedial Goals (µg/L)	Project Quantitation Limit (ug/L)	Analytical Method		Achievable Laboratory Limits	
				MDLs	QLs (ug/L)	MDLs	QLs (ug/L)
Endrin	72-20-8	No Action	No Action	Per CLP SOW SOM02.2	0.10	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Endosulfan II	33213-65-9	40	40	Per CLP SOW SOM02.2	0.10	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
4,4'-DDD	72-54-8	0.1	0.1	Per CLP SOW SOM02.2	0.10	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Endosulfan sulfate	1031-07-8	40	40	Per CLP SOW SOM02.2	0.10	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
4,4'-DDT	50-29-3	0.1	0.1	Per CLP SOW SOM02.2	0.10	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Methoxychlor	72-43-5	40	40	Per CLP SOW SOM02.2	0.50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Endrin ketone	53494-70-5	No Action	No Action	Per CLP SOW SOM02.2	0.10	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Endrin aldehyde	7421-93-4	No Action	No Action	Per CLP SOW SOM02.2	0.10	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
alpha-Chlordane	5103-71-9	No Action	No Action	Per CLP SOW SOM02.2	0.05	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
gamma-Chlordane	5103-74-2	0.5	0.5	Per CLP SOW SOM02.2	0.05	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method

QAPP Worksheet 15-5
Reference Limits and Evaluation Table

Matrix: Aqueous (Groundwater)

Analytical Group: TCL Pesticides (CLP SOW SOM02.2)

Concentration Level: Low

Analyte	CAS Number	Project Action Level: Preliminary Remedial Goals (µg/L)	Project Quantitation Limit (ug/L)	Analytical Method		Achievable Laboratory Limits	
				MDLs	QLs (ug/L)	MDLs	QLs (ug/L)
Toxaphene	8001-35-2	No Action	No Action	Per CLP SOW SOM02.2	5.0	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method

Notes:

1. The Method Detection Levels (MDLs) should meet the criteria given in USEPA CLP SOW SOM02.2. The MDL will be confirmed by the laboratory annually. The most current MDL will be reported at time of sample collection.
2. The Achievable Laboratory Quality Limits (QLs) must be equal to or less than the Analytical Method QLs.

QAPP Worksheet 15-6
Reference Limits and Evaluation Table

Matrix: Aqueous (Aqueous)

Analytical Group: PCDD/F (CLP SOW DLM02.2)

Concentration Level: Low

Analyte	CAS Number	Project Action Levels Preliminary Remedial Goals (pg/L)[1]	Project Quantitation Limit[2] (pg/L)	Analytical Method		Achievable Laboratory Limits[4]	
				MDLs (pg/L)	QLs (pg/L)	MDLs (pg/L)	QLs (pg/L)
2,3,7,8-TCDD	1746-01-6	No Action	No Action	Per CLP SOW DLM02.2	10	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
1,2,3,7,8-PeCDD	40321-76-4	No Action	No Action	Per CLP SOW DLM02.2	50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
1,2,3,6,7,8-HxCDD	57653-85-7	No Action	No Action	Per CLP SOW DLM02.2	50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
1,2,3,4,7,8-HxCDD	39227-28-6	No Action	No Action	Per CLP SOW DLM02.2	50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
1,2,3,7,8,9-HxCDD	19408-74-3	No Action	No Action	Per CLP SOW DLM02.2	50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
1,2,3,4,6,7,8-HpCDD	35822-46-9	No Action	No Action	Per CLP SOW DLM02.2	50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
OCDD	3268-87-9	No Action	No Action	Per CLP SOW DLM02.2	100	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
2,3,7,8-TCDF	51207-31-9	No Action	No Action	Per CLP SOW DLM02.2	10	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
1,2,3,7,8-PeCDF	57117-41-6	No Action	No Action	Per CLP SOW DLM02.2	50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
2,3,4,7,8-PeCDF	57117-31-4	No Action	No Action	Per CLP SOW DLM02.2	50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method

QAPP Worksheet 15-6
Reference Limits and Evaluation Table

Matrix: Aqueous (Aqueous)

Analytical Group: PCDD/F (CLP SOW DLM02.2)

Concentration Level: Low

Analyte	CAS Number	Project Action Levels Preliminary Remedial Goals (pg/L)[1]	Project Quantitation Limit[2] (pg/L)	Analytical Method		Achievable Laboratory Limits[4]	
				MDLs (pg/L)	QLs (pg/L)	MDLs (pg/L)	QLs (pg/L)
1,2,3,6,7,8-HxCDF	57117-44-9	No Action	No Action	Per CLP SOW DLM02.2	50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
1,2,3,7,8,9-HxCDF	72918-21-9	No Action	No Action	Per CLP SOW DLM02.2	50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
1,2,3,4,7,8-HxCDF	70648-26-9	No Action	No Action	Per CLP SOW DLM02.2	50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
2,3,4,6,7,8-HxCDF	60851-34-5	No Action	No Action	Per CLP SOW DLM02.2	50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
1,2,3,4,6,7,8-HpCDF	67562-39-4	No Action	No Action	Per CLP SOW DLM02.2	50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
1,2,3,4,7,8,9-HpCDF	55673-89-7	No Action	No Action	Per CLP SOW DLM02.2	50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
OCDF	39001-02-0	No Action	No Action	Per CLP SOW DLM02.2	100	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Total 2,3,7,8-TCDD TEQ		0.00001	0.00001	Not Applicable	Not Applicable	Not report by laboratory	Not reported by laboratory

Notes:

1. The Method Detection Levels (MDLs) should meet the criteria given in USEPA CLP SOW DLM02.2. The MDL will be confirmed by laboratory annually. The most current MDL will be reported at time of sample collection.
2. The Achievable Laboratory Quality Limits (QLs) must be equal to or less than the Analytical Method QLs.

QAPP Worksheet 15-7
Reference Limits and Evaluation Table

Matrix: Aqueous (Groundwater)

Analytical Group: TAL Metal (CLP SOW ISM02.2)

Concentration Level: Low

Analyte	CAS Number	Project Action Level: Preliminary Remedial Goals (µg/L)	Project Quantitation Limit (ug/L)	Analytical Method		Achievable Laboratory Limits	
				MDLs (ug/L)	QLs (ug/L)	MDLs (ug/L)	QLs (ug/L)
Aluminum	7429-90-5	50	50	Per CLP SOW ISM02.2	50	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Antimony	7440-36-0	No Action	No Action	Per CLP SOW ISM02.2	2	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Arsenic	7440-38-2	3	3	Per CLP SOW ISM02.2	1	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Barium	7440-39-3	2,000	2,000	Per CLP SOW ISM02.2	10	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Beryllium	7440-41-7	No Action	No Action	Per CLP SOW ISM02.2	1	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Cadmium	7440-43-9	4	4	Per CLP SOW ISM02.2	1	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Calcium	7440-70-2	No Action	No Action	Per CLP SOW ISM02.2	500	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Chromium	7440-47-3	70	70	Per CLP SOW ISM02.2	2	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Cobalt	7440-48-4	No Action	No Action	Per CLP SOW ISM02.2	1	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Copper	7440-50-8	No Action	No Action	Per CLP SOW ISM02.2	2	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method

QAPP Worksheet 15-7
Reference Limits and Evaluation Table

Matrix: Aqueous (Groundwater)

Analytical Group: TAL Metal (CLP SOW ISM02.2)

Concentration Level: Low

Analyte	CAS Number	Project Action Level: Preliminary Remedial Goals (µg/L)	Project Quantitation Limit (ug/L)	Analytical Method		Achievable Laboratory Limits	
				MDLs (ug/L)	QLs (ug/L)	MDLs (ug/L)	QLs (ug/L)
Iron	7439-89-6	300	300	Per CLP SOW ISM02.2	200	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Lead	7439-92-1	5	5	Per CLP SOW ISM02.2	1	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Magnesium	7439-95-4	No Action	No Action	Per CLP SOW ISM02.2	500	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Manganese	7439-96-5	50	50	Per CLP SOW ISM02.2	1	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Nickel	7440-02-0	No Action	No Action	Per CLP SOW ISM02.2	1	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Potassium	2023695	No Action	No Action	Per CLP SOW ISM02.2	500	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Selenium	7782-49-2	No Action	No Action	Per CLP SOW ISM02.2	5	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Silver	7440-22-4	No Action	No Action	Per CLP SOW ISM02.2	1	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Sodium	7440-23-5	No Action	No Action	Per CLP SOW ISM02.2	500	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Thallium	7440-28-0	No Action	No Action	Per CLP SOW ISM02.2	1	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method

QAPP Worksheet 15-7
Reference Limits and Evaluation Table

Matrix: Aqueous (Groundwater)

Analytical Group: TAL Metal (CLP SOW ISM02.2)

Concentration Level: Low

Analyte	CAS Number	Project Action Level: Preliminary Remedial Goals (µg/L)	Project Quantitation Limit (ug/L)	Analytical Method		Achievable Laboratory Limits	
				MDLs (ug/L)	QLs (ug/L)	MDLs (ug/L)	QLs (ug/L)
Vanadium	7440-62-2	No Action	No Action	Per CLP SOW ISM02.2	5	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method
Zinc	7440-66-6	No Action	No Action	Per CLP SOW ISM02.2	2	Must be equal to or less than Analytical Method	Must be equal to or less than Analytical Method

Notes:

1. The Method Detection Levels (MDLs) should meet the criteria given in USEPA CLP SOW ISM02.2. The MDL will be confirmed by the laboratory annually. The most current MDL will be reported at time of sample collection.
2. The Achievable Laboratory Quality Limits (QLs) must be equal to or less than the Analytical Method QLs. Laboratory will via ICP-MS to achieve project QLs [which equal Preliminary Remedial Goals (PRG) for the project].

QAPP Worksheet 16
Project Schedule Timeline Table

Sampling Schedule

Refer to Table 2 for the proposed detailed sampling schedule. No changes will be made to the monitoring network or list of analytes without the prior written concurrence of the USEPA and USACE.

Reporting Schedule

The long-term monitoring results will be reported annually in the first 15 years of the program to the USEPA and USACE. In years 16 through 30, the data evaluation report shall be submitted biennially. The report shall summarize the findings of the monitoring events, and the biennial certification of the CEA shall be included once every two years.

During years where no samples are collected, a letter will be submitted which specifies that no samples were collected, as well as when the next full LTM report will be developed. Additional project communications (interim progress reporting, recurring conference calls, etc.) shall be conducted at a frequency to be established by the CONTRACTOR and the USACE.

Classification Exception Area (CEA) Filing Schedule

The biennial certification of the CEA will occur every two years following the anniversary of the effective date of the permit.

QAPP Worksheet 17

Sampling Design and Rationale

Long-Term Monitoring Program and Rationale

Program Description

After the completion of the OU3 RI and FS, the USEPA evaluated the results and potential alternatives for restoration of groundwater to meet Applicable or Relevant and Appropriate Requirements (ARARs). The conclusion of this evaluation was that practicable alternatives could not be implemented. Consequently, the USEPA invoked an ARAR waiver for groundwater at the site due to technical impracticability. The USEPA established in the September 2012 OU3 ROD that the appropriate remedy for groundwater at OU3 was a combination of Institutional Controls and Groundwater Monitoring. The selected remedy includes the following components:

- Prevention of exposure to site groundwater contamination by continuing efforts to identify existing private wells within the OU3 study area and by placing institutional controls in the form of a CEA, as defined by the extent of the delineated TI zone, to prevent the installation of new drinking water wells;
- Implementation of a long-term sampling and analysis program to monitor the groundwater contamination at the site in order to prevent exposure and assess groundwater migration; and
- Implementation of a long-term vapor intrusion monitoring program.

The program described below applies specifically to groundwater monitoring; vapor intrusion monitoring will be addressed in a separate program (and therefore a separate QAPP document).

The Long-Term Monitoring Program will be established to monitor the effectiveness of the selected remedy, measuring contaminant concentrations from locations originally investigated during the RI (shown on Figure 2), as well as four additional locations situated at the edges of the TI zone to monitor contaminant concentrations at the distal portions of the plume. The contaminant concentrations observed during the monitoring will be used to evaluate whether or not the institutional controls required by the selected remedy are successful in preventing development of conditions which pose an unacceptable risk to ecological or human health. The concentrations will also be used to assess contaminant migration. In addition to groundwater sample collection, the long-term monitoring program will include collection of water level measurements to evaluate the direction of groundwater movement, vertical hydraulic gradients, and seasonal or temporal fluctuations in water levels.

The long-term monitoring program will extend for 30 years. This 30-year timeframe has been broken up into four “sets” of years, shorter periods of time which correspond to the frequency of sample collection. These blocks of years are:

- Years 1 and 2,
- Years 3 through 5,
- Years 6 through 15, and
- Years 16 through 30.

The number of samples collected declines as the monitoring progresses, with a total of 19,724 samples retrieved over the course of the entire program. Groundwater obtained during the program will be analyzed for the following parameters:

- TCL VOC

- TCL SVOC
- TCL Pesticide
- PCB Aroclor
- TAL Metal
- PCDD/F Congeners
- PCB Congeners

Not all samples will be run for every chemical analysis. Further, in addition to marking changes in sample collection quantities, the four time blocks within the long-term monitoring program also correspond to changes in the frequency of parameter analysis. The breakdown of analysis frequency by year block is presented in Table 3.

If the measured concentration of the groundwater contamination within or downstream of the CEA is less than the remedial goals presented in Table 1 or anthropogenic background levels, whichever is higher, an unacceptable ecological or human health risk is not present. However, if the concentration trend at a location within or downgradient of the CEA increases to within a 0.05 level of significance, then the protectiveness of the remedy will be evaluated. Statistical testing will be performed using Mann-Kendall analysis.

General Condition Assessment

Upon arrival at each monitoring well location, any site conditions that may affect the quality of the sample will be documented. Weather conditions will also be recorded, including temperature, cloud cover (*e.g.,* partly cloudy, full sun, etc.), relative humidity, wind direction and speed, and precipitation (*e.g.,* type and intensity). Other potential field conditions include the presence of airborne particulates such as dust or soot from heavy truck traffic, or the presence of unusual odors. Further, the outer protective monument, well casing, and well cap will be inspected for any signs of damage or vandalism. If there is evidence of damage, or if a lock is missing, this information will be recorded in the field notebook and reported to the Project Manager (PM).

Before the traditional bedrock wells located on the former CDE facility property are sampled, the headspace will be screened for the presence of organic gases using a Photoionization Detector (PID) or Flame ionization Detector (FID). No headspace measurements are required at wells where multi-level samplers have been installed. If organic vapors are detected, the instrument reading will be documented in the field notebook and the gases allowed to dissipate before proceeding. Organic gases will be measured in accordance with the procedures defined in Standard Operating Procedure (SOP) No. 01 – Procedure for the Calibration and Operation of a Photoionization Detector, or SOP No. 02 – Procedure for the Calibration and Operation of a Flame Ionization Detector, depending on the equipment selected.

Water Level Measurements

Water level measurements will be collected and recorded at all shallow bedrock monitoring wells and at all ports of the multi-level wells as a part of each groundwater sampling event. These measurements will be obtained at traditionally-constructed wells using either manual water level meters or pressure transducers installed within the wells. If free product, such as NAPL, is detected in the well, its presence and thickness will also be recorded. Additionally, the depth to the bottom of each conventionally-screened well on the former CDE facility property will be measured and recorded to determine if screen occlusion due to siltation has occurred. This will be accomplished through comparison of the measured value to the bottom depth recorded in the original well construction logs.

The water level in FLUTe™ wells will be determined using a bead-type electric water level meter to measure the water level in the existing pump tube. As with the traditionally-screened wells, if NAPL, is detected in the well, its presence and thickness will be recorded. Surface water measurements will be collected and

recorded at all five staff gages located in Bound Brook and Spring Lake (Figure 2); water levels at the staff gages shall be measured from the gages to the nearest 0.01 feet.

Water levels in the multi-port monitoring wells will be recorded using the pump tube for each port as described in FLUTe™ 01 - A Guide for the Use of Pressure Transducers with the Water FLUTe™ System. The most recent version of this SOP should be obtained by the CONTRACTOR upon initialization of the long-term monitoring program. Each pressure transducer is a permanent device, installed during the construction of the FLUTe™ System multi-port liner and connected directly to the formation. The expected battery life of the pressure transducers is approximately five years, and they cannot be replaced without un-installing the FLUTe multilevel sampler. Ports will be purged prior to recording water levels.

To measure product (if present), a product/water interface meter will be grounded to the steel casing and the probe slowly lowered into the well until water is encountered. The date, time, well number, and depth to water will be recorded in the field notebook. If NAPL is present, the thickness will be recorded. The cable and probe of the interface meter will be decontaminated between use at each well in accordance with decontamination procedures presented in SOP No. 03 – Procedure for the Decontamination of Groundwater Sampling Equipment, included in Attachment 3.

Groundwater Sampling

Groundwater samples from traditional screened bedrock wells will be collected in accordance with low-flow, minimal drawdown procedures as described in SOP No. 04 – Procedure to Collect Groundwater Samples using Low Flow Techniques, included in Attachment 3. For each individual well, the location of the low-flow pump intake will be recorded during each sampling event and will remain constant during subsequent sampling events. The low-flow pump intake will be centered in the middle of the screened interval, and new tubing will be used at each well for each sampling event.

Prior to sampling, the groundwater must achieve “stabilization” – a condition where key water quality parameters do not deviate from a consistent value beyond a certain criteria. To evaluate whether or not this condition has been reached, water quality parameters will be measured during purging to determine when well stabilization has been achieved. Parameters to be measured include:

- pH;
- Temperature (deg C.);
- Conductivity, (Siemens/meter, S/m);
- DO (milligrams/liter, mg/l), during purging, before and after sample acquisition);
- ORP (millivolts, mV), during purging, before and after sample acquisition); and
- Flow rate.

Field water quality parameters will be collected using a YSI 556 Multiprobe Water Quality Meter or equivalent connected to a flow-through cell. Readings will be taken every three minutes for the first 15 minutes and five minutes thereafter until water quality parameters stabilize. Stabilization is considered achieved when five readings in a row do not deviate from a consistent value beyond a certain criteria. Water quality measurements will be collected in accordance with the procedures presented in SOP No. 05 – Procedure for the Calibration and Operation of a YSI 566 Multi-Probe Water Quality Meter, included in Attachment 3.

Groundwater samples from the FLUTe™ multi-port wells will be collected according to FLUTe™ 02 - Sampling Guidelines for Water FLUTe™ Systems. [Note: The most recent version of this SOP should be obtained by the CONTRACTOR upon initialization of the long-term monitoring program.] FLUTe™ will supply a spreadsheet for each multi-port system, designating the sampling pressure and discard volume for each sampling port, in order to achieve flow rates at or less than 0.2 liter per minute. At least three purge strokes for each port must be performed prior to stabilization.

The following additional parameters will be recorded when sampling FLUTe™ wells:

- Depth to formation water at each port prior to purging as measured inside the pump tube for each port, using a bead-type electric water level meter;
- The formation pressure at each port using the pressure transducer, where installed; and
- Purge time and volume for each port.

Following measurement of physical parameters, analytical samples will be collected from the wells. However, analytical samples will not be collected if NAPL is detected.

Sample Management

Sample management is the process by which field samples are handled once collected. This process encompasses sample labeling, preservation, documentation, and shipment to the lab. All samples will be placed in a cooler at less than 6°C immediately upon collection. A subset of the samples will also require chemical preservation (refer to Worksheet 19). Sample containers shall be provided by the analytical laboratory, and shall come pre-preserved for those constituents which require chemical preservation.

Sample custody documentation provides a written record of sample collection and analysis, and sample custody procedures provide for specific identification of samples associated with an exact location, the recording of pertinent information associated with the sample, and a chain of custody record that serves as physical evidence of sample custody. SCRIBE software developed by the USEPA will be used to develop chain of custody documentation; however, if necessary, field crew may submit hand-written chain of custodies.

Samples will be shipped overnight to the assigned laboratory for chemical analysis. Specific guidance on sample management is provided in SOP No. 06 – Procedure to Conduct Sample Management.

Quality Assurance/Quality Control

Quality assurance/quality control (QA/QC) samples are analyzed as a “check” on the field and analytical programs. External quality control samples (*e.g.,* field duplicates and equipment blanks) are intended to provide an indication of how consistent sample collection and analyses are over the course of the program. Internal quality control samples are intended to provide an indication of the accuracy, precision, and sensitivity of the analytical methods for each analytical batch of field samples that are analyzed. The internal quality control samples are CLP-method specific (refer to Worksheets 20 and 28).

QAPP Worksheet 18
Sampling Locations and Methods/SOP Requirements Table

Sampling Location/ID Number	Matrix	Depth	Analytical Group	Concentration Level	Estimated Number of Samples (identify field duplicates)	Sampling SOP Reference	Rationale for Sampling Location
MW-01A	Groundwater	See Table 2	TCL VOC, TCL SVOC, TCL Pesticides, PCB Aroclors, TAL Metal, PCDD/F, and PCB Congeners Water Level, pH, Temperature, Conductivity, Dissolved Oxygen, ORP, and Flow Rate	Low	Estimated quantities are provided in Worksheet 20	Example field SOPs are provided in Attachment 3	Location investigated during RI.
MW02-A	Groundwater	See Table 2	TCL VOC, TCL SVOC, TCL Pesticides, PCB Aroclors, TAL Metal, PCDD/F, and PCB Congeners Water Level, pH, Temperature, Conductivity, Dissolved Oxygen, ORP, and Flow Rate	Low	Estimated quantities are provided in Worksheet 20	Example field SOPs are provided in Attachment 3	Location investigated during RI.
MW-03	Groundwater	See Table 2	TCL VOC, TCL SVOC, TCL Pesticides, PCB Aroclors, TAL Metal, PCDD/F, and PCB Congeners Water Level, pH, Temperature, Conductivity, Dissolved Oxygen, ORP, and Flow Rate	Low	Estimated quantities are provided in Worksheet 20	Example field SOPs are provided in Attachment 3	Location investigated during RI.

Sampling Location/ID Number	Matrix	Depth	Analytical Group	Concentration Level	Estimated Number of Samples (identify field duplicates)	Sampling SOP Reference	Rationale for Sampling Location
MW-04	Groundwater	See Table 2	TCL VOC, TCL SVOC, TCL Pesticides, PCB Aroclors, TAL Metal, PCDD/F, and PCB Congeners Water Level, pH, Temperature, Conductivity, Dissolved Oxygen, ORP, and Flow Rate	Low	Estimated quantities are provided in Worksheet 20	Example field SOPs are provided in Attachment 3	Location investigated during RI.
MW-05	Groundwater	See Table 2	TCL VOC, TCL SVOC, TCL Pesticides, PCB Aroclors, TAL Metal, PCDD/F, and PCB Congeners Water Level, pH, Temperature, Conductivity, Dissolved Oxygen, ORP, and Flow Rate	Low	Estimated quantities are provided in Worksheet 20	Example field SOPs are provided in Attachment 3	Location investigated during RI.
MW-06	Groundwater	See Table 2	TCL VOC, TCL SVOC, TCL Pesticides, PCB Aroclors, TAL Metal, PCDD/F, and PCB Congeners Water Level, pH, Temperature, Conductivity, Dissolved Oxygen, ORP, and Flow Rate	Low	Estimated quantities are provided in Worksheet 20	Example field SOPs are provided in Attachment 3	Location investigated during RI.

Sampling Location/ID Number	Matrix	Depth	Analytical Group	Concentration Level	Estimated Number of Samples (identify field duplicates)	Sampling SOP Reference	Rationale for Sampling Location
MW-07	Groundwater	See Table 2	TCL VOC, TCL SVOC, TCL Pesticides, PCB Aroclors, TAL Metal, PCDD/F, and PCB Congeners Water Level, pH, Temperature, Conductivity, Dissolved Oxygen, ORP, and Flow Rate	Low	Estimated quantities are provided in Worksheet 20	Example field SOPs are provided in Attachment 3	Location investigated during RI.
MW-08	Groundwater	See Table 2	TCL VOC, TCL SVOC, TCL Pesticides, PCB Aroclors, TAL Metal, PCDD/F, and PCB Congeners Water Level, pH, Temperature, Conductivity, Dissolved Oxygen, ORP, and Flow Rate	Low	Estimated quantities are provided in Worksheet 20	Example field SOPs are provided in Attachment 3	Location investigated during RI.
MW-09	Groundwater	See Table 2	TCL VOC, TCL SVOC, TCL Pesticides, PCB Aroclors, TAL Metal, PCDD/F, and PCB Congeners Water Level, pH, Temperature, Conductivity, Dissolved Oxygen, ORP, and Flow Rate	Low	Estimated quantities are provided in Worksheet 20	Example field SOPs are provided in Attachment 3	Location investigated during RI.

Sampling Location/ID Number	Matrix	Depth	Analytical Group	Concentration Level	Estimated Number of Samples (identify field duplicates)	Sampling SOP Reference	Rationale for Sampling Location
MW-10	Groundwater	See Table 2	TCL VOC, TCL SVOC, TCL Pesticides, PCB Aroclors, TAL Metal, PCDD/F, and PCB Congeners Water Level, pH, Temperature, Conductivity, Dissolved Oxygen, ORP, and Flow Rate	Low	Estimated quantities are provided in Worksheet 20	Example field SOPs are provided in Attachment 3	Location investigated during RI.
MW-11	Groundwater	See Table 2	TCL VOC, TCL SVOC, TCL Pesticides, PCB Aroclors, TAL Metal, PCDD/F, and PCB Congeners Water Level, pH, Temperature, Conductivity, Dissolved Oxygen, ORP, and Flow Rate	Low	Estimated quantities are provided in Worksheet 20	Example field SOPs are provided in Attachment 3	Location investigated during RI.
MW-12	Groundwater	See Table 2	TCL VOC, TCL SVOC, TCL Pesticides, PCB Aroclors, TAL Metal, PCDD/F, and PCB Congeners Water Level, pH, Temperature, Conductivity, Dissolved Oxygen, ORP, and Flow Rate	Low	Estimated quantities are provided in Worksheet 20	Example field SOPs are provided in Attachment 3	Location investigated during RI.

Sampling Location/ID Number	Matrix	Depth	Analytical Group	Concentration Level	Estimated Number of Samples (identify field duplicates)	Sampling SOP Reference	Rationale for Sampling Location
ERT-1	Groundwater	See Table 2	TCL VOC, TCL SVOC, TCL Pesticides, PCB Aroclors, TAL Metal, PCDD/F, and PCB Congeners Water Level, pH, Temperature, Conductivity, Dissolved Oxygen, ORP, and Flow Rate	Low	Estimated quantities are provided in Worksheet 20	Example field SOPs are provided in Attachment 3	Location investigated during RI.
ERT-2	Groundwater	See Table 2	TCL VOC, TCL SVOC, TCL Pesticides, PCB Aroclors, TAL Metal, PCDD/F, and PCB Congeners Water Level, pH, Temperature, Conductivity, Dissolved Oxygen, ORP, and Flow Rate	Low	Estimated quantities are provided in Worksheet 20	Example field SOPs are provided in Attachment 3	Location investigated during RI.
ERT-3	Groundwater	See Table 2	TCL VOC, TCL SVOC, TCL Pesticides, PCB Aroclors, TAL Metal, PCDD/F, and PCB Congeners Water Level, pH, Temperature, Conductivity, Dissolved Oxygen, ORP, and Flow Rate	Low	Estimated quantities are provided in Worksheet 20	Example field SOPs are provided in Attachment 3	Location investigated during RI.

Sampling Location/ID Number	Matrix	Depth	Analytical Group	Concentration Level	Estimated Number of Samples (identify field duplicates)	Sampling SOP Reference	Rationale for Sampling Location
ERT-4	Groundwater	See Table 2	TCL VOC, TCL SVOC, TCL Pesticides, PCB Aroclors, TAL Metal, PCDD/F, and PCB Congeners Water Level, pH, Temperature, Conductivity, Dissolved Oxygen, ORP, and Flow Rate	Low	Estimated quantities are provided in Worksheet 20	Example field SOPs are provided in Attachment 3	Location investigated during RI.
ERT-5	Groundwater	See Table 2	TCL VOC, TCL SVOC, TCL Pesticides, PCB Aroclors, TAL Metal, PCDD/F, and PCB Congeners Water Level, pH, Temperature, Conductivity, Dissolved Oxygen, ORP, and Flow Rate	Low	Estimated quantities are provided in Worksheet 20	Example field SOPs are provided in Attachment 3	Location investigated during RI.
ERT-6	Groundwater	See Table 2	TCL VOC, TCL SVOC, TCL Pesticides, PCB Aroclors, TAL Metal, PCDD/F, and PCB Congeners Water Level, pH, Temperature, Conductivity, Dissolved Oxygen, ORP, and Flow Rate	Low	Estimated quantities are provided in Worksheet 20	Example field SOPs are provided in Attachment 3	Location investigated during RI.

Sampling Location/ID Number	Matrix	Depth	Analytical Group	Concentration Level	Estimated Number of Samples (identify field duplicates)	Sampling SOP Reference	Rationale for Sampling Location
ERT-7	Groundwater	See Table 2	TCL VOC, TCL SVOC, TCL Pesticides, PCB Aroclors, TAL Metal, PCDD/F, and PCB Congeners Water Level, pH, Temperature, Conductivity, Dissolved Oxygen, ORP, and Flow Rate	Low	Estimated quantities are provided in Worksheet 20	Example field SOPs are provided in Attachment 3	Location investigated during RI.
ERT-8	Groundwater	See Table 2	TCL VOC, TCL SVOC, TCL Pesticides, PCB Aroclors, TAL Metal, PCDD/F, and PCB Congeners Water Level, pH, Temperature, Conductivity, Dissolved Oxygen, ORP, and Flow Rate	Low	Estimated quantities are provided in Worksheet 20	Example field SOPs are provided in Attachment 3	Location investigated during RI.
MW-13	Groundwater	See Table 2	TCL VOC, TCL SVOC, TCL Pesticides, PCB Aroclors, TAL Metal, PCDD/F, and PCB Congeners Water Level, pH, Temperature, Conductivity, Dissolved Oxygen, ORP, and Flow Rate	Low	Estimated quantities are provided in Worksheet 20	Example field SOPs are provided in Attachment 3	Location investigated during RI.

Sampling Location/ID Number	Matrix	Depth	Analytical Group	Concentration Level	Estimated Number of Samples (identify field duplicates)	Sampling SOP Reference	Rationale for Sampling Location
MW-14S	Groundwater	See Table 2	TCL VOC, TCL SVOC, TCL Pesticides, PCB Aroclors, TAL Metal, PCDD/F, and PCB Congeners Water Level, pH, Temperature, Conductivity, Dissolved Oxygen, ORP, and Flow Rate	Low	Estimated quantities are provided in Worksheet 20	Example field SOPs are provided in Attachment 3	Location investigated during RI.
MW-14D	Groundwater	See Table 2	TCL VOC, TCL SVOC, TCL Pesticides, PCB Aroclors, TAL Metal, PCDD/F, and PCB Congeners Water Level, pH, Temperature, Conductivity, Dissolved Oxygen, ORP, and Flow Rate	Low	Estimated quantities are provided in Worksheet 20	Example field SOPs are provided in Attachment 3	Location investigated during RI.
MW-15S	Groundwater	See Table 2	TCL VOC, TCL SVOC, TCL Pesticides, PCB Aroclors, TAL Metal, PCDD/F, and PCB Congeners Water Level, pH, Temperature, Conductivity, Dissolved Oxygen, ORP, and Flow Rate	Low	Estimated quantities are provided in Worksheet 20	Example field SOPs are provided in Attachment 3	Location investigated during RI.

Sampling Location/ID Number	Matrix	Depth	Analytical Group	Concentration Level	Estimated Number of Samples (identify field duplicates)	Sampling SOP Reference	Rationale for Sampling Location
MW-15D	Groundwater	See Table 2	TCL VOC, TCL SVOC, TCL Pesticides, PCB Aroclors, TAL Metal, PCDD/F, and PCB Congeners Water Level, pH, Temperature, Conductivity, Dissolved Oxygen, ORP, and Flow Rate	Low	Estimated quantities are provided in Worksheet 20	Example field SOPs are provided in Attachment 3	Location investigated during RI.
MW-16	Groundwater	See Table 2	TCL VOC, TCL SVOC, TCL Pesticides, PCB Aroclors, TAL Metal, PCDD/F, and PCB Congeners Water Level, pH, Temperature, Conductivity, Dissolved Oxygen, ORP, and Flow Rate	Low	Estimated quantities are provided in Worksheet 20	Example field SOPs are provided in Attachment 3	Location investigated during RI.
MW-17	Groundwater	See Table 2	TCL VOC, TCL SVOC, TCL Pesticides, PCB Aroclors, TAL Metal, PCDD/F, and PCB Congeners Water Level, pH, Temperature, Conductivity, Dissolved Oxygen, ORP, and Flow Rate	Low	Estimated quantities are provided in Worksheet 20	Example field SOPs are provided in Attachment 3	Location investigated during RI.

Sampling Location/ID Number	Matrix	Depth	Analytical Group	Concentration Level	Estimated Number of Samples (identify field duplicates)	Sampling SOP Reference	Rationale for Sampling Location
MW-18	Groundwater	See Table 2	TCL VOC, TCL SVOC, TCL Pesticides, PCB Aroclors, TAL Metal, PCDD/F, and PCB Congeners Water Level, pH, Temperature, Conductivity, Dissolved Oxygen, ORP, and Flow Rate	Low	Estimated quantities are provided in Worksheet 20	Example field SOPs are provided in Attachment 3	Location investigated during RI.
MW-19	Groundwater	See Table 2	TCL VOC, TCL SVOC, TCL Pesticides, PCB Aroclors, TAL Metal, PCDD/F, and PCB Congeners Water Level, pH, Temperature, Conductivity, Dissolved Oxygen, ORP, and Flow Rate	Low	Estimated quantities are provided in Worksheet 20	Example field SOPs are provided in Attachment 3	Location investigated during RI.
MW-20	Groundwater	See Table 2	TCL VOC, TCL SVOC, TCL Pesticides, PCB Aroclors, TAL Metal, PCDD/F, and PCB Congeners Water Level, pH, Temperature, Conductivity, Dissolved Oxygen, ORP, and Flow Rate	Low	Estimated quantities are provided in Worksheet 20	Example field SOPs are provided in Attachment 3	Location investigated during RI.

Sampling Location/ID Number	Matrix	Depth	Analytical Group	Concentration Level	Estimated Number of Samples (identify field duplicates)	Sampling SOP Reference	Rationale for Sampling Location
MW-22	Groundwater	See Table 2	TCL VOC, TCL SVOC, TCL Pesticides, PCB Aroclors, TAL Metal, PCDD/F, and PCB Congeners Water Level, pH, Temperature, Conductivity, Dissolved Oxygen, ORP, and Flow Rate	Low	Estimated quantities are provided in Worksheet 20	Example field SOPs are provided in Attachment 3	Location investigated during RI.
MW-23	Groundwater	See Table 2	TCL VOC, TCL SVOC, TCL Pesticides, PCB Aroclors, TAL Metal, PCDD/F, and PCB Congeners Water Level, pH, Temperature, Conductivity, Dissolved Oxygen, ORP, and Flow Rate	Low	Estimated quantities are provided in Worksheet 20	Example field SOPs are provided in Attachment 3	Location investigated during RI.
Former Production Well	Groundwater	See Table 2	TCL VOC, TCL SVOC, TCL Pesticides, PCB Aroclors, TAL Metal, PCDD/F, and PCB Congeners Water Level, pH, Temperature, Conductivity, Dissolved Oxygen, ORP, and Flow Rate	Low	Estimated quantities are provided in Worksheet 20	Example field SOPs are provided in Attachment 3	Location investigated during RI.

Sampling Location/ID Number	Matrix	Depth	Analytical Group	Concentration Level	Estimated Number of Samples (identify field duplicates)	Sampling SOP Reference	Rationale for Sampling Location
MW-24	Groundwater	See Table 2	TCL VOC, TCL SVOC, TCL Pesticides, PCB Aroclors, TAL Metal, PCDD/F, and PCB Congeners Water Level, pH, Temperature, Conductivity, Dissolved Oxygen, ORP, and Flow Rate	Low	Estimated quantities are provided in Worksheet 20	Example field SOPs are provided in Attachment 3	Characterize edge of existing plume.
MW-25	Groundwater	See Table 2	TCL VOC, TCL SVOC, TCL Pesticides, PCB Aroclors, TAL Metal, PCDD/F, and PCB Congeners Water Level, pH, Temperature, Conductivity, Dissolved Oxygen, ORP, and Flow Rate	Low	Estimated quantities are provided in Worksheet 20	Example field SOPs are provided in Attachment 3	Characterize edge of existing plume.
MW-26	Groundwater	See Table 2	TCL VOC, TCL SVOC, TCL Pesticides, PCB Aroclors, TAL Metal, PCDD/F, and PCB Congeners Water Level, pH, Temperature, Conductivity, Dissolved Oxygen, ORP, and Flow Rate	Low	Estimated quantities are provided in Worksheet 20	Example field SOPs are provided in Attachment 3	Characterize edge of existing plume.

Sampling Location/ID Number	Matrix	Depth	Analytical Group	Concentration Level	Estimated Number of Samples (identify field duplicates)	Sampling SOP Reference	Rationale for Sampling Location
MW-27	Groundwater	See Table 2	TCL VOC, TCL SVOC, TCL Pesticides, PCB Aroclors, TAL Metal, PCDD/F, and PCB Congeners Water Level, pH, Temperature, Conductivity, Dissolved Oxygen, ORP, and Flow Rate	Low	Estimated quantities are provided in Worksheet 20	Example field SOPs are provided in Attachment 3	Characterize edge of existing plume.

Refer to Worksheets 26 and 27 for information on sample custody and recommended sample identification.

QAPP Worksheet 19
Analytical SOP Requirement Table

Matrix	Analytical Group	Concentration Level	Analytical and Preparation Method/SOP Reference	Sample Volume/Mass per Analysis	Containers (number, size, and type)	Preservation Requirements (chemical, temperature, light protected)	Maximum Holding Time (preparation/ analysis)
Aqueous (Groundwater)	TCL VOC	Trace	SOM02.2	Must fill vials to capacity. No headspace	(3) 40 ml VOA vials w/Teflon lined septum	1:1 HCl to pH<2; cool to <6°C Not frozen	10 days
Aqueous (Groundwater)	TCL SVOC	Low	SOM02.2	1000 ml	(2) 1L amber glass bottles w/Teflon lined cap	Cool to <6°C Not frozen	5 days extract, 40 days analyze
Aqueous (Groundwater)	PCB Congeners	Low	CBC01.2	1000 ml	(2) 1L amber glass bottle w/Teflon lined cap	Cool to <6°C Not frozen	5 days extract, 40 days analyze
Aqueous (Groundwater)	PCB Aroclors	Low	SOM02.2	1000 ml	(2) 1L amber glass bottle w/Teflon lined cap	Cool to <6°C Not frozen	5 days extract, 40 days analyze
Aqueous (Groundwater)	TCL Pesticide	Low	SOM02.2	1000 ml	(2) 1L amber glass bottle w/Teflon lined cap	Cool to <6°C Not frozen	5 days extract, 40 days analyze
Aqueous (Groundwater)	PCDD/F	Low	DLM02.2	1000 ml	(2) 1L amber glass bottle w/Teflon lined cap	Cool to <6°C Not frozen	One year
Aqueous (Groundwater)	TAL Metal	Low	ISM02.2	250 mL	(1) 500 mL high density polyethylene	HNO_3 to pH<2; cool to <6°C Not frozen	6 months (Hg-26 days)

1. The size and type of the sample container may differ depending upon the requirements of the assigned laboratory. The sample size requirements and type of the sample containers may be modified dependent upon the requirements of the laboratory.

QAPP Worksheet 20
Field Quality Control Sample Summary Table

Matrix	Analytical Group	Conc. Level	Analytical and Preparation SOP Reference	Estimated No. of Field Samples	Estimated No. of Field Duplicates	Estimated No. of Lab Replicates and Matrix Spike (for Inorganic Analyses)	Estimated No. of MS/MSD (for Organic Analyses)	Estimated No. of Field Blanks	Estimated No. of Trip Blanks (for Organic Analyses)	Estimated Total No. of Samples to Lab
Aqueous (Groundwater)	Water Level, pH, Temperature, Conductivity, Dissolved Oxygen, ORP, and Flow Rate	Low	Example Field SOP provided in Attachment 3.	NA	NA	NA	NA	NA	NA	NA
Aqueous (Groundwater)	TCL VOC	Trace	CLP SOW SOM02.2	5481	1 per 20 field samples. If fewer than 20 samples in an event, then 1 per event.	NA	1 per 20 field samples. If fewer than 20 samples in an event, then 1 per event.	1 per event	1 per shipment	TBD
Aqueous (Groundwater)	TCL SVOC	Low	CLP SOW SOM02.2	1568	1 per 20 field samples. If fewer than 20 samples in an event, then 1 per event.	NA	1 per 20 field samples. If fewer than 20 samples in an event, then 1 per event.	1 per event	NA	TBD

Matrix	Analytical Group	Conc. Level	Analytical and Preparation SOP Reference	Estimated No. of Field Samples	Estimated No. of Field Duplicates	Estimated No. of Lab Replicates and Matrix Spike (for Inorganic Analyses)	Estimated No. of MS/MSD (for Organic Analyses)	Estimated No. of Field Blanks	Estimated No. of Trip Blanks (for Organic Analyses)	Estimated Total No. of Samples to Lab
Aqueous (Groundwater)	TCL Pesticides	Low	CLP SOW SOM02.2	1568	1 per 20 field samples. If fewer than 20 samples in an event, then 1 per event.	NA	1 per 20 field samples. If fewer than 20 samples in an event, then 1 per event.	1 per event	NA	TBD
Aqueous (Groundwater)	PCB Congeners	Low	CLP SOW CBC01.2	292	1 per 20 field samples. If fewer than 20 samples in an event, then 1 per event.	1 per 20 field samples. If fewer than 20 samples in an event, then 1 per event. If required by the laboratory, refer to Worksheet 12.	NA	1 per event	NA	TBD
Aqueous (Groundwater)	PCB Aroclors	Low	CLP SOW SOM02.2	4170	1 per 20 field samples. If fewer than 20 samples in an event, then 1 per event.	NA	1 per 20 field samples. If fewer than 20 samples in an event, then 1 per event.	1 per event	NA	TBD

Matrix	Analytical Group	Conc. Level	Analytical and Preparation SOP Reference	Estimated No. of Field Samples	Estimated No. of Field Duplicates	Estimated No. of Lab Replicates and Matrix Spike (for Inorganic Analyses)	Estimated No. of MS/MSD (for Organic Analyses)	Estimated No. of Field Blanks	Estimated No. of Trip Blanks (for Organic Analyses)	Estimated Total No. of Samples to Lab
Aqueous (Groundwater)	PCDD/F	Low	CLP SOW DLM02.2	292	1 per 20 field samples. If fewer than 20 samples in an event, then 1 per event.	1 per 20 field samples. If fewer than 20 samples in an event, then 1 per event. If required by the laboratory, refer to Worksheet 12	NA	1 per event	NA	TBD
Aqueous (Groundwater)	TAL Metal	Low	CLP SOW ISM02.2	4170	1 per 20 field samples. If fewer than 20 samples in an event, then 1 per event.	1 per 20 field samples. If fewer than 20 samples in an event, then 1 per event.	NA	1 per event	NA	TBD

Notes:

1. "Estimate Number of Field Samples" includes the anticipated total number of field samples to be collected over the course of the Long Term Monitoring Program (anticipated to be 30 years).

QAPP Worksheet 21
Project Sampling SOP Reference Table

Reference Number	Title, Revision Date and/or Number	Originating Organization	Equipment Type	Modified for Project Work?	Comments
SOP No. 01[1]	Procedure for Calibration, Operation and Maintenance of MiniRAE 2000 Photoionization Detector (PID)	Example provided by LBG	Refer to SOP	No	Attachment 3
SOP No. 02[1]	Procedure for Calibration and Operation of a Flame Ionization Detector	Example provided by LBG	Refer to SOP	No	Attachment 3
SOP No. 03	Procedure to Conduct Field Decontamination	Example provided by LBG	Refer to SOP	No	Attachment 3
SOP No. 04	Procedure to Collect Groundwater Samples Using Low-Flow Techniques	Example provided by LBG	Refer to SOP	No	Attachment 3
SOP No. 05	Procedure for the Calibration and Operation of a YSI 566 Multi-Probe Water Quality Meter	Example provided by LBG	Refer to SOP	No	Attachment 3
SOP No. 06	Procedure to Conduct Sample Management (February 2014, Version 1)	Example provided by LBG	Refer to SOP	No	Attachment 3
SOP No. 07	Management and Disposal of Investigation-Derived Waste	Example provided by LBG	Refer to SOP	No	Attachment 3
SOP No. 08	Procedure to Conduct a Technical System Field Audit (February 2014, Version 1)	Example provided by LBG	Refer to SOP	No	Attachment 3

Reference Number	Title, Revision Date and/or Number	Originating Organization	Equipment Type	Modified for Project Work?	Comments
Scribe User's Guide	ERT Comprehensive Training Manual for Scribe v3.8 or latest version at time of sample collection	USEPA	Refer to referenced document	No	Scribe software will be used to manage samples and create COC; however, depending on field conditions, staff can generate a hand-written COC for sample shipment.
SOP No. HW-32	Standard Operating Procedure For Implementing The National Strategy For Procuring Analytical Services for All OSWER Programs (Superfund, RCRA, Brownfields), Revision 5, March 17, 2005 or latest version at time of sample collection	USEPA	Refer to referenced document	No	To be used by the field team as a guide for collecting and preparing samples

Notes:

1. Only one of these SOPs should be required. The one used will be determined by which instrument is selected by the CONTRACTOR to perform the organic vapor testing.

QAPP Worksheet 22
Field Equipment Calibration, Maintenance, Testing, and Inspection Table

Field Equipment	Calibration Activity	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference
MiniRAE Photoionization Detector (PID)[1]	Instrument will arrive on-site pre-calibrated. Daily calibration verification per manual. Re-calibrate if verification fails. Confirm expiration date of calibration standard.	Instrument must be cleaned daily. Refer to manual for maintenance.	Test battery daily. Refer to manual for instrument test checks.	Inspect for damage as per operator's manual	Daily calibration, maintenance, and testing (as needed)	Refer to operator's manual	Refer to operator's manual	CONTRACTOR field crew	Refer to Worksheet 21 for field SOP
Flame Ionization Detector (FID)[1]	Instrument will arrive on-site pre-calibrated. Daily calibration verification per manual. Re-calibrate if verification fails. Confirm expiration date of calibration standard.	Instrument must be cleaned daily. Refer to manual for maintenance.	Test battery daily. Refer to manual for instrument test checks.	Inspect for damage as per operator's manual	Daily calibration, maintenance, and testing (as needed)	Refer to operator's manual	Refer to operator's manual	CONTRACTOR field crew	Refer to Worksheet 21 for field SOP
YSI Model 600 XL or Horiba U52	Instrument will arrive on-site pre-calibrated. Daily calibration verification per manual. Re-calibrate if verification fails. Confirm expiration date of calibration standard.	Instrument must be cleaned daily. Refer to manual for maintenance.	Test battery daily. Refer to manual for instrument test checks.	Inspect for damage as per operator's manual	Daily calibration, maintenance, and testing (as needed)	Refer to operator's manual	Refer to operator's manual	CONTRACTOR field crew	Refer to Worksheet 21 for field SOP
Water Level	Calibration not required.	Instrument must be cleaned daily. Refer to manual for maintenance.	Test battery daily. Refer to manual for instrument test checks.	Inspect for damage as per operator's manual	Daily maintenance and testing (as needed)	Refer to operator's manual	Refer to operator's manual	CONTRACTOR field crew	None

Field Equipment	Calibration Activity	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference
Interface Probe	Calibration not required.	Instrument must be cleaned daily. Refer to manual for maintenance.	Test battery daily. Refer to manual for instrument test checks.	Inspect for damage as per operator's manual	Daily maintenance and testing (as needed)	Refer to operator's manual	Refer to operator's manual	CONTRACTOR field crew	None

Notes:

1. Only one of these instruments and SOPs is be required. The one used will be determined by which instrument is selected by the CONTRACTOR to perform the organic vapor testing.

QAPP Worksheet 23
Analytical SOP Reference Table

Reference Number	Title, Revision Date, and/or Number	Definitive or Screening Data	Analytical Group	Instrument	Proposed Laboratory for Performing Analysis	Modified for Project Work?
SOM02.2	USEPA CONTRACT LABORATORY PROGRAM STATEMENT OF WORK FOR ORGANIC SUPERFUND METHODS Multi-Media, Multi-Concentration SOM02.2, August 2014 or latest version at time of sample collection	Definitive	TCL VOC	GC/MS	Assigned CLP Laboratory	No Implement Trace VOC
SOM02.2	USEPA CONTRACT LABORATORY PROGRAM STATEMENT OF WORK FOR ORGANIC SUPERFUND METHODS Multi-Media, Multi-Concentration SOM02.2, August 2014 or latest version at time of sample collection	Definitive	TCL SVOC	GC/MS	Assigned CLP Laboratory	No Implement SIM SVOC (refer to Note 1)
CBC01.2	USEPA ANALYTICAL SERVICES BRANCH STATEMENT OF WORK FOR ANALYSIS OF CHLORINATED BIPHENYL CONGENERS (CBCS) Multi-Media, Multi-Concentration CBC01.2, DECEMBER 2009 or latest version at time of sample collection	Definitive	PCB Congeners	HRGC-HRMS	Assigned CLP Laboratory	No
SOM02.2	USEPA CONTRACT LABORATORY PROGRAM STATEMENT OF WORK FOR ORGANIC SUPERFUND METHODS Multi-Media, Multi-Concentration SOM02.2, August 2014 or latest version at time of sample collection	Definitive	PCB Aroclor	GC/ECD	Assigned CLP Laboratory	No
SOM02.2	USEPA CONTRACT LABORATORY PROGRAM STATEMENT OF WORK FOR ORGANIC SUPERFUND METHODS Multi-Media, Multi-Concentration SOM02.2, August 2014 or latest version at time of sample collection	Definitive	TCL Pesticide	GC/ECD	Assigned CLP Laboratory	No Implement GPC cleanup as needed (refer to Note 2)

Reference Number	Title, Revision Date, and/or Number	Definitive or Screening Data	Analytical Group	Instrument	Proposed Laboratory for Performing Analysis	Modified for Project Work?
DLM02.2	USEPA ANALYTICAL SERVICES BRANCH STATEMENT OF WORK FOR ANALYSIS OF CHLORINATED DIBENZO-P-DIOXINS (CDDs) AND CHLORINATED DIBENZOFURANS (CDFs) Multi-Media, Multi-Concentration DLM02.2 DECEMBER 2009 or latest version at time of sample collection	Definitive	PCDD/F	HRGC-HRMS	Assigned CLP Laboratory	No
ISM02.2	USEPA CONTRACT LABORATORY PROGRAM STATEMENT OF WORK FOR INORGANIC SUPERFUND METHODS Multi-Media, Multi-Concentration ISM02.2, August 2014 or latest version at time of sample collection	Definitive	TAL Metal	ICP-MS	Assigned CLP Laboratory	No

Notes:

1. Simultaneous Ion Monitoring (SIM) will be used to report Benzo(a)anthracene, bis-(2-Ethylhexyl) phathalate, Benzo(f)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno (1,2,3-cd)pyrene, and Dibenzo(a,h)anthracene.
2. As necessary, laboratory will implement gel permeation chromatography (GPC) to clean extracts and improve chromatography.

QAPP Worksheet 24
Analytical Instrument Calibration Table

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference
GC-ECD (PCB Aroclor)	Five-point initial calibration curve and CCV as required.	ICAL: prior to sample analysis and when CCV fails CCV: every 12 hours	RSD ≤ 20.0% Opening CCV: %D ≤ 25% and %D ≤30% for Aroclors and surrogates Closing CCV: %D ≤ 50% for both Aroclors and surrogates	Inspect system, re-calibrate as needed. Reanalyze affected samples.	Assigned CLP Lab personnel	SOM02.2
GC-MS (TCL VOC)	Tune with BFB Five-point initial calibration curve, immediately followed by ICV. CCV as required.	ICAL: prior to sample analysis and when CCV fails CCV: every 12 hours	Tune must meet criteria specified in SOM02.2, Exhibit D, Section 17, Table 2 (p. D-46/Trace VOC) ICAL: %RSD ≤ 20% CCV: %D ≤ 30%	Inspect system, re-calibrate as needed. Reanalyze affected samples.	Assigned CLP Lab personnel	SOM02.2

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference
GC-MS (TCL SVOC)	Tune with DFTPP Five-point initial calibration curve, immediately followed by ICV. CCV as required.	ICAL: prior to sample analysis and when CCV fails CCV: every 12 hours	Tune must meet criteria specified in SOM02.2, Exhibit D, Section 17, Table 2 (p. D-64/SVOC) ICAL: %RSD ≤ 20% CCV: %D ≤ 30%	Inspect system, re-calibrate as needed. Reanalyze affected samples.	Assigned CLP Lab personnel	SOM02.2
ICP-MS (TAL Metal)	Four-point initial calibration curve, immediately followed by ICV. CCV as required and blanks as required.	Tune daily prior to ICAL ICAL: Prior to sample analysis and when CCV fails CCV: prior to sample analysis and repeat every 10 samples	ICAL: Correlation coefficient ≥ 0.995. CCV; %R within 90-110%.	Inspect system, re-calibrate as needed. Reanalyze affected samples.	Assigned CLP Lab personnel	ISM02.2
HRGC/HRMS (PCB Congeners)	Five point initial calibration curve per CBC01.2 Exhibit D, Section 17, Table 5. CCV as required.	ICAL: prior to sample analysis CCV every 12 hours, prior to analysis or after corrective action	RSD ≤ 20% for ICAL. CCV: % R within 70-130% for native compounds and %R 50-150% all others.	Inspect system, re-calibrate as needed. Reanalyze affected samples.	Assigned CLP Lab personnel	CBC01.2

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference
HRGC/HRMS (PCDD/F)	Five point initial calibration curve per DLM02.2, Exhibit D, Section 17, Table 4. CCV as required.	ICAL: prior to sample analysis CCV every 12 hours, prior to analysis or after corrective action	ICAL: %RSD for the RR must be ±20% and the %RSD for the RRF must be ±35% CCV: % R within 70-130% for native compounds and %R 50-150% all others.	Inspect system, re-calibrate as needed. Reanalyze affected samples.	Assigned CLP Lab personnel	DLM02.2

QAPP Worksheet 25
Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table

Instrument/ Equipment [1,2,3]	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference
Refer to list of instruments provided in Worksheet 24	Refer to laboratory quality manual[1,2,3]	Refer to laboratory quality manual[1,2,3]	Refer to laboratory quality manual[1,2,3]	Refer to laboratory quality manual[1,2,3]	Refer to laboratory quality manual[1,2,3]	Correct problems prior to analyzing project samples	Assigned laboratory personnel	Refer to methods listed in Worksheet 24

Notes:

1. The maintenance of the analytical instruments including the testing activity, inspection activity, frequency, acceptance criteria, responsible person, and SOP reference must be documented in the Laboratory Quality Manual.
2. Spare parts and maintenance of laboratory analytical instrumentation is the responsibility of the laboratory.

QAPP Worksheet 26
Sample Handling System

SAMPLE COLLECTION, PACKAGING, AND SHIPMENT
Sample Collection (Personnel/Organization): To be determined by CONTRACTOR
Sample Packaging (Personnel/Organization): To be determined by CONTRACTOR
Coordination of Shipment (Personnel/Organization): To be determined by CONTRACTOR
Type of Shipment/Carrier: Overnight delivery or courier to the laboratory
SAMPLE RECEIPT AND ANALYSIS
Sample Receipt (Personnel/Organization): Assigned laboratory personnel
Sample Custody and Storage (Personnel/Organization): Assigned laboratory personnel
Sample Preparation (Personnel/Organization): Assigned laboratory personnel
Sample Determinative Analysis (Personnel/Organization): Assigned laboratory personnel
SAMPLE ARCHIVING
Field Sample Storage (Number of days from sample collection): Samples will be shipped within 24 hours of collection.
Sample Extract/Digestate Storage (Number of days from extraction/digestion): Refer to Worksheet 19 for holding time and preservation requirements.
SAMPLE DISPOSAL
Personnel/Organization: Assigned laboratory personnel
Number of Days from Analysis: At least 90 days

Sample Handling and Custody

Sample custody procedures ensure the timely, correct, and complete analysis of each sample for all parameters requested. A sample is considered to be in someone's custody if it:

- Is in his/her possession.
- Is in his/her view, after being in his/her possession
- Is in his/her possession and has been placed in a secured location.
- Is in a designated secure area.

Sample custody documentation provides a written record of sample collection and analysis. Sample custody procedures provide for specific identification of samples associated with an exact location, the recording of pertinent information associated with the sample (including time of sample collection and any preservation techniques), and a record, called a chain of custody (COC) form that serves as physical evidence of sample custody. SCRIBE software will be used to manage samples and create the COC; however, depending on field conditions, staff can generate a hand-written COC for sample shipment. An example chain of custody form is included as Attachment 4.

Custody procedures will be in accordance with the procedures outlined in USACE Requirements for the Preparation of Sampling and Analysis Plans (USACE, 2001) and USEPA CLP Guidance for Field Samplers (USEPA, 2007). The COC documentation system provides the means to individually identify, track, and monitor each sample from the time of collection through final data reporting. Sample custody procedures are developed in three areas: sample collection, laboratory analysis, and final evidence files, which are described below.

Field Sample Handling and Custody

Field records provide a means of recording information for each field activity performed at the Site. COC procedures document pertinent sampling data and all transfers of custody until the samples reach the analytical laboratory. The sample packaging and shipment procedures summarized below will ensure that the samples arrive at the laboratory with the COC intact. Refer to SOP No. 2 in Attachment 3 for sample management information.

Field Procedures

The general responsibilities of the field team are listed below:

- The field crew is personally responsible for the care and custody of the samples until they are transferred to the sample management team or until they are properly dispatched. As few people as possible should handle the samples.
- The field crew is responsible for entering the proper information on the field forms, including all pertinent information such as sample identification number, date and time of sample collection, type of analysis, and description of sample location. The information entered on the field form will be used to generate a COC.
- All sample containers will be labeled with the project identification, sample number, matrix, type of analysis required, and preservation requirements techniques employed, if applicable.
- The samples will be properly preserved, bagged, and packed into coolers. The original COC form will be placed into the lead cooler and will be shipped to the laboratory.
- The sample management team will review all field activities to determine whether proper custody procedures were followed during the field work and if additional samples are required.

Sample Identification System

All samples collected from the Site must be identified with a sample label in addition to an entry on the COC. Indelible ink will be used to complete sample labels and handwritten COCs. Refer to Worksheet 27 for Sample Identification nomenclature and information on COC.

Sample Labels

Sample labels will require (at a minimum) the field team to record the following information for each sample container:

- Site Name
- Sample Identification
- Sample Matrix
- Parameters to be analyzed
- Date Collected
- Time Collected
- Collector's Initials
- Method of Preservation

Sample Receipt

A designated sample custodian accepts custody of the samples and verifies that the information on the sample labels matches the information on the COC. The sample custodian will document any discrepancies and will sign and date all appropriate receiving documents. The sample custodian will also document the condition of the samples upon receipt at the laboratory. Once the samples have been accepted by the laboratory, checked and logged in, they must be maintained in accordance with laboratory custody and security requirements. To ensure traceability of samples while in the possession of the laboratory, a method for sample identification that has been documented in a laboratory SOP will be used to assign sample numbers. The following stages of analysis must be documented by the laboratory:

- Sample Extraction/Preparation,
- Sample Analysis,
- Data Reduction, and
- Data Reporting.

Laboratory personnel are responsible for the custody of samples until they are returned to the sample custodian. When sample analyses and quality assurance checks have been completed in the laboratory, the used portion of the sample must be stored or disposed of in accordance with the protocols specified by CLP. Identifying labels, data sheets, COCs, and laboratory records will be retained until analyses and quality assurance checks are completed in accordance with the protocols specified by CLP.

QAPP Worksheet 27
Sample Custody Requirements

Field Sample Custody Procedures **Sample Collection:** Samples will be collected following the example field SOPs provided in Attachment 3. **Packaging and Shipping:** The field sample custody procedures (including sample packing, shipment, and delivery requirements) are discussed in Worksheet 26. For additional information, refer to SOP No. 06 in Attachment 3 for sample management information. **Delivery:** Overnight delivery or courier to the laboratory.
Laboratory Sample Custody Procedures Each laboratory will have a sample custodian, who accepts custody of the samples and verifies that the information on the sample labels matches the information on the COC. The sample custodian will document any discrepancies and will sign and date all appropriate receiving documents, as well as document the condition of the samples upon receipt at the laboratory. If any sampling archiving is included in the program, the sample custodian will document which samples have been identified for archiving and record the holding times, the required analysis date to stay within holding times, and the date the sample was put into archive status. The laboratory will dispose of samples when the CONTRACTOR confirms that the samples are no longer needed and can be discarded.
COC Procedures A COC record will accompany the samples from the time of sampling through all transfers of custody. The COC procedures are detailed in SOP No. 2 in Attachment 2. SCRIBE software will be used to manage samples and create COC; however, depending on field conditions, staff can generate a hand-written COC for sample shipment.

Sample Identification Procedures

Sample labeling procedures are discussed in the text in Worksheet 26.

The recommended sample identification scheme for this project will be as follows

Sample ID for "Groundwater" Samples: **CDE-OU3-LTM-XX-DX/S-GW XXX** where

- CDE = Cornell-Dubilier Electronics
- OU3 = Operable Unit 3
- LTM = Long-Term Monitoring
- XX = Well ID
- DX/S = Depth and Port Number or Shallow
- GW = Groundwater Matrix
- XXX = Sample Number (such as -001, -002, -003 etc.)

Chain of Custody Procedure

A COC record will accompany the samples from the time of sampling through all transfers of custody. The COC procedures are detailed in SOP No. 2 in Attachment 2. SCRIBE software will be used to manage samples and create COC; however, depending on field conditions, staff can generate a hand-written COC for sample shipment. The following information (at a minimum) will be included on the COC forms. All COC forms must be signed in ink:

- Project name.
- Signature of sampler.
- Sample identification.
- Date of collection.
- Sample matrix.
- Analyses required.
- Preservation (if applicable).
- Air express/shipper's bill of lading identification numbers.

The COC form serves as an official communication to the laboratory detailing the particular analyses required for each sample. The COC record will accompany the samples from the time of sampling through all transfers of custody. It will be kept on file at the laboratory where samples are analyzed and archived. An electronic or hard-copy of each COC should be also made and kept in the project electronic-file directory. The sample management team completes a COC record to accompany each shipment from the field to the laboratory. The completed COC is placed in a zip-lock bag and taped to the inside cover of the sample shipping container. If there is more than one container in a shipment, copies of the COC form will be placed in each container. Each container is then sealed with signed custody seals and custody is transferred to the laboratory.

Transfer of Custody and Shipment

The custody of samples must be maintained from the time of sampling through shipment and relinquishment to the laboratory. Instructions for transferring custody are given below:

- All samples are accompanied by a COC. When transferring custody of samples, the individuals relinquishing and receiving will sign, date, and note the time on the COC. This form documents sample custody transfer from the sample management team, through the shipper, to the analytical laboratory. Since a common carrier will usually not accept responsibility for handling COC forms, the name of the carrier is entered under "Received by," the bill-of-lading number is recorded in the comments section, and the COC form is placed in a zip-lock plastic bag and taped to the inside lid of the lead shipping cooler. Copies of the COC form will be placed in each additional cooler in a shipment.
- Samples will be packaged for shipment and either picked up at the Site by the laboratory or dispatched to the appropriate laboratory via overnight delivery service. SOP No. 2 in Attachment 2 contains the proper sample packaging techniques. A separate COC record must accompany each shipment. Shipping containers will be sealed for shipment to the laboratory. Two custody seals will be applied to each cooler to document that the container was properly sealed and to determine if the container was tampered with during shipment. The signed custody seals will be placed on the coolers in such a manner that the custody seal would be broken if the cooler were opened (i.e., diagonally opposite corners of the cooler lid).
- The original COC will accompany the shipment. A copy (electronic or hardcopy) will be retained by the CONTRACTOR.
- If the samples are sent by common carrier or air freight, proper documentation must be maintained. For example, the bill of lading must be retained by the Field Team Leader.

Laboratory Custody Procedures

The laboratory custody procedures will be equivalent to those described in the latest edition of the laboratory custody SOPs, including:

- A designated sample custodian accepts custody of the samples and verifies that the information on the sample labels matches the information on the COC. The sample custodian will document any discrepancies and will sign and date all appropriate receiving documents. The sample custodian will also document the condition of the samples upon receipt at the laboratory.
- Once the samples have been accepted by the laboratory, checked and logged in, they must be maintained in accordance with laboratory custody and security requirements.
- To ensure traceability of samples while in the possession of the laboratory, a method for sample identification that has been documented in a laboratory SOP will be used to assign sample numbers.
- The following stages of analysis must be documented by the laboratory:
    - Sample Extraction/Preparation,
    - Sample Analysis,
    - Data Reduction, and
    - Data Reporting.
- Laboratory personnel are responsible for the custody of samples until they are returned to the sample custodian.
- When sample analyses and quality assurance checks have been completed in the laboratory, the used portion of the sample must be stored or disposed of in accordance with the protocols specified by CLP. Identifying labels, data sheets, COCs, and laboratory records will be retained until analyses and quality assurance checks are completed in accordance with the protocols specified by CLP.

Final Evidence Files

In the final phase of sample custody, the COC records and sample analysis request form copies are archived in their respective project files. Laboratory custody forms, sample preparation and analysis logbooks, and data packages will become part of the laboratory final evidence file. Other relevant documentation including records, reports, and correspondence, logs, pictures, and data review reports will be archived by the CONTRACTOR.

Sample Holding Times

Information on sample holding times and required preservation for each test method will be provided in Worksheet 19.

Sample Packaging and Shipping Requirements

Custody of samples must be maintained through the shipment of samples to the selected laboratory. All samples will be packaged and shipped within 24 hours of sample collection unless other arrangements are made with the laboratory. See SOP No. 2 in Attachment 3 for a description of the sample management, custody procedures, and sample packing.

QAPP Worksheet 28-1

QC Sample Table

Matrix: Aqueous (Groundwater)

Analytical Group / SOP Reference: Trace TCL VOC / SOM02.2

Sampler / Sampling SOP / No. of Samples: CLP / SOP No. 04 / See Worksheets 23

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Field Blank	1 event	QAPP	Investigate the source of contamination	Site Quality Control Officer and Data Validator	Sensitivity	Less than QLs
Field Duplicates	1 per 20 field samples. If fewer than 20 samples in an event, then 1 per event.	QAPP	If the RPDs exceed limits for the field duplicate, investigate field sampling method and flag data as necessary	Site Quality Control Officer and Data Validator	Precision	RPD $\leq$ 40% for duplicate values greater than or equal to 5 times the QL
MS/MSD	1 per 20 field samples. If fewer than 20 samples in an event, then 1 per event.	SOM02.2	Investigate matrix effects, reanalyze affected samples as necessary, and flag data as necessary	Assigned CLP Laboratory and Data Validator	Accuracy/Bias/ Precision	Per recovery and RPD% requirements in SOM02.2, Exhibit D, Section 17, Table 11 (p. D-54/Trace VOC)
Deuterated Monitoring Compounds	Each sample, standard, and blank	SOM02.2	Investigate problem, reanalyze affected samples as necessary, and flag data as necessary	Assigned CLP Laboratory and Data Validator	Accuracy/Bias	Recoveries per requirements in SOM02.2, Exhibit D, Section 17, Table 10 (p. D-54/Trace VOC)
MB	1 per analytical batch	SOM02.2	Investigate problem, reanalyze affected samples as necessary, and flag data as necessary	Assigned CLP Laboratory and Data Validator	Sensitivity	Less than QLs

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Trip Blank	One per shipment	QAPP	Investigate the source of contamination	Site Quality Control Officer and Data Validator	Sensitivity	Less than QLs
The assigned laboratory must perform all of the QC sample analyses and meet all of the measurement performance criteria that assess the analytical DQIs specified in USEPA CLP SOM02.2.						

QAPP Worksheet 28-2

QC Sample Table

Matrix: Aqueous (Groundwater)

Analytical Group / SOP Reference: TCL SVOC / SOM02.2

Sampler / Sampling SOP / No. of Samples: CLP / SOP No. 04 / See Worksheets 23

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Field Blank	1 per event	QAPP	Investigate the source of contamination	Site Quality Control Officer and Data Validator	Sensitivity	Less than QLs
Field Duplicate	1 per 20 field samples. If fewer than 20 samples in an event, then 1 per event.	QAPP	If the RPDs exceed limits for the field duplicate, investigate field sampling method and flag data as necessary	Site Quality Control Officer and Data Validator	Precision	RPD $\leq$ 40% for duplicate values greater than or equal to 5 times the QL
MS/MSD	1 per 20 field samples. If fewer than 20 samples in an event, then 1 per event.	SOM02.2	Investigate matrix effects, reanalyze affected samples as necessary, and flag data as necessary	Assigned CLP Laboratory and Data Validator	Accuracy/Bias/ Precision	Per recovery and RPD% requirements in SOM02.2, Exhibit D, Section 17, Table 12 (p. D-76/SVOC)
Deuterated Monitoring Compounds	Each sample, standard, and blank	SOM02.2	Investigate problem, reanalyze affected samples as necessary, and flag data as necessary	Assigned CLP Laboratory and Data Validator	Accuracy/Bias	Recovery per requirements in SOM02.2, Exhibit D, Section 17, Table 11 (p. D-76/SVOC)
MB	1 per analytical batch	SOM02.2	Investigate source of contamination, reanalyze affected samples as necessary, and flag data as necessary	Assigned CLP Laboratory and Data Validator	Sensitivity	Less than QLs

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
The assigned laboratory must perform all of the QC sample analyses and meet all of the measurement performance criteria that assess the analytical DQIs specified in USEPA CLP SOM02.2.						

QAPP Worksheet 28-3

QC Sample Table

Matrix: Aqueous (Groundwater)

Analytical Group / SOP Reference: PCB Congeners / CBC01.2

Sampler / Sampling SOP / No. of Samples: CLP / SOP No. 04 / See Worksheets 23

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Field Blank	1 per event	QAPP	Investigate the source of contamination	Site Quality Control Officer and Data Validator	Sensitivity	Less than QLs
Field Duplicate	1 per 20 field samples. If fewer than 20 samples in an event, then 1 per event.	QAPP	If the RPDs exceed limits for the field duplicate, investigate field sampling method and flag data as necessary	Site Quality Control Officer and Data Validator	Precision	RPD $\leq$ 40% for duplicate values greater than or equal to 5 times the QL
LCS/LCSD	LCS: 1 per analytical batch LCSD: May be performed in lieu of lab replicate	CBC01.2	Investigate problem, reanalyze affected samples as necessary, and flag data as necessary	Assigned CLP Laboratory and Data Validator	Accuracy/Bias/ Precision	Per recoveries given in CBC01.2, Exhibit D, Section 17, Table 6 (p. D-78) LCSD: RPD $\leq$ 40%
RRT	Each sample, standard, and blank	CBC01.2	Investigate problem, reanalyze affected samples as necessary, and flag data as necessary	Assigned CLP Laboratory and Data Validator	Accuracy/Bias	RRT within limits of CBC01.2, Exhibit D, Section 17, Table 2 (p. D-71)
MB	1 per analytical batch	CBC01.2	Investigate source of contamination, reanalyze affected samples as necessary, and flag data as necessary	Assigned CLP Laboratory and Data Validator	Sensitivity	Less than QLs

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Laboratory Replicates	1 per 20 field samples. If fewer than 20 samples in an event, then 1 per event.	QAPP	Investigate problem, reanalyze affected samples as necessary, and flag data as necessary	Assigned CLP Laboratory and Data Validator	Precision	RDP $\leq$ 40% if reported values are > 5x QL, otherwise use professional judgment
The assigned laboratory also must perform and meet all of the measurement performance criteria that assess the analytical DQIs specified in EPA CLP SOW CBC01.2. Laboratory will perform a laboratory replicate to access precision; in lieu of laboratory replicate, laboratory may analyze a LCSD.						

QAPP Worksheet 28-4

QC Sample Table

Matrix: Aqueous (Groundwater)

Analytical Group / SOP Reference: PCB Aroclors / SOM02.2

Sampler / Sampling SOP / No. of Samples: CLP / SOP No. 04 / See Worksheets 23

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Field Blank	1 per event	QAPP	Investigate the source of contamination	Site Quality Control Officer and Data Validator	Sensitivity	Less than QLs
Field Duplicates	1 per 20 field samples. If fewer than 20 samples in an event, then 1 per event.	QAPP	If the RPDs exceed limits for the field replicate, investigate field sampling method and flag data as necessary	Site Quality Control Officer and Data Validator	Precision	RPD $\leq$ 40% for duplicate values greater than or equal to 5 times the QL
Surrogates	Each sample, standard, and blank	SOM02.2	Investigate problem, reanalyze affected samples as necessary, and flag data as necessary	Assigned CLP Laboratory and Data Validator	Accuracy	Recoveries per SOM02.2, Exhibit D, Section 17, Table 6 (p. D-65/ARO)
MS/MSD	1 per 20 field samples. If fewer than 20 samples in an event, then 1 per event.	SOM02.2	Investigate matrix effects, reanalyze affected samples as necessary, and flag data as necessary	Assigned CLP Laboratory and Data Validator	Accuracy/Bias/ Precision	Per ecovery and RPD requirements in SOM02.2, Exhibit D, Section 17, Table 7 (p. D-65/ARO)
LCS	1 per analytical batch	SOM02.2	Investigate problem, reanalyze affected samples as necessary, and flag data as necessary	Assigned CLP Laboratory and Data Validator	Accuracy/Bias	Per recoveries per SOM02.2, Exhibit D, Section 17, Table 8 (p. D-65/ARO)

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
MB	1 per analytical batch	SOM02.2	Investigate source of contamination, reanalyze affected samples as necessary, and flag data as necessary	Assigned CLP Laboratory and Data Validator	Sensitivity	Less than QLs
The assigned laboratory must perform all of the QC sample analyses and meet all of the measurement performance criteria that assess the analytical DQIs specified in USEPA CLP SOM02.2.						

QAPP Worksheet 28-5

QC Sample Table

Matrix: Aqueous (Groundwater)

Analytical Group / SOP Reference: TCL Pesticide / SOM02.2

Sampler / Sampling SOP / No. of Samples: CLP / SOP No. 04 / See Worksheets 23

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Field Blank	1 per event	QAPP	Investigate the source of contamination	Site Quality Control Officer and Data Validator	Sensitivity	Less than QLs
Field Duplicates	1 per 20 field samples. If fewer than 20 samples in an event, then 1 per event.	QAPP	If the RPDs exceed limits for the field replicate, investigate field sampling method and flag data as necessary	Site Quality Control Officer and Data Validator	Precision	RPD $\leq$ 40% for duplicate values greater than or equal to 5 times the QL
Surrogates	Each sample, standard, and blank	SOM02.2	Investigate problem, reanalyze affected samples as necessary, and flag data as necessary	Assigned CLP Laboratory and Data Validator	Accuracy	Recoveries per SOM02.2, Exhibit D, Section 17, Table 10 (p. D-77/PEST)
MS/MSD	1 per 20 field samples. If fewer than 20 samples in an event, then 1 per event.	SOM02.2	Investigate matrix effects, reanalyze affected samples as necessary, and flag data as necessary	Assigned CLP Laboratory and Data Validator	Accuracy/Bias/ Precision	Per recovery and RPD% requirements in SOM02.2, Exhibit D, Section 17, Table 11 (p. D-77/PEST)
LCS	1 per analytical batch	SOM02.2	Investigate problem, reanalyze affected samples as necessary, and flag data as necessary	Assigned CLP Laboratory and Data Validator	Accuracy/Bias	Per recovery and RPD% requirements in SOM02.2, Exhibit D, Section 17, Table 12 (p. D-77/PEST)

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
MB	1 per analytical batch	SOM02.2	Investigate source of contamination, reanalyze affected samples as necessary, and flag data as necessary	Assigned CLP Laboratory and Data Validator	Sensitivity	Less than QLs
The assigned laboratory must perform all of the QA/QC sample analyses and meet all of the measurement performance criteria that assess the analytical DQIs specified in USEPA CLP SOM02.2.						

QAPP Worksheet 28-6

QC Sample Table

Matrix: Aqueous (Groundwater)

Analytical Group / SOP Reference: PCDD/F / DLM02.2

Sampler / Sampling SOP / No. of Samples: CLP / SOP No. 04 / See Worksheets 23

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Field Blank	1 per event	QAPP	Investigate the source of contamination	Site Quality Control Officer and Data Validator	Sensitivity	Less than QLs
Field Duplicates	1 per 20 field samples. If fewer than 20 samples in an event, then 1 per event.	QAPP	If the RPDs exceed limits for the field replicate, investigate field sampling method and flag data as necessary	Site Quality Control Officer and Data Validator	Precision	RPD $\leq$ 40% for duplicate values greater than or equal to 5 times the QL
LCS/LCSD	LCS: 1 per analytical batch LCSD: May be performed in lieu of lab replicate	DLM02.2	Investigate problem, reanalyze affected samples as necessary, and flag data as necessary	Assigned CLP Laboratory and Data Validator	Accuracy/Bias/ Precision	Per recoveries given in DLM02.2, Exhibit D, Section 17, Table 6 (p. D-66) RRT within limits given in DLM02.2, Exhibit D, Section 17, Table 2 (p. D-61) LCSD: RPD $\leq$ 40%
MB	1 per analytical batch	DLM02.2	Investigate source of contamination, reanalyze affected samples as necessary, and flag data as necessary	Assigned CLP Laboratory and Data Validator	Sensitivity	Less than QLs

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Laboratory Replicates	1 per 20 field samples. If fewer than 20 samples in an event, then 1 per event.	DLM02.2	Investigate problem, reanalyze affected samples as necessary, and flag data as necessary	Assigned CLP Laboratory and Data Validator	Precision	RDP $\leq$ 40% if reported values are > 5x QL, otherwise use professional judgment
The assigned laboratory must perform and meet all of the measurement performance criteria that assess the analytical DQIs specified in USEPA DLM02.2. Laboratory will perform a laboratory replicate to access precision in lieu of laboratory replicate, laboratory may analyze a LCSD.						

QAPP Worksheet 28-7

QC Sample Table

Matrix: Aqueous (Groundwater)

Analytical Group / SOP Reference: TAL Metal / ISM02.2

Sampler / Sampling SOP / No. of Samples: CLP / SOP No. 04 / See Worksheets 23

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Field Blank	1 per event	QAPP	Investigate the source of contamination	Site Quality Control Officer and Data Validator	Sensitivity	Less than QLs
Field Duplicate	1 per 20 field samples. If fewer than 20 samples in an event, then 1 per event.	QAPP	If the RPDs exceed limits for the field replicate, investigate field sampling method and flag data as necessary	Site Quality Control Officer and Data Validator	Precision	RPD $\leq$ 30% for duplicate values greater than or equal to 5 times the QL
MB	1 per analytical batch	ISM02.2	Investigate problem, reanalyze affected samples as necessary, and flag data as necessary	Assigned CLP Laboratory and Data Validator	Sensitivity	Less than QLs
LCS	1 per analytical batch	ISM02.2	Investigate problem, reanalyze affected samples as necessary, and flag data as necessary	Assigned CLP Laboratory and Data Validator	Accuracy/Bias	70 -130 % Recovery per ISM02.2 (except for Ag and Sb, which are 50 – 150%R)
MS	1 per 20 field samples. If fewer than 20 samples in an event, then 1 per event.	ISM02.2	Investigate matrix effects, reanalyze affected samples as necessary, and flag data as necessary	Assigned CLP Laboratory and Data Validator	Accuracy/Bias	75 -125 % Recovery per ISM02.2

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Laboratory replicate	1 per 20 field samples. If fewer than 20 samples in an event, then 1 per event.	ISM02.2	Investigate problem, reanalyze affected samples as necessary, and flag data as necessary	Assigned CLP Laboratory and Data Validator	Precision	RPD $\leq$ 20% for reported values greater than or equal to 5 times the QL
The assigned laboratory must perform all of the QC sample analyses and meet all of the measurement performance criteria that assess the analytical DQIs specified in the applicable USEPA CLP SOW ISM02.2 (including ICP-AES serial dilution and interference check sample).						

QAPP Worksheet 29
Project Documents and Records Table

Sample Collection Documents and Records	On-site Analysis Documents and Records	Off-site Analysis Documents and Records	Data Assessment Documents and Records	Other
Field notes	Field observations	Copies of field notes will be made and stored in the project files. Subcontractors (if used) will provide an electronic copy of field notes and field measurements to CONTRACTOR.	No assessment required	TBD by CONTRACTOR
Air bills and COCs	Air bills and COC	Copies of air bills and COC will be kept in project files.	No assessment required	TBD by CONTRACTOR
CLP Trip Report and CLP ANSET Report	COC	Electronic CLP Trip Report and CLP ANSET report will be provided to CLP. CLP Case Number will be closed at the end of the sampling event.	No assessment required	TBD by CONTRACTOR
CLP EDD and laboratory data packages	COC	Electronic data deliverables and laboratory data packages will be prepared by laboratory and submitted to CONTRACTOR. Files will be saved in the project directory.	CLP laboratory data package	TBD by CONTRACTOR
CLP Data validation reports	Not applicable	Data validation reports will be provided to CONTRACTOR and saved in project directory.	No assessment required	TBD by CONTRACTOR

Project Document Control System

Project documents will be controlled by Project Manager from CONTRACTOR, who will maintain and distribute hardcopies and electronic copies of the project documents and any amendments. Electronic copies of project information will be maintained in the project electronic-file directory and the project database. Subcontractors (if used), will be responsible for maintaining records of field work, field notes, and field generated data.

Data Recording

Data for this project will be collected by handwritten entries onto field notebooks. SCRIBE software will be the primary tool used to generate COC records and sample labels. Computer-generated data associated with laboratory analyses will be generated by laboratory. Data will be provided in USEPA Region 2 MEDD format.

Data Quality Assurance Checks

Project Manager from CONTRACTOR will monitor the progress of sample collection to verify that samples are collected as planned. The progress of sample collection and processing will be monitored through documentation of the samples collected each day.

The laboratory will have a formal in-house Quality Assurance Plan to which it adheres and implements as part of daily operations. Data generation processes will be reviewed and modified to meet objectives, if necessary. A formalized data generation procedure will be utilized. Each analyst must have previously

demonstrated, through the laboratory quality assurance program, their requisite skills.

Laboratory Data Transmittal

Laboratory data are managed by the laboratory's internal management system, beginning with sample check-in on the sample-receiving data terminal. Full laboratory data reports for each sample delivery group (SDG) will be delivered to CONTRACTOR. In an effort to streamline the electronic submittal of environmental sampling data, the Superfund Program in EPA Region 2 has adopted a standardized electronic data deliverable (EDD) format that is being required for all data submitted to the region. Please refer to this website for additional details:
http://www.epa.gov/region2/superfund/medd.htm

Data Storage and Retrieval

Paper copies of the field notes, electronic copy of files, and the photographic log will then be transmitted regularly to Project Manager from CONTRACTOR. Field notes will be stored in the custody of the Project Manager for the duration of the project. Subcontractors (if used) will be responsible for maintaining records of field work, field notes, and field generated data. The full laboratory data reports submitted to CONTRACTOR will be stored in the custody of the Site Quality Officer. Raw data and electronic media of all field samples, including quality control samples and blanks, will be archived from the date of generation and will be kept by the laboratory. Hard copies of project files will be archived off-site at a secure facility and retained until the end of the contract. Data will be transferred to the USEPA upon completion of the project. Retrieval of data by others will be at the discretion of the USEPA. The length of time that records will be archived will be at the discretion of the USEPA. Each laboratory shall archive, electronically, the sample analyses and submit the electronic data files along with the data deliverable package. In addition, each laboratory must submit instrument manufacturer, method files and identification file information. CONTRACTOR must receive this information in the event a laboratory on this project closes or updates hardware/software.

QAPP Worksheet 30
Analytical Services Table

Matrix	Analytical Group	Concentration Level	Sample Location/ ID Numbers	Analytical SOP	Data Package Turnaround Time	Proposed Laboratory	Backup Laboratory/ (Name and Address, Contact Person and Telephone Number)
Aqueous (Groundwater)	TCL VOC	Trace	Refer to Worksheet 18	CLP SOM02.2	Per assigned CLP Laboratory.		Not Currently Assigned
Aqueous (Groundwater)	TCL SVOC	Low	Refer to Worksheet 18	CLP SOM02.2	Per assigned CLP Laboratory.		Not Currently Assigned
Aqueous (Groundwater)	TCL Pesticide	Low	Refer to Worksheet 18	CLP SOM02.2	Per assigned CLP Laboratory.		Not Currently Assigned
Aqueous (Groundwater)	PCB Aroclor	Low	Refer to Worksheet 18	CLP SOM02.2	Per assigned CLP Laboratory.		Not Currently Assigned
Aqueous (Groundwater)	TAL Metal	Low	Refer to Worksheet 18	CLP ISM02.2	Per assigned CLP Laboratory.		Not Currently Assigned
Aqueous (Groundwater)	PCDD/F	Low	Refer to Worksheet 18	CLP DLM02.2	Per assigned CLP Laboratory.		Not Currently Assigned
Aqueous (Groundwater)	PCB Congener	Low	Refer to Worksheet 18	CLP CBC01.2	Per assigned CLP Laboratory.		Not Currently Assigned

QAPP Worksheet 31
Planned Project Assessments Table

Assessment Type	Frequency	Internal or External	Organization Performing Assessment	Person(s) Responsible for Performing Assessment	Person(s) Responsible for Responding to Assessment Findings	Person(s) Responsible for Identifying and Implementing Corrective Actions	Person(s) Responsible for Monitoring Effectiveness of Corrective Action
Quality control reports of any non-conformance	Daily as required	Internal	CONTRACTOR	Recommend Field Crew and subcontractors (if used)	Recommend Site Quality Control Officer	Recommend Project Manager or Site Quality Control Officer	Recommend Site Quality Control Officer
Field Health and Safety Audit	For Years 0-15, annual (or as necessary) when sampling occurs annually. Every other year (or as necessary) for Years 16-30	Internal	CONTRACTOR	Recommend Project Safety Officer or designee	Recommend Project Manager	Recommend Project Manager or Project Safety Officer	Recommend Project Manager or Project Safety Officer
Technical System Audit	For Years 0-15, annual (or as necessary) when sampling occurs annually. Every other year (or as necessary) for Years 16-30	Internal	CONTRACTOR	Recommend Site Quality Control Officer or designee	Recommend Project Manager	Recommend Project Manager or Site Quality Control Officer	Recommend Site Quality Control Officer

QAPP Worksheet 32
Assessment Findings and Corrective Action Responses

Assessment Type	Nature of Deficiencies Documentation	Individual(s) Notified of Findings	Timeframe of Notification	Nature of Corrective Action Response Documentation	Individual(s) Receiving Corrective Action Response	Timeframe for Response
Quality control reports of any non-conformance	See description below	Recommend Site Quality Control Officer and Project Manager	Recommend as soon as possible	Complete non-conformance form (refer to attachments)	Recommend Project Manager or Data Validator (depending on nature of non-conformance)	Recommend as soon as possible
Field Health and Safety Audit	Incident report	Recommend Project Manager and Safety Officer	Recommend as soon as possible	Incident report and additional tail-gate meeting	Recommend Project Team	Recommend as soon as possible
Technical System Audits	See description below	Recommend Site Quality Control Officer or Project Manager	Recommend within a week	Field Corrective Actions or Flied Modification	Recommend Project Manager	Recommend within week
Internal Laboratory Audits	Per Laboratory Quality Manual	Laboratory Management or designee	Annually	Per Laboratory Quality Manual	Laboratory Personnel	Per Laboratory Quality Manual

Non-Conformance

A non-conformance is defined as an identified or suspected deficiency or discrepancy with regard to:

- An approved document, for example improper sampling procedures, improper instrument calibration, or incorrect calculations;
- An item where the quality of the end product or subsequent activities using the document or item would be affected by the deficiency; or
- An activity which is not conducted in accordance with the established plans or procedures.

Any field member, subcontractor (if used), or laboratory engaged in project work that discovers or suspects a non-conformance is responsible for submitting a non-conformance report to the Site Quality Control Officer. The Site Quality Control Officer will evaluate each non-conformance report and provide a corrective action. An example of a Non-Conformance Quality Control Report is included as Attachment 5.

The Project Manager or data validator, depending on the nature of the non-conformance, will verify that no further project work dependent on the non-conforming item or activity will be performed until the non-conformance is properly addressed and approval to continue is issued. A copy of each non-conformance report will be included in the project file. Copies of all non-conformance reports will also be maintained by the Site Quality Control Officer or designee.

Assessment and Audit

To monitor the capability and performance of the field activities, a field health and safety audit and technical systems audit are performed. Performance audits of laboratories are conducted to measure the accuracy of the measurement systems.

Technical System Audits

Field audits will be conducted in accordance with SOP No. 08, included in Attachment 3, on an ongoing basis during the project as field data are generated, reduced, and analyzed. Numerical manipulations, including manual calculations, will be documented. Records of numerical analyses will be legible, of reproduction-quality, and sufficiently complete to permit logical reconstruction by a qualified individual other than the originator. System audits of site activities will be accomplished by an inspection of field site activities. During this audit, the auditor(s) will compare current field practices with standard procedures. The following elements will be evaluated during a Technical Systems Audit:

- Whether procedures and analyses are conducted according to procedures outlined in the QAPP.
- Whether proper sample documentation is being recorded.
- The level of quality control conducted by the field team.
- Decontamination procedures, where applicable.
- Sample packaging and shipment.

A Technical Systems Audit will be completed within the first month of sampling. As long as the field team(s) demonstrate proficiency in the procedures being audited, a follow-up audit will not be required. However, if the audit indicates the need for corrective action, a second Technical Systems Audit will be required. Following the initial audit, Technical Systems Audits will be conducted on the following schedule:

- For Years 0-15, annual (or as necessary) when sampling occurs annually.
- For Years 16-30, every other year (or as necessary).

Any minor deficiencies that are noted during the Technical Systems Audit will be corrected in the field as they occur. If major deficiencies are noted (i.e., those that cannot be immediately corrected in the field), a Stop-Work Order will be issued until appropriate measures can be taken to correct the problem. A Stop-Work Order may be issued by the Site Quality Control Officer or designee, following notification to the Project Manager. The conditions and the need for a Stop-Work Order will be documented in sufficient detail to permit evaluation of the deficiency and determination of proper corrective action(s). Pertinent communications with the Site Quality Control Officer and Project Manager that pertain to an evaluation of the problem along with potential solutions and their implementation will be attached to the Stop-Work Order. In order for work to resume following a Stop-Work Order, the Project Manager and Site Quality Control Officer must rescind it in writing. The Site Quality Control Officer is responsible for tracking non-conforming conditions, evaluating the effectiveness of corrective measures, and assuring that the necessary steps have been taken to prevent recurrence of the original problem.

Regardless of whether major, minor, or no deficiencies were noted during the audit, a written report of the Technical Systems Audit will be prepared by the Site Quality Control Officer and submitted to Project Manager. This report will identify any deficiencies found and will outline the corrective actions that were recommended/implemented to address them. Periodically during the audit, it may be determined that the Site program should be modified to increase data quality or efficiency. These modifications will be documented by the Project Manager or Site Quality Control Officer in a Field Modification Form.

Field Corrective Actions

At the end of each sampling day, the sampling team (including subcontractors, if used) is to report any problems requiring corrective action that were encountered during the day. Corrective action will be undertaken when a non-conforming condition is identified. A non-conforming condition occurs when QA objectives for precision, accuracy, completeness, representativeness, or comparability are not met, or when procedural practices or other conditions are not

acceptable. A report is to be filed that documents the problems encountered and the corrective action implemented. A Stop-Work Order may be issued by the Site Quality Control Officer or designee, following notification to the Project Manager, if corrective action does not adequately address a problem, or if no resolution can be reached.

Internal Laboratory Audits

As part of its quality assurance program, the Laboratory Quality Assurance Manager will conduct periodic checks and audits of the analytical systems to ensure that the systems are working properly and personnel are adhering to established procedures and documenting the required information. These checks and audits will also assist in determining or detecting where problems are occurring. In addition to conducting internal reviews and audits, as part of its established quality assurance program, the laboratory is required to take part in regularly scheduled performance evaluation and laboratory audits from state and federal agencies for applicable tests. Each laboratory selected to support this program must maintain current state or federal certifications, as appropriate.

Laboratory Corrective Actions

If a particular laboratory analysis is deemed “out of control,” corrective action will be taken by the laboratory to maintain continued data quality. Each laboratory must adhere to their in-house corrective action policy. The coordinator of the laboratory’s analytical section will be responsible for initiating laboratory corrective action when necessary.

QAPP Worksheet 33
QA Management Reports Table

Type of Report	Frequency (daily, weekly monthly, quarterly, annually, etc.)	Projected Delivery Date(s)	Person(s) Responsible for Report Preparation (Title and Organizational Affiliation)	Report Recipient(s) (Title and Organizational Affiliation)
Field Health and Safety Audit	For Years 0-15, annual (or as necessary) when sampling occurs annually. Every other year (or as necessary) for Years 16-30	Recommend as soon as possible	Recommend Project Safety Officer or designee	Recommend Project Manager
Technical System Audit	For Years 0-15, annual (or as necessary) when sampling occurs annually. Every other year (or as necessary) for Years 16-30	Recommend within a week	Recommend Site Quality Control Officer or designee	Recommend Project Manager and Site Quality Control Officer
Data Validation Report	After laboratory data are received	To be determined by CLP	CLP Data Validator	Recommend Site Quality Control Officer and Project Manager
Corrective Action Reports	When corrective action is required	When corrective action is implemented	Recommend Project Manager	Project Team

QAPP Worksheet 34
Verification (Step I) Process Table

Verification Input	Description	Internal/ External	Responsible for Verification (Name, Organization)
COC	The COC will be reviewed initially in the field for complete and correct information. During validation, the COC will be verified against laboratory receipt and report to examine traceability of data.	Internal/External	USEPA CLP program
	Upon receipt at the laboratory, the COC will be compared to sample containers and any discrepancies will be resolved.	External	USEPA CLP program
Field Records	Review the field records for errors or omissions. This information will be transmitted to the Site Quality Control Officer or designee for correction.	Internal	CONTRACTOR
Field measurements	Field-measured water quality parameters will be manually recorded by the field team into a field notebook from the instrument readout.	Internal	CONTRACTOR
Corrective Action	Corrective action will be implemented and verified for completeness. Corrective actions must also be communicated to appropriate staff.	Internal	CONTRACTOR
Document of deviation from sample collection methods	Verify completeness of field modification form documenting the deviation of sample collection method.	Internal	CONTRACTOR
CLP laboratory data packages and EDD	Laboratory data reports and EDDs will be verified by the laboratory performing the work for completeness and technical accuracy prior to release.	External	USEPA CLP program
	Laboratory data will be assessed using the validation procedures.	External	USEPA CLP program
Data Verification	Verify data completeness in final electronic (validated) database	Internal	CONTRACTOR

QAPP Worksheet 35
Validation (Steps IIa and IIb) Process Table

Step IIa/IIb	Validation Input	Description	Responsible for Validation (Name, Organization)
IIa	COC	The COC will be reviewed initially in the field for complete and correct information. During validation, the COC will be verified against laboratory receipt and report to examine traceability of data.	USEPA CLP program
IIa	Field Records	Review the field records for errors or omissions. This information will be transmitted to the Site Quality Control Officer or designee for correction.	CONTRACTOR
IIb	Field measurements	Field-measured water quality parameters will be manually recorded by the field team into a field notebook from the instrument readout.	CONTRACTOR
IIa	EDD	Laboratory data reports and EDDs will be verified by the laboratory performing the work for completeness and technical accuracy prior to release.	USEPA CLP program
IIb	Validation of laboratory data reports	Data validation will confirm that holding times and sample preservations. Data validation will consider measurement performance criteria for field duplicates, evaluate quantitation limits, assess precision of MS/MSD, and assess accuracy of LCS samples. Validation will follow USEPA Functional Guidelines.	USEPA CLP program
IIa	Data Validation Reports	Verification that entry of qualifiers into the database and data validation reports has been performed correctly and completely will be conducted.	USEPA CLP program
IIb	Deviations from SOP and project documents	Determine impacts of any deviation from method and the project plan.	Project Team

QAPP Worksheet 36
Validation (Steps IIa and IIb) Summary Table

Step IIa/IIb	Matrix	Analytical Group	Concentration Level	Validation Criteria	Data Validator (title and organizational affiliation)
IIa/IIb	Groundwater	All chemical parameters analyzed by laboratory	Trace to Low	USEPA CLP Validation Process	USEPA CLP program
IIa/IIb	Groundwater	Water Level, pH, Temperature, Conductivity, Dissolved Oxygen, ORP, and Flow Rate	NA	Data verification and completeness	Not Applicable

Field Measurements

Field-measured water quality parameters will be manually recorded by the field team into a field notebook from the instrument readout. As necessary, the CONTRACTOR'S project team will review data quality and usability during the data evaluation.

Chemical Parameters

The laboratory will perform verification of chemical data according to their laboratory quality control manual prior to submittal of EDD and laboratory data packages to the CONTRACTOR. Laboratory data will then be validated by CLP Program against the QAPP, laboratory SOPs, and method criteria. Validation will follow USEPA National Functional Guidelines and CLP Validation Process.

Once data validation is completed, a data validation report will be generated. The report will contain information regarding the parameters that were qualified, the reason for the qualification, and the direction of the bias for parameters qualified as estimated, when possible. Based upon the quality assurance review of the analytical data, specific codes (data qualifiers or "flags") will be placed next to results to provide an indication of the quantitative and qualitative reliability of the results. The data qualifier codes in the National Function Guidelines are being used for this project. Qualifiers assigned by laboratories will be defined by each laboratory in their data package and will be superseded by the data validator's qualifiers. The final deliverable will be an EDD, which is formatted according to the USEPA Region 2 MEDD guidelines.

QAPP Worksheet 37
Usability Assessment

Summarize the usability assessment process and all procedures, including interim steps and any statistics, equations, and computer algorithms that will be used:

Field Measurements:

Field-measured water quality parameters will be manually recorded by the field team into a field notebook from the instrument readout. As necessary, the CONTRACTOR'S project team will review data quality and usability during the data evaluation.

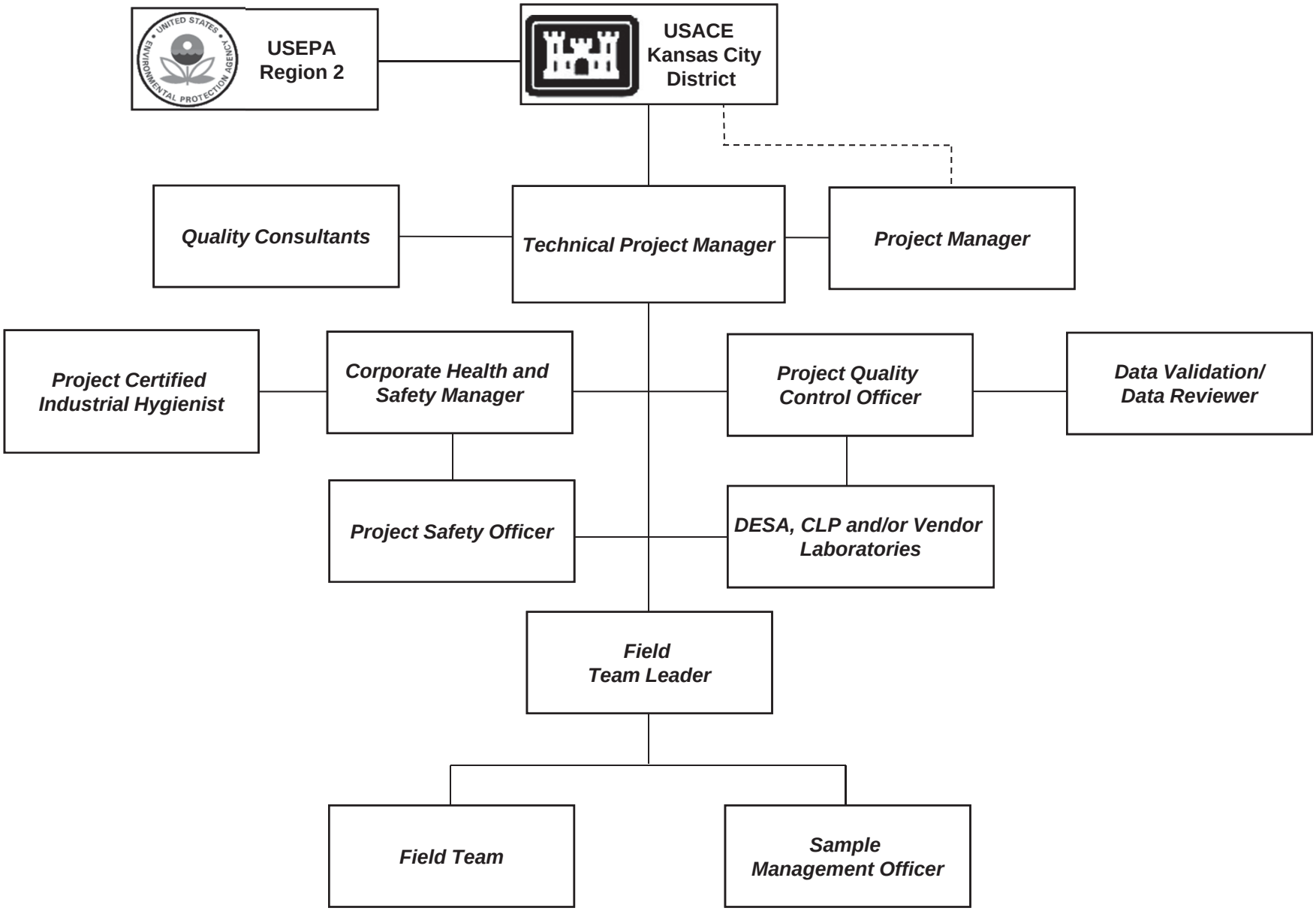
Chemical Parameters

Once the validation package is received, it will be reviewed by the CONTRACTOR Site Quality Control Officer. Any quality issues with the validation will be discussed with the CLP Program. Data usability will assess:

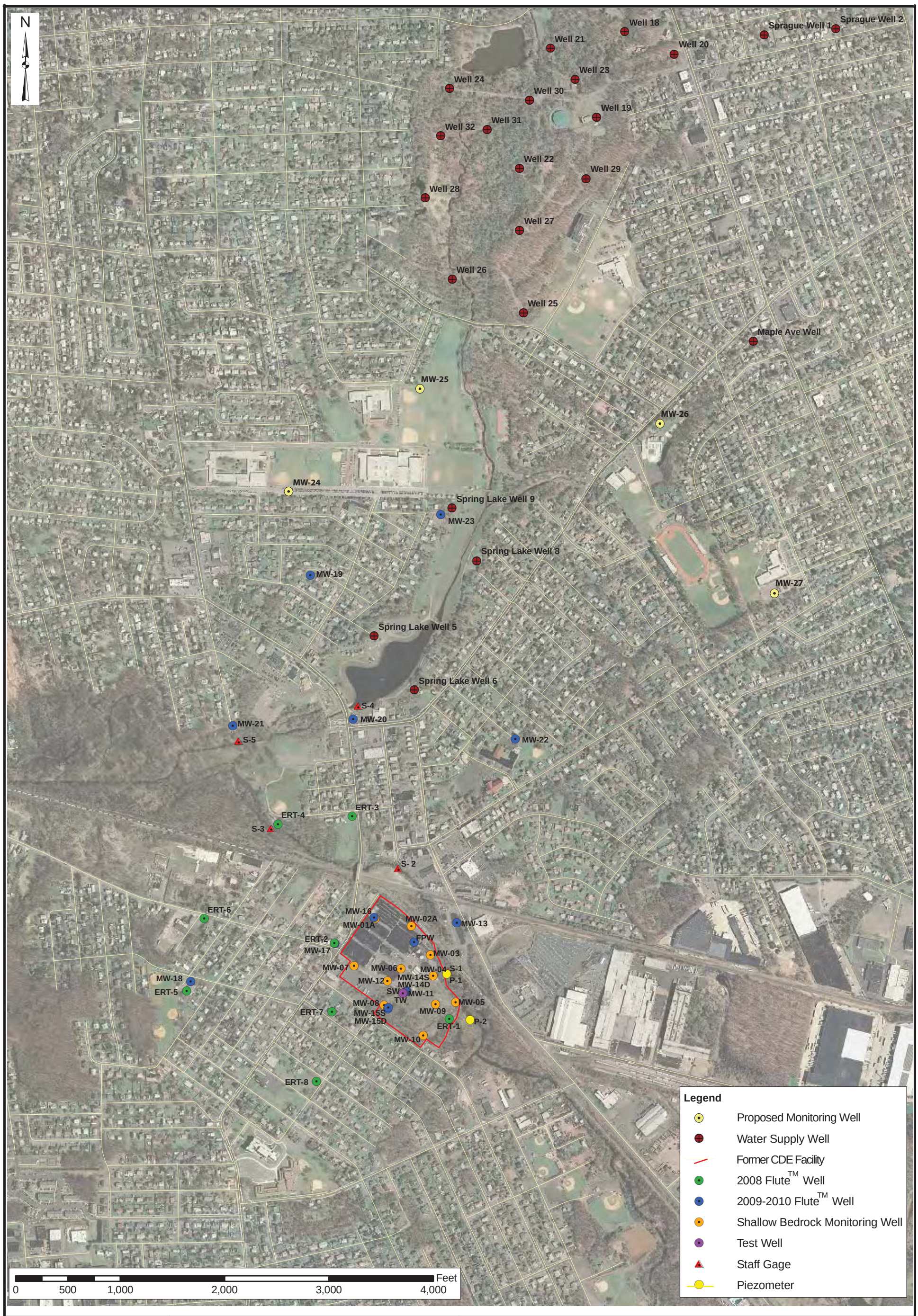
- Precision: Results of field duplicates, MS/MSD, and laboratory replicates (depending on analytical method) will be evaluated based on the measurement performance criteria presented on Worksheet 12. Any conclusions about the precision of the analyses or sample collection techniques will be drawn and any limitations on the use of the data will be described.
- Sensitivity: Results of field blanks and laboratory blanks (depending on analytical method) will be evaluated based on the measurement performance criteria presented on Worksheet 12. Any conclusions about the accuracy/bias of the analyses based on contamination will be drawn and any limitations on the use of the data will be described.
- Overall Accuracy/Bias: Results of LCS (depending on analytical method) will be evaluated based on the measurement performance criteria presented on Worksheet 12. Any conclusions about the overall accuracy/bias of the analyses will be drawn and any limitations on the use of the data will be described.
- Sensitivity: All analytical results reported will be evaluated to determine if adequate sensitivity was achieved. The results for each analyte will be cross-checked against the project quantitation limits presented in Worksheet 15.
- Representativeness: Representativeness is achieved through adherence to sampling and analytical procedures described in the QAPP and compliance with stipulated sample holding times. After evaluation of relative compliance with specified procedures and holding times, conclusions about data representativeness will be drawn and any limitations on the use of data will be described.
- Comparability: Data comparability will be assessed through evaluation of achieved sample specific reporting limits, units of measure, and adherence to specified analytical methodologies and field/sample collection standard operating procedures specified in the QAPP. After the evaluations are completed, conclusions about data comparability will be drawn and any limitations on the use of data will be described.
- Completeness: The field completeness will be calculated by the ratio of the number of samples received in acceptable condition by the laboratories to the number of samples planned to be collected as specified in this document.

Describe the evaluative procedures used to assess overall measurement error associated with the project: Field Measurements As necessary, the CONTRACTOR'S project team will review data quality and usability during the data evaluation. Chemical Parameters: Laboratory will perform a data verification of chemical data according to their laboratory quality control manual prior to submittal of EDD and laboratory data packages to the CONTRACTOR. Laboratory data will then be validated by CLP Program against the QAPP, laboratory SOPs, and method criteria. The validator will apply qualifiers and comments on the usability of the data. Once the validation package is received, it will be reviewed by the Site Quality Control Officer. Any quality issues with the validation will be discussed with the CLP Program.
Identify the personnel responsible for performing the usability assessment: The usability of the data is the responsibility of CONTRACTOR. Recommend the CONTRACTOR'S Site Quality Control Officer or designee perform a data usability evaluation after the data have been validated or verified (depending on the parameter).

FIGURES



Contractor Logo	Cornell-Dubilier Electronics Superfund Site OU-3 Example Project Team Organization Chart	FIGURE 1



LOUIS BERGER

Cornell-Dubilier Electronics Superfund Site

South Plainfield, New Jersey

MONITORING WELL AND STAFF GAGE LOCATIONS

Figure 2

TABLES

Table 1
Remediation Goals
Cornell-Dubilier Electronics Superfund Site
South Plainfield, New Jersey

Chemical of Concern	CAS No.	NJDEP Remediation Standards for Groundwater (ug/L)	NJDEP PQL (ug/L)	NJDEP Modified* Remediation Standards for Groundwater (ug/L)	Federal MCLs (ug/L)	NJDEP Drinking Water MCLs (ug/L)	Preliminary Remediation Goal (ug/L)
Volatile Organic Compounds							
1,1,2-Trichloroethane	79-00-5	3	2	3	5	3	3
1,1-Dichloroethene	75-35-4	1	1	1	7	2	1
1,2,4-Trichlorobenzene	120-82-1	9	1	9	70	9	9
1,2-Dibromo-3-chloropropane	96-12-8	0.02	0.02	0.02	0.2	0.2	0.02
1,2-Dichloroethane	107-06-2	0.3	2	2	5	2	2
1,4-Dichlorobenzene	106-46-7	75	5	75	75	75	75
Benzene	71-43-2	0.2	1	1	5	1	1
Bromodichloromethane	75-27-4	0.6	1	1	80	NA	1
Chlorobenzene	108-90-7	50	1	50	100	50	50
Chloroform	67-66-3	70	1	70	80	NA	70
cis-1,2-Dichloroethene	156-59-2	70	1	70	70	70	70
Dibromochloromethane	124-48-1	0.4	1	1	80	NA	1
Methyl tert-butyl ether	1634-04-4	70	1	70	NA	70	70
Methylene chloride	75-09-2	3	1	3	5	3	3
Tetrachloroethene	127-18-4	0.4	1	1	5	1	1
trans-1,2-Dichloroethene	156-60-5	100	1	100	100	100	100
Trichloroethene	79-01-6	1	1	1	5	1	1
Vinyl chloride	75-01-4	0.08	1	1	2	2	1
Semi-Volatile Organic Compounds							
Benzo(a)anthracene	56-55-3	0.05	0.1	0.1	NA	NA	0.1
Benzo(a)pyrene	50-32-8	0.005	0.1	0.1	0.2	0.2	0.1
Benzo(b)fluoranthene	205-99-2	0.05	0.2	0.2	NA	NA	0.2
Benzo(k)fluoranthene	207-08-9	0.5	0.3	0.5	NA	NA	0.5
bis(2-Ethylhexyl)phthalate	117-81-7	2	3	3	6	6	3
Dibenzo(a,h)anthracene	53-70-3	0.005	0.3	0.3	NA	NA	0.3
Indeno(1,2,3-cd)pyrene	193-39-5	0.05	0.2	0.2	NA	NA	0.2
Polychlorinated Biphenyls and Dioxins							
Aroclor 1016***	12674-11-2	0.02	0.5	0.5	0.5	0.5	0.5
Aroclor 1248***	12672-29-6	0.02	0.5	0.5	0.5	0.5	0.5
Aroclor 1254***	11097-69-1	0.02	0.5	0.5	0.5	0.5	0.5
2,3,7,8-TCDD Toxic Equivalence (TEQ)	1746-01-6	0.0000002	0.00001	0.00001	0.00003	0.00003	0.00001
Pesticides							
4,4'-DDD	72-54-8	0.1	0.02	0.1	NA	NA	0.1
4,4'-DDE	72-55-9	0.1	0.01	0.1	NA	NA	0.1
4,4'-DDT	50-29-3	0.1	0.1	0.1	NA	NA	0.1
alpha-BHC	319-84-6	0.006	0.02	0.02	NA	NA	0.02
beta-BHC	319-85-7	0.02	0.04	0.04	NA	NA	0.04
Dieldrin	60-57-1	0.002	0.03	0.03	NA	NA	0.03
Endosulfan II	33213-65-9	40	0.04	40	NA	NA	40
Endosulfan sulfate	1031-07-8	40	0.02	40	NA	NA	40
gamma-BHC	58-89-9	0.03	0.02	0.03	0.2	0.2	0.03
gamma-Chlordane**	5103-74-2	0.01	0.5	0.5	2	0.5	0.5
Heptachlor	76-44-8	0.008	0.05	0.05	0.4	0.4	0.05
Heptachlor epoxide	1024-57-3	0.004	0.2	0.2	0.2	0.2	0.2
Methoxychlor	72-43-5	40	0.1	40	40	40	40
Inorganics							
Aluminum	7429-90-5	200	30	200	50-200	200	50
Arsenic	7440-38-2	0.02	3	3	10	5	3
Barium	7440-39-3	6,000	200	6,000	2,000	2,000	2,000
Cadmium	7440-43-9	4	0.5	4	5	5	4
Chromium	7440-47-3	70	1	70	100	100	70
Iron	7439-89-6	300	20	300	300	300	300
Lead	7439-92-1	5	5	5	15	NA	5
Manganese	7439-96-5	50	0.4	50	50	50	50

*'Modified' is defined as the higher of the Remediation Standard for Groundwater and PQL
**Standards for gamma-Chlordane come from "Total" Chlordane standard that includes alpha- and gamma-Chlordane
***Aroclor standards are for "PCBs (Polychlorinated biphenyls)" which include all PCB Aroclors

The values presented in this table were taken directly from Table 7 of the signed ROD

TABLE 2
LONG-TERM MONITORING PLAN - SAMPLE FREQUENCY SCHEDULE
Cornell-Dubilier Electronics Superfund Site
South Plainfield, New Jersey

Well ID	Single Screen or Water FLUTe Port #	Depth Interval (ft bgs)		Pump Intake Depth (ft)	Years 1 to 2 (per year)							Years 3 to 5 (per year)							Years 6 to 15 (per year)							Years 16 to 30 (per year)						
					Trace Volatiles	Semi-Volatiles	Pesticides	PCB Aroclors	TAL Metals (ICP- MS)	Dioxins and Furans	PCB Congeners	Trace Volatiles	Semi-Volatiles	Pesticides	PCB Aroclors	TAL Metals (ICP- MS)	Dioxins and Furans	PCB Congeners	Trace Volatiles	Semi-Volatiles	Pesticides	PCB Aroclors	TAL Metals (ICP- MS)	Dioxins and Furans	PCB Congeners	Trace Volatiles	Semi-Volatiles	Pesticides	PCB Aroclors	TAL Metals (ICP- MS)	Dioxins and Furans	PCB Congeners
Shallow Bedrock Monitoring Wells																																
MW-01A	1	24	49	37	4	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5
MW-02A	1	24	49	37	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
MW-03	1	17	32	25	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
MW-04	1	29	49	39	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
MW-05	1	25	45.5	35	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
MW-06	1	29	44	37	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
MW-07	1	43	58	51	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
MW-08	1	42	57.5	50	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
MW-09	1	29	54	42	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
MW-10	1	37	52	45	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
MW-11	1	34	59	47	4	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5
MW-12	1	35	60	48	4	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Deep Bedrock Multi-Port Monitoring Wells																																
ERT-1	1	24	29	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	2	33	43	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	3	46	56	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	4	59	64	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	5	67	77	Not Applicable	4	2	2	2	2			2	2	2	2	2				1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	6	100	105	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	7	112	117	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	8	135	140	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
ERT-2	1	25	35	Not Applicable	4	2	2	2	2			2	2	2	1	1			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	2	40	50	Not Applicable	4	2	2	2	2			2	2	2	1	1			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	3	54	59	Not Applicable	4	2	2	2	2			2	2	2	1	1			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	4	70	75	Not Applicable	4	2	2	2	2			2	2	2	1	1			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	5	97	107	Not Applicable	4	2	2	2	2			2	2	2	1	1			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	6	113	123	Not Applicable	4	2	2	2	2			2	2	2	1	1			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	7	127	137	Not Applicable	4	2	2	2	2			2	2	2	1	1			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
ERT-3	1	27	37	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	2	55	65	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	3	90	105	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	4	110	120	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	5	124	134	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	6	138	148	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
ERT-4	1	27	37	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	2	46	56	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	3	61	66	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	4	83	88	Not Applicable	4			1	1	1	1	2			1	1	1	1	1			1	1	1	1	0.5			0.5	0.5	0.5	0.5
	5	91	106	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	6	111	116	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	7	128	138	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
ERT-5	1	24	34	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	2	37	47	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	3	50	60	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	4	77	87	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	5	93	98	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	6	120	130	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
ERT-6	1	26	36	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	2	75	85	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	3	93	103	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	4	107	117	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	5	128	138	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
ERT-7	1	25	35	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	2	45	55	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	3	65	75	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	4	100	110	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	5	130	140	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
ERT-8	1	17	27	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	2	31	41	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	3	44	54	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	4	57	62	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	5	87	97	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	6	107	112	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	7	135	145	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		

TABLE 2
LONG-TERM MONITORING PLAN - SAMPLE FREQUENCY SCHEDULE
Cornell-Dubilier Electronics Superfund Site
South Plainfield, New Jersey

Well ID	Single Screen or Water FLUTe Port #	Depth Interval (ft bgs)		Pump Intake Depth (ft)	Years 1 to 2 (per year)							Years 3 to 5 (per year)							Years 6 to 15 (per year)							Years 16 to 30 (per year)						
					Trace Volatiles	Semi-Volatiles	Pesticides	PCB Aroclors	TAL Metals (ICP- MS)	Dioxins and Furans	PCB Congeners	Trace Volatiles	Semi-Volatiles	Pesticides	PCB Aroclors	TAL Metals (ICP- MS)	Dioxins and Furans	PCB Congeners	Trace Volatiles	Semi-Volatiles	Pesticides	PCB Aroclors	TAL Metals (ICP- MS)	Dioxins and Furans	PCB Congeners	Trace Volatiles	Semi-Volatiles	Pesticides	PCB Aroclors	TAL Metals (ICP- MS)	Dioxins and Furans	PCB Congeners
MW-13	1	18	28	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	2	35	45	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	3	63	73	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	4	95	105	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	5	115	125	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	6	150	160	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	7	230	240	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
MW-14S	1	30	35	Not Applicable	4	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5
	2	41	46	Not Applicable	4	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5
	3	55	60	Not Applicable	4	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5
	4	65	70	Not Applicable	4	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5
MW-14D	1	80	85	Not Applicable	4	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5
	2	123	133	Not Applicable	4	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5
	3	199	209	Not Applicable	4	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5
MW-15S	1	30	40	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	2	70	80	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
MW-15D	1	125	135	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	2	185	195	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
MW-16	1	20	30	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	2	40	50	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	3	85	95	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	4	108	118	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	5	135	145	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	6	170	180	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	7	195	205	Not Applicable	4	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5
MW-17	1	170	180	Not Applicable	4	2	2	2	2			2	2	2	1	1			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	2	205	215	Not Applicable	4	2	2	2	2			2	2	2	1	1			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	3	235	245	Not Applicable	4	2	2	2	2			2	2	2	1	1			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
MW-18	1	160	170	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	2	210	220	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
MW-19	1	65	75	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	2	132	142	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	3	200	210	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	4	257	267	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	5	367	377	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	6	480	490	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	7	545	555	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
MW-20	1	25	35	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	2	85	95	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	3	125	135	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	4	175	185	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	5	205	215	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	6	250	260	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	7	297	307	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	8	355	365	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
MW-21	1	50	60	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	2	87	97	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	3	150	160	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	4	205	215	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	5	260	270	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	6	428	438	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	7	485	495	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	8	505	515	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
MW-22	1	45	55	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	2	125	135	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	3	210	220	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	4	305	315	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
MW-23	1	60	70	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	2	120	130	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	3	170	180	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	4	226	236	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	5	258	268	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	6	316	326	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	7	350	360	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	8	406	416	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	9	444	454	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		

TABLE 2
LONG-TERM MONITORING PLAN - SAMPLE FREQUENCY SCHEDULE
Cornell-Dubilier Electronics Superfund Site
South Plainfield, New Jersey

Well ID	Single Screen or Water FLUTe Port #	Depth Interval (ft bgs)		Pump Intake Depth (ft)	Years 1 to 2 (per year)							Years 3 to 5 (per year)							Years 6 to 15 (per year)							Years 16 to 30 (per year)						
					Trace Volatiles	Semi-Volatiles	Pesticides	PCB Aroclors	TAL Metals (ICP- MS)	Dioxins and Furans	PCB Congeners	Trace Volatiles	Semi-Volatiles	Pesticides	PCB Aroclors	TAL Metals (ICP- MS)	Dioxins and Furans	PCB Congeners	Trace Volatiles	Semi-Volatiles	Pesticides	PCB Aroclors	TAL Metals (ICP- MS)	Dioxins and Furans	PCB Congeners	Trace Volatiles	Semi-Volatiles	Pesticides	PCB Aroclors	TAL Metals (ICP- MS)	Dioxins and Furans	PCB Congeners
Former Production Well	1	31	41	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	2	46	51	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	3	100	110	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	4	125	135	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	5	180	190	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	6	200	205	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	7	235	245	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	8	268	278	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
	9	300	310	Not Applicable	4	2	2	2	2			2	2	2	2	2			1	1	1	1	1			0.5	0.5	0.5	0.5	0.5		
MW-24	1	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	2	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	3	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	4	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	5	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	6	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	7	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	8	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	9	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
MW-25	1	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	2	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	3	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	4	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	5	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	6	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	7	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	8	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	9	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
MW-26	1	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	2	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	3	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	4	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	5	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	6	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	7	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	8	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	9	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
MW-27	1	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	2	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	3	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	4	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	5	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	6	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	7	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	8	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
	9	TBD	TBD	Not Applicable	4			1	1			2			1	1			1			1	1			0.5			0.5	0.5		
SUBTOTAL (per year)					**696**	**114**	**114**	**231**	**231**	**23**	**23**	**348**	**114**	**114**	**221**	**221**	**12**	**12**	**173**	**57**	**57**	**174**	**174**	**12**	**12**	**87**	**29**	**29**	**87**	**87**	**6**	**6**
FIELD QC SAMPLES																																
Duplicate				5% for all analyses	35	6	6	12	12	1	1	17	6	6	11	11	1	1	9	3	3	9	9	1	1	4	1	1	4	4	0	0
MS/MSD				5% for all analyses	35	6	6	12	12	1	1	17	6	6	11	11	1	1	9	3	3	9	9	1	1	4	1	1	4	4	0	0
Field Blank				1 per event	4	4	4	4	4	4	4	2	2	2	2	2	2	2	1	1	1	1	1	1	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Trip Blank				1 per shipment	4	4	4	4	4	4	4	2	2	2	2	2	2	2	1	1	1	1	1	1	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5
TOTAL NO. OF SAMPLES (per year)					**774**	**133**	**133**	**262**	**262**	**33**	**33**	**387**	**129**	**129**	**247**	**247**	**17**	**17**	**192**	**65**	**65**	**193**	**193**	**15**	**15**	**97**	**32**	**32**	**97**	**97**	**8**	**8**

Notes:
Assume one sample will be collected for the applicable analytes during each sampling event. Not all analytes will be quantified during all sampling events.
The maximum number of samples corresponds to the number of events.

TABLE 3
LONG-TERM MONITORING PLAN - SAMPLE SUMMARY
Cornell-Dubilier Electronics Superfund Site
South Plainfield, New Jersey

Time Period	Years in Time Period	Sample Type	Field	Duplicate	MS/MSD	Field Blank	Trip Blank	Total Samples, by Analyte	Total Samples, by Analyte
		Frequency	*(per Year)*	*(5% for all analyses)*	*(5% for all analyses)*	*(1 per event)*	*(1 per shipment)*	*(per Year)*	*Time Period*
Years 1 to 2	2	Trace Volatiles	696	35	35	4	4	774	1547
		Semi-Volatiles	114	6	6			133	267
		Pesticides	114	6	6			133	267
		PCB Aroclors	231	12	12			262	524
		TAL Metals (ICP- MS)	231	12	12			262	524
		Dioxins and Furans	23	1	1			33	67
		PCB Congeners	23	1	1			33	67
		GRAND TOTALS	**1432**	**72**	**72**	**4**	**4**	**1631**	**3262**
Years 3 to 5	3	Trace Volatiles	348	17	17	2	2	387	1160
		Semi-Volatiles	114	6	6			129	388
		Pesticides	114	6	6			129	388
		PCB Aroclors	221	11	11			247	741
		TAL Metals (ICP- MS)	221	11	11			247	741
		Dioxins and Furans	12	1	1			17	52
		PCB Congeners	12	1	1			17	52
		GRAND TOTALS	**1042**	**52**	**52**	**2**	**2**	**1174**	**3523**
Years 6 to 15	10	Trace Volatiles	173	9	9	1	1	192	1923
		Semi-Volatiles	57	3	3			65	647
		Pesticides	57	3	3			65	647
		PCB Aroclors	174	9	9			193	1934
		TAL Metals (ICP- MS)	174	9	9			193	1934
		Dioxins and Furans	12	1	1			15	152
		PCB Congeners	12	1	1			15	152
		GRAND TOTALS	**659**	**33**	**33**	**1**	**1**	**739**	**7389**
Years 16 to 30	15	Trace Volatiles	87	4	4	0.5	0.5	97	1451
		Semi-Volatiles	29	1	1			32	485
		Pesticides	29	1	1			32	485
		PCB Aroclors	87	4	4			97	1451
		TAL Metals (ICP- MS)	87	4	4			97	1451
		Dioxins and Furans	6	0	0			8	114
		PCB Congeners	6	0	0			8	114
		GRAND TOTALS	**330**	**17**	**17**	**0.5**	**0.5**	**370**	**5550**

LONG TERM MONITORING PROGRAM TOTAL: 19,724

Notes:
Assume maximum of events per year as:

Years 1 and 2	4	
Years 3 to 5	2	
Years 6 to 15	1	
Year 16 to 30	0.5	denotes sampling every other year

Assume one shipment per event

ATTACHMENT 1.1

Data Quality Objectives

ATTACHMENT 1.1
DATA QUALITY OBJECTIVES
FOR CDE OU3-GROUNDWATER
LONG TERM MONITORING PLAN (LTMP)

Data Quality Objectives (DQOs) are used to help decision-makers collect data of the right type, quality, and quantity to support management decisions. The approach to developing DQOs is an iterative one, designed to take decision-makers through a strategic planning process from broad project goals through a number of refining steps toward generating environmental data that will be appropriate to making the decisions needed to reach the goals.

This document begins with a "project-level" statement of the DQOs that sets the framework for addressing the environmental problems of the study area. The project-level DQOs focus on the information that the decision-making team needs to produce a comprehensive Long-Term Monitoring Plan (LTMP) at the Cornell-Dubilier Electronics Superfund Site (Site) Operable Unit 3 (OU3) groundwater.

1.0 State the Problem

The Site is a Superfund Site with a completed Remedial Investigation (RI), Feasibility Study (FS), and Technical Impracticability Evaluation Report (TIER), which were conducted in accordance with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as amended. The Record of Decision (ROD) was issued for OU3 Groundwater in September of 2012.

The United States Environmental Protection Agency (USEPA) determined that the appropriate remedy for the groundwater at the site was a combination of Institutional Controls and Groundwater Monitoring. The selected remedy satisfies the requirements of CERCLA Section 121 and the National Contingency Plan (NCP)'s nine evaluation criteria for remedial alternative, 40 CFR § 300.430(e) (9). The selected remedy includes the following components:

- Prevention of exposure to site groundwater contamination by continuing efforts to identify existing private wells within the OU3 study area and by placing institutional controls in the form of a Classification Exception Area (CEA), as defined by the extents of the delineated TI zone, to prevent the installation of new drinking water wells;
- Implementation of a long-term sampling and analysis program to monitor the groundwater contamination at the site in order to prevent exposure and assess groundwater migration; and
- Implementation of a long-term vapor intrusion monitoring program.

EPA evaluated alternatives for restoration of groundwater to meet ARARs and concluded that no practicable alternatives could be implemented. Consequently, EPA invoked an ARAR waiver for the groundwater at the site due to technical impracticability.

This task is concerned with monitoring the nature and extent of the contamination, attributable to the Site, in groundwater. USEPA is evaluating vapor intrusion issues related to site contaminants under a separate monitoring program. Previous analyses of groundwater samples collected at the Site contained chemical contamination, including volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), Polychlorinated Biphenyls (PCBs), Dioxins/Furans, Pesticides, and Metals.

The objective of the LTMP is to answer the following questions:

- Does the institutional control prevent or minimize potential risks to human and ecological receptors from exposure by contact or ingestion of contaminants in groundwater attributable to the Site?
- Is the extent of groundwater contamination attributable to the Site remaining stable and not expanding beyond the TI zone (CEA)?

2.0 Identify the Decision

To meet the objectives, the following fundamental questions will need to be answered:

Fundamental Questions	Alternative Actions
Are there sufficient data from previous investigations to make an informed evaluation of the baseline (ambient) nature and extent of contamination in groundwater?	If the data are sufficient, no further baseline data collection may be necessary. If the data are insufficient, more sampling and analyses will be performed to better characterize the baseline extent of the contamination.
Are the concentrations of contaminants in groundwater from the former Cornell-Dubilier Electronics facility stable within the CEA?	If concentrations of contaminants in groundwater are stable (or decreasing) within the CEA, then the institutional control is acceptable. If concentrations of contaminants in groundwater are not stable (increasing) within the CEA, then the risks to down-gradient receptors will be evaluated.
Are the concentrations of contaminants in groundwater from the former Cornell-Dubilier Electronics facility stable in the fractured bedrock at the down-gradient edge of the CEA?	If concentrations of contaminants in groundwater are stable (or decreasing) at the down-gradient edge of the CEA, then there is not an unacceptable risk to receptors beyond the CEA. If concentrations of contaminants in groundwater are not stable (increasing) at the down-gradient edge of the CEA, then the risk to receptors will be evaluated.

The following decisions will need to be supported with adequate data:

- Determine if there are sufficient data from the previous investigations to make a statistically significant evaluation of the baseline (ambient) nature and extent of contamination in groundwater.
- Determine if there are sufficient data to develop a statistical evaluation of the data trends over time.

- Evaluate the risks associated with the change in concentration of contamination in the groundwater.

3.0 Identify the Inputs to the Decision

The following inputs are required to answer the fundamental questions identified in Step 2, above:

- Review the existing groundwater data for OU3;
- Determine the sampling locations to monitor and evaluate contaminated groundwater plume boundaries and concentrations;
- Sample and analyze groundwater samples for Target Compound List (TCL) VOCs, SVOCs, Pesticides, PCB Aroclors, Target Analyte List (TAL) Metals, PCB Congeners, and Dioxins/Furans;
- Conduct a data trend analysis using the Mann-Kendall Test to see if the data are following a trend and if the trend is stable, increasing, or decreasing with statistical significance; and
- Evaluate the potential change in risk to receptors associated with the chemical contamination data trends and evaluate the ongoing effectiveness selected remedy.

4.0 Define the Boundaries of the Study

The physical boundaries of the study area have been defined by the USEPA as the entire area encompassing contaminated groundwater attributable to the former CDE facility. The area covers approximately 825 acres, and extends to the north and northeast of the former CDE facility.

The Site is located in the Borough of South Plainfield, northern Middlesex County, in the central portion of New Jersey. The Site includes the former CDE facility located at 333 Hamilton Boulevard in South Plainfield, a fenced, 26-acre facility that is bounded on the northeast by Bound Brook and the former Lehigh Valley Railroad, Perth Amboy Branch (presently Conrail); on the southeast by Bound Brook and a property used by the South Plainfield Department of Public Works; on the southwest, across Spicer Avenue, by single family residential properties; and to the northwest, across Hamilton Boulevard, by mixed residential and commercial properties. The surrounding area represents an urban environment with principally commercial and light industrial use to the northeast and east, principally residential development to the south and directly north, and mixed residential and commercial properties to the west.

The CDE Superfund Site has been divided into four Operable Units (OUs) by the USEPA. Operable Unit 1 (OU1) addresses residential, commercial, and municipal properties in the vicinity of the former CDE facility. On September 30, 2003, the USEPA signed a Record of Decision (ROD) to address OU1. Operable Unit 2 (OU2) addresses contaminated soils and buildings at the former CDE facility. On September 30, 2004, the USEPA signed a ROD to address OU2. Operable Unit 3 (OU3), the subject of this Quality Assurance Project Plan (QAPP), addresses contaminated groundwater. The USEPA signed a ROD for OU3 in September, 2012. Operable Unit 4 (OU4) addresses Bound Brook.

There are practical constraints and obstacles that may impede sampling efforts and interfere with the planned data collection. For example, weather conditions at the site may prevent the collection of samples as scheduled. Also, the geological and physical conditions encountered at

the sampling locations may interfere with collection of a desired sample. If these conditions exist, it may be necessary to adjust the sampling schedule and possibly choose alternate sampling locations. Further, laboratory data may not meet the quality assurance criteria or reporting limit criteria and it may be necessary to re-sample locations.

5.0 Develop a Decision Rule

The purpose of this step is to integrate the outputs from the previous steps into a statement that defines the conditions that would cause the decision-maker to choose among alternative actions. The following primary decision rules will be used to answer the fundamental questions:

- If the measured concentration of the groundwater contamination within or down-gradient of the CEA is less than the remedial goals set forth in Table 7 of the ROD or anthropogenic background levels, whichever is higher, an unacceptable ecological or human health risk is not present.
- If the concentration trend, as determined by using the Mann-Kendall Test, at a location at the down-gradient edge of the CEA is not stable (rising) withstatistical significance as indicated by evaluating the Mann-Kendall statistic (S) magnitude relative to the critical value of S, then the protectiveness of the remedy will be evaluated.

6.0 Specify Limits on Decision Errors

This step specifies the decision-maker's acceptable limits on decision errors, which are used to establish appropriate performance goals for limiting uncertainty in environmental data. These acceptable limits on decision errors allow decision-makers to generate resource-effective sampling designs while limiting uncertainties in the collected data.

There are two types of decision errors applicable to estimating the true value of a population:

- Sampling design error, which occurs when the sampling design is unable to capture the complete state of natural variability over space and time; and
- Measurement error, which refers to a combination of random and systematic errors, known as the total error, which can be controlled by hypothesis testing.

Hypothesis testing entails selection of the null hypothesis (H_o) and the alternative hypothesis (H_a) and testing to reject or accept H_o. The null hypothesis is the baseline condition that is presumed to be true in the absence of strong evidence to the contrary.

The null hypothesis and alternative hypothesis are as follows:

- H_o: The groundwater plume emanating from the site *is stable and does not expand beyond the TI zone,* and existing institutional controls (*i.e.,* long term monitoring and the CEA) *are adequate* to prevent or minimize potential risk.
- H_a: The groundwater plume emanating from the site *is not stable and is expanding beyond the TI zone,* and existing institutional controls (*i.e.,* long term monitoring and the CEA) *are not adequate* to prevent or minimize potential risk.

There are two types of decision errors:

- The false rejection decision error (false positive), or Type I error, which occurs when the null hypothesis is rejected when it is true; and

- The false acceptance decision error (false negative), or Type II error, which occurs when the null hypothesis is not rejected when it is false.

In this case, the ***false rejection error*** concludes that the groundwater does not contain chemical contamination at stable concentrations that pose a potential risk to human health when there actually are chemicals at stable concentrations that do pose a potential risk to human health. The ***false acceptance error*** concludes that the groundwater does contain chemicals at stable concentrations that pose a potential risk to human health when there are actually no chemicals at stable concentrations that pose a potential risk to human health.

The consequence of the ***false acceptance decision error*** will be unnecessary expenditure of resources such as funding, personnel, and time. The consequence of the ***false rejection decision error*** is that chemicals in the groundwater will not be properly monitored, the institutional controls will not be maintained, and contaminated groundwater will pose unacceptable risk to human health. Because of the possible severity of the false rejection decision error consequence, the false acceptance decision error is more tolerable than the false rejection decision error. The false acceptance decision error will occur when the analytical results are biased high or there is systematic error or drift higher in the data series, and the false rejection decision error will occur when the analytical results are biased low or there is systematic error or drift lower in the data series.

7.0 Optimize the Design for Obtaining Data

This step involves development of the most resource-effective sampling and analysis design for generating data that are expected to satisfy project DQOs.

The consequence of the decision error will need to be balanced against the cost of limiting the possibility of these errors. These errors will be managed by the use of precise and accurate analytical methods and a relatively large number of samples along with duplicate samples. The large number of samples will need to be collected to minimize a false rejection decision error, and to minimize the risk of not maintaining institutional controls over the long-term. A general approach to avoid collecting a large number of samples is to minimize duplication and unnecessary samples by evaluating the existing data, field visit observations, historical photographs, physical setting, documented past practice and process history. However, the best approach to overcome this risk is to systematically perform sampling, even in areas where the chemicals may not be present.

The sampling design will consist of a non-probabilistic, also called judgmental, sampling methodology. In the judgmental sampling methodology, sampling locations and frequencies are established based on the goals presented above. The resulting sampling design is used to confirm or disprove the existence of contamination at specific locations, and to collect data in sufficient numbers at locations of interest to more quickly identify potential trends. Judgmental samples can be used subjectively to provide information about specific areas of the site, and can be evaluated statistically to quantify the contamination trend over time.

To minimize unacceptable errors, laboratory analyses with a high degree of confidence and extensive quality control and quality assurance and documentation procedures need to be utilized. Therefore, the USEPA's Contract laboratory Program (CLP) resources will be used whenever possible, or a National Environmental Accreditation Conference (NELAC)-certified subcontract laboratories will be retained when a USEPA CLP laboratory is unavailable. For this

Long Term Monitoring Program, laboratory analysis will be conducted for parameters such as PCB Aroclors and Congeners, Dioxins and Furans, VOCs, SVOCs, Pesticides, and Metals.

ATTACHMENT 1.2

Data Needs

DATA NEEDS TABLE
Cornell-Dubilier Electronics Superfund Site
OU3 Groundwater LTMP

Data Need	Data User	Parameter	Methods (Note 1)	QLs	Rationale for Analysis	Data Use
Groundwater	LTMP Team: including Scientists, Engineers, and Regulators	TCL Volatiles	SOM01.2, DESA method or SW-846 8260B	See Worksheet 15 for project QLs	Measure concentrations of volatile organics	Evaluate the nature and extent of groundwater contamination over time
		TAL Metals and Cyanide	EPA CLP SOW ILM05.4, DESA method or SW-846 methods	See Worksheet 15 for project QLs	Determine concentrations of metals	
		PCB Arolcors	EPA CLP SOW SOM01.2, DESA method or SW-846 8082	See Worksheet 15 for project QLs	Measure concentrations of PCB Aroclors	
		Chlorinated Organic Pesticides	SOM01.2, DESA method or SW-846 8081	See Worksheet 15 for project QLs	Measure concentrations of Chlorinated Organic Pesticides	
		TCL Semi-Volatiles	EPA CLP SOW SOM01.2, DESA method or SW-846 8270C	See Worksheet 15 for project QLs	Measure concentrations of semi-volatile organics	
		PCB Congeners (Note 2)	EPA 1668A or CLP SOW CBC01.1	See Worksheet 15 for project QLs	Measure concentrations of the World Health Orgnization (WHO) list toxic PCB congeners and their contribution to Toxic Equivalence (TEQ) as well as total PCBs as the sum of the PCB Congeners	
		Dioxins/Furans (Note 2)	EPA Method 1613B/8290 or CLP SOW DLM02.0	See Worksheet 15 for project QLs	Measure concentrations of Dioxin/Furan isomers and determine their contribution to TEQ	
Data Need	**Data User**	**Parameter**	**Methods (Note 1)**	**QLs**		**Data Use**
		pH	Field meter	NA	Field screening parameters for low-flow sampling	Monitor groundwater sampling conditions
		Oxygen/reduction potential		NA		
		Dissolved Oxygen (DO)		NA		
		Conductivity		NA		
		Temperature		NA		

Note 1 - The actual test methods selected may vary dependent upon the capabilties of the assigned laboratory.
Note 2 - PCB Congeners and Dixon/Furan isomers should be analyzed from a subset of samples taken from locations where PCB Aroclors are present.

ATTACHMENT 2

Example Field Modification Form

FIELD MODIFICATION FORM
FOR
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE OU-3
The Louis Berger Group

Date:

Document:

Activity:

Requested Modification:

Rationale:

Attachments:

Project Manager: _____

Deputy Project Manager: _____

Project Quality Control Officer: _____

ATTACHMENT 3

Example Field Standard Operating Procedures

Procedure for Calibration and Operation of a MiniRAE 2000 Photoionization Detector

I. Introduction

This procedure describes the equipment and methods to be used to calibrate and operate a MiniRAE 2000 Photoionization Detector (PID).

II. Equipment and Supplies

The following equipment will be needed:

1. PID (HNU or similar model)
2. Operating manual
3. Probes: 9.5 eV, 10.2 eV, or 11.7 eV
4. Battery charger for PID
5. Spare batteries
6. Tygon tubing
7. Traceable calibration gas
8. Isobutylene standards for calibration
9. Benzene reference standard
10. "T" valve for calibration
11. Field Data Sheets/Site Logbook
12. Intake assembly extension
13. Strap for carrying PID
14. Teflon tubing for downhole measurements
15. Plastic bags for protecting the PID from moisture and dirt

III. Guidelines

Start-up/Calibration:

1. Allow the temperature of the unit to equilibrate to its surrounding. This should take about five minutes.
2. Attach the probe to the read-out unit. Match the alignment key, then twist the connector clockwise until a distinct locking is felt.
3. Make sure the microswitch (red button) is depressed by the locking ring.
4. Turn the FUNCTION switch to the battery check position. Check to ensure that the indicator reads within or beyond the green battery arc on the scale plate. If the indicator is below the green arc, or if the red LED comes on, the battery must be charged prior to use.
5. To zero the instrument, turn the FUNCTION switch to the STANDBY position and rotate the ZERO POTENTIOMETER until the meter reads zero. Wait 15-20 seconds to ensure that the zero adjustment is stable; if not, then readjust.

6. Check to see that the SPAN POTENTIOMETER is set at the appropriate setting for the probe being used (i.e., 9.8 for the 10.2 eV probe, 5.0 for the 11.7 eV probe, 1 for the 9.5 eV probe. Note: The setting may vary based on the intensity of the light source).
7. Set the FUNCTION switch to the desired range (i.e., 0-20, 0-200, 0-2000).
8. Listen for the fan operation to verify fan function.
9. Look for ultraviolet light source in the probe to verify function. Do not look at light.
10. Record the following information in the site logbook: the instrument ID number (U.S. EPA decal or serial umber if the instrument is a rental), the initial and final span settings, the date and time, the source and lot number of the calibration gas, concentration and type of calibration gas used, and the name of the person who field calibrated the instrument.
11. Check instrument with an organic point such as a magic marker, prior to survey to verify instrument function.
12. Under no circumstances is work to be done without a proper functioning instrument.
13. Set the FUNCTION switch to the range setting which includes the concentration of the calibration gas.
14. Attach a regulator to a disposable cylinder of calibration gas. Connect the regulator to the probe of the HNU with a piece of clean tygon tubing. Open the valve on the regulator.
15. After 15 seconds, the meter reading should equal the response value as indicated on the calibration gas cylinder used. If the reading is within ±15% of the response value, then the instrument can be field calibrated to the response value using the external SPAN ADJUSTMENT control. The SPAN ADJUSTMENT control should be adjusted to a lower setting until the correct reading has been obtained. The lower the number on the SPAN ADJUSTMENT control, the greater the instrument sensitivity. If the SPAN ADJUSTMENT control has to be adjusted below a setting of 4.00, the unit should be red-tagged and returned for repairs. 5. If the meter reading is greater than ±15% of the response value of the calibration gas used, then the instrument should be red-tagged and returned for re-calibration.
16. If the PID does not start up, check out, or calibrate properly, the instrument should not be used. Under no circumstances is work requiring air monitoring with a PID to be done without a proper functioning instrument.
17. In some field applications, with the exception of the probe's inlet and exhaust, the PID should be wrapped in clear plastic to prevent it from becoming contaminated and to prevent water from getting inside in the event of precipitation.

Operation:

1. All readings are to be recorded in the site logbook. Readings should be recorded, following background readings, as ppm.
2. As with any field instrument, accurate results depend on the operator being completely familiar with the operator's manual. The instructions in the operating manual should be followed explicitly in order to obtain accurate results.
3. Position the probe assembly close to the area to be monitored because the low sampling rate allows for only very localized readings. Under no circumstances should the probe tip assembly be immersed in fluid. While taking care to prevent the PID from being exposed to excessive moisture, dirt, or contamination, monitor the work activity as specified in the site Health and Safety Plan.
4. The PID survey should be conducted at a slow to moderate rate of speed and the intake assembly (the probe) slowly swept from side to side. There is a three to five second delay in read-out depending upon the instruments sensitivity to the contaminant.
5. During drilling activities, PID monitoring is performed at regular intervals downhole, at the headspace, and in the breathing zone. In addition, where elevated organic vapor levels are encountered, monitoring may be performed in the breathing zone during actual drilling. When the activity being monitored is other than drilling, readings should emphasize breathing zone conditions.
6. When the activity is completed or at the end of the day, carefully clean the outside of the
7. PID with a damp disposable towel to remove any visible dirt.

IV. References

http://www.dem.ri.gov/pubs/sops/wmsr2114.pdf

MiniRAE 2000 Operation and Maintenance Manual, 2005

Procedure for Calibration and Operation of a Portable Flame Ionization Detector (MicroFID)

I. Introduction

This procedure describes the equipment and methods to be used to calibrate and operate a MicroFID™ Portable Flame Ionization Detector (FID).

II. Equipment and Supplies

The following equipment will be needed:

1. MicroFID™ (Photovac MicroFID IS or similar model)
2. Operating Manual
3. Battery Pack and Charger
4. Grade 5 Hydrogen gas
5. Calibration gas containing the appropriate amount of methane
6. MicroFID™ Field Kit which includes a printer cable, a long sample probe, a carrying case, and a MicroFID™ Calibration Kit
7. Computer and printer
8. Field Data Sheets/ Site Logbook

III. Guidelines

Startup/Calibration:

1. Charge the battery pack of the MicroFID™ before beginning operations, as per instructions provided in MicroFID™ manal.
2. Fill the internal cylinder in the MicroFID™ with hydrogen gas using the refill adaptor, as per the MicroFID™ manual.
3. Prepare Calibration Gas Bag and Zero Air Bag for calibration as per guidelines in MicroFID™ manual. To calibrate, press CAL and select the desired Cal Memory. Enter the desired response factor and press ENTER. Select Low Range or High Range and press ENTER.
    a. Connect the supply of zero air. If using room air, press ENTER. If using a charcoal filter, connect the filter as outlined in the MicroFID™ manual.\
    b. If using a gas bag with zero air, connect the gas bag adapter to the inlet, open the bag and press ENTER. MicroFID™ sets its zero point. Enter the known span gas concentration and then connect the gas bag adapter to the inlet. Open the bag.

4. When MicroFIDTM's display reverts to normal, it is calibrated and ready for use. Remove the span gas bag from the inlet. Press the ALARM key and enter the alarm level for the selected Cal Memory.
5. When calibrating the MicroFID™, ensure the instrument is level. If instrument is tilted side to side, gravity will affect the flame height and cause erroneous readings.
6. MicroFID™ has 10 Cal Memories and be calibrated with 10 different span gas or response factors if needed. Program Cal Memories as required per the guidelines provided in MicroFID™ manual.

Operation:

1. MicroFID™ has two modes of operation; High Sensitivity and Method 21. In High Sensitivity Operation, the MicroFID™ does not read in parts per million (ppm) units equivalent to the calibration gas, but displays a reading proportional to the total concentration of ionizable gases and vapors detected.
2. To use the High Sensitivity option, press SETUP, select the 0-20 ppm display range with the ARROW keys and press ENTER. Press CAL under Cal Memory, use the ARROW keys to select High Sensitivity, then press ENTER.
3. Press EXIT, select the bar graph with the DISPLAY key. Press CAL and calibrate MicroFID™ with zero air.
4. Method 21 is a United States Environmental Protection Agency (USEPA) protocol for the determination of volatile organic compound (VOC) leaks in process equipment. The user must be familiar with the Method 21 protocol and use the specifications outlined in the Method 21 documentation for programming MicroFID™'s Cal Memories and monitoring sites.
5. Method 21 requires setting up MicroFID™ to monitor various locations. As each location may have different concentration ranges and compounds, store a Cal Memory and the associated response factor and alarm level as part of each event, then sampling can be conducted at numerous locations without having to re-calibrate at each location.
6. For Method 21 calibration, follow instructions provided in MicroFID™ manual, and use a different gas bag and gas bag adapter for each concentration and each type of calibration gas.
7. The monitoring schedule can be entered in the MicroFID for Method 21 in a couple of ways. The easiest way is to go to each site and enter the required information. The monitoring schedule can also be programmed before beginning field operation. Once the schedule is programmed, it can be used at any time to perform Method 21 monitoring. Refer to MicroFID™ manual for guidelines on using the schedule.

IV. References

Photovac MicroFID Portable Flame Ionization Detector Manual, 2000.

Procedure for the Field Decontamination of Groundwater Sampling Equipment

I. Introduction

This standard operating procedure (SOP) describes the methods used to decontaminate sampling equipment used for the collection of groundwater samples, and if necessary, Light Non-Aqueous Phase Liquid (LNAPL) or Dense Non-Aqueous Phase Liquid (DNAPL) samples.

II. Equipment and Supplies

The following equipment will be used to decontaminate equipment and tools used to collect groundwater samples:

1. Tap water for initial cleaning and rinsing of equipment.
2. Spring water for final rinsing of equipment after tap water rinse.
3. Non-phosphate detergent (e.g. Alconox™) for cleaning equipment.
4. Lab Grade Reagent Water for final rinse.
5. Aluminum foil.
6. Personnel protective equipment (PPE) - including disposable gloves and safety glasses. Refer to the Health and Safety Plan for requirements.
7. Re-sealable buckets approved for waste collection and transportation.
8. Spray bottles or squirt bottles.
9. Brushes for cleaning equipment.
10. Miscellaneous – field notebooks, writing instrument, and digital camera to document decontamination procedures.

III. Guidelines

It is anticipated that much of the equipment used to collect groundwater samples will be dedicated sampling equipment (*i.e.*, location-dedicated, disposable, or pre-cleaned), reducing the amount of field decontamination required. All non-dedicated equipment (*e.g.*, flow through chambers, interface probes, water quality probes, and possibly submersible pumps) must be cleaned between sample locations to avoid cross-contamination.

IV. Procedure

1. Follow the procedure below for decontamination of non-dedicated groundwater sampling equipment, especially if LNAPL, DNAPL, or free product is encountered in the monitoring well:
2. Wash each item with bottled water to remove mud, dirt, or other visually present material.
3. Scrub the item with a brush and soapy water.

4. Rinse the item with spring water to remove all residual soap.
5. Rinse the item with lab grade reagent water water.
6. Allow to air dry.
7. Wrap the item in aluminum foil to protect it until it is used.
8. Capture and store decontamination liquids in containers with re-sealable lids.
9. Note the following exceptions (assuming that LNALP, DNALP, or free product was not encountered in the monitoring well).
10. Interface probes used to check water and free product elevations within the monitoring well are to be scrubbed (probe and steel tape) with soap and thoroughly rinsed with deionized water.
11. The flow-through chamber and the probes of the water quality sensors used during low-flow groundwater sample collection are to be rinsed thoroughly with deionized water.
12. Submersible pumps, if not pre-cleaned and dedicated to each monitoring well location, are to be thoroughly cleaned with deionized water.

V. References

American Society for Testing and Materials (ASTM), 1994. Standard Practice for Decontamination of Field Equipment Used at Nonradioactive Waste Sites. Designation: D 5088 – 90.

Procedure for Low-Flow, Minimal-Drawdown Groundwater Sample Collection

I. Introduction

This standard operating procedure (SOP) describes methods used to sample groundwater with low flow, minimal drawdown techniques. If a dense or light non-aqueous phase liquid (DNAPL or LNAPL), or free product is encountered, the thickness of the layer will be recorded in the field notebook.

II. Equipment and Supplies

The following equipment will be used to perform low flow, minimal drawdown, groundwater sampling.

1. Depth-to-water measuring device - An electronic water-level indicator or steel tape and chalk, with marked intervals of 0.01 foot. Interface probe for determination of NAPL presence, if needed.
2. Steel tape and weight - Used for measuring total depth of well. Lead weight should not be used.
3. Sampling pump - Submersible or bladder pumps with adjustable rate controls are preferred. Pumps are to be constructed of inert materials, such as stainless steel and Teflon®. Pump types that are acceptable include gear and helical driven, centrifugal (low-flow type), and air-activated piston. An adjustable rate, peristaltic pump can be used when the depth to water is 20 feet or less.
4. Tubing - Teflon® or Teflon®-lined polyethylene tubing is preferred when sampling for organic compounds. Polyethylene tubing can be used when sampling inorganics.
5. Power source - If a combustion type (gasoline or diesel-driven) generator is used, it must be placed downwind of the sampling area.
6. Flow measurement supplies - flow meter, graduated cylinder, and a stop watch.
7. Multi-parameter meter with flow-through cell - This can be one instrument or more contained in a flow-through cell. The water quality indicator parameters which ened to be monitored include:
    a. pH
    b. ORP
    c. Dissolved oxygen (DO),

d. Specific conductance, and

e. Temperature.

Calibration fluids for all instruments should be NIST-traceable and there should be enough for daily calibration throughout the sampling event. The inlet of the flow cell must be located near the bottom of the flow cell and the outlet near the top. The size of the flow cell should be kept to a minimum, and a closed cell is preferred. The flow cell must not contain any air or gas bubbles when monitoring for the water quality indicator parameters.

8. Decontamination supplies - Including a reliable and documented source of distilled water and any solvents (if used). Pressure sprayers, buckets or decontamination tubes for pumps, brushes and non-phosphate soap will also be needed.
9. Sample bottles, sample preservation supplies, sample tags or labels, and chain-of-custody forms.
10. Well construction, field, and water quality data from the previous sampling event.
11. Well keys and map of well locations.
12. Field notebook, groundwater sampling logs, and calculator. A suggested field data sheet (groundwater sampling record or groundwater sampling log) are provided at the end of this attachment.
13. Polyethylene sheeting placed on ground around the well head.
14. Personal protective equipment as specified in the site Health and Safety Plan.
15. Air monitoring equipment as specified in the Site Health and Safety Plan.
16. Tool box - All needed tools for all site equipment used.
17. Containers with re-sealable lids.

III. Guidelines

Investigative-derived waste (IDW) generated during groundwater sampling will be placed in re-sealable containers and managed. Generally, the following considerations should be taken into account during groundwater sampling activities:

- All equipment entering the well or included in the sampling chain should be cleaned using appropriate decontamination procedures and should be staged on 0.5-mil polyethylene plastic.
- A new, clean pair of disposable nitrile gloves should be worn during sampling activities and changed between sampling locations.

- All sample containers will be placed in separate plastic bags immediately after collection and decontamination of the outside of the container.
- All used field equipment to be decontaminated will be placed in plastic bags. All field waste (*i.e.*, PPE, plastic sheeting, towels, etc.) will be placed in a plastic bag for subsequent disposal.
- If possible, one member of the field team will be solely responsible for entering all field activity information into the field logbook (if applicable), while another member(s) will be solely responsible for collecting samples.
- Field personnel will use equipment constructed of Teflon®, stainless steel, or carbon steel that has been properly decontaminated.
- Plastic sheeting should be placed around the well to prevent sampling equipment from coming into contact with the ground.
- All down-hole equipment must be constructed of Teflon®, stainless steel, or polypropylene.
- Retrieval lines for pumps should be polypropylene monofilament, stainless steel, or Teflon coated wire. At a minimum, leaders constructed of these materials are acceptable.
- Pumps should not be allowed to drop freely into the well.
- Outer gloves should be changed before sampling or handling clean equipment.
- Tighten the cap on all sample containers after sampling.

IV. Procedure

Pre-Sampling Activities

1. Check and record the condition of the monitoring well for damage or evidence of tampering. Lay out polyethylene sheeting around the well to minimize the likelihood of contamination of sampling/purging equipment from the soil. Place monitoring, purging and sampling equipment on the sheeting.
2. Unlock well head. Record location, time, date, and appropriate information in a field logbook or on the ground-water sampling log (See attached groundwater sampling record and groundwater sampling log as examples).
3. Remove inner casing cap.
4. Monitor the headspace of the monitoring well at the rim of the casing for volatile organic compounds (VOCs) with a photoionization detector (PID) or a Flame Ionization Detector (FID) and record in the logbook. If VOCs are present, allow the gases to dissipate prior to collection of groundwater samples.

5. Measure the depth to water to nearest 0.01 feet relative to the top of the inner well casing (if applicable) with an electronic water level indicator or steel tape. Record the depth in logbook or groundwater sampling log. Measure the depth to water a second time to confirm initial measurement; measurement should agree within 0.01 feet or re-measure.
6. Check the available well information or field information for the total depth of the monitoring well. Use the information from the depth of water in step six and the total depth of the monitoring well to calculate the volume of the water in the monitoring well (*i.e.,* volume of one casing). Record information in field logbook or groundwater sampling log.

Purging and Sampling Activities

1. Place the pump and support equipment at the wellhead and slowly lower the pump and tubing down into the monitoring well until the location of the pump intake is set at a pre-determined location within the screen interval. The placement of the pump intake should be positioned with a calibrated sampling pump hose, sounded with a weighted tape, or using a pre-measured hose. Refer to the available monitoring well information to determine the depth and length of the screen interval. Measure the depth of the pump intake while lowering the pump into location. Record pump location in field logbook or groundwater sampling log.
2. Measure the water level (water level must be measured to nearest 0.01 feet) and record information on the ground-water sampling log, leave water level indicator probe in the monitoring well.
3. Connect the discharge line from the pump to a flow-through cell. The discharge line from the flow-through cell should be directed to an appropriately-sized container to contain the purge water during the purging and sampling of the monitoring well.
4. Start pumping the well at a low flow rate (*e.g.,* 0.2 to 0.5 liter per minute) and slowly increase the speed. Check water level. Maintain a steady flow rate while maintaining a drawdown of less than 0.33 feet. If drawdown is greater than 0.33 feet, lower the flow rate. 0.33 feet is a goal to help guide with the flow rate adjustment. It should be noted that this goal may be difficult to achieve under some circumstances due to geologic heterogeneities within the screened interval, and may require adjustment based on site-specific conditions and personal experience.
5. Measure the discharge rate of the pump with every three to five minutes using the following two methods:
    a. A graduated cylinder and a stop watch; and
    b. Measure the water level and record both flow rate and water level on the groundwater sampling log.

Continue purging, monitor and record water level and pump rate every three to five minutes during purging. Pumping rates should be kept at minimal flow to ensure minimal drawdown in the monitoring well.

6. During the purging, a minimum of one well volume (including the volume of water in the tubing, pump, and flow cell) must be purged prior to recording the water quality indicator parameters. Once this volume has been purged, record the water quality indicator parameters every three to five minutes. The water quality indicator field parameters are dissolved oxygen, specific electrical conductance, pH, redox potential, and temperature. Oxidation-reduction potential may not always be an appropriate stabilization parameter, and will depend on site-specific conditions. However, readings should be recorded because of its value as a double check for oxidizing conditions. The stabilization criterion is based on three successive readings of the water quality field parameters; the following are the criteria which must be used:

Parameter	**Stabilization Criteria**
pH	+/- 0.1 pH units
Specific Electrical Conductance (SEC)	+/- 3% S/cm
Oxidation-Reduction Potential (ORP)	+/- 10 millivolts
Dissolved Oxygen	+/- 10% milligrams per liter
Temperature	+/- 2 degrees

7. Once the criteria have been successfully met indicating that the water quality indicator parameters have stabilized, then sample collection can take place.
8. If a stabilized drawdown in the well can't be maintained at 0.33 feet, reduce the flow rate or turn the pump off for 15 minutes and allow for recovery. It should be noted whether or not the pump has a check valve. A check valve is required if the pump is shut off. Under no circumstances should the well be pumped dry.
9. After 15 minutes, begin pumping again at a lower flow rate. If the water draws down more than 0.33 feet again, turn pump off and allow for recovery. If two tubing volumes (including the volume of water in the pump and flow cell) have been removed during purging, then sampling can proceed next time the pump is turned on. This information should be noted in the field notebook or groundwater sampling log with a recommendation for a different purging and sampling procedure.
10. Maintain the same pumping rate or reduce slightly for sampling (0.2 to 0.5 liter per minute) in order to minimize disturbance of the water column. Samples should be collected directly from the discharge port of the pump tubing prior to passing through the flow-through cell. Disconnect the pump's tubing from the flow-through cell so that the

samples are collected from the pump's discharge tubing. For samples collected for dissolved gases or VOC analyses, the pump tubing needs to be completely full of ground water to prevent the ground water from being aerated as it flows through the tubing. The sequence of the samples is immaterial unless filtered (dissolved) samples are collected and they must be collected last. All sample containers should be filled with minimal turbulence by allowing the ground water to flow from the tubing gently down the inside of the container. When filling the VOC samples, a meniscus must be formed over the mouth of the vial to eliminate the formation of air bubbles and head space prior to capping.

11. Remove the pump from the monitoring well. Decontaminate the pump and dispose of the tubing if it is non-dedicated.
12. Before locking the monitoring well, measure and record the well depth (to 0.1 feet). Measure the total depth a second time to confirm initial measurement; measurement should agree within 0.01 feet or re-measure.
13. Close and lock the well.

V. References

Gibs, J. and T.E. Imbrigiotta, 1990, Well-Purging Criteria for Sampling Purgeable Organic Compounds; Ground Water, Vol. 28, No. 1, pp 68-78.

Pohlmann, K.F. and A.J. Alduino, 1992, GROUND- WATER ISSUE PAPER: Potential Sources of Error in Ground-Water Sampling at Hazardous Waste Sites, US Environmental Protection Agency. EPA/540/S-92/019.

Puls, R.W. and M.J. Barcelona, 1996, GROUND- WATER ISSUE PAPER: Low-Flow (Minimal Draw- down) Ground-Water Sampling Procedure, US Envi- ronmental Protection Agency. EPA/540/S-95/504, 12 pp.

Schuller, R.M., J.P. Gibb and R.A Griffin, 1981, Recommended Sampling Procedures for Monitoring Wells; Ground Water Monitoring Review, Spring 1981, pp. 42-46.

Parker, L.V. and T.A. Ranney, 1998, Sampling Trace- Level Organic Solutes with Polymeric Tubing: Part 2, Dynamic Studies; Ground Water Monitoring and Remediation, Vol. 18, No. 1, pp. 148-155.

U.S. Environmental Protection Agency, 1986, RCRA Ground-Water Monitoring Technical Enforcement Guidance Document; OSWER-9950.1, U.S. Govern- ment Printing Office, Washington, D.C., 208 pp., appendices.

U.S. Environmental Protection Agency, 1995, Ground Water Sampling - A Workshop Summary, Texas, November 30-December 2, 1993, EPA/600/R-94/205, 146 pp.

U.S. Environmental Protection Agency Region 1,

1996, Low Stress (low flow) Purging and Sampling Prodedure for the Collection of Ground water Samples From Monitoring Wells, SOP#: GW 0001, July 30, 1996.

U.S. Environmental Protection Agency Region 2, 1998, Ground Water Sampling Procedure Low Stress (Low Flow) Purging and Sampling, GW Sampling SOP Final, March 16, 1998.

Wilde, F.D., D.B. Radtke, J.Gibs and R.T. Iwatsubo, eds., 1998, National Field Manual for the Collection of Water-Quality Data; U.S. Geological Survey Tech- niques of Water-Resources Investigations, Book 9, Handbooks for Water-Resources Investigations, variously paginated.

Wilkin, R.T., M.S. McNeil, C.J. Adair and J.T. Wilson, 2001, Field Measurement of Dissolved Oxygen: A Comparison of Methods, Ground Water Monitoring and Remediation, Vol. 21, No. 4, pp. 124-132.

New Jersey Department of Environmental Protection, 2005, Field Sampling Procedures Manual, August 2005

Procedure for the Calibration and Operation of a YSI 556 MPS

I. Introduction

This standard operating procedure describes the equipment and methods for collecting collect water quality field data using a YSI 556 MPS during long-term groundwater monitoring activities at Operable Unit 03 (OU3) of the Cornell-Dubilier Electronics Superfund Site. The YSI 556 MPS simultaneously measures conductivity, temperature, dissolved oxygen (DO), Oxidation-Reduction Potential (ORP), and pH in water.

II. Equipment and Supplies

The following equipment is required to collect and store water quality data:

1. YSI 556 MPS Main Unit which contains display screen and keypad
2. YSI 5563 Probe Module which contains power cable, pH/ORP probe, conductivity/temperature probe, DO probe, Probe Sensor Guard, and Transport/Calibration Cup
3. Transparent flow-through cell and associated tubing
4. 4 alkaline C cells or optional rechargeable battery pack
5. YSI Calibration Solutions
6. Personal safety equipment specified by the Site Safety and Health Plan
7. Computer with EcoWatch software
8. Field notebook
9. Indelible markers/pens (e.g., Sharpies™)
10. YSI 556 MPS Operations Manual.

III. Procedure

1. Read and become familiar with the YSI 556 MPS Operations Manual.
2. Prior to field use, inspect probes to verify that no cracks, discolorations, etc., exist on or around the probes.
3. Clean the YSI 556 MPS Transport/Calibration Cup, YSI Flow Cell 5083, and all probes as per equipment decontamination guidelines provided in the NJDEP FSPM. Be sure to rinse the probes thoroughly with water. The probes should be cleaned once calibration is complete, and between each sampling location.
4. Calibrate the YSI 556 MPS as per the manufacture's specifications (see Section 6: Calibrate, of the YSI 556 MPS Operations Manual).
    a. All of the sensors, except temperature, require periodic calibration to ensure high performance.

b. Keep in mind that pH and DO values change with temperature.

Note pre-calibration values, instrument voltage settings, and post-calibration values in the field logbook.

5. Place the YSI 556 MPS Transport/Calibration Cup in the YSI Flow Cell 5083.
6. Press the On/Off key for the YSI 556 MPS, or select Run from the main menu to display the run screen. Make sure the sensor guard is installed. Be sure to completely immerse all the sensors.
7. Watch the readings on the display until they are stable, and are in the correct range, as per the guidelines provided by the NJDEP FSPM on Water Quality Indicator Parameters (WQIPs) measurement. Perform logging of sample data as per Section 9: Logging, in the YSI 556 MPS Operations Manual.
8. Follow instructions provided in the YSI 556 MPS Operations Manual to upload sampling data to PC using EcoWatch software.
9. Data should be monitored to ensure that the results are within the expected ranges and that the instrument is operating properly. If data are suspect, the instrument should be re-calibrated and the measurements re-taken.
10. Once the WQIPs are within the acceptable ranges given in the NJDEP FSPM, groundwater samples can be collected for analyses. After use, clean the YSI 566 MPS as per decontamination guidelines given in the NJDEP FSPM.
11. For short term storage, fill the transport/calibration cup with ½ inch of tap water supplied with the instrument, or place a moist sponge inside the cup, and place the probe module with all of the sensors installed into the cup. If using tap water, make sure that the water level is low enough so that none of the sensors are under water.
12. Prepare the YSI 556 MPS for long term storage as per Section 12: Storage, in the YSI 556 MPS Operations Manual.

IV. Reference

YSI 556 Multi-Probe System Operations Manual, 2009.

Procedure to Conduct Sample Management

I. Introduction

This standard operating procedure (SOP) provides reference information on sample management procedures.

II. Definitions

Trip Blanks – Trip blanks are used to check for sample contamination originating during sample transport and shipping as well as from site conditions. Trip blanks are necessary when aqueous environmental samples are collected for volatile organic analysis (such as VOC or GRO).
.
Field Duplicate – Field duplicates are two separate samples collected from the same sampling location. Field duplicates are used to evaluate field sampling precision and are collected at a frequency of 1 per 10 environmental field samples for each analyte group.

Laboratory Replicate – Laboratory replicates are two separate samples extracted from the same sample container by the laboratory. Laboratory replicates are used to evaluate method precision and are analyzed at a frequency of 1 per 20 environmental field samples.

Matrix Spike/Matrix Spike Duplicates (MS/MSD) – MS/MSD analysis is the process where standard mixes are added to field samples prior to extraction. The sample is then split into duplicates and analyzed. The analysis is used to evaluate the matrix effect of the sample upon the analytical methodology.

III. Guidelines

The use of sample management procedures during sample collection is intended to ensure that all samples obtained during the site investigation are accounted for when the project is completed. The sample management officer (SMO) is responsible for the implementation of sample management, and also for assuring that the proper QA/QC samples are collected.

IV. Laboratory Coordination

Weekly contact should be maintained with subcontract laboratories to keep them informed of the status of the sampling program. As a courtesy, copies of the COC will be provided electronically to the laboratory along with tracking number. Arrangements will be made with the subcontract laboratory to provide suitable, clean sample containers appropriate for each test. Laboratories will provide Material Safety Data Sheets for all preservatives used in sample containers.

V. QA/QC Samples

Field Blank
Field blanks are collected for each type of matrix used to collect samples. Field blanks are collected at a frequency of 1 per 20 field samples. Decontaminated equipment must be properly stored in an area and in a manner that will prevent cross contamination.

Equipment Blank
Equipment blanks are used to check that dedicated sampling equipment (such as Teflon tubing or distilled water) is not contaminated prior to use. One equipment blank will be collected at the beginning of the field program and for each lot of supplies.

Field Duplicates
Samples for duplicate analysis are collected in the field for each matrix sampled at a frequency of 1 per 20 field samples. Sufficient quantity of matrix must be collected from the same sample location to fill a duplicate set of sample containers. The duplicate volume is shipped to the laboratory under a separate sample ID

Matrix Spike/Matrix Spike Duplicate (MS/MSD) and Matrix Spike (MS)/Laboratory Replicate)
MS/MSD or MS/Laboratory replicate analyses are collected at a frequency of 1 per 20 environmental samples. QC samples will be marked on the COC.

VI. Sample Documentation, Packaging, and Shipping Procedures

One or more members of the field team should be designated as SMOs. The SMO will bear the ultimate responsibility for the documentation, packaging, and shipping of the samples. These procedures are outlined in the sections below.

Documentation and Chain of Custody
For documentation purposes, the field team will enter information about each sample into the field logbook as they collect the sample. The information recorded should include but not be limited to the following:

- Sample number (Sample ID)
- Method of sample collection
- Sample date
- Time of collection
- Description of sample location
- Preservative(s) used
- Analyses required

Before placing a sample in a cooler, the sample label should be covered with clear tape. The sample labels should contain the following information:

- Site Name

- Sample ID
- Sample Matrix
- Parameters to be analyzed

Once all of the samples have been collected, they should be grouped for shipment by receiving laboratory and the COC filled out. (Sample date and time will be recorded on the COC.) COCs will be prepared and attached to the inside of each cooler.

Packaging and Shipping Samples

Below are guidelines for packaging and shipping samples.

1. Make sure the caps on the sample bottles are tightly sealed. Wipe down the outside of all of the sample bottles.

2. Preserve the samples according to the analytical laboratory QA/QC Requirements.

3. Apply one custody seal around the circumference of the container or over the cap and onto the sides of the container. The custody seal must be applied to sample containers in such a manner as to reveal if the container was opened during transit.

4. Place containers in individual zip-lock bags. Eliminate extra air space from the bag before sealing. Cover sample containers with bubble wrap (one layer).

5. Prepare the shipping container (usually a cooler) so that no leakage can occur during shipping. Securely seal all valves using duct tape on both the inside and the outside of the cooler, and line with plastic or a larger garbage bag.

6. Surround the sample bottles with bags of ice. Prior to placement in the cooler, remove the ice from the original bag and re-pack into double zip lock bags. Use enough ice to ensure that the proper temperature (2-6 degrees Celcius) is maintained during transport. Place a temperature blank (filled with tap water and labeled as “temperature blank”) into the cooler.

7. Once the samples are packed, close and securely tie or tape the plastic or garbage bag.

8. Fill in the ‘relinquished by’ and ‘received by’ sections of the COC prior to shipment.

9. Seal the original COC form in a Ziploc bag and tape to the inside of the cooler.

10. Close the cooler and seal with strapping tape. If visibly dirty, wipe down the outside. Apply two signed and dated custody seals to the cooler diagonally across from each other where the cooler lid meets the cooler. Apply the custody seals in such a manner as to reveal if the cooler was opened during transit.

11. Place a shipping waybill on the outside of each cooler in a hang-tag. If more than one cooler is being sent to one destination, label each cooler appropriately, e.g., 1 of X, 2 of X, etc. Attach the air bill to one of the coolers.

12. Attach the following stickers to the outside of the cooler (1) “Environmental Samples, Non-Hazardous” label, (2) “This way up” label.

13. Notify the laboratory of the shipment.

Management and Disposal of Investigation-Derived Waste

I. Introduction

This standard operating procedure (SOP) describes the methods used to manage, store, and dispose of investigation-derived waste (IDW) produced during long-term monitoring activities at Operable Unit 03 (OU3) of the Cornell-Dubilier Electronics Superfund Site. The procedures specifically address water, decon solution, and personal protective equipment (PPE) waste generated from monitoring program.

This SOP does not address radioactive decontamination, PPE for radioactive waste, or disposal of radioactive contaminated waste material.

II. Definitions

FTL: Field Team Leader

IDW: Investigation-Derived Waste

PPE: Personal Protective Equipment

PSO: Project Safety Officer

SOP: Standard Operating Procedure

III. Equipment and Supplies

The purchase, maintenance, and use of the supplies and equipment listed below are the responsibility of the Project Safety Officer (PSO) and Field Team Leader (FTL). The following equipment and supplies will be used to collect and dispose of investigation-derived waste:

1. Waste Storage and Disposal Containers
   A. 30- or 55-gallon drums will be used for the storage and disposal of non-solvent liquid wastes. Specific equipment includes sealed top drums with screw-plug openings for liquids. Steel (6D) drums will be used for the storage and disposal of solvent waste. Polylined (17E) drums will be used for the storage and disposal of aqueous organic and acid waste.
2. Transferring Equipment
   A. Plastic safety funnels with brass or plastic screens and vents.
   B. Hand pump/siphon with Teflon or tygon tubing.

C. Tools: screwdriver, drum plug wrench, and brass pliers.

D. Drum dolly.

3. PPE

A. Disposable Tyvex coveralls and/or lab coats.

B. Disposable plastic gloves (nitrile, butyl rubber, or Viton).

C. Respirator and cartridges (consult PSO to determine PPE requirements).

D. Shoe covers (rubber or Tyvek).

4. Spill Cleanup Equipment and Supplies

A. Spill absorbent (Vermiculite or Speedidry™).

B. Broom, foxtail and dustpan.

C. Shovel.

D. Paper towels.

E. 85-gallon overpack drum.

F. Manual drum pump (same as pump in 'Item 2. Transferring Equipment').

5. Labels and Logs**:** A supply of labels and log sheets that are referred to in this SOP are to be kept on site in an easily accessible location. Additional logs will be obtained from the FTL.

6. Digital camera to document IDW management.

IV. Guidelines

IDW generated during the field investigation will be containerized in the proper vessel and held in the appropriate designated storage area until it is characterized, the method for proper disposal has been determined, and approval for disposal is granted. After the PSO and FTL receive documentation on the level of contamination in the waste, they will assist the Project Manager in deciding whether the waste is suitable for disposal in a landfill, or if it must be discarded in a hazardous waste stream. The following procedures will be used to store, manage, and transport IDW:

1. Liquid Waste Storage and Disposal

   A. All solvents used for decontamination will be captured and disposed of in appropriate aqueous waste containers that have been clearly labeled. Care will be taken not to mix substances that will react with each other. If there is any question concerning compatibility, the PSO or FTL will be contacted prior to taking action. A record of the type, relative amount, and hazards associated with each substance added will be kept on the hazardous waste log. This log will be attached to the satellite container. Waste may be temporarily stored, if properly labeled, prior to satellite container introduction. The waste contents in these temporary storage containers will be introduced into an approved satellite container by the end of every working day.

   B. Staff performing decontamination procedures will wear appropriate PPE, gloves (*e.g.*, nitrile) and eye protection. Care will be taken to avoid contact of cleaning solutions with clothing as much as possible. If circumstances dictate that contact will occur (*e.g.*, high pressure washing, splashing, high wind), waterproof outer clothing will be worn (*e.g.*, foul weather gear or rain gear).

   C. Liquid waste will be transferred into an air-tight, 55-gallon, screw-cap drum. When a new drum is started, the larger cap is unscrewed with the drum plug wrench. The safety vent is screwed in and the cap tightened by hand.

2. PPE Waste Storage and Disposal

   A. An air-tight, 30-gallon open-top drum (collection container) will be used for long-term storage of PPE waste.

   B. The lid will to be removed from the collection container and the contents placed into the storage drum.

   C. Once the transfer has been completed, the lid and sealing ring will be replaced on the storage drum.

The PSO and FTL are responsible for the oversight of IDW collection and management and for ensuring that IDW is disposed of off-site in accordance with local, state, and Federal regulations. The responsibilities of the PSO and FTL include:

A. Packaging and labeling of containers.

B. Arranging for waste removal.

C. Maintaining manifest records and tracking the manifest until its signed and returned.

D. Conducting weekly inspections of the waste area.

E. Ensuring that the proper waste-handling materials and personal protective equipment are available and adequate (*e.g.*, gloves, coveralls, goggles, respirators and cartridges, boots, funnels, pumps).

F. Maintaining emergency spill response equipment.

Procedure to Conduct a Technical System Field Audit

I. Introduction

This guideline is to provide information on technical field system audit (TSA) to be conducted for the Cornell-Dubilier Electronics Superfund Site.

II. Guidelines

The purpose of the TSA is to ensure that the sampling team adheres to the guidelines contained in the Quality Assurance Project Plan (QAPP). Prior to conducting the audit, a copy of the QAPP will be reviewed by the auditor Project Quality Control (QC) Officer or designee. During the TSA, the sampling team's adherence to these guidelines will be verified and any deficiencies from the guidelines will be documented. The effect of the deficiencies will be noted, and any necessary corrective actions will be instituted.

Prior to conducting the audit, the auditor will contact the Deputy Project Manager (DPM) to discuss the audit. This will ensure that the sampling team is properly prepared for the sampling event.

Conducting the TSA

The following procedures will be used to conduct the TSA:

1. The auditor will bring the following equipment/documents into the field:

    - Copy of the QAPP and any relevant memos, correspondence or addenda
    - TSA audit checklist
    - Digital camera

2. The following aspects of the sampling event will be audited:

    - QA/QC samples
    - Sampling methodologies
    - Field documentation
    - Sample management tasks
    - Decontamination procedures

Corrective Action in the Field

Besides observing and reporting, the auditor is responsible for initiating steps for the start-up of corrective action procedures.

If the auditor witnesses discrepancies in the field between the QAPP and the performance of the sampling team, the auditor has several options available for corrective action. These options are dependent upon the type of deficiencies observed.

Deficiencies observed and the corrective action taken must be documented in the auditor's log book.

Minor Deficiencies

Minor deficiencies are problems where the impact, if any, to the data can be easily eliminated and the deficiency can be corrected or the procedure repeated to achieve the desired result. Minor deficiencies that are observed by the auditor will immediately be brought to the attention of the field team. The auditor and the field team will discuss the problem and agree upon what corrective action is necessary. This will allow for the deficiencies to be corrected immediately in the field.

Major Deficiencies

Major deficiencies are events or procedures that substantially deviate from approved work plans, will result in increased project costs not previously approved, or will significantly impact the quality of the data.

Upon witnessing a major deficiency, the auditor will temporarily stop all related site work and will inform the field team of the problem. The auditor and field team will discuss the deficiency as well as what steps are necessary for corrective action. If the deficiency can be corrected in the field, the auditor may allow work to resume as long as all necessary corrective actions are taken. Information regarding the nature of the deficiency as well as the corrective action(s) taken will immediately be transmitted to the USACE Project Manager, the Louis Berger Group Manager (PM), and the DPM.

If the deficiency cannot be corrected in the field, a Stop-Work Order will be issued until appropriate measures can be taken to correct the problem. A written report of the major deficiencies will be prepared by the Project QC Officer and submitted to the USACEPM, the Louis Berger Group PM, and the DPM. The Stop-Work Order will remain in effect until the proper corrective action(s) can be implemented.

Preparation of a TSA Report

The TSA report provides a means of relaying the events of a sampling episode to key personnel. These events could possibly affect the sample integrity (QA/QC) and therefore, are important to the decisions made regarding analytical data. This report will identify any deficiencies found in the field and will outline the corrective actions that were recommended/implemented to address any minor deficiencies observed. The field audit report will also recommend appropriate corrective actions for any major deficiency noted. Follow-up reports describing completed corrective actions which addressed major deficiencies will be submitted by the Louis Berger Group PM to the USACE PM.

A quality control field audit report will usually contain the following information:

- Date and location of field audit
- Sample matrices witnessed

- Name of personnel conducting the sampling
- Summary of sample methodology
- Description of any infractions that occurred and the corrective actions taken
- Conclusions
- Recommendations
- Quality control field audit checklist

The following are examples of audit check lists:

QUALITY CONTROL FIELD AUDIT REPORT

SUMMARY INFORMATION

1. PROJECT NAME: _____

2. PROJECT ADDRESS: _____

3. PREDESIGN INVESTIGATION _BUILDING MATERIALS

SOILS:_____OTHER: _____

4. DATE(S) OF QC FIELD AUDIT _____

5. AUDITOR'S NAME_____PHONE_____

6. FACILITY CONTACT _____PHONE_____

7. CONTRACTOR CONTACT_____PHONE_____

8. PERSONNEL ON-SITE

NAME	REPRESENTING	PHONE

9. AUDITOR'S COMMENTS

_____

_____

_____

_____

10. WEATHER CONDITIONS

SUNNY PARTLY SUNNY PARTLY CLOUD CLOUDY RAIN
DRIZZLE SNOW SLEET

TEMPERATURE_____ WIND SPEED_____ WIND DIRECTION_____

11. LEVEL OF PERSONNEL PROTECTION REQUIRED IN WORK PLAN

A B C D

LEVEL OF PERSONNEL PROTECTION ACTUALLY DONNED:

A B C D

12. FIELD SURVEY EQUIPMENT

INSTRUMENT	MODEL	CALIBRATION CHECK	STANDARD
CONDUCTIVITY METER	_____	_____	_____
DISSOLVED O_2 METER	_____	_____	_____
PH METER	_____	_____	_____
COMBUSTIBLE GAS INDICATOR (LEL/O_2)	_____	_____	_____
FLAME IONIZATION DETECTOR (OVA)	_____	_____	_____
PHOTOIONIZATION DETECTOR (HNU)	_____	_____	_____
TOTAL GAS INDICATOR (CO, HS)	_____	_____	_____
OTHER	_____	_____	_____

OBSERVATIONS

_____

_____

_____

_____

13. DID THE SAMPLING TEAM TAKE PERIODIC SURVEYS OF THE AMBIENT AIR CONDITIONS?

YES NO N/A

14. DID THE SAMPLING TEAM PROVIDE A DECON ZONE DESIGNATING CLEAN AND CONTAMINATED AREAS?

YES NO N/A

15. WERE PHOTOGRAPHS TAKEN? YES NO

16. AUDITOR'S COMMENTS

_____

_____

_____

_____

_____

_____

NON-AQUEOUS SAMPLE INFORMATION

1. NON-AQUEOUS MATRIX SAMPLED:

SOIL SEDIMENT SLUDGE CHEMICAL SOLIDS WASTE PILE

OTHER_____

2. TYPE OF SAMPLE: GRAB COMPOSITE

IF COMPOSITE - SAMPLES/COMPOSITE _____

3. WAS THE VOA SAMPLE COLLECTED FIRST FROM A DISCRETE LOCATION PRIOR TO HOMOGENIZATION? YES NO N/A

4. WAS THE SAMPLE HOMOGENIZED PRIOR TO ACQUISITION INTO THE SAMPLE CONTAINERS? YES NO

5. TYPE OF SAMPLING EQUIPMENT:

MATERIAL OF CONSTRUCTION

SPOON/SPATULA	STAINLESS STEEL	TEFLON	GLASS	OTHER
TROWEL/SCOOP	STAINLESS STEEL	TEFLON	GLASS	OTHER
BUCKET AUGER	STAINLESS STEEL	TEFLON	GLASS	OTHER
SPLIT SPOON	STAINLESS STEEL	TEFLON	GLASS	OTHER
SHELBY TUBE	STAINLESS STEEL	TEFLON	GLASS	OTHER
TRIER	STAINLESS STEEL	TEFLON	GLASS	OTHER
PONAR DREDGE	STAINLESS STEEL	TEFLON	GLASS	OTHER

6. WAS THE DRILL RIG, AUGER FLIGHTS, RODS, ETC. DECONTAMINATED ACCORDING TO STANDARD PROCEDURES BETWEEN EACH SAMPLE LOCATION? YES NO N/A

IF NO, METHOD OF DECONTAMINATION _____

7. IF MUD ROTARY DRILLING WAS UTILIZED WHAT WAS THE SOURCE OF THE WATER? _____

8. WAS THE SAMPLING EQUIPMENT DEDICATED? YES_____ NO _____

9. WAS THE SAMPLING EQUIPMENT: LAB DECONTAMINATED? FIELD DECONTAMINATED?

10. WAS THE SAMPLING EQUIPMENT DECONTAMINATED ACCORDING TO STANDARD PROCEDURES? YES NO

IF NO, METHOD OF DECONTAMINATION: _____

11. WAS THE DECONTAMINATION AREA LOCATED AWAY FROM THE SOURCE OF CONTAMINATION? YES NO N/A

12. ARE DISPOSABLE GLOVES WORN AND CHANGED BETWEEN EACH SAMPLE LOCATION? YES NO N/A

13. AUDITOR'S COMMENTS

_____
_____
_____
_____

QA/QC INFORMATION

1. LABORATORY:

NAME _____ PHONE _____

CONTACT PERSON _____

CLP CLP CAPABLE CERTIFIED OTHER _____

2. SAMPLE INFORMATION:

MATRIX PARAMETER PRESERVATIVE CONTAINER DESCRIPTION

_____
_____
_____
_____

3. WHAT ORDER BY ANALYTICAL PARAMETER ARE SAMPLES COLLECTED:
_____

4. FIELD BLANKS: YES NO N/A FREQUENCY _____

METHOD: _____

WAS IDENTICAL BOTTLE TO BOTTLE TRANSFER OF WATER UTILIZED? YES NO

5. TRIP BLANKS: YES NO N/A FREQUENCY _____

6. WHAT WAS THE SOURCE OF THE BLANK WATER?
LABORATORY DEMONSTRATED ANALYTE-FREE OTHER_____

7. SAMPLE PACKAGING AND HANDLING:

SAMPLE CONTAINERS LABELED	YES	NO	N/A
COC FORMS COMPLETED	YES	NO	N/A
CUSTODY SEALS	YES	NO	N/A
SAMPLES PRESERVED TO $4^{o}C$:	YES	NO	N/A

8. AUDITOR'S COMMENTS

_____

_____

_____

_____

ATTACHMENT 4

Example Chain of Custody Forms

Page 1 of 1

USEPA CLP Organics COC (LAB COPY)
DateShipped: 2/1/2010
CarrierName: FedEx
AirbillNo: 841821272121

CHAIN OF CUSTODY RECORD
Case #: 12345
Cooler #: 4

No: 39428-01/29/10-0016
Lab: Generic Organic Lab
Lab Contact: Mr. Lab Contact
Lab Phone: 555-555-1234

Organic Sample #	Matrix/Sampler	Coll. Method	Analysis/Turnaround	Tag/Preservative/Bottles	Station Location	Collected	Inorganic Sample #	For Lab Use Only
B7260	Sediment/ SERAS	Grab	CLP TCL Pesticides(14), CLP TCL PCBs(14), BNA(14)	1587, 1588, 1589 (3)	ERT4-3-A	01/29/2010 11:40	MB7260	
B7261	Sediment/ SERAS	Grab	BNA(14), CLP TCL PCBs(14), CLP TCL Pesticides(14)	1594, 1596, 1597 (3)	ERT4-3-B	01/29/2010 11:40	MB7261	
B7262	Sediment/ SERAS	Grab	BNA(14), CLP TCL PCBs(14), CLP TCL Pesticides(14)	1600, 1602, 1603 (3)	ERT4-3-C	01/29/2010 11:40	MB7262	
B7263	Sediment/ SERAS	Grab	BNA(14), CLP TCL PCBs(14), CLP TCL Pesticides(14)	1606, 1608, 1609 (3)	ERT4-3-D	01/29/2010 11:40	MB7263	
B7264	Sediment/ SERAS	Grab	BNA(14), CLP TCL PCBs(14), CLP TCL Pesticides(14)	1612, 1614, 1615 (3)	ERT4-3-E	01/29/2010 11:40	MB7264	
B7265	Sediment/ SERAS	Grab	BNA(14), CLP TCL PCBs(14), CLP TCL Pesticides(14)	1618, 1620, 1621 (3)	ERT4-3-F	01/29/2010 11:40	MB7265	
B7266	Sediment/ SERAS	Grab	BNA(14), CLP TCL PCBs(14), CLP TCL Pesticides(14)	1624, 1626, 1627 (3)	ERT4-3-G	01/29/2010 11:40	MB7266	
B7267	Sediment/ SERAS	Grab	BNA(14), CLP TCL PCBs(14), CLP TCL Pesticides(14)	1630, 1632, 1633 (3)	ERT4-3-H	01/29/2010 11:40	MB7267	
B7268	Sediment/ SERAS	Grab	BNA(14), CLP TCL PCBs(14), CLP TCL Pesticides(14)	1636, 1638, 1639 (3)	ERT4-3-I	01/29/2010 11:40	MB7268	
B7269	Sediment/ SERAS	Grab	BNA(14), CLP TCL PCBs(14), CLP TCL Pesticides(14)	1642, 1644, 1645 (3)	ERT4-3-J	01/29/2010 11:40	MB7269	
B7270	Sediment/ SERAS	Grab	BNA(14), CLP TCL PCBs(14), CLP TCL Pesticides(14)	1648, 1650, 1651 (3)	ERT4-3-K	01/29/2010 11:40	MB7270	

Special Instructions:	**Shipment for Case Complete? N**
	Samples Transferred From Chain of Custody #
Analysis Key: BNA=CLP TCL Semivolatiles	

Items/Reason	Relinquished by	Date	Received by	Date	Time	Items/Reason	Relinquished By	Date	Received by	Date	Time

Figure 3-6. Scribe Organics Chain of Custody Record (Laboratory Copy)

Page 2 of 3

USEPA CLP Inorganics COC (LAB COPY)
DateShipped: 2/1/2010
CarrierName: FedEx
AirbillNo: 841821272187

CHAIN OF CUSTODY RECORD

Case #: 12345
Cooler #: 2

No: 39428-01/29/10-0012
Lab: Generic Inorganic Lab
Lab Contact: Mr. Lab Contact
Lab Phone: 555-555-1234

Inorganic Sample #	Matrix/Sampler	Coll. Method	Analysis/Turnaround	Tag/Preservative/Bottles	Station Location	Collected	Organic Sample #	For Lab Use Only
MB7268	Sediment/ SERAS	Grab	CLP TAL/Hg/CN(14)	1635 (1)	ERT4-3-I	01/29/2010 11:40	B7268	
MB7269	Sediment/ SERAS	Grab	CLP TAL/Hg/CN(14)	1641 (1)	ERT4-3-J	01/29/2010 11:40	B7269	
MB7270	Sediment/ SERAS	Grab	CLP TAL/Hg/CN(14)	1647 (1)	ERT4-3-K	01/29/2010 11:40	B7270	
MB7271	Sediment/ SERAS	Grab	CLP TAL/Hg/CN(14)	1656 (1)	ERT3-3-A	01/29/2010 11:00	B7271	
MB7272	Sediment/ SERAS	Grab	CLP TAL/Hg/CN(14)	1659 (1)	ERT3-3-B	01/29/2010 11:00	B7272	
MB7273	Sediment/ SERAS	Grab	CLP TAL/Hg/CN(14)	1665 (1)	ERT3-3-C	01/29/2010 11:00	B7273	
MB7274	Sediment/ SERAS	Grab	CLP TAL/Hg/CN(14)	1671 (1)	ERT3-3-D	01/29/2010 11:00	B7274	
MB7275	Sediment/ SERAS	Grab	CLP TAL/Hg/CN(14)	1677 (1)	ERT3-3-E	01/29/2010 11:00	B7275	
MB7276	Sediment/ SERAS	Grab	CLP TAL/Hg/CN(14)	1683 (1)	ERT3-3-F	01/29/2010 11:00	B7276	
MB7277	Sediment/ SERAS	Grab	CLP TAL/Hg/CN(14)	1689 (1)	ERT3-3-G	01/29/2010 11:00	B7277	
MB7278	Sediment/ SERAS	Grab	CLP TAL/Hg/CN(14)	1695 (1)	ERT3-3-H	01/29/2010 11:00	B7278	

Sample(s) to be used for Lab QC: MB7276	**Shipment for Case Complete? N**
	Samples Transferred From Chain of Custody #
Analysis Key: TM=CLP TAL Total Metals, CN=CLP CN	

Items/Reason	Relinquished by	Date	Received by	Date	Time	Items/Reason	Relinquished By	Date	Received by	Date	Time

Figure 3-8. Scribe Inorganics Chain of Custody Record (Laboratory Copy)

ATTACHMENT 5

Example Non-Conformance Quality Control Report

CORNELL DUBILIER ELECTRONICS SUPERFUND SITE
NON-CONFORMANCE/QUALITY CONTROL REPORT

Date: _____

Organization Name: _____

Initiator's Name & Title: _____

Problem Description:

_____
_____
_____
_____
_____
_____
_____

Reported To: _____

Corrective Action:

_____
_____
_____
_____
_____
_____
_____

Reviewed and Implemented by: _____

ATTACHMENT 6

Example Daily Quality Control Report

DAILY QUALITY CONTROL REPORT

Site: _____
Project No.: _____
Date: _____
Field Team: _____

Weather (circle)

	Bright Sun	Clear	Overcast	Rain	T-Storm	Snow
Temp:	0 to 32	32 to 50	50 to 70	70 to 85	> 85	
Wind:	Still	Gusty	Moder.	High	Direction:	
Humidity:	Dry	Moder.	Humid			

Subcontractors and Equipment on Site: _____

Health and Safety Levels: (circle)

D	Mod. D	C	B	A

Summary of Health and Safety Activities: _____

Instrument Used: (circle)	PID	LEL	pH	Cond	Therm.	Turbidity	DO	ORP
Calibrated: (check)								

For actual calibration results, see field calibration forms.

Summary of Work Performed: _____

All samples were collected according to the procedures outlined in the planning documents?

Yes _____ No _____

Problems encountered/corrective actions taken: _____

Time Project Manager Contacted: _____

Name: _____ Signature: _____

APPENDIX B

NJDEP Biennial Certification Form and Instructions

New Jersey Department of Environmental Protection
Site Remediation Program

INSTRUCTIONS FOR THE REMEDIAL ACTION PROTECTIVENESS / BIENNIAL CERTIFICATION FORM – GROUND WATER

General Instructions

1. **Applicability.** Use this form to submit a Remedial Action Protectiveness/Biennial Certification Report for Ground Water to the New Jersey Department of Environmental Protection (NJDEP). The NJDEP will use the information presented in the form to update site information and determine the priority of the case and level of review, if necessary.

   This form shall be used by all persons who have obtained a Ground Water Remedial Action Permit and for those sites which have previously established a Classification Exception Area/Well Restriction Area (CEA/WRA) under a No Further Action Letter.

   Sites with a No Further Action Letter should submit a Ground Water Remedial Action Permit Application along with the Ground Water Remedial Action Protectiveness/Biennial Certification Form at the time the next biennial certification is due in accordance with N.J.A.C. 7:26C-7.6, 'Remedial action permit application schedule'. All CEAs/WRAs should have a permit in place no later than May 7, 2014.

2. **Updates.** The NJDEP may update this form periodically. Please ensure you are using the latest version of this form. Download the latest version of this form from the NJDEP Website: http://www.nj.gov/dep/srp/srra/forms/.

3. **Signatures.** This form must be signed by the Person Responsible for Monitoring the Protectiveness of the Remedial Action and the Licensed Site Remediation Professional (LSRP) or the NJDEP licensed Subsurface Evaluator responsible for completion of the form and attached Exhibits.

   LSRP vs. Subsurface Evaluator
   Please make sure you check the appropriate box at the top of the form to indicate if a Licensed Site Remediation Professional (LSRP) or a Subsurface Evaluator is certifying the form. Ensure that the corresponding signature page is included with the form.

   The Subsurface Evaluator option is only for unregulated heating oil tanks (UHOT) where you are a NJDEP licensed Subsurface Evaluator and the remediation is for unregulated heating oil tank system(s) and no other areas of concern.

4. Completed forms should be sent to:
   Bureau of Case Assignment & Initial Notice
   Site Remediation Program
   NJ Department of Environmental Protection
   401-05H
   PO Box 420
   Trenton, NJ 08625-0420

Section A. Site Name, Location and Information

- **Site Name:** Provide the name of the site (i.e., ABC Corporation);
- **List all AKAs:** Provide all other known names for the site;
- **Street Address:** Provide the street address for the site NOTE: This should be the physical location of the site – not the mailing address;
- **Municipality:** Provide the name of the municipalit(ies) where the site is physically located and indicate if it is a township, borough, village, or city. NOTE: This should be the name of the incorporated municipality and not the local name;
- **County:** Provide the name of the count(ies) where the site is located;
- **Zip Code:** Enter the five digit code for the physical location of the site;
- **Program Interest (PI) Numbers:** The PI Number is assigned by the NJDEP and can be obtained via the web at http://www.nj.gov/dep/srp/ (DEP DATA MINER REPORTS).

- **Case Tracking Numbers:** Provide all NJDEP generated site identification numbers (Hotline incident numbers, UST Notice of Intent to Close numbers, ISRA numbers, etc.);
- **Municipal Block and Lot Numbers:** Provide the municipal block and lot numbers for the entire site (not just the municipal block and lot numbers of the CEA/WRA).

Section B. Fees

Sites with a Ground Water Remedial Action Permit (RAP) – If you are submitting this form for a site with an effective RAP, there is no fee. The cost of review is covered by the Annual Permit Fee.

Sites without a Ground Water RAP – For cases where the NJDEP has issued a Restricted Use or Limited Restricted Use No Further Action Letter *and* the NJDEP has not yet issued a permit, include a check in the amount of $375.00. Checks shall be made payable to "Treasurer State of New Jersey". Please include your Program Interest (PI) Number on the check. Pursuant to N.J.A.C. 7:26C-7.6, this submission must also include an application to obtain a Ground Water RAP.

Section C. Fee Billing Contact Person

Complete this section for the fee billing contact person. The Annual Permit Fee Invoice will be mailed to this person.

Section D. Current Owner of the Site

Complete this section for the current owner of the site. If the property owner of the site has changed since the last submission to the NJDEP, check the box, provide the date the change became effective, and complete this section. If the property owner has changed, as described above, and a Remedial Action Permit has been issued for this site pursuant to N.J.A.C. 7:26C-7, and the owner listed in the permit is not the same as the owner indicated in this form, submit a Remedial Action Permit Transfer/Change of Ownership Application, available from the NJDEP at http://www.nj.gov/dep/srp/forms. That application is needed because the new property owner must sign on as a co-permittee, and if applicable, provide financial assurance, before the former owner will be removed from the permit.

You are not required to complete this section if the current owner has not changed *and* is also the Person Responsible for Monitoring the Protectiveness of the Remedial Action; only check the box and go to the next section.

Section E. Current Operator of the Site

Complete this section for the current operator of the site. If the operator of the site has changed since the last submission to the NJDEP, check the box, provide the date the change became effective, and complete this section. You are not required to complete this section if the current operator is also the Person Responsible for Monitoring the Protectiveness of the Remedial Action; only check the box and go to the next section.

Section F. Current Lessee of the Site

Complete this section for the current lessee of the site. If the lessee of the site has changed since the last submission to the NJDEP, check the box, provide the date the change became effective, and complete this section. You are not required to complete this section if the current lessee of the site is also the Person Responsible for Monitoring the Protectiveness of the Remedial Action; only check the box and go to the next section.

Section G. Remedial Action and CEA/WRA Information

1. Type of Ground Water Remediation

   Check either the box for Monitored Natural Attenuation or Active Remediation to identify the type of Remedial Action implemented at the site.

   a. **Monitored Natural Attenuation**

      If you checked Monitored Natural Attenuation complete questions 1 through 6 underneath the check box as indicated below:

      1) Indicate if ground water sampling has been conducted at the site since the CEA/WRA was established or the last submittal of the Ground Water Remedial Action Protectiveness/Biennial Certification Form, whichever is most recent. If "Yes," attach a summary of the ground water sampling results to this form, including all historical ground water sampling data for the site.

      2) Indicate if the results of the ground water sampling demonstrate that contaminant concentrations have decreased to or below the applicable Ground Water Quality Standards for two consecutive sampling events accounting for seasonal fluctuation. If "Yes," then submit a Ground Water Remedial Action Permit Application

for a termination or a request for a CEA/WRA lift for sites that do not currently have a Ground Water Remedial Action Permit and skip the rest of this section. Only answer Not Applicable (N/A) to this question if ground water sampling has not been conducted since the CEA/WRA was established or the last submittal of the Ground Water Remedial Action Protectiveness/Biennial Certification Form, whichever is most recent.

3) Indicate if there is a decreasing trend of contaminant concentrations in the ground water. If the answer is "No" for this question, indicate if the ground water plume is considered stable. If "No," then the permittee/co-permittee shall modify the Remedial Action and apply for a modification of the Ground Water Remedial Action Permit as necessary pursuant to N.J.A.C. 7:26C-7.8(d)2.

   A ground water plume is considered stable if the concentration trends remain the same over time and the sentinel well concentration remains below the Ground Water Quality Standards. Evidence of a decreasing trend of contaminant concentrations in the ground water or a stable plume is required for Monitored Natural Attenuation to be considered as a remedy.

4) Indicate if the ground water plume is reaching the sentinel wells. All Ground Water Remedial Action Permits are required to have a "clean" sentinel well for the monitoring of the fate and transport of the ground water contaminant plume. If "Yes," then the permittee/co-permittee shall complete additional delineation of the ground water contamination and modify the Remedial Action and apply for a modification of the Ground Water Remedial Action Permit as necessary pursuant to N.J.A.C. 7:26C-7.8(d)2.

5) Indicate if all soil contamination in the unsaturated zone has been remediated to the applicable numeric Soil Remediation Standard for all area(s) of concern associated with this CEA/WRA. Only answer N/A to this question if soil contamination in the unsaturated zone was never present for the area(s) of concern associated with this CEA/WRA.

6) Indicate if all free and/or residual product in the unsaturated and saturated zones as determined pursuant to N.J.A.C. 7:26E-5.1(e) has been treated or removed for all area(s) of concern associated with this CEA/WRA. Only answer N/A to this question if free and/or residual product in the unsaturated and saturated zones was never present for the area(s) of concern associated with this CEA/WRA.

b. **Active Remediation**

If you checked Active Remediation, indicate the type of remediation (e.g. Multiple Phase Extraction System, SVE/Air Sparging, Ozone Sparging, Pump & Treat, etc) and complete questions 1 through 7 as indicated below:

1) Indicate if ground water sampling has been conducted at the site since the CEA/WRA was established or the last submittal of the Remedial Action Protectiveness/Biennial Certification Form, whichever is most recent. If "Yes," attach a summary of the ground water sampling results to this form, including all historical ground water sampling data for the site.

2) Indicate if the results of the ground water sampling demonstrate that contaminant concentrations have decreased to or below the applicable Ground Water Quality Standards for two consecutive sampling events accounting for seasonal fluctuation. If "Yes," then submit a Ground Water Remedial Action Permit Application for a termination or a request for a CEA/WRA lift for sites that do not currently have a Ground Water Remedial Action Permit and skip the rest of this section. Only answer N/A to this question if ground water sampling has not been conducted since the CEA/WRA was established or the last submittal of the Ground Water Remedial Action Protectiveness/Biennial Certification Form, whichever is most recent.

3) Indicate if there is a decreasing trend of contaminant concentrations in the ground water. If the answer is "No" for this question, indicate if the ground water plume is considered stable. If "No," then the permittee/co-permittee shall modify the Remedial Action and apply for a modification of the Ground Water Remedial Action Permit as necessary pursuant to N.J.A.C. 7:26C-7.8(d)2.

   A ground water plume is considered stable if the concentration trends remain the same over time and the sentinel well concentration remains below the Ground Water Quality Standards. Evidence of a decreasing trend of contaminant concentrations in the ground water or a stable plume is required for Monitored Natural Attenuation to be considered as a remedy.

4) Indicate if the ground water plume is reaching the sentinel wells. All Ground Water Remedial Action Permits are required to have a "clean" sentinel well for the monitoring of the fate and transport of the ground water contaminant plume. If "Yes," then the permittee/co-permittee shall complete additional delineation of the ground water contamination and modify the Remedial Action and apply for a modification of the Ground Water Remedial Action Permit as necessary pursuant to N.J.A.C. 7:26C-7.8(d)2.

5) Indicate if the ground water plume is migrating horizontally or vertically into an uncontaminated aquifer zone below and adjacent to the contaminant plume.

6) Indicate if the ground water Remedial Action is performing as designed. If the answer is "No" for this question, provide an explanation.

7) Indicate if the active ground water treatment system been shutdown for longer than 24-hours since the CEA/WRA was established or the last submittal of the Ground Water Remedial Action Protectiveness/ Biennial Certification Form, whichever is more recent. If "Yes", provide an explanation for the shutdown, including the duration of the shutdown and whether or not the shutdown rendered the Remedial Action not protective of public health, safety and of the environment.

8) Indicate the expected duration of the active remediation in whole years.

2. Indicate if a Technical Impracticability (TI) Determination has been submitted. If "Yes," please provide the date of the TI Determination and attach a summary of the TI Determination and a 5-year evaluation if applicable.

3. Check the ground water monitoring schedule that is currently being applied for the site.

4. CEA/WRA Specific Information: Provide the date that the CEA/WRA was established, the expected expiration date of the CEA/WRA, the name of the impacted aquifer, the ground water classification, the ground water flow direction, the horizontal extent of the CEA/WRA in acres, and the vertical depth of the CEA/WRA. Attach a scaled site map with the extent of the CEA/WRA on it and all the monitoring wells associated with the CEA/WRA.

5. Indicate if the municipal block and lot numbers for the site have changed since the CEA/WRA was established or the last submittal of the Ground Water Remedial Action Protectiveness/Biennial Certification Form, whichever is more recent. If "Yes," attach a current tax map of the property, and list the former and new municipal block and lot numbers of the property.

6. Indicate if this form being submitted pursuant to a Ground Water Remedial Action Permit. If not, this submission must also include an application to obtain a Ground Water RAP.

7. Indicate if hard copies of this form have been provided to the municipal and county clerks for each municipality and county in which the site is located; the local, county and regional health department for each municipality and county in which the site is located; each current owner of the site; each current operator of the site; the Pinelands Commission as applicable; and the Highlands Commission as applicable.

8. Indicate if copies of this form and its attachments have been submitted to the NJDEP in both in paper and electronically on a CD in Adobe PDF format.

9. Indicate if monitoring wells associated with the CEA/WRA have been damaged, vandalized, repaired, replaced, or decommissioned pursuant to N.J.S.A. 58:4A and N.J.A.C. 7:9D. If "Yes," attach a description of what occurred and, if applicable, a copy of the Well Abandonment Report for each well that has been damaged, vandalized, repaired, replaced, or decommissioned, and the construction specifications for each new/replacement well. Attach the maintenance and evaluation logs for all the monitoring wells associated with the CEA/WRA.

10. Indicate if additional monitoring wells have been installed since the CEA/WRA was established or the last submittal of the Ground Water Remedial Action Protectiveness/Biennial Certification Form, whichever is more recent. If "Yes", attach the construction specifications for each new well.

11. Indicate if the CEA/WRA has been revised for any reason that did not require conducting additional remediation. If "Yes," attach a new CEA/WRA Fact Sheet Form with all Exhibits and indicate which major CEA/WRA component(s) have been revised.

12. Indicate if you evaluated the Ground Water Quality Standards and other regulations and guidance relevant to the CEA/WRA and any resulting vapor intrusion risk, that have been modified subsequent to the establishment of the CEA/WRA or the last submittal of the Ground Water Remedial Action Protectiveness/Biennial Certification Form, whichever is more recent.

13. Indicate if the CEA/WRA has been mapped *and* accurately depicts the CEA boundary on NJ-GeoWeb. If not, then submit a GIS compatible map, produced in conformance with guidance at http://www.nj.gov/dep/srp/gis, of the CEA/WRA by email to srpgis_cea@dep.state.nj.us.

GIS Deliverables submittal requirements:

- ESRI ArcMap users are advised that "mdb" (geodatabase) files are no longer accepted via email for security reasons. Attach GIS polygon shape files instead. Shape files need to include the following file extensions: .shp; .shx; .dbf; and .prj.
- Computer-aided Design (CAD) software users must submit DWG files defined in "model space" NAD 83 State Plane Coordinate feet. The CEA boundary should be mapped as a DWG **Polygon** and the record(s) that depict the extent of the CEA boundary must be named "CEA_Boundary" in the Layer field. Do not name annotation, graphics or any other map element in this way.

- Send GIS deliverables **by email only** to srpgis_cea@dep.state.nj.us (do not include CAD or shape files on the CD submitted with the form).
- Please refer to http://www.nj.gov/dep/srp/gis/ for the Minimum Accuracy Requirements for SRP GIS Submissions.
- In the body of the email that includes the GIS deliverables, include the CEA information as described in the Administrative Requirements for GIS Deliverables found at http://www.state.nj.us/dep/srp/gis/.
- GIS questions/comments should be directed to srpgis@dep.state.nj.us.

Section H. Land Use, Changes, and Disturbances

1. – 3. Check all that apply indicating the land use(s) for the site.

4. Describe the current site operations and the status of any planned future land use(s) for the site.

5. Indicate if the property use for the site has changed to residential, school, and/or licensed child care facility since the CEA/WRA was established or the last submittal of the Ground Water Remedial Action Protectiveness/Biennial Certification Form, whichever is most recent. If it has, indicate if you implemented a Presumptive Remedy, Alternate Remedy pre-approved by the NJDEP, or an unrestricted use remedy.

   If you implemented a Presumptive Remedy pursuant to the NJDEP's Presumptive Remedies for Soil Contamination at Schools, Child Care Centers, and Residences (N.J.A.C. 7:26E-5.3) briefly describe the presumptive remedy.

   If you implemented an Alternate Remedy attach a copy of the NJDEP's pre-approval letter.

6. Indicate if disturbances of the land, such as installation of a detention basin, have taken place.

   If "Yes":

   a) Indicate the type of and the approximate date of the disturbance(s).

   b) Indicate if these disturbances resulted in a contaminated discharge to surface water that rendered the Remedial Action not protective of public health, safety and of the environment.

   c) Indicate if these disturbances intercept the water table within the CEA/WRA area in such a way that ground water sampling was needed to determine if the ground water contaminant plume could discharge to surface water. If "Yes," indicate if the ground water meets the more stringent of either the New Jersey Surface Water Quality Criteria, N.J.A.C. 7:9B or the Federal Surface Water Quality Criteria, CFR Part 131.

Section I. Current or Planned Water Use Within the Well Search Area

1. Indicate the water use within the CEA/WRA when the CEA/WRA was established.

2. Indicate the current water use within the CEA/WRA boundaries.

3. Attach the results of the required updated well search to this form, including a scaled site map. Additional information about well searches for CEA Biennial Certification can be found at http://www.state.nj.us/dep/srp/guidance/ceacompliance/tech/.

   Questions regarding well searches should go to the Well Permitting Section of the Bureau of Water Systems and Well Permitting, (formerly the Bureau of Water Allocation) at (609) 984-6831.

4. Indicate if the water use has changed within the well search area since the CEA/WRA was established or the last submittal of the Ground Water Remedial Action Protectiveness/Biennial Certification Form, whichever is more recent. If "Yes", briefly describe.

5. Indicate if any changes in water use altered the areal extent and/or the duration of the CEA/WRA.

6. Indicate if any of the following wells have been installed within one mile up-gradient, side-gradient, and down-gradient of the CEA/WRA since the CEA/WRA was established or the last submittal of the Ground Water Remedial Action Protectiveness/Biennial Certification Form, whichever is more recent. If "Yes," check all that apply and indicate if it was necessary to sample the well pursuant to N.J.A.C. 7:26E-1.14.

7. Indicate if there are any planned changes in water use for the aquifers in which the CEA/WRA is located since the CEA/WRA was established or the last submittal of the Ground Water Remedial Action Protectiveness/Biennial Certification Form, whichever is more recent. Responses to this question should be based on municipal and water purveyor planning data. Users should **not** contact the NJDEP (i.e., New Jersey Geological Survey or Division of Water Supply and Geoscience) for information concerning ground water use planning horizons.

   Check all the sources that were evaluated to determine planned changes in water use.

8. Indicate if the actual or planned changes reported in items 1-7 above render the Remedial Action that includes the CEA/WRA not protective of public health, safety and of the environment. If "Yes," then the permittee/co-permittee

shall modify the Remedial Action and apply for a modification of the Ground Water Remedial Action Permit as necessary pursuant to N.J.A.C. 7:26C-7.8(d)2.

Section J. Vapor Intrusion

1. Indicate if volatile organic compounds are included in the CEA/WRA. If volatile organic compounds are included complete this section, otherwise proceed to the next section.
2. Based on the most recent data available, indicate if any of the contaminants in the CEA/WRA exceed the current Ground Water Screening Levels in the NJDEP's Vapor Intrusion Technical Guidance Document (http://www.nj.gov/dep/srp/guidance/index.html#vi).
3. Indicate if it was necessary to re-evaluate the fate and transport of the ground water contaminant plume or the contaminants in the CEA/WRA with regard to vapor intrusion.
4. Indicate if there were any changes in property use that increased the risk of vapor intrusion.
5. Indicate if you investigated the vapor intrusion pathway.

   Note: The vapor intrusion trigger distances are applied from the edge of the ground water plume based on linear interpolation (not a contaminated monitoring well) when determining which buildings should be investigated.

   If you investigated the vapor intrusion pathway:

   a). Attach a scaled site map indicating the location of all structures investigated for vapor intrusion.

   b). Indicate if the investigation revealed that an Immediate Environmental Concern (IEC) condition exists. If "Yes," provide the date of IEC Contaminant Source Control Report.

   c). Indicate if the investigation revealed that a Vapor Concern (VC) condition exists. If "Yes," provide the date of VC Mitigation Response Action Report.

   d). Indicate if public notification was conducted to notify all applicable parties of the increased vapor intrusion risk.
6. Provide a written explanation of either how the vapor intrusion pathway was investigated *or* the reasons for not evaluating the vapor intrusion pathway.
7. Indicate if any vapor intrusion engineering control(s)/mitigation system(s) have been installed as a result of this ground water contamination.

   If "Yes," indicate the type of system installed and attach the Operation, Maintenance, and Monitoring (OMM) Plan for the vapor intrusion engineering control(s)/mitigation system(s) both in paper and electronically (in "MS Word" file format). The OMM Plan should identify the building(s) and/or structure(s) and vapor intrusion engineering control(s)/mitigation system(s) that are in place (e.g., active or passive), including the address and block and lot of each impacted property. Refer to the NJDEP's Vapor Intrusion Technical Guidance Document at http://www.nj.gov/dep/srp/guidance/index.html#vi.

Section K. Financial Assurance

1. Indicate if the Remedial Action includes an engineering control. **"Engineering control"** means any physical mechanism to contain or stabilize contamination or ensure the effectiveness of a Remedial Action. An engineering control may include, without limitation, a cap, cover, building, dike, trench, leachate collections system, fence, physical access control, and ground water containment system including, without limitation, a slurry wall and a ground water pumping system.

   If the proposed ground water Remedial Action **does not** include an engineering control, than Financial Assurance (FA) is not required for the permit, skip the rest of this section and go to the next section. Note: Permits for Monitored Natural Attenuation do not require FA.
2. Indicate if both the "Person Responsible for Conducting the Remediation" and the current property owner are exempt from establishing FA pursuant to N.J.A.C. 7:26C-7.10(c). The Administrative Requirements for the Remediation of Contaminated Sites, specifically N.J.A.C. 7:26C-7.10(c), defines certain entities that are exempt from filing FA. Check all that qualifies the co-permittees to be exempted and skip the rest of this section and go to the next section.

   If either entity is not exempt, *then establishment of the full amount of the FA is required* by the non-exempt permittee(s) - attach a completed Remediation Cost Review and RFS/FA Form.
3. Indicate whether the current owner of the site is either a homeowner association or a condominium association. If a homeowner association or a condominium association is identified in Section D of this form, attach a copy of the association's annual budget that includes funds for the operation, maintenance, and monitoring of the engineering

control(s) at the site. If the association identified in Section D of this form is ever unable to meet this requirement, then the person responsible for conducting the remediation is required to establish the FA for the permit if they are not exempt pursuant to N.J.A.C. 7:26C-7.10(c).

Section L. Person Responsible for Monitoring the Protectiveness of the Remedial Action

The certification in this section shall be signed and dated by the person responsible for monitoring the protectiveness of the remedial action. The certification in this section shall ***not*** be signed by the Licensed Site Remediation Professional or law firm hired to assist the owner or operator with their compliance obligations. The certification required in this section shall be executed as follows:

1. For a corporation or limited liability company, by a principal executive officer of at least the level of vice president; or
2. For a partnership or sole proprietorship, by a general partner or the proprietor, respectively; or
3. For a municipality, state, Federal or other public agency, by either a principal executive officer or ranking elected official; or
4. By a duly authorized representative of the corporation, partnership, sole proprietorship, municipality, state or Federal or other public agency, as applicable. A person is deemed to be a duly authorized representative if the person is authorized in writing by an individual described in 1, 2 or 3 above and the authorization meets the following criteria:
   i. The authorization specifies either an individual or a position having responsibility for the overall operation of the industrial establishment or activity, such as the position of plant manager, or a superintendent or person of equivalent responsibility (a duly authorized representative may thus be either a named individual or any individual occupying a named position);
   ii. The written authorization is submitted to the NJDEP along with the certification; and
   iii. If an authorization is no longer accurate because a different individual or position has responsibility for the overall operation of the industrial establishment or activity, a new authorization satisfying the requirements of this section shall be submitted to the NJDEP prior to or together with any reports, information, or applications to be signed by an authorized representative.

- Provide the full legal name of the person responsible for monitoring the protectiveness of the remedial action;
- Provide the full name of the representative of the person responsible for monitoring the protectiveness of the remedial action, pursuant to N.J.A.C. 7:26C-1. Enter “Same” if the representative is the same person as the person responsible for monitoring the protectiveness of the remedial action;
- Provide the title of the representative of the person responsible for monitoring the protectiveness of the remedial action;
- Provide the telephone number, extension number, and fax number of the representative of the person responsible for monitoring the protectiveness of the remedial action;
- Provide the mailing address, including the city/town, state, and zip code of the representative of the person responsible for monitoring the protectiveness of the remedial action;
- Provide the email address of the representative of the person responsible for monitoring the protectiveness of the remedial action;
- The representative for the person responsible for monitoring the protectiveness of the remedial action shall provide:
  - His/her signature where indicated;
  - His/her name and title (i.e., President, CEO); and
  - The date when the signing occurred.

Section M. Complete the appropriate signature page.

The Subsurface Evaluator option is only for cases associated with unregulated heating oil tanks (UHOT) where you are a NJDEP licensed Subsurface Evaluator and the remediation is for unregulated heating oil tank system(s) and no other areas of concern.

Licensed Site Remediation Professional Information and Statement

- LSRP ID Number: Provide the Licensed Site Remediation Professional ID Number.
- Provide the name, phone number, email and mailing address (city/town, state, zip code) of the Licensed Site Remediation Professional.

- The Licensed Site Remediation Professional should indicate the level of oversight he/she provided by placing an “X” in appropriate box(es).
- The certification in this section shall be signed and dated by the Licensed Site Remediation Professional.
- The Licensed Site Remediation Professional should indicate by placing an “X” in the box if there have been no changes to the contact information in this section since the last submission.

Subsurface Evaluator UST Report Certification Form

- The certification in this section shall be signed and dated by the Subsurface Evaluator. Include the evaluator’s name, UST certification number, the firm’s name, the firm’s UST certification number, address (city/town, state, zip code), telephone number, and email address.
- The Subsurface Evaluator should indicate by placing an “X” in the box if there have been no changes to the contact information in this section since the last submission.

New Jersey Department of Environmental Protection
Site Remediation Program

REMEDIAL ACTION PROTECTIVENESS / BIENNIAL CERTIFICATION FORM – GROUND WATER

☐ LSRP ☐ Subsurface Evaluator (UHOT)

Date Stamp
(For Department use only)

SECTION A. SITE NAME AND LOCATION

Site Name: _____

List all AKAs: _____

Street Address: _____

Municipality: _____ (Township, Borough or City)

County: _____ Zip Code: _____

Program Interest (PI) Number(s): _____

Case Tracking Number(s): _____

Municipal Block and Lot Numbers of the entire Site:

_____

SECTION B. FEES

☐ Ground Water Remedial Action Protectiveness/Biennial Certification for a Remedial Action Permit (No fee)
☐ Ground Water Remedial Action Protectiveness/Biennial Certification - Non-Remedial Action Permit $375.00

SECTION C. FEE BILLING CONTACT PERSON

☐ Changed Since Last Submission Effective Date of Change: _____

Business Name: _____

First Name of Contact: _____ Last Name of Contact: _____

Title: _____

Phone Number: _____ Ext.: _____ Fax: _____

Mailing Address: _____

Municipality: _____ State: _____ Zip Code: _____

Email Address: _____

SECTION D. CURRENT OWNER OF THE SITE

☐ Changed Since Last Submission Effective Date of Change: _____

☐ If same as Person Responsible for Monitoring the Protectiveness of the Remedial Action (Section L), check box and proceed to next section.

Full Legal Name of the Owner: _____

First Name of Contact: _____ Last Name of Contact: _____

Title: _____

Phone Number: _____ Ext.: _____ Fax: _____

Mailing Address: _____

Municipality: _____ State: _____ Zip Code: _____

Email Address: _____

SECTION E. CURRENT OPERATOR OF THE SITE

☐ Changed Since Last Submission Effective Date of Change: _____

☐ If same as Person Responsible for Monitoring the Protectiveness of the Remedial Action (Section L), check box and proceed to the next section.

Full Legal Name of the Operator: _____

First Name of Contact: _____ Last Name of Contact: _____

Title: _____

Phone Number: _____ Ext.: _____ Fax: _____

Mailing Address: _____

Municipality: _____ State: _____ Zip Code: _____

Email Address: _____

SECTION F. CURRENT LESSEE OF THE SITE

☐ Changed Since Last Submission Effective Date of Change: _____

☐ If same as Person Responsible for Monitoring the Protectiveness of the Remedial Action (Section L), check box and proceed to the next section.

Full Legal Name of the Lessee: _____

First Name of Contact: _____ Last Name of Contact: _____

Title: _____

Phone Number: _____ Ext.: _____ Fax: _____

Mailing Address: _____

Municipality: _____ State: _____ Zip Code: _____

Email Address: _____

SECTION G. REMEDIAL ACTION AND CEA/WRA INFORMATION

1. Type of Ground Water Remediation

a. ☐ **Monitored Natural Attenuation**

1) Has ground water sampling been conducted at the site since the CEA/WRA was established or the last submittal of the Ground Water Remedial Action Protectiveness/ Biennial Certification Form, whichever is more recent? ..... ☐ Yes ☐ No

If "Yes," attach a summary of the ground water sampling results to this form, including all historical ground water sampling data for the site.

2) Do the results of the ground water sampling demonstrate that contaminant concentrations have decreased to or below the applicable Ground Water Quality Standards for two consecutive sampling events accounting for seasonal fluctuation? ..... ☐ Yes ☐ No ☐ N/A

If "Yes", then submit a Ground Water Remedial Action Permit Application for a termination or a request for a CEA/WRA lift for sites that do not currently have a Ground Water Remedial Action Permit and skip the rest of this section.

3) Do the results of the ground water sampling indicate that there is a decreasing trend of contaminant concentrations in the ground water? ..... ☐ Yes ☐ No

If "No," is the ground water plume considered stable? ..... ☐ Yes ☐ No

If "No," then the permittee/co-permittee shall modify the Remedial Action and apply for a modification of the Ground Water Remedial Action Permit as necessary pursuant to N.J.A.C. 7:26C-7.8(d)2.

4) Is the ground water plume reaching the sentinel wells? ..... ☐ Yes ☐ No

If "Yes," then the permittee/co-permittee shall complete additional delineation of the ground water contamination and modify the Remedial Action and apply for a modification of the Ground Water Remedial Action Permit as necessary pursuant to N.J.A.C. 7:26C-7.8(d)2.

5) Has all soil contamination in the unsaturated zone been remediated to the applicable numeric Soil Remediation Standard for all area(s) of concern associated with this CEA? ☐ Yes ☐ No ☐ N/A

6) Has all free and/or residual product in the unsaturated and saturated zones, as determined pursuant to N.J.A.C. 7:26E-5.1(e), been treated or removed for all area(s) of concern associated with this CEA? ☐ Yes ☐ No ☐ N/A

b. ☐ **Active Remediation**

Provide the type of remediation: _____

1) Has ground water sampling been conducted at the site since the CEA/WRA was established or the last submittal of the Ground Water Remedial Action Protectiveness/ Biennial Certification Form, whichever is more recent? ..... ☐ Yes ☐ No

If "Yes", Attach a summary of the ground water sampling results to this form, including all historical ground water sampling data for the site.

2) Do the results of the ground water sampling demonstrate that contaminant concentrations have decreased to or below the applicable Ground Water Quality Standards for two consecutive sampling events accounting for seasonal fluctuation? ..... ☐ Yes ☐ No ☐ N/A

If "Yes", then submit a Ground Water Remedial Action Permit Application for a termination or a request for a CEA/WRA lift for sites that do not currently have a Ground Water Remedial Action Permit and skip the rest of this section.

3) Do the results of the ground water sampling indicate that there is a decreasing trend of contaminant concentrations in the ground water? ..... ☐ Yes ☐ No

If "No", is the ground water plume considered stable? ..... ☐ Yes ☐ No

If "No," then the permittee/co-permittee shall modify the Remedial Action and apply for a modification of the Ground Water Remedial Action Permit as necessary pursuant to N.J.A.C. 7:26C-7.8(d)2.

4) Is the ground water plume reaching the sentinel wells? ..... ☐ Yes ☐ No

If "Yes," then the permittee/co-permittee shall complete additional delineation of the ground water contamination and modify the Remedial Action and apply for a modification of the Ground Water Remedial Action Permit as necessary pursuant to N.J.A.C. 7:26C-7.8(d)2.

5) Is the ground water plume migrating horizontally or vertically into an uncontaminated aquifer zone below and adjacent to the contaminant plume? ..... ☐ Yes ☐ No

6) Is the ground water remedial action performing as designed? ..... ☐ Yes ☐ No

If "No", provide an explanation:

7) Has the active ground water treatment system been shutdown for longer than 24-hours since the CEA/WRA was established or the last submittal of the Ground Water Remedial Action Protectiveness/Biennial Certification Form, whichever is more recent? ..... ☐ Yes ☐ No ☐ N/A

If "Yes", provide an explanation for the shutdown, including the duration of the shutdown and whether or not the shutdown rendered the Remedial Action not protective of public health, safety and of the environment:

8) What is the expected duration of the active remediation? _____ (whole years)

2. Has a Technical Impracticability (TI) Determination been submitted? ..... ☐ Yes ☐ No

   If "Yes," please provide the date of the TI Determination: _____
   And attach a summary of the TI Determination and a 5-year evaluation if applicable.

3. Check the Ground Water **Monitoring Schedule** that is currently being applied for the site:

   ☐ Monthly ☐ Annual
   ☐ Quarterly ☐ Biennial
   ☐ Semi Annual ☐ Other: _____

4. CEA/WRA Specific Information:

   Date CEA/WRA was Established: _____ Expected Expiration Date of the CEA/WRA: _____

   Name of the Impacted Aquifer: _____

   Ground Water Classification: _____ Ground Water Flow Direction: _____

   Horizontal Extent of CEA/WRA: _____ (acres) Vertical Depth of the CEA/WRA: _____ (feet below ground surface)

   Attach a scaled site map with the extent of the CEA/WRA on it.

5. Since the CEA/WRA was established or the last submittal of the Ground Water Remedial Action Protectiveness/Biennial Certification Form, whichever is more recent, did the Municipal Block and Lot number(s) of the CEA/WRA change? ..... ☐ Yes ☐ No

   If "Yes," attach a current Tax Map of the property and list the former and new Municipal Block and Lot numbers of the CEA/WRA below:

   Former Municipal Block and Lot Number(s): _____

   New Municipal Block and Lot Number(s): _____

6. Is this form being submitted pursuant to a Ground Water Remedial Action Permit? ..... ☐ Yes ☐ No
   If 'No', submit a completed Ground Water Remedial Action Permit Application with this form.

7. Did you provide hard copies of this form to the municipal and county clerks for each municipality and county in which the site is located; the local, county and regional health department for each municipality and county in which the site is located; each current owner of the site; each current operator of the site; each current property owner within the footprint of the CEA/WRA and the Pinelands Commission, as applicable, and the Highlands Commission as applicable? ..... ☐ Yes ☐ No

8. Did you provide to NJDEP copies of this form in paper and electronically on a CD (in Adobe PDF format)? ..... ☐ Yes ☐ No

9. Have monitoring wells associated with the CEA/WRA been damaged, vandalized, repaired, replaced, or decommissioned? ..... ☐ Yes ☐ No

   If "Yes," attach a description of what occurred and, if applicable, a copy of the Well Abandonment Report for each well that has been damaged, vandalized, repaired, replaced, or decommissioned, and the construction specifications for each new/replacement well.

   Attach the maintenance and evaluation logs for all the monitoring wells associated with the CEA/WRA.

10. Have additional monitoring wells been installed since the CEA/WRA was established or the last submittal of the Ground Water Remedial Action Protectiveness/Biennial Certification Form, whichever is more recent? ..... ☐ Yes ☐ No

    If "Yes", attach the construction specifications for each new well.

11. Has the CEA/WRA been revised for any reason that did not require conducting additional remediation? ..... ☐ Yes ☐ No

    If "Yes," attach a new CEA/WRA Fact Sheet form with all Exhibits and indicate which major CEA component(s) have been revised:

    ☐ Contaminant List ☐ Boundaries ☐ Projected Term of CEA/WRA

12. Have you evaluated the Ground Water Quality Standards and other regulations and guidance relevant to the CEA/WRA and any resulting vapor intrusion risk, that have been modified subsequent to the establishment of the CEA/WRA or the last submittal of the Ground Water Remedial Action Protectiveness/Biennial Certification Form and report, whichever is more recent? ..... ☐ Yes ☐ No

13. Has the CEA/WRA been accurately mapped on NJ-GeoWeb? ..... ☐ Yes ☐ No

If 'No', then submit a GIS compatible map of the CEA/WRA to srpgis_cea@dep.state.nj.us.

SECTION H. LAND USE, CHANGES, AND DISTURBANCES

1. Site Use(s) at the time the CEA/WRA was established *(check all that apply)*

☐ Industrial	☐ Child Care Facility	☐ Park or Recreational Use	☐ Other: _____
☐ Residential	☐ Hospital	☐ Vacant	
☐ Commercial	☐ Landfill	☐ Government Facility	
☐ School	☐ Agricultural	☐ Road/Right of Way	

2. Current Site Use(s) *(check all that apply)*

☐ Industrial	☐ Child Care Facility	☐ Park or Recreational Use	☐ Other: _____
☐ Residential	☐ Hospital	☐ Vacant	
☐ Commercial	☐ Landfill	☐ Government Facility	
☐ School	☐ Agricultural	☐ Road/Right of Way	

3. Intended Future Site Use(s), If Known *(check all that apply)*

☐ Industrial	☐ Child Care Facility	☐ Park or Recreational Use	☐ Future site use unknown
☐ Residential	☐ Hospital	☐ Vacant	☐ Other: _____
☐ Commercial	☐ Landfill	☐ Government Facility	
☐ School	☐ Agricultural	☐ Road/Right of Way	

4. Describe the current site operations and the status of any planned future land use(s) for the site, particularly if the proposed use is residential, school, or licensed child care facility:

5. Since time the CEA/WRA was established or the last submittal of the Ground Water Remedial Action Protectiveness/Biennial Certification Form, whichever is more recent, has the site use changed to residential, school, or licensed child care facility? ..... ☐ Yes ☐ No

If "Yes,": indicate the type of remedy used:

☐ Presumptive Remedy pursuant to the NJDEP's Presumptive Remedies for Soil Contamination at Schools, Child Care Centers, and Residences. [N.J.A.C. 7:26E- 5.3]

Briefly describe presumptive remedy:

☐ Alternate Remedy pre-approved by the NJDEP. Attach a copy of the NJDEP's pre-approval letter.

☐ Unrestricted Use Remedy

6. Have disturbances of the land, such as installation of a detention basin, taken place? ..... ☐ Yes ☐ No

If "Yes,":

a) Indicate the type of and the approximate date of the disturbance(s): _____

b) Did these disturbances result in a contaminated discharge to surface water that rendered the Remedial Action not protective of public health, safety and of the environment? ..... ☐ Yes ☐ No

c) Did these disturbances intercept the water table within the CEA/WRA area in such a way that ground water sampling was needed to determine if the ground water contaminant plume could discharge to surface water?..... ☐ Yes ☐ No

If "Yes," does the ground water meet the more stringent of either the New Jersey Surface Water Quality Criteria, N.J.A.C. 7:9B or the Federal Surface Water Quality Criteria, CFR Part 131?..... ☐ Yes ☐ No

SECTION I. CURRENT OR PLANNED WATER USE WITHIN THE WELL SEARCH AREA

1. Water use within the CEA/WRA when CEA/WRA was established *(check all that apply)*

☐ Potable
☐ Well Head Protection Area
  ☐ Tier 1 ☐ Tier 2 ☐ Tier 3
☐ Irrigation
☐ Industrial
☐ Geothermal

2. Current water use within the CEA/WRA Boundaries *(check all that apply)*

☐ Potable
☐ Well Head Protection Area
  ☐ Tier 1 ☐ Tier 2 ☐ Tier 3
☐ Irrigation
☐ Industrial
☐ Geothermal

3. Attach the results of the required updated well search to this form, including a scaled map.

4. Since the CEA/WRA was established or the last submittal of the Ground Water Remedial Action Protectiveness/Biennial Certification Form, whichever is more recent, has the water use changed within the well search area? ..... ☐ Yes ☐ No

   If "Yes," briefly describe:

5. Have any changes in water use altered the areal extent and or the duration of the CEA/WRA?..... ☐ Yes ☐ No

6. Since the CEA/WRA was established or the last submittal of the Ground Water Remedial Action Protectiveness/Biennial Certification Form, whichever is more recent, have any of the following wells been installed within one mile up-gradient, side-gradient, and down-gradient of the CEA/WRA? ..... ☐ Yes ☐ No

   If "Yes," check all that apply:

   ☐ Potable ☐ Industrial ☐ Community Supply Well ☐ Irrigation
   ☐ Geothermal ☐ Production ☐ Non-Community Supply Well

   If you checked one of the above, was it necessary to sample the well pursuant to N.J.A.C. 7:26 E-1.14?..... ☐ Yes ☐ No

7. Since the CEA/WRA was established or the last submittal of the Ground Water Remedial Action Protectiveness/Biennial Certification Form, whichever is more recent, are there any planned changes in water use for the aquifers in which the CEA/WRA is located? ..... ☐ Yes ☐ No

   Check all the sources that were evaluated to determine planned changes in water use:

   ☐ Municipal Master Plans
   ☐ Zoning Plans
   ☐ Local water purveyor plans and planning data pertaining to the existence of water lines and proposed future installation of water lines, wells or well fields
   ☐ Local and County ordinances restricting installation of potable wells
   ☐ Local and County boards of health
   ☐ Local planning officials

8. Did or will the actual or planned changes reported in items 1-7 above render the Remedial Action that includes the CEA/WRA not protective of public health, safety and of the environment?..... ☐ Yes ☐ No

   If "Yes," then the permittee/co-permittee shall modify the Remedial Action and apply for a modification of the Ground Water Remedial Action Permit as necessary pursuant to N.J.A.C. 7:26C-7.8(d)2.

SECTION J. VAPOR INTRUSION

1. Are volatile organic compounds included in the CEA/WRA? ..... ☐ Yes ☐ No
   If "Yes," complete this section, otherwise proceed to the next section

2. Based on the most recent data available, do any of the contaminants in the CEA/WRA exceed the current ground water screening levels in the NJDEP's Vapor Intrusion Technical Guidance Document? ..... ☐ Yes ☐ No

3. Was it necessary to re-evaluate the fate and transport of the ground water contaminant plume or the contaminants in the CEA/WRA with regard to vapor intrusion? ..... ☐ Yes ☐ No

4. Were there any changes in property use that increased the risk of vapor intrusion? ..... ☐ Yes ☐ No

5. Did you investigate the vapor intrusion pathway? ..... ☐ Yes ☐ No

   If "Yes,":

   a) Attach a scaled site map indicating the location of all structures investigated for vapor intrusion.

   b) Did the investigation indicate that an Immediate Environmental Concern (IEC) condition exists? ..... ☐ Yes ☐ No

      If "Yes," provide the date of IEC Contaminant Source Control Report: _____

   c) Did the investigation indicate that a Vapor Concern (VC) condition exists? ..... ☐ Yes ☐ No

      If "Yes," provide the date of VC Mitigation Response Action Report: _____

   d) Was public notification conducted to notify all applicable parties of the increased vapor intrusion risk? ..... ☐ Yes ☐ No ☐ N/A

6. Provide a written explanation of either how the vapor intrusion pathway was investigated <u>or</u> the reasons for not evaluating the vapor intrusion pathway.

7. Have any vapor intrusion engineering controls/mitigation systems been installed as a result of this ground water contamination? ..... ☐ Yes ☐ No

   If "Yes," indicate the type of engineering control that was implemented: *(check all that apply)*

   ☐ Subsurface Depressurization System
   ☐ Subsurface Ventilation System
   ☐ Soil Vapor Extraction System
   ☐ HVAC Positive Pressure
   ☐ Other (specify): _____

   Attach the Operation, Maintenance, and Monitoring (OMM) Plan for the vapor intrusion engineering control(s)/mitigation system(s) both in paper and electronically (in "MS Word" file format). The OMM Plan should clearly identify the building(s) and/or structure(s) and vapor intrusion engineering control(s)/mitigation system(s) that are in place (e.g., active or passive), including the address and block and lot of each impacted property.

SECTION K. FINANCIAL ASSURANCE

1. Does the Remedial Action include an engineering control? ..... ☐ Yes ☐ No

   If "No," proceed to the next section.

2. Are **both** the "Person Responsible for Conducting the Remediation" and the current property owner exempt from establishing Financial Assurance pursuant to N.J.A.C. 7:26C-7.10(c)? ..... ☐ Yes ☐ No

   If "Yes," check the exemptions that apply, and then proceed to the next section.

Person Responsible for Conducting the Remediation – Co-Permittee	Current Owner of the Site – Co-Permittee	
☐	☐	Government entity
☐	☐	A person not liable pursuant to the Spill Act that purchased contaminated property before May 7, 2009
☐	☐	A person that conducted remediation at their primary or secondary residence
☐	☐	Owner or operator of a child care center
☐	☐	Public school or private school
☐	☐	Owner or operator of a small business responsible for conducting remediation at the location of the business

   If "No," - *If either entity is not exempt, then establishment of the full amount of the Financial Assurance is required by the non-exempt permittee(s) - attach a completed Remediation Cost Review and RFS/FA Form.*

3. Is the current owner of the site either a homeowner association or a condominium association pursuant to the New Jersey Common Interest Association Act, N.J.S.A. 46:8A-1 et seq.?..... ☐ Yes ☐ No

   If "Yes," and the association is identified in Section D of this form, attach a copy of the association's annual budget that includes funds for the operation, maintenance, and monitoring of the engineering control(s) at the site.

SECTION L. PERSON RESPONSIBLE FOR MONITORING THE PROTECTIVENESS OF THE REMEDIAL ACTION INFORMATION AND CERTIFICATION

Full Legal Name of the Person Responsible for monitoring the Protectiveness of the Remediation: _____

Representative First Name: _____ Representative Last Name: _____

Title: _____

Phone Number: _____ Ext: _____ Fax: _____

Mailing Address: _____

Municipality: _____ State: _____ Zip Code: _____

Email Address: _____

Relationship to the Site *(check all that apply)*

- ☐ I am the current Owner
- ☐ I am the current Operator
- ☐ I am the current Lessee
- ☐ I am the Person who conducted the remediation
- ☐ I am the Permittee
- ☐ I am the Co-Permittee

This certification shall be signed by the person responsible for submitting the Ground Water Remedial Action Protectiveness/Biennial Certification Form in accordance with the Administrative Requirements for the Remediation of Contaminated Sites rule at N.J.A.C. 7:26C-1.5(a).

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, including all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, to the best of my knowledge, I believe that the submitted information is true, accurate and complete. I am aware that there are significant civil penalties for knowingly submitting false, inaccurate or incomplete information and that I am committing a crime of the fourth degree if I make a written false statement which I do not believe to be true. I am also aware that if I knowingly direct or authorize the violation of any statute, I am personally liable for the penalties.

I also understand that engineering and institutional controls must be evaluated and maintained to ensure they remain protective of public health and safety and the environment.

Based upon the information provided herein, I hereby certify that the remedial action(s) implemented at the site that includes engineering and/or institutional controls remains protective of public health and safety and the environment.

Signature: _____ Date: _____

Name/Title: _____

SECTION M. LICENSED SITE REMEDIATION PROFESSIONAL INFORMATION AND STATEMENT

LSRP ID Number: _____

First Name: _____ Last Name: _____

Phone Number: _____ Ext: _____ Fax: _____

Mailing Address: _____

Municipality: _____ State: _____ Zip Code: _____

Email Address: _____

This statement shall be signed by the LSRP who is submitting this notification in accordance with SRRA Section 16 d. and Section 30 b.2.

I certify that I am a Licensed Site Remediation Professional authorized pursuant to N.J.S.A. 58:10C to conduct business in New Jersey. As the Licensed Site Remediation Professional of record for this remediation, I:

[SELECT ONE OR BOTH OF THE FOLLOWING AS APPLICABLE]:

☐ *directly oversaw and supervised all of the referenced remediation, and\or*

☐ *personally reviewed and accepted all of the referenced remediation presented herein.*

I believe that the information contained herein, and including all attached documents, is true, accurate and complete.

It is my independent professional judgment and opinion that the remediation conducted at this site, as reflected in this submission to the Department, conforms to, and is consistent with, the remediation requirements in N.J.S.A. 58:10C-14.

My conduct and decisions in this matter were made upon the exercise of reasonable care and diligence, and by applying the knowledge and skill ordinarily exercised by licensed site remediation professionals practicing in good standing, in accordance with N.J.S.A. 58:10C-16, in the State of New Jersey at the time I performed these professional services.

I am aware pursuant to N.J.S.A. 58:10C-17 that for purposely, knowingly or recklessly submitting false statement, representation or certification in any document or information submitted to the board or Department, etc., that there are significant civil, administrative and criminal penalties, including license revocation or suspension, fines and being punished by imprisonment for conviction of a crime of the third degree.

LSRP Signature: _____ Date: _____

LSRP Name/Title: _____

Company Name: _____

No Changes to Contact Information Since Last Submission ☐

Completed forms should be sent to:

Bureau of Case Assignment & Initial Notice
Site Remediation Program
NJ Department of Environmental Protection
401-05H
PO Box 420
Trenton, NJ 08625-0420

SECTION M. SUBSURFACE EVALUATOR INFORMATION AND STATEMENT

I certify under penalty of law that the work was performed under my oversight and I have reviewed the report and all attached documents, and the submitted information is true, accurate and complete in accordance with the requirements of N.J.A.C. 7:14B and N.J.A.C. 7:26E. I am aware that there are significant civil and criminal penalties for submitting false, inaccurate or incomplete information including fines and/or imprisonment.

Name: _____ UST Cert. No.: _____

Firm: _____ Firm's UST Cert. Number: _____

Firm Address: _____

Municipality: _____ State: _____ Zip Code: _____

Phone Number: _____ Ext: _____ Fax: _____

Email Address: _____

Signature: _____ Date: _____

No Changes To Contact Information Since Last Submission ☐

Completed forms should be sent to:

Bureau of Case Assignment & Initial Notice
Site Remediation Program
NJ Department of Environmental Protection
401-05H
PO Box 420
Trenton, NJ 08625-0420

APPENDIX C

Well Construction Logs

Project Name: Cornell-Dubilier	Site Id: MW01
Project Number: 1945.1018	
Logged By: T. Fowler	Location: South Plainfield, NJ
Contractor: Tabasco Drilling	X Coordinate: 516243.47
Drilling Method: 6.25 in. id HSA, 3 in. split spoons	Y Coordinate: 635263.45
Remarks: Diedrich D-120 Rig. Well originally intended for this location was installed as MW01A. NAB: Not Above Background.	Elevation: 70.92'
	Date Started: 08/02/00
	Date Completed: 08/02/00

Depth (ft)	Sample No.	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Notes
	CDE-MW01-00	08/02/00	1110	45	- 16 20 50	SM/ML		0-0.5 Asphalt and coarse GRAVEL (subbase). 0.5-1 Coarse GRAVEL, fine to coarse medium brown to red brown sand, some silt. 1-2 Red brown SILT; weathered siltstone; dry.	NAB NAB	Sample from 0.00-2.00 ft.
1										
2	CDE-MW01-02	08/02/00	1125	100	38 100/.33	ML		Red brown weathered SILTSTONE; partially broken to silt-size particles; horizontal bedding; dry.	NAB NAB	Sample from 2.00-4.00 ft.
3										
4	CDE-MW01-04	08/02/00	1140	100	118/.5			Red brown weathered SILTSTONE, broken into 2 in by 0.25 in pieces and silt-size particles; dry.	NAB NAB	Sample from 4.00-6.00 ft.
5										
6								End of boring at 6 feet.		
7										
8										
9										
10										
11										
12										

Project Name: Cornell-Dubilier	Site Id: MW01A
Project Number: 1945.1018	Static Water Level: 15.66'
Location: South Plainfield, NJ	X Coordinate: 516299.16
Logged By: T. Fowler, C. Prothro	Y Coordinate: 635229.71
Contractor: Tabasco Drilling	Elevation: 70.48'
Drilling Method: 10in and 6in roller bits; 2in core barrel	Conductor Casing: type: Steel dia: 10.00in fm: 0.00' to: 6.00'
Date Started: 08/07/00	Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: 0.0' to: 24.00'
Date Completed: 08/31/00	Screens: type: Slotted size: 0.010in dia: 2.00in fm: 24.00' to: 49.00'
Remarks: Diedrich D-120 Rig, 6.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone. Static water level values collected during synoptic water level round on 10/05/00.	Annular Fill: type: Bentonite fm: 0.33' to: 22.00' type: #0 Quartz Sand fm: 22.00' to: 23.00' type: #1 Quartz Sand fm: 23.00' to: 49.00'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
	8/7/00	1129			PV		0-.17 Asphalt. .17-.5 Concrete.			Samples collected to 6' with hand auger. Borehole advanced with 6.25" HSA. Sample: CDE-MW01A-00
1					SM/ML		Red brown SILT to f SAND and ang-subang f-c siltstone gravel; trace silty clay.			
2	8/7/00	1145					Red brown SILT to f SAND and subrounded to angular f-c siltstone gravel; trace silty clay; dry.	0.0 ppm 0.0 ppm		
3										
4	8/7/00	1230						0.0 ppm 0.0 ppm		
5										
6	8/7/00	1720	100		SL		6-7.5 Red-brown SILTSTONE; highly fractured. 7.5-10.5 Red-brown SILTSTONE; horizontal fractures at approx. 1-4 ft apart; some calcareous material. 10.5-11.5 Red-brown SILTSTONE; highly fractured. At 10.75, weathering. At 11, vertical fracture. 11.5-12.2 Red-brown SILTSTONE; horizontal fractures at approx. 0.25-0.42 ft spacing with some calcite and/or aragonite micro-crystals. 12.2-12.3 Red-brown SILTSTONE; weathered zone. 12.3-13.5 Red-brown SILTSTONE; massive; horizontal fractures at 12.5 and 13 ft. 13.5-13.75 Red-brown SILTSTONE; well formed aragonite micro-crystals in vugs and fractures at 13.6 ft. 13.75-16 Red-brown SILTSTONE; massive; horizontal fractures at 14.3, 14.5, 15, 15.75, and 15.9 ft; aragonite and/or calcite micro-crystals at 14.3 ft.	0.0 ppm 0.0 ppm		10" Outer Casing to 6'. Core run #1: From 6-16'. Standard 2" core barrel. Rate of barrel advance ~0.3'/min. RQD=36%.
7										
8										
9										
10										
11										

Project Name: Cornell–Dubilier	Site Id: MW01A
Project Number: 1945.1018	Static Water Level: 15.66'
Location: South Plainfield, NJ	X Coordinate: 516299.16
Logged By: T. Fowler, C. Prothro	Y Coordinate: 635229.71
Contractor: Tabasco Drilling	Elevation: 70.48'
Drilling Method: 10in and 6in roller bits; 2in core barrel	Conductor Casing: type: Steel dia: 10.00in fm: 0.00' to: 6.00'
Date Started: 08/07/00	Blank Casing: type: TP 304 SS dia: 2.00in fm: 0.0' to: 24.00'
Date Completed: 08/31/00	Screens: type: Slotted size: 0.010in dia: 2.00in fm: 24.00' to: 49.00'
Remarks: Diedrich D–120 Rig, 6.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone. Static water level values collected during synoptic water level round on 10/05/00.	Annular Fill: type: Bentonite fm: 0.33' to: 22.00'; type: #0 Quartz Sand fm: 22.00' to: 23.00'; type: #1 Quartz Sand fm: 23.00' to: 49.00'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
13										
14										
15										
16	8/8/00	1110	41		SL/MS		Red brown SILTSTONE/MUDSTONE with muscovite and calcareous micro–crystals; frequent fractures at 0.8–.25 ft; frequent horizontal fractures. 17.33–18.25, skolithos present. At 17.83 ft, high concentration of calcite and/or aragonite micro–crystals. At 16.58 and 19.33 ft, vertical fractures. At 17.71 ft, diagonal fractures. 23.92–26 Red brown SILTSTONE/MUDSTONE; visible sedimentary bedding structures.	0.0 ppm 0.0 ppm		6" Inner Casing t 16'. Core run #2: From 16–26'. Standard 2" core barrel. Rate of barrel advance ~0.3'/min. RQD=0%.
17										
18										
19										
20										
21										
22										
23										

Project Name: Cornell-Dubilier	Site Id: MW01A
Project Number: 1945.1018	Static Water Level: 15.66'
Location: South Plainfield, NJ	X Coordinate: 516299.16
Logged By: T. Fowler, C. Prothro	Y Coordinate: 635229.71
Contractor: Tabasco Drilling	Elevation: 70.48'
Drilling Method: 10in and 6in roller bits; 2in core barrel	Conductor Casing: type: Steel dia: 10.00in fm: 0.00' to: 6.00'
Date Started: 08/07/00	Blank Casing: type: TP 304 SS dia: 2.00in fm: 0.0' to: 24.00'
Date Completed: 08/31/00	Screens: type: Slotted size: 0.010in dia: 2.00in fm: 24.00' to: 49.00'
Remarks: Diedrich D-120 Rig, 6.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone. Static water level values collected during synoptic water level round on 10/05/00.	Annular Fill: type: Bentonite fm: 0.33' to: 22.00' type: #0 Quartz Sand fm: 22.00' to: 23.00' type: #1 Quartz Sand fm: 23.00' to: 49.00'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
										2" Screen top at 24'.
25										
26	8/8/00	1558	100		SL		26-34 Red-brown SILTSTONE; some calcareous micro-crystals and m sand. At 26.67, 27.16, 27.38, 28.46, 29.54, 30.75, 31.75, 32.42, 32.75, 33.25, 34.33, 34.5, 35.25, 35.58, 35.75, and 36 ft, horizontal fractures. At 29, 32.75, 33, and 33.5 ft, vertical fractures. At 27, 28.5, and 32.17, diagonal fractures. 34-36 Red-brown MUDSTONE/SILTSTONE; some f-m sand.	0.0 ppm 0.0 ppm		Core run #3: From 26-36'. Standard 2" core barrel. Rate of barrel advance ~0.3'/min. RQD=36%. Water loss of ~4 gallons from 26-36'.
27										
28										
29										
30										
31										
32										
33										
34										
35										

Project Name: Cornell–Dubilier	Site Id: MW01A
Project Number: 1945.1018	Static Water Level: 15.66'
Location: South Plainfield, NJ	X Coordinate: 516299.16
Logged By: T. Fowler, C. Prothro	Y Coordinate: 635229.71
Contractor: Tabasco Drilling	Elevation: 70.48'
Drilling Method: 10in and 6in roller bits; 2in core barrel	Conductor Casing: type: Steel dia: 10.00in fm: 0.00' to: 6.00'
Date Started: 08/07/00	Blank Casing: type: TP 304 SS dia: 2.00in fm: 0.0' to: 24.00'
Date Completed: 08/31/00	Screens: type: Slotted size: 0.010in dia: 2.00in fm: 24.00' to: 49.00'
Remarks: Diedrich D–120 Rig, 6.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone. Static water level values collected during synoptic water level round on 10/05/00.	Annular Fill: type: Bentonite fm: 0.33' to: 22.00' type: #0 Quartz Sand fm: 22.00' to: 23.00' type: #1 Quartz Sand fm: 23.00' to: 49.00'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
37			76							
38										
39	8/30/00	1636			SL/MS		Red brown SILTSTONE; frequent horizontal fractures spaced at 0.08–.25 ft; trace to some white calcareous deposits. At 40.5 ft, weathered gray–green anaerobic zone. At 41.83 ft, green–gray rounded f quartz grains and dark minerals. At 45 ft, frequent fracturing.	0.0 ppm 0.0 ppm		Core run #4: From 39–49'. Standard 2" core barrel. Rate of barrel advance ~0.2'/min. RQD=0.0% Water loss of ~12.5 gallons from 39'.
40										
41										
42										
43										
44										
45										
46										
47										
	8/31/00	0915	95				Red–brown SILTSTONE; frequent (~9) breaks at 0–10 degrees.			Core run #5 From 47.5–49'.

FW	Project Name: Cornell–Dubilier	Site Id: MW01A
	Project Number: 1945.1018	Static Water Level: 15.66'
	Location: South Plainfield, NJ	X Coordinate: 516299.16
	Logged By: T. Fowler, C. Prothro	Y Coordinate: 635229.71
Contractor: Tabasco Drilling		Elevation: 70.48'
Drilling Method: 10in and 6in roller bits; 2in core barrel		Conductor Casing: type: Steel dia: 10.00in fm: 0.00' to: 6.00'
Date Started: 08/07/00		Blank Casing: type: TP 304 SS dia: 2.00in fm: 0.0' to: 24.00'
Date Completed: 08/31/00		Screens: type: Slotted size: 0.010in dia: 2.00in fm: 24.00' to: 49.00'
Remarks: Diedrich D–120 Rig, 6.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone. Static water level values collected during synoptic water level round on 10/05/00.		Annular Fill: type: Bentonite fm: 0.33' to: 22.00'; type: #0 Quartz Sand fm: 22.00' to: 23.00'; type: #1 Quartz Sand fm: 23.00' to: 49.00'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
49							End of boring at 49 feet.			Standard 2" core barrel. RQD=0.0%. 2" screen bottom at 49'.
50										
51										
52										
53										
54										
55										
56										
57										
58										
59										

Project Name: Cornell–Dubilier	Site Id: MW02
Project Number: 1945.1018	
Logged By: T. Fowler	Location: South Plainfield, NJ
Contractor: Tabasco Drilling	X Coordinate: 516713.32
Drilling Method: 6.25 in. id HSA, 3 in. split spoons	Y Coordinate: 635097.59
Remarks: Diedrich D–120 Rig. Well originally intended for this location was installed as MW02A. NAB: Not Above Background.	Elevation: 71.67'
	Date Started: 08/02/00
	Date Completed: 08/03/00

Depth (ft)	Sample No.	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Notes
	CDE–MW02–00	08/02/00	1515	20	– 6 5 4	ML/SM		0–.5 Asphalt and coarse gravel. 0.5–1.5 Dark gray brown SILT; some sand; dry; becomes brown m–c SAND; moist. 1.5–2.0 Red brown SILTSTONE; weathered.	NAB NAB	Sample from 0.00-2.00 ft.
1										
2	CDE–MW02–02	08/02/00	1520	100	4 5 9 9	ML		Red brown SILT; bedding not apparent; becoming moist with depth.	44 ppm 30 ppm	Sample from 2.00-4.00 ft.
3										
4	CDE–MW02–04	08/02/00	1530	100	4 9 36 45			Red brown SILT (weathered siltstone); moist; petroleum odors are noted.	40 ppm 400 ppm	Sample from 4.00-6.00 ft.
5										Hydropunch sample driven from 5–7'; due to insufficient sample volume, bailer sample is collected. (CDE–MWG02–01)
6								End of boring at 6 feet.		
7										Hydropunch refusal at 7.25 ft; possible concrete.
8										
9										
10										
11										
12										

Project Name: Cornell-Dubilier	Site Id: MW02A
Project Number: 1945.1018	Static Water Level: 14.29'
Location: South Plainfield, NJ	X Coordinate: 516642.49
Logged By: T. Brooks, C. Prothro	Y Coordinate: 635153.40
Contractor: Tabasco Drilling	Elevation: 71.22'
Drilling Method: 10in and 6in roller bits; 2in core barrel	Conductor Casing: type: Steel dia: 10.00in fm: 0.00' to: 12.00'
Date Started: 08/14/00	Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: 0.2' to: 24.00'
Date Completed: 08/31/00	Screens: type: Slotted size: 0.010in dia: 2.00in fm: 24.00' to: 49.00'
Remarks: Diedrich D-120 Rig, 4.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.	Annular Fill: type: Bentonite fm: 0.33' to: 21.00' type: #0 Quartz Sand fm: 21.00' to: 23.00' type: #1 Quartz Sand fm: 23.00' to: 49.00'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction MP. EL. 71.01	Notes
	8/14/00	0850			SM		0-0.08 Asphalt and Gravel subbase. 0.08-0.17 Gray-red to gray-orange silty SAND.	0.0 ppm 0.0 ppm		Samples collected to 4' with hand auger and from 4-10' with 3" split spoon. Borehole advanced with 4.25" HSA.
1										
2	8/14/00	1015					Red-brown to red-orange silty SAND and siltstone Gravel.	0.0 ppm 0.0 ppm		
3										
4	8/14/00	1020	87	40 87 100/.42			Red-brown to orange-brown silty SAND and weathered Siltstone with thin laminae of greenish-gray clayey silt.	15.5 ppm 12.9 ppm		
5										Sample: CDE-MW02A-04
6	8/14/00	1045	69	29 37 100/.42			Same as above.	12.3 ppm 9.7 ppm		6-8' Oily sheen on split spoon.
7										Sample: CDE-MW02A-06
8	8/14/00	1055	75	30 75 100/.25			Same as above.	17.1 ppm 15.2 ppm		
9										Sample: CDE-MW02A-08
10	8/14/00		NA	NA			Same as above.			
11										Auger refusal at 12'. Install 10" Outer Casing to 12'.

Project Name: Cornell–Dubilier	Site Id: MW02A
Project Number: 1945.1018	Static Water Level: 14.29'
Location: South Plainfield, NJ	X Coordinate: 516642.49
Logged By: T. Brooks, C. Prothro	Y Coordinate: 635153.40
Contractor: Tabasco Drilling	Elevation: 71.22'
Drilling Method: 10in and 6in roller bits; 2in core barrel.	Conductor Casing: type: Steel dia: 10.00in fm: 0.00' to: 12.00'
Date Started: 08/14/00	Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: 0.2' to: 24.00'
Date Completed: 08/31/00	Screens: type: Slotted size: 0.010in dia: 2.00in fm: 24.00' to: 49.00'
Remarks: Diedrich D–120 Rig, 4.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.	Annular Fill: type: Bentonite fm: 0.33' to: 21.00' type: #0 Quartz Sand fm: 21.00' to: 23.00' type: #1 Quartz Sand fm: 23.00' to: 49.00'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
	8/15/00	1105	85		SL/MS		12–16.5 Red–brown SILTSTONE to MUDSTONE; horizontal fractures at 0.16–0.25 ft spacing. At 12.92 ft, calcareous deposits. At 13.17 ft, diagonal fracture. At 13.75 ft, vugs. At 16.25 ft, horizontal fracture. 16.5–22 Red–brown SILTSTONE to MUDSTONE; horizontal fractures at 0.08–0.25 ft spacing; characterized by zones of heavy weathering. At 19.6 ft, diagonal fracture. At 20.25 ft, heavily weathered. At 18, 18.6, and 20 ft, vugs.	0.0 ppm 0.0 ppm		Core run #1: From 12–22'. Standard 2" core barrel. Rate of barrel advance ~0.08'/min. RQD=23.5%.
13										
14										
15										
16										
17										At 17.0', some water loss.
18										At 18.5', more water loss. 6" Inner Casing to 18.5'.
19	8/16/00	1323	62				19–19.16 Red–brown SANDSTONE; horizontal fractures at 0.08–0.25 ft spacing. 19.6–23.92 Red–brown SILTSTONE to MUDSTONE; horizontal fractures at 0.08–0.25 ft spacing. 23.92–25.16 Red–brown SILTSTONE to MUDSTONE; horizontal fractures at 0.33 ft spacing. At 19.67 and 22.83, horizontal fractures. At 20.33, diagonal fracture. At 19.16, 21.67, 22.67, weathering. At 19.75 and 20.0, vugs. At 19.46, 21.25, 21.75, 22.5, and 23.5, calcareous deposits.	0.0 ppm 0.0 ppm		Core run #2: From 19–29'. Standard 2" core barrel. Rate of barrel advance ~0.1'/min. RQD=21.6%. At 21', water loss.
20										
21										
22										
23										At 23', water loss.

Project Name: Cornell–Dubilier	Site Id: MW02A
Project Number: 1945.1018	Static Water Level: 14.29'
Location: South Plainfield, NJ	X Coordinate: 516642.49
Logged By: T. Brooks, C. Prothro	Y Coordinate: 635153.40
Contractor: Tabasco Drilling	Elevation: 71.22'
Drilling Method: 10in and 6in roller bits; 2in core barrel.	Conductor Casing: type: Steel dia: 10.00in fm: 0.00' to: 12.00'
Date Started: 08/14/00	Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: 0.2' to: 24.00'
Date Completed: 08/31/00	Screens: type: Slotted size: 0.010in dia: 2.00in fm: 24.00' to: 49.00'
Remarks: Diedrich D–120 Rig, 4.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.	Annular Fill: type: Bentonite fm: 0.33' to: 21.00'; type: #0 Quartz Sand fm: 21.00' to: 23.00'; type: #1 Quartz Sand fm: 23.00' to: 49.00'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
										2" Screen top at 24'.
25										
26										
27										
28										
29	8/16/00	1535	92				29–31 Red–brown SILTSTONE to MUDSTONE; horizontal fractures at 0.08 to 0.25 ft spacing. 31–31.2 Red–brown SILTSTONE to MUDSTONE; weathered; horizontal fractures at 0.08 to 0.25 ft spacing. 31.2–32 Red–brown SILTSTONE to MUDSTONE; horizontal fractures at 0.08 to 0.25 ft spacing. 32–33.2 Red–brown SILTSTONE to MUDSTONE; horizontal fractures at 0.33 to 0.42 ft spacing. 33.2–33.3 Red–brown SILTSTONE to MUDSTONE; weathered; horizontal fractures at 0.33 to 0.42 ft spacing. 33.3–34.16 Red–brown SILTSTONE to MUDSTONE; horizontal fractures at 0.33 to 0.42 ft spacing. 34.16–34.7 Red–brown SILTSTONE to MUDSTONE; weathered; horizontal fractures at 0.08 to 0.16 ft spacing. 34.7–35.16 Red–brown SILTSTONE to MUDSTONE; horizontal fractures at 0.08 to 0.16 ft spacing. 35.16–36.16 Red–brown SILTSTONE to MUDSTONE. 36.16–36.5 Red–brown SILTSTONE to MUDSTONE; horizontal fractures at 0.08 ft spacing. 36.5–36.8 Red–brown SILTSTONE to MUDSTONE; anaerobic green–gray precipitate; horizontal fractures at 0.08 ft spacing. 36.8–37 Red–brown SILTSTONE to MUDSTONE; horizontal fractures at 0.08 ft spacing. 37–37.6 Red–brown SILTSTONE to MUDSTONE; weathered; horizontal fractures at 0.08 ft spacing. At 30, 31.75 and 33.5 ft, green–gray precipitate. At 36.6 ft, diagonal fracture. 37.6–38.25 Red–brown SILTSTONE to MUDSTONE.	0.0 ppm 0.0 ppm		Core run #3: From 29–39'. Standard 2" core barrel. Rate of barrel advance ~0.1'/min. RQD=21.6%.
30										
31										
32										
33										
34										
35										

	Project Name: Cornell–Dubilier	Site Id: MW02A
	Project Number: 1945.1018	Static Water Level: 14.29'
	Location: South Plainfield, NJ	X Coordinate: 516642.49
	Logged By: T. Brooks, C. Prothro	Y Coordinate: 635153.40
Contractor: Tabasco Drilling		Elevation: 71.22'
Drilling Method: 10in and 6in roller bits; 2in core barrel.		Conductor Casing: type: Steel dia: 10.00in fm: 0.00' to: 12.00'
Date Started: 08/14/00		Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: 0.2' to: 24.00'
Date Completed: 08/31/00		Screens: type: Slotted size: 0.010in dia: 2.00in fm: 24.00' to: 49.00'
Remarks: Diedrich D–120 Rig, 4.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.		Annular Fill: type: Bentonite fm: 0.33' to: 21.00'; type: #0 Quartz Sand fm: 21.00' to: 23.00'; type: #1 Quartz Sand fm: 23.00' to: 49.00'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
							At 29.83–30, 31.75, 33.58, 34.5–34.75, and 37–37.66 ft, vugs. At 31.75, 33.58, and 36.5–36.83 ft, calcareous deposits.			
37										
38										At 38', water loss. At 39', water loss.
39	9/14/00		100				39–44 Red–brown SILTSTONE to MUDSTONE; horizontal fractures at 0.42–0.5 ft spacing; characterized by weathered to heavily weathered zones. At 39.8 ft, diagonal fracture. At 39.08, 40.5, 41.16–41.33, and 43 ft, calcareous deposits. At 39.33, 41.16, 42.75, and 42.92 ft, vugs. At 40.38–40.46 ft, gray weathered zone.	0.3 ppm 0.3 ppm		Core run #4: From 39–44'. Standard 2" core barrel. Rate of barrel advance ~0.09'/min. RQD=37%. At 40', water loss.
40										
41										
42										
43										At 43', water loss.
44			96				44–44.6 Red–brown SILTSTONE to sandy MUDSTONE; horizontal fractures at 0.08–0.21 ft spacing; trace to some white calcareous–filled vugs and fractures. 44.6–45 Red–brown SILTSTONE to sandy MUDSTONE; frequent fractures; horizontal fractures at 0.08–0.21 ft spacing; trace to some white calcareous–filled vugs and fractures. At 45 Vertical fracture with trace dark staining. 45–46 Red–brown SILTSTONE to sandy MUDSTONE; horizontal fractures at 0.08–0.21 ft spacing; trace to some white calcareous–filled vugs and fractures. 46–47 Red–brown SILTSTONE to sandy MUDSTONE; horizontal fractures at 0.08–0.21 ft spacing; some white calcareous–filled vugs and fractures. 47–47.7 Red–brown SILTSTONE to sandy MUDSTONE; horizontal fractures at 0.08–0.21 ft spacing; trace to some white calcareous–filled vugs and fractures.	0.0 ppm 0.0 ppm		Core run #5: From 44–49'. Standard 2" core barrel. RQD=20.8%.
45										
46										
47										

	Project Name: Cornell–Dubilier	Site Id: MW02A
	Project Number: 1945.1018	Static Water Level: 14.29'
	Location: South Plainfield, NJ	X Coordinate: 516642.49
	Logged By: T. Brooks, C. Prothro	Y Coordinate: 635153.40
Contractor: Tabasco Drilling		Elevation: 71.22'
Drilling Method: 10in and 6in roller bits; 2in core barrel.		Conductor Casing: type: Steel dia: 10.00in fm: 0.00' to: 12.00'
Date Started: 08/14/00		Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: 0.2' to: 24.00'
Date Completed: 08/31/00		Screens: type: Slotted size: 0.010in dia: 2.00in fm: 24.00' to: 49.00'
Remarks: Diedrich D–120 Rig, 4.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.		Annular Fill: type: Bentonite fm: 0.33' to: 21.00' type: #0 Quartz Sand fm: 21.00' to: 23.00' type: #1 Quartz Sand fm: 23.00' to: 49.00'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
49							47.7–47.9 Vertical fracture with trace dark staining. 47.9–48.8 Red–brown SILTSTONE to sandy MUDSTONE; horizontal fractures at 0.08–0.21 ft spacing; trace to some white calcareous–filled vugs and fractures. End of boring at 49 feet.			2" Screen bottom at 49'.
50										
51										
52										
53										
54										
55										
56										
57										
58										
59										

Project Name: Cornell–Dubilier	Site Id: MW03
Project Number: 1945.1018	Static Water Level: 12.84'
Location: South Plainfield, NJ	X Coordinate: 516827.35
Logged By: T. Fowler	Y Coordinate: 634878.57
Contractor: Tabasco Drilling	Elevation: 71.11'
Drilling Method: 10in and 6in roller bits; 2in core barrel	Conductor Casing: type: Steel dia: 10.00in fm: 0.00' to: 8.00'
Date Started: 08/03/00	Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: 0.5' to: 17.00'
Date Completed: 08/18/00	Screens: type: Slotted size: 0.010in dia: 2.00in fm: 17.00' to: 32.00'
Remarks: Diedrich D–120 Rig, 6.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.	Annular Fill: type: Bentonite fm: 0.33' to: 14.00' type: #0 Quartz Sand fm: 14.00' to: 15.00' type: #1 Quartz Sand fm: 15.00' to: 32.00'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction (MP. EL. 70.60)	Notes
	8/3/00	1445	60	– 17 18 22	SW		Asphalt. Gray–brown f–c SAND; some silt and f gravel. 1.4–1.9 Gray angular GRAVEL; some lt yellow brown sand; dry. At 1.5 ft, dark gray–black stain. 1.9–2.0 Red–brown weathered SILTSTONE.	NAB NAB		Samples collected to 7' with 3" split spoon. Borehole advanced with 6.25" HSA. Sample: CDE–MW03–00
1										
2	8/3/00	1500	50	8 8 8 6	ML		Red–brown SILT; dry to trace moist; siltstone fragment near bottom.			
3								NAB NAB		Sample: CDE–MW03–02
4	8/3/00	1510	70	6 5 4 6			Red–brown SILT; moist to dry; low to moderate plasticity.			
5								NAB NAB		Sample: CDE–MW03–04
6	8/3/00	1525	100	46 100/.42			6–7 Red–brown weathered SILTSTONE; friable with horizontal bedding planes; dry to slightly moist.			Sample: CDE–MW03–06
7	8/4/00	1423					7–14 Red–brown SILTSTONE, very broken to 14 ft, 0.25 in, to 2 in bedding plane, 0 degree breaks, some 70 to 90 degree breaks. 14–17 Clayey SILT and SAND in a gummy matrix; 0 and 80 degree fractures, 0.5 in to 4 in pieces.	NAB NAB		Core run #1: From 7–17'. Standard 2" core barrel. RQD=2%. 10" Outer Casing to 8'.
8			35		SL					
9										
10										
11										

FW	Project Name: Cornell-Dubilier	Site Id: MW03
	Project Number: 1945.1018	Static Water Level: 12.84'
	Location: South Plainfield, NJ	X Coordinate: 516827.35
	Logged By: T. Fowler	Y Coordinate: 634878.57
Contractor: Tabasco Drilling		Elevation: 71.11'
Drilling Method: 10in and 6in roller bits; 2in core barrel		Conductor Casing: type: Steel dia: 10.00in fm: 0.00' to: 8.00'
Date Started: 08/03/00		Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: 0.5' to: 17.00'
Date Completed: 08/18/00		Screens: type: Slotted size: 0.010in dia: 2.00in fm: 17.00' to: 32.00'
Remarks: Diedrich D-120 Rig, 6.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.		Annular Fill: type: Bentonite fm: 0.33' to: 14.00' type: #0 Quartz Sand fm: 14.00' to: 15.00' type: #1 Quartz Sand fm: 15.00' to: 32.00'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
13										
14										
15										
16										
17	8/7/00	1140	84				17-19 Red-brown SILTSTONE; highly fractured; 0 and 90 degree fractures. 19-21 Red-brown SILTSTONE; very highly fractured; some 0 degree fractures. 21-22 Red-brown SILTSTONE; very highly fractured; some 0 and 90 degree fractures. 22-23 Red-brown SILTSTONE; very highly fractured; some 0 degree fractures. 23-24 Red-brown SILTSTONE; possible weathered zone; probable inflow zone; 70 degree fracture. 24-27 Red-brown SILTSTONE; fractures at 0 and 30 degrees; fractures filled in with silt; 0.25 in vugs near bottom.	NAB NAB		2" Screen top at 17'. Core run #2; From 17-27'. Standard 2" core barrel. RQD=16%. 6" Inner Casing to 18'.
18										
19										
20										
21										
22										
23										

FW	Project Name: Cornell–Dubilier	Site Id: MW03
	Project Number: 1945.1018	Static Water Level: 12.84'
	Location: South Plainfield, NJ	X Coordinate: 516827.35
	Logged By: T. Fowler	Y Coordinate: 634878.57
Contractor: Tabasco Drilling		Elevation: 71.11'
Drilling Method: 10in and 6in roller bits; 2in core barrel		Conductor Casing: type: Steel dia: 10.00in fm: 0.00' to: 8.00'
Date Started: 08/03/00		Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: 0.5' to: 17.00'
Date Completed: 08/18/00		Screens: type: Slotted size: 0.010in dia: 2.00in fm: 17.00' to: 32.00'
Remarks: Diedrich D–120 Rig, 6.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.		Annular Fill: type: Bentonite fm: 0.33' to: 14.00' type: #0 Quartz Sand fm: 14.00' to: 15.00' type: #1 Quartz Sand fm: 15.00' to: 32.00'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
25										
26										
27	8/7/00						Red–brown SILTSTONE; trace 0 degree fractures to 32 ft; 27.8 and 28.8 ft, possible 0–20 degree fractures; at 31 ft, 10 degree fractures with blue weathering.	NAB NAB		Core run #3: From 27–32'. Standard 2" core barrel.
28										
29										
30										
31										
32							End of boring at 32 feet.			2" Screen bottom at 32'.
33										
34										
35										

FW	Project Name: Cornell–Dubilier	Site Id: MW04
	Project Number: 1945.1018	Static Water Level: 13.26'
	Location: South Plainfield, NJ	X Coordinate: 516853.13
	Logged By: C. Prothro, T. Fowler	Y Coordinate: 634679.23
Contractor: Tabasco Drilling		Elevation: 72.61'
Drilling Method: 10in and 6in roller bits; 2in core bar.		Conductor Casing: type: Steel dia: 10.00in fm: 0.00' to: 15.00'
Date Started: 08/15/00		Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: 1.2' to: 29.00'
Date Completed: 09/13/00		Screens: type: Slotted size: 0.010in dia: 2.00in fm: 29.00' to: 49.00'
Remarks: Diedrich D–120 Rig, 6.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.		Annular Fill: type: Bentonite fm: 0.33' to: 25.00' type: fm: 25.00' to: 27.00' type: fm: 27.00' to: 49.00'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction MP. EL. 71.46	Notes
	8/15/00	1315	75	17 37 26 20	SM		0–0.1 ASPHALT. 0.1–0.9 Black silty SAND; trace to some fill (brick, cinder, ash) and subrounded to subangular f gravel; semi–dry. 0.9–1.5 Red brown to orange brown silty SAND and weathered Siltstone; dry.	0.0 ppm 0.0 ppm		Samples collected to 15' with 3" split spoon. Borehole advanced with 6.25" HSA. Sample: CDE–MW04–00
1										
2	8/15/00	1330	57	27 22 25 29			Red–brown to orange–brown silty SAND and yellow–brown, blue–black, gray silty Sand, subrounded to subangular f siltstone Gravel, and Fill (cinder and ash); loose; dry.	0.0 ppm 0.0 ppm		
3										
4	8/15/00	1336	50.	17 14 10 13			Red–brown to orange–brown silty SAND and yellow–brown, blue–black, gray silty Sand, subrounded to subangular f siltstone Gravel, Fill (cinder and ash), and Slag fragments; loose; dry.	0.0 ppm 3.9 ppm		
5										Sample: CDE–MW04–04
6	8/15/00	1348	60	9 10 9 8	SM/CH		Red–brown to red silty SAND and Fill; grades to silty CLAY and subrounded m–c siltstone and sandstone Gravel; semi–dense; moist.	0.3 ppm 6.1 ppm		
7										
8	8/15/00	1355	0	6 7 6 4			No recovery.			
9										
10	8/15/00	1410	65	2 2 10 41	MH/CH		Red–brown to brown–red clayey SILT to silty CLAY; trace to some subangular to subrounded siltstone and sandstone gravel.	1.4 ppm 4.0 ppm		
11										

Project Name: Cornell–Dubilier	Site Id: MW04
Project Number: 1945.1018	Static Water Level: 13.26'
Location: South Plainfield, NJ	X Coordinate: 516853.13
Logged By: C. Prothro, T. Fowler	Y Coordinate: 634679.23
Contractor: Tabasco Drilling	Elevation: 72.61'
Drilling Method: 10in and 6in roller bits; 2in core bar.	Conductor Casing: type: Steel dia: 10.00in fm: 0.00' to: 15.00'
Date Started: 08/15/00	Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: 1.2' to: 29.00'
Date Completed: 09/13/00	Screens: type: Slotted size: 0.010in dia: 2.00in fm: 29.00' to: 49.00'
Remarks: Diedrich D–120 Rig, 6.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.	Annular Fill: type: Bentonite fm: 0.33' to: 25.00' type: fm: 25.00' to: 27.00' type: fm: 27.00' to: 49.00'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
	8/15/00	1600	58	28 1 /.42	SL		12–12.8 Red–brown clayey SILT to silty CLAY and subrounded to subangular f–m siltstone and sandstone Gravel. 12.8–13.15 Red–brown SILTSTONE; weathered; wet.	1.2 ppm 3.7 ppm		
13										Sample: CDE–MW04–12
14	8/15/00	1625	30	57 1 /.25			Red–brown to orange–brown SILTSTONE; massive; weathered; dry.	0.0 ppm 3.7 ppm		Bailer Sam[illegible] CDE–MW[illegible]1
15	8/16/00	1415	78				15–17.75 Red–brown SILTSTONE to MUDSTONE; frequent horizontal fractures at <1–2" spacing; becomes heavily weathered at 17.5 ft.	0.0 ppm 0.0 ppm		10" Outer Casing to 15'. Core run #1: From 15–22'. Standard 2" core barrel. Rate of barrel advance ~0.06'/min. RQD=0%.
16					SL/MS		17.75–19.58 Red–brown SILTSTONE; massive; horizontal fractures at 0.08 to 0.25 ft apart. At 18.58 and 18.92 ft, diagonal fractures present. 19.58–21.08 Red–brown MUDSTONE; heavily fractured and weathered.			
17										
18										
19										
20										
21										
22										
23										

Project Name: Cornell-Dubilier	Site Id: MW04
Project Number: 1945.1018	Static Water Level: 13.26'
Location: South Plainfield, NJ	X Coordinate: 516853.13
Logged By: C. Prothro, T. Fowler	Y Coordinate: 634679.23
Contractor: Tabasco Drilling	Elevation: 72.61'
Drilling Method: 10in and 6in roller bits; 2in core bar.	Conductor Casing: type: Steel dia: 10.00in fm: 0.00' to: 15.00'
Date Started: 08/15/00	Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: 1.2' to: 29.00'
Date Completed: 09/13/00	Screens: type: Slotted size: 0.010in dia: 2.00in fm: 29.00' to: 49.00'
Remarks: Diedrich D-120 Rig, 6.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.	Annular Fill: type: Bentonite fm: 0.33' to: 25.00' type: fm: 25.00' to: 27.00' type: fm: 27.00' to: 49.00'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
25	9/12/00	1420	100		SL		25-27 Red-brown SILTSTONE; fractures spaced at 0.04-.25 ft at 80 to 90 degrees. 27-27.9 Red-brown SILTSTONE to MUDSTONE; finely bedded; fractures at 10 degrees. 27.9-28.6 SILTSTONE to MUDSTONE; vertical and horizontal fractures. 28.6-29.6 Red-brown SILTSTONE; some 0-10 degree and 40 degree fractures and 0.02 ft vugs. 29.6-30.6 Silty MUDSTONE; irregular fractures; becomes mudstone. 30.6-32.5 Dk red-brown to red-gray MUDSTONE; weathered; 10 degree fractures; fine white laminae; trace shaley. 32.5-33.3 Dk red-brown to red-gray MUDSTONE; 10 degree fractures; fine white laminae; trace shaley. 33.3-33.5 Blue SILTSTONE; 0.08 ft fractures at 10 degrees; weathered.	0.0 ppm 0.0 ppm		6" Inner Casing to 25'. Core run #2: From 25-34'. Standard 2" core barrel. RQD=21%.
26										
27					SL/MS					
28										
29					SL					2" Screen top at 29'.
30					MS					
31					MS/SL					
32										
33										At 33.5', lost water circulation.
34	9/12/00	1430	100		MS		34-35 Dk red-brown to red-gray MUDSTONE; heavily fractured at 0 degrees. At 35, Dk red-brown to red-gray MUDSTONE; weathered. 35-44 Red brown SILTSTONE to MUDSTONE; massive; fine laminae; trace 0 to 30 degree fractures. At 35.1, 36.2, and 40.2 ft, weathered zones present.	0.0 ppm 0.0 ppm		Core run #3: From 34-44'. Standard 2" core barrel. RQD=73%. Pulsating water loss; net loss ~10 gallons.
35					SL/MS					

	Project Name: Cornell–Dubilier	Site Id: MW04
	Project Number: 1945.1018	Static Water Level: 13.26'
	Location: South Plainfield, NJ	X Coordinate: 516853.13
	Logged By: C. Prothro, T. Fowler	Y Coordinate: 634679.23
Contractor: Tabasco Drilling		Elevation: 72.61'
Drilling Method: 10in and 6in roller bits; 2in core bar.		Conductor Casing: type: Steel dia: 10.00in fm: 0.00' to: 15.00'
Date Started: 08/15/00		Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: 1.2' to: 29.00'
Date Completed: 09/13/00		Screens: type: Slotted size: 0.010in dia: 2.00in fm: 29.00' to: 49.00'
Remarks: Diedrich D–120 Rig, 6.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.		Annular Fill: type: Bentonite fm: 0.33' to: 25.00' type: fm: 25.00' to: 27.00' type: fm: 27.00' to: 49.00'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
37										
38										
39										
40										
41										
42										
43										
44	9/13/00	0845	100		SL		44–45 Red–brown SILTSTONE; massive; trace 0 to 10 degree fractures. At 45 ft, Red–brown SILTSTONE; massive; small vugs present. 45–46 Red–brown SILTSTONE; massive; fractures at 30 degrees. 46–47 Red–brown SILTSTONE; massive; highly fractured at 0 and 90 degrees.	0.0 ppm 15.0 ppm		Core run #4: From 44–49'. Standard 2" core barrel. RQD=25%. Water loss of over 100 gallons.
45										
46										
47										FID peak at 15 ppm from 46–47 feet.

FW	Project Name: Cornell–Dubilier	Site Id: MW04
	Project Number: 1945.1018	Static Water Level: 13.26'
	Location: South Plainfield, NJ	X Coordinate: 516853.13
	Logged By: C. Prothro, T. Fowler	Y Coordinate: 634679.23
Contractor: Tabasco Drilling		Elevation: 72.61'
Drilling Method: 10in and 6in roller bits; 2in core bar.		Conductor Casing: type: Steel dia: 10.00in fm: 0.00' to: 15.00'
Date Started: 08/15/00		Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: 1.2' to: 29.00'
Date Completed: 09/13/00		Screens: type: Slotted size: 0.010in dia: 2.00in fm: 29.00' to: 49.00'
Remarks: Diedrich D–120 Rig, 6.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.		Annular Fill: type: Bentonite fm: 0.33' to: 25.00' type: fm: 25.00' to: 27.00' type: fm: 27.00' to: 49.00'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
49							End of boring at 49 feet.			2" Screen bottom at 49'.
50										
51										
52										
53										
54										
55										
56										
57										
58										
59										

Project Name: Cornell–Dubilier	Site Id: MW05
Project Number: 1945.1018	Static Water Level: 13.94'
Location: South Plainfield, NJ	X Coordinate: 517066.26
Logged By: C. Prothro	Y Coordinate: 634425.11
Contractor: Belasco Drilling	Elevation: 70.79'
Drilling Method: 10in and 6in roller bits; 2in core bar.	Conductor Casing: type: Steel dia: 10.00in fm: –3.00' to: 14.00'
Date Started: 08/18/00	Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: –2.0' to: 25.00'
Date Completed: 08/21/00	Screens: type: Slotted size: 0.010in dia: 2.00in fm: 25.00' to: 45.50'
Remarks: Diedrich D–120 Rig, 6.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.	Annular Fill: type: Bentonite fm: 0.33' to: 23.00' type: fm: 23.00' to: 24.00' type: fm: 24.00' to: 45.00'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
	8/18/00	0919	72	13 16 12 9	SM/Fl		0–0.5 Topsoil. 0.5–2 Red–brown silty SAND, rounded to subangular f–c sandstone Gravel, and black Fill (brick, cinders, ash, and slag), loose, moist.	0.0 ppm 0.0 ppm		Samples collected to 14' with 3" split spoon. Borehole advanced with 6.25" HSA. Sample: CDE–MW05–00
1										
2	8/18/00	0924	0	3 9 7 7			No recovery; brick fragment in spoon.	0.0 ppm 0.0 ppm		
3										
4	8/18/00	0935	67	1 5 8 7			Black silty SAND, rounded to subangular f–c sandstone Gravel, and Fill (brick, cinders, ash, and glass); loose; moist.	0.0 ppm 0.0 ppm		
5										
6	8/18/00	1005	30	3 6 7 5			Same as above.			
7										Sample: CDE–MW05–06
8	8/18/00	1012	67	1 2 5			0–0.2 Black silty SAND, rounded to subangular f–c sandstone Gravel, and Fill (brick, cinders, ash, and glass); loose; moist. 0.2–1.35 Orange–brown to red–brown f SAND; loose; wet.			
9										
10	8/18/00	1020	60	3 13 13 100/5"	SM		0–1.0 Orange–brown to red–brown f SAND; loose; wet. 1.0–1.2 Red–brown SILTSTONE; weathered; dense; dry.			
11					SL					Sample: CDE–MW05–10

	Project Name: Cornell–Dubilier	Site Id: MW05
	Project Number: 1945.1018	Static Water Level: 13.94'
	Location: South Plainfield, NJ	X Coordinate: 517066.26
	Logged By: C. Prothro	Y Coordinate: 634425.11
Contractor: Belasco Drilling		Elevation: 70.79'
Drilling Method: 10in and 6in roller bits; 2in core bar.		Conductor Casing: type: Steel dia: 10.00in fm: –3.00' to: 14.00'
Date Started: 08/18/00		Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: –2.0' to: 25.00'
Date Completed: 08/21/00		Screens: type: Slotted size: 0.010in dia: 2.00in fm: 25.00' to: 45.50'
Remarks: Diedrich D–120 Rig, 6.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.		Annular Fill: type: Bentonite fm: 0.33' to: 23.00' type: fm: 23.00' to: 24.00' type: fm: 24.00' to: 45.00'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
	8/18/00	1035	30	7 95			Red–brown SILTSTONE; v. dense; dry.			
13										
14	8/19/00	1115	87		SL/MS		14–16 Red–brown SILTSTONE to MUDSTONE; frequent horizontal fractures spaced at 0.08 ft; some sedimentary bedding and white calcareous–filled vugs.	0.0 ppm 1.5 ppm		10" Outer C to 14'. Core run #1: From 14–21.5'. Standard 2" core barrel. Rate of barrel advance ~0.02'/min. RQD=0.0%
15							16–19 Red–brown SILTSTONE to MUDSTONE; frequent horizontal fractures spaced at 0.16–0.25 ft; vertical fracture present at 17.5–18.			
16							19–20 Void. 20–21.5 Red–brown SILTSTONE to MUDSTONE. At 20 and 21.3 ft, highly weathered.			
17										
18										
19										
20										
21										
22	8/19/00	1155	100				21.5–21.9 Red–brown SILTSTONE to MUDSTONE. At 21.9 ft, low angle diagonal fracture. 21.9–24 Red–brown SILTSTONE to MUDSTONE; horizontal fractures spaced at 0.16–0.25 ft. At 22.4 ft, anaerobic gray–green zone.	0.0 ppm 0.0 ppm		Core run #2: From 21.5–24' Standard 2" barrel. Rate of barrel advance ~0.02'/min. RQD=0.0%. 6" Inner Casing to 24
23							At 23 ft, frequent fractures.			

FW	Project Name: Cornell-Dubilier	Site Id: MW05
	Project Number: 1945.1018	Static Water Level: 13.94'
	Location: South Plainfield, NJ	X Coordinate: 517066.26
	Logged By: C. Prothro	Y Coordinate: 634425.11
Contractor: Belasco Drilling		Elevation: 70.79'
Drilling Method: 10in and 6in roller bits; 2in core bar.		Conductor Casing: type: Steel dia: 10.00in fm: -3.00' to: 14.00'
Date Started: 08/18/00		Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: -2.0' to: 25.00'
Date Completed: 08/21/00		Screens: type: Slotted size: 0.010in dia: 2.00in fm: 25.00' to: 45.50'
Remarks: Diedrich D-120 Rig, 6.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.		Annular Fill: type: Bentonite fm: 0.33' to: 23.00' type: fm: 23.00' to: 24.00' type: fm: 24.00' to: 45.00'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
	8/20/00	1055	100				24.1-24.8 Red-brown SILTSTONE; some void spaces, white calcareous-filled vugs, sedimentary structures, zones of anaerobic conditions, and horizontal and diagonal fractures; highly weathered; frequently fractured.	0.0 ppm 0.0 ppm		Core run #3: From 24-29'. Standard 2" core barrel. Rate of barrel advance ~0.02'/min. RQD=6.4%. 2" Screen top at 25'.
25							24.8-26.3 Red-brown sandy MUDSTONE; some void spaces, white calcareous-filled vugs, sedimentary structures, zones of anaerobic conditions, and horizontal fractures spaced at 0.08-0.16 ft; voids and vugs present.			
26							26.3-28 Red-brown sandy MUDSTONE; calcareous-filled vugs and small black zones; some sedimentary structures, zones of anaerobic conditions; fractures spaced at 0.08-0.58 ft.			
27							28-29 Red-brown SILTSTONE; weathered. At 28.7 ft, fractures.			
28										Water loss at ~50 gallons from 29-35'.
29	8/20/00	1645	95				29-30 Red-brown SILTSTONE; massive; frequent horizontal, diagonal, and vertical fractures; white calcareous-filled vugs; some weathered fractures.	0.0 ppm 0.0 ppm		Core run #4: From 29-35'. Standard 2" core barrel. Rate of barrel advance ~0.06'/min. RQD=23.3%.
30							30-31.1 Red-brown SILTSTONE to MUDSTONE; frequent horizontal fractures; one vertical fracture; white calcareous-filled vugs. At 32 ft, highly fractured and weathered. At 32.75 ft, diagonal fracture.			
31							32-35 Red-brown SILTSTONE to MUDSTONE; massive; horizontal fractures spaced at 0.13-0.5 ft.			
32										
33										
34										
	8/21/00	1056	90				34.5-44: Red-brown SILTSTONE to sandy MUDSTONE; massive; white calcareous-filled vugs. 19 fractures present. At 35.5 and 35.8 ft, weathered diagonal fracture. At 36.5 and 36.6 ft, weathered horizontal fractures with biotite and other dark minerals present.	0.0 ppm 21.3 ppm		Core run #5: From 34.5-44'. Standard 2" core barrel. Rate of barrel advance
35							36.5-38 Red-brown SILTSTONE to sandy MUDSTONE; massive; white calcareous-filled vugs; cross-bedding and			

Project Name: Cornell–Dubilier	Site Id: MW05
Project Number: 1945.1018	Static Water Level: 13.94'
Location: South Plainfield, NJ	X Coordinate: 517066.26
Logged By: C. Prothro	Y Coordinate: 634425.11
Contractor: Belasco Drilling	Elevation: 70.79'
Drilling Method: 10in and 6in roller bits; 2in core bar.	Conductor Casing: type: Steel dia: 10.00in fm: –3.00' to: 14.00'
Date Started: 08/18/00	Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: –2.0' to: 25.00'
Date Completed: 08/21/00	Screens: type: Slotted size: 0.010in dia: 2.00in fm: 25.00' to: 45.50'
Remarks: Diedrich D–120 Rig, 6.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.	Annular Fill: type: Bentonite fm: 0.33' to: 23.00' type: fm: 23.00' to: 24.00' type: fm: 24.00' to: 45.00'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
							sedimentary structures (bioturbation and skolithos). 38–38.3 Red-brown silty CLAY and subrounded to subangular f-m sandstone Gravel; some gray-green calcareous material; trace dark mineral. 38.3–39.1 Fractured zone; trace weathering. 39–39.1 Subangular to subrounded c Sandstone and Siltstone GRAVEL; well-sorted; trace gray-green calcareous material. 39–39.5 Horizontal fracture spaced at 0.16 ft. 39.5–41 Red-brown SILTSTONE to sandy MUDSTONE; massive; calcareous material; biotite and other dark minerals present. At 40.8 ft, aragonite-filled vug. 41–41.8 Red-brown SILTSTONE to sandy MUDSTONE; becoming coarser; sedimentary structures and white calcareous material; trace crystals and bioturbation evidence. 41.8–44 Sandy MUDSTONE; massive; white calcareous material, sedimentary structures, and fractures; some bioturbation. At 42.6, 43.5, and 43.9 ft, horizontal fractures.			~0.06'/min. RQD=25.9%. Water loss at 104 gallons to 38'. Water loss at ~100 gallons from 38–40'. Water loss at ~224 gallons from 35–43'.
45	8/21/00	1600	100				45–46.5 Red-brown SILTSTONE to sandy MUDSTONE; white calcareous-filled vugs; 9 horizontal and 1 diagonal fractures. 46.5–48 Red-brown SILTSTONE to sandy MUDSTONE; massive. 48–48.2 Red-brown SILTSTONE to sandy MUDSTONE; weathered; fractured. 48.2–49 Red-brown SILTSTONE to sandy MUDSTONE; massive. At 46.6, 46.8, 47, 47.2, 47.3, and 48.8 ft, horizontal fractures. At 48.8 ft, diagonal fracture. At 49 ft, horizontal fracture.	0.0 ppm 26.3 ppm		2" Screen bottom at 45.5'. Core run #6: From 45–49'. Standard 2" core barrel. Rate of barrel advance ~0.02'/min RQD=10.9%. Borehole

	Project Name: Cornell–Dubilier	Site Id: MW05
	Project Number: 1945.1018	Static Water Level: 13.94'
	Location: South Plainfield, NJ	X Coordinate: 517066.26
	Logged By: C. Prothro	Y Coordinate: 634425.11
Contractor: Belasco Drilling		Elevation: 70.79'
Drilling Method: 10in and 6in roller bits; 2in core bar.		Conductor Casing: type: Steel dia: 10.00in fm: –3.00' to: 14.00'
Date Started: 08/18/00		Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: –2.0' to: 25.00'
Date Completed: 08/21/00		Screens: type: Slotted size: 0.010in dia: 2.00in fm: 25.00' to: 45.50'
Remarks: Diedrich D–120 Rig, 6.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.		Annular Fill: type: Bentonite fm: 0.33' to: 23.00' type: fm: 23.00' to: 24.00' type: fm: 24.00' to: 45.00'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
49							End of boring at 49 feet.			collapsed to 37' and would not stay open past 45.5'.
50										
51										
52										
53										
54										
55										
56										
57										
58										
59										

Project Name: Cornell–Dubilier	Site Id: MW06
Project Number: 1945.1018	Static Water Level: 17.36'
Location: South Plainfield, NJ	X Coordinate: 516545.36
Logged By: T. Fowler, C. Prothro	Y Coordinate: 634747.59
Contractor: Tabasco Drilling	Elevation: 74.83'
Drilling Method: 10in and 6in roller bits; 2in core barrel	Conductor Casing: type: Steel dia: 10.00in fm: 0.00' to: 6.50'
Date Started: 08/08/00	Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: 0.2' to: 29.00'
Date Completed: 08/11/00	Screens: type: Slotted size: 0.010in dia: 2.00in fm: 29.00' to: 44.00'
Remarks: Diedrich D–120 Rig, 6.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.	Annular Fill: type: Bentonite fm: 0.33' to: 25.30' type: #0 Quartz Sand fm: 25.30' to: 27.00' type: #1 Quartz Sand fm: 27.00' to: 44.00'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction (MP. EL. 74.64)	Notes
	8/8/00	0900	65	7 7 7 8	SM		Stained FILL, Sand, Gravel, Silt, and Flyash; becomes less gravel with depth; more black staining; moist at bottom.			Samples collected to 6.5' with 3" split spoon. Borehole advanced with 6.25" HSA.
1								2.0 ppm 18.0 ppm		Sample: CDE–MW06-00
2	8/8/00	0905	70	2 3 2 3	SM/ML		Brown to red–brown CLAY; moderately plastic; moist; becomes red–brown silt and low plasticity.			
3								1.0 ppm 7.0 ppm		Sample CDE–MW06-02
4	8/8/00	0910	50	1 2 3 25			Red–brown SILT (weathered siltstone); low plasticity; slightly moist.			
5								0.1 ppm 6.0 ppm		Sample CDE–MW06-04
6	8/8/00	0915	50	35 1	ML/SM		Red–brown SILTSTONE; some blue laminae; dry to slightly moist; weathered.			10" Outer Casing to 6.5'.
	8/8/00	1600	82				6.5–11.5 Red–brown SILTSTONE; frequent fractures at 0 to 30 degrees.			Sample: CDE–MW06-06
7							11.5–13 Red–brown SILTSTONE; moderate fractures at 0 to 30 degrees.	0.3 ppm 8.0 ppm		Bailer sample: CDE–MW6–06–01
8					SL		13–16.5 Red–brown SILTSTONE; moderate fractures at 0 to 50 degrees; some near vertical fractures; vugs at 15.0 ft.			Core run #1: From 6.5–17.5'. Standard 2" core barrel. Rate of barrel advance ~0.2'/min. RQD=3%.
9										
10										
11										

Project Name: Cornell–Dubilier	Site Id: MW06
Project Number: 1945.1018	Static Water Level: 17.36'
Location: South Plainfield, NJ	X Coordinate: 516545.36
Logged By: T. Fowler, C. Prothro	Y Coordinate: 634747.59
Contractor: Tabasco Drilling	Elevation: 74.83'
Drilling Method: 10in and 6in roller bits; 2in core barrel	Conductor Casing: type: Steel dia: 10.00in fm: 0.00' to: 6.50'
Date Started: 08/08/00	Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: 0.2' to: 29.00'
Date Completed: 08/11/00	Screens: type: Slotted size: 0.010in dia: 2.00in fm: 29.00' to: 44.00'
Remarks: Diedrich D–120 Rig, 6.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.	Annular Fill: type: Bentonite fm: 0.33' to: 25.30' type: #0 Quartz Sand fm: 25.30' to: 27.00' type: #1 Quartz Sand fm: 27.00' to: 44.00'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
13										Odor present at ~13'.
14										Some odor at ~14'.
15										Slight odor present at ~15.5'.
16										
17	8/10/00	1004			SL/MS					6" Inner Casing to 16.5'. Core run #2: From 17–27'. Standard 2" core barrel. Rate of barrel advance ~0.3'/min. RQD=23%.
18			100				17–27 Red–brown SILTSTONE; horizontal fractures present at 1–3 ft spacing; white calcareous calcite and/or aragonite microcrystals; vugs present (< 0.02 ft in size). 20.25–27 Sedimentary structures (cross–bedding). At 26.16 ft, diagonal fractures. At 21.5 ft, frequent white calcareous calcite and/or aragonite microcrystals. At 19.25, 20.16, 22.5, 23, 23.33, and 26.58 ft, evidence of weathering.	0.0 ppm 0.0 ppm		
19										
20										
21										Water loss of ~5–6 gallons from 21'.
22										
23										

Project Name: Cornell-Dubilier	Site Id: MW06
Project Number: 1945.1018	Static Water Level: 17.36'
Location: South Plainfield, NJ	X Coordinate: 516545.36
Logged By: T. Fowler, C. Prothro	Y Coordinate: 634747.59
Contractor: Tabasco Drilling	Elevation: 74.83'
Drilling Method: 10in and 6in roller bits; 2in core barrel	Conductor Casing: type: Steel dia: 10.00in fm: 0.00' to: 6.50'
Date Started: 08/08/00	Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: 0.2' to: 29.00'
Date Completed: 08/11/00	Screens: type: Slotted size: 0.010in dia: 2.00in fm: 29.00' to: 44.00'
Remarks: Diedrich D-120 Rig, 6.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.	Annular Fill: type: Bentonite fm: 0.33' to: 25.30' type: #0 Quartz Sand fm: 25.30' to: 27.00' type: #1 Quartz Sand fm: 27.00' to: 44.00'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
25										
26										
27	8/10/00	1337	85				27-28 Red-brown SILTSTONE to MUDSTONE; horizontal fractures at 0.04 to 0.25 ft spacing; trace vugs and pits. 28-30 Red-brown SILTSTONE to MUDSTONE; horizontal fractures at 0.58 ft spacing; trace vugs and pits. 30-37 Red-brown SILTSTONE to MUDSTONE; horizontal fractures at 0.04 to 0.25 ft spacing; trace vugs and pits. 27-27.66 Red-brown SILTSTONE to MUDSTONE; massive; sedimentary bedding planes at 35-40 degrees. 27.8-31.4 MUDSTONE; horizontal sedimentary structures (white calcareous layers of microcrystals). 28.5-30.33 MUDSTONE; horizontal sedimentary structures (white calcareous layers of microcrystals); trace fossils (skolithos). 31.4-34.6 Red-brown SILTSTONE to MUDSTONE; becomes coarser; becomes SANDSTONE at 33.3 ft. with visible quartz grains. 34.6-37 Red-brown SILTSTONE to MUDSTONE; becomes coarser. Severe weathering and dark zone present between 30 ft. and 30.5 ft. Vug with visible aragonity crystal present at 39.9 ft.	0.0 ppm 0.0 ppm		Core run #3: From 27-37'. Standard 2" core barrel. Rate of barrel advance ~0.9'/min. RQD=8%. 2" Screen top at 29'.
28										
29										
30										
31										
32										
33										
34										
35										

Project Name: Cornell–Dubilier	Site Id: MW06
Project Number: 1945.1018	Static Water Level: 17.36'
Location: South Plainfield, NJ	X Coordinate: 516545.36
Logged By: T. Fowler, C. Prothro	Y Coordinate: 634747.59
Contractor: Tabasco Drilling	Elevation: 74.83'
Drilling Method: 10in and 6in roller bits; 2in core barrel	Conductor Casing: type: Steel dia: 10.00in fm: 0.00' to: 6.50'
Date Started: 08/08/00	Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: 0.2' to: 29.00'
Date Completed: 08/11/00	Screens: type: Slotted size: 0.010in dia: 2.00in fm: 29.00' to: 44.00'
Remarks: Diedrich D–120 Rig, 6.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.	Annular Fill: type: Bentonite fm: 0.33' to: 25.30' type: #0 Quartz Sand fm: 25.30' to: 27.00' type: #1 Quartz Sand fm: 27.00' to: 44.00'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
37	8/10/00	1503	90				37–38 Red-brown SILTSTONE; frequent vertical fractures with .25 ft spacing. 38–38.5 Red-brown SILTSTONE; some horizontal sedimentary structures; trace f sand and horizontal fractures. 38.5–39 Red-brown SILTSTONE to MUDSTONE; horizontal sedimentary structures. 39–39.5 Red-brown SILTSTONE to MUDSTONE; frequent vertical fractures with .25 ft spacing; horizontal sedimentary structures. 39.5–40 Red-brown SILTSTONE to MUDSTONE; horizontal sedimentary structures. At 39 ft, Vertical vug of 0.25 ft width. 39.33–39.58 Red-brown SILTSTONE to MUDSTONE; frequent vertical fractures with .25 ft spacing; diagonal fracturing; horizontal sedimentary structures. 40–42 Red-brown MUDSTONE; some f sand; horizontal fractures. At 40 and 41.66 ft, diagonal fractures.	0.0 ppm 0.0 ppm		Core run #4: From 37–44'. Standard 2" core barrel. Rate of barrel advance ~0.1'/min. RQD=7.4%. Water loss of ~14 gallons from 37–39'.
38										
39										
40										
41										
42										
43										
44							End of boring at 44 feet.			2" Screen Bottom at 44'.
45										
46										
47										

Project Name: Cornell-Dubilier	Site Id: MW07
Project Number: 1945.1018	Static Water Level: 24.44'
Location: South Plainfield, NJ	X Coordinate: 516095.57
Logged By: C. Prthro, L. Haymon, T. Fowler	Y Coordinate: 634773.40
Contractor: Tabasco Drilling	Elevation: 82.16'
Drilling Method: 10in and 6in roller bits; 2in core bar.	Conductor Casing: type: Steel dia: 10.00in fm: 0.00' to: 17.00'
Date Started: 08/01/00	Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: 0.8' to: 43.00'
Date Completed: 08/06/00	Screens: type: Slotted size: 0.010in dia: 2.00in fm: 43.00' to: 58.00'
Remarks: Diedrich D-120 Rig, 6.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.	Annular Fill: type: Bentonite fm: 0.33' to: 39.00' type: fm: 39.00' to: 40.00' type: fm: 40.00' to: 62.00'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction MP. EL. 81.35	Notes
	8/1/00	0850	95	24 24 25 32	ML		0-0.33 Asphalt. 0.33-0.5 Black silty CLAY, subrounded f diabase GRAVEL, and FILL (ash, cinders, and brick). 0.5-1.9 Red-brown SILTSTONE and silty Clay; weathered; dry.	0.0 ppm 0.0 ppm		Samples collected to 6' with 3" split spoon. Borehole advanced with 6.25" HSA. Sample: CDE-MW07-00
1										
2	8/1/00	0911	75	22 26 29 96	SM/ML		Red-brown SILTSTONE and silty Clay; weathered; dry.	0.6 ppm 0.6 ppm		
3										Sample: CDE-MW07-02
4	8/1/00	0930	65	45 51 100/.33			Red-brown SILTSTONE, Silt, and silty Clay; weathered; dry.	0.0 ppm 0.0 ppm		
5										Sample: CDE-MW07-04.
6	8/1/00	0950	0	100/.33	SL		No Recovery. 6-8.7 Red-brown SILTSTONE; dark staining at fractures; weathered; horizontal fractures at 0.08 ft spacing. 8.7-14.75 Red-brown SILTSTONE; weathered fracture zones with fractures at 0.08 ft spacing; dark staining at fractures.	0.0 ppm 0.0 ppm		10" Outer Casing to 6'. Core run #1: From 6-16'. Standard 2" core barrel. Rate of barrel advance ~0.1'/min. RQD=4%.
	8/2/00	1300	86							
7										
8										
9										
10										
11										

	Project Name: Cornell–Dubilier	Site Id: MW07
	Project Number: 1945.1018	Static Water Level: 24.44'
	Location: South Plainfield, NJ	X Coordinate: 516095.57
	Logged By: C. Prothro, L. Haymon, T. Fowler	Y Coordinate: 634773.40
Contractor: Tabasco Drilling		Elevation: 82.16'
Drilling Method: 10in and 6in roller bits; 2in core bar.		Conductor Casing: type: Steel dia: 10.00in fm: 0.00' to: 17.00'
Date Started: 08/01/00		Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: 0.8' to: 43.00'
Date Completed: 08/06/00		Screens: type: Slotted size: 0.010in dia: 2.00in fm: 43.00' to: 58.00'
Remarks: Diedrich D–120 Rig, 6.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.		Annular Fill: type: Bentonite fm: 0.33' to: 39.00'; type: fm: 39.00' to: 40.00'; type: fm: 40.00' to: 62.00'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
13										
14										
15										
16	8/3/00	1505	81				16–17.5 Red–brown SILTSTONE; frequent horizontal fractures along bedding planes; trace calcareous inclusions. 17.5–25 Red–brown SILTSTONE; horizontal fractures along bedding planes; trace calcareous inclusions. 25–26 Red–brown SILTSTONE; horizontal fractures along bedding planes; dissolution zone with gray–green inclusions; trace calcareous inclusions.	0.0 ppm 0.0 ppm		6" Inner Casing to 16'. Core run #2: From 16–26'. Standard 2" core barrel. Rate of barrel advance ~0.1'/min. RQD=13%.
17										
18										
19										
20										
21										
22										
23										

Project Name: Cornell–Dubilier	Site Id: MW07
Project Number: 1945.1018	Static Water Level: 24.44'
Location: South Plainfield, NJ	X Coordinate: 516095.57
Logged By: C. Prothro, L. Haymon, T. Fowler	Y Coordinate: 634773.40
Contractor: Tabasco Drilling	Elevation: 82.16'
Drilling Method: 10in and 6in roller bits; 2in core bar.	Conductor Casing: type: Steel dia: 10.00in fm: 0.00' to: 17.00'
Date Started: 08/01/00	Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: 0.8' to: 43.00'
Date Completed: 08/06/00	Screens: type: Slotted size: 0.010in dia: 2.00in fm: 43.00' to: 58.00'
Remarks: Diedrich D–120 Rig, 6.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.	Annular Fill: type: Bentonite fm: 0.33' to: 39.00' type: fm: 39.00' to: 40.00' type: fm: 40.00' to: 62.00'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
25										
26	8/3/00	1740	90				26–27.5 Red–brown SILTSTONE; vugs; fractures along bedding planes. 27.5–28 Red–brown SILTSTONE inclusions; vugs; frequent fractures along bedding planes. 28–30 Red–brown SILTSTONE. 30–31 Red–brown SILTSTONE; vugs; trace fractures along bedding planes. 31–33 Red–brown SILTSTONE; trace fractures along bedding planes; white calcareous inclusions. 33–34 Red–brown SILTSTONE; vugs; fractures along bedding planes. 34–36 Red–brown SILTSTONE; white and green–gray inclusions; vugs; trace fractures along bedding planes.			Core run #3: From 26–36'. Standard 2" core barrel. Rate of barrel advance ~0.1'/min. RQD=38%.
27										
28										
29										
30										
31										
32										
33										
34										
35										

	Project Name: Cornell–Dubilier	Site Id: MW07
	Project Number: 1945.1018	Static Water Level: 24.44'
	Location: South Plainfield, NJ	X Coordinate: 516095.57
	Logged By: C. Prothro, L. Haymon, T. Fowler	Y Coordinate: 634773.40
Contractor: Tabasco Drilling		Elevation: 82.16'
Drilling Method: 10in and 6in roller bits; 2in core bar.		Conductor Casing: type: Steel dia: 10.00in fm: 0.00' to: 17.00'
Date Started: 08/01/00		Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: 0.8' to: 43.00'
Date Completed: 08/06/00		Screens: type: Slotted size: 0.010in dia: 2.00in fm: 43.00' to: 58.00'
Remarks: Diedrich D–120 Rig, 6.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.		Annular Fill: type: Bentonite fm: 0.33' to: 39.00' type: fm: 39.00' to: 40.00' type: fm: 40.00' to: 62.00'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
	8/4/00	1115	64				36–39 Red–brown SILTSTONE; horizontal fractures at 0.08–0.33 ft spacing with majority at 0.16–0.25 ft spacing. At 39 ft, Diagonal fracture with possible well–formed aragonite crystals (<0.2"). At 37.2, 37.8, 38.8, 39.2, 43, 44, and 45 ft, pitting and vugs. At 42.5 ft, Diagonal fracture.	0.0 ppm 0.0 ppm		Core run #4: From 36–46'. Standard 2" core barrel. Rate of barrel advance ~0.09'/min. RQD=64%.
37										
38										
39										
40										
41										
42										
43										2" Screen top at 43'.
44										Water loss at 44'.
45										
46	8/5/00	0955	98				46–47.5 Red–brown SILTSTONE; horizontal fractures, some 20 degrees. 47.5–49.5 Red–brown SILTSTONE. At 48.5, Horizontal break. 49.5–50 Red–brown SILTSTONE; trace horizontal fractures. 50–51 Red–brown SILTSTONE. At 50.5 Vugs and horizontal fractures.	0.0 ppm 0.0 ppm		Core run #5: From 46–5[illegible] Standard 2[illegible] barrel. Rate of barrel advance ~0.06'/min. RQD=55%.
47										

	Project Name: Cornell–Dubilier	Site Id: MW07
	Project Number: 1945.1018	Static Water Level: 24.44'
	Location: South Plainfield, NJ	X Coordinate: 516095.57
	Logged By: C. Prothro, L. Haymon, T. Fowler	Y Coordinate: 634773.40
Contractor: Tabasco Drilling		Elevation: 82.16'
Drilling Method: 10in and 6in roller bits; 2in core bar.		Conductor Casing: type: Steel dia: 10.00in fm: 0.00' to: 17.00'
Date Started: 08/01/00		Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: 0.8' to: 43.00'
Date Completed: 08/06/00		Screens: type: Slotted size: 0.010in dia: 2.00in fm: 43.00' to: 58.00'
Remarks: Diedrich D–120 Rig, 6.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.		Annular Fill: type: Bentonite fm: 0.33' to: 39.00' type: fm: 39.00' to: 40.00' type: fm: 40.00' to: 62.00'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
							51–54.5 Red–brown SILTSTONE; horizontal to 20 degree fractures, one vertical fracture. 54.5–56 Red–brown SILTSTONE; vugs and horizontal and 70 degree fractures. At 54 ft, Vugs.			
49										
50										
51										
52										
53										
54										
55										
56	8/5/00	1137	99				56–58 Red–brown SILTSTONE; occasional fractures at 0 to 10 degrees. 58–59 Red–brown SILTSTONE; frequent horizontal fractures. At 59 ft, fracture at 70 degrees. 59–61.93 Red–brown SILTSTONE. At 60 ft, fracture at 40 degrees. At 61 ft, fracture at 10 to 20 degrees.	0.0 ppm 0.0 ppm		Core run #6: From 56–62'. Standard 2" core barrel. Rate of barrel advance ~0.07'/min. RQD=69%. 2" Screen bottom at 58'.
57										
58										
59										

	Project Name: Cornell–Dubilier	Site Id: MW07
	Project Number: 1945.1018	Static Water Level: 24.44'
	Location: South Plainfield, NJ	X Coordinate: 516095.57
	Logged By: C. Prothro, L. Haymon, T. Fowler	Y Coordinate: 634773.40
Contractor: Tabasco Drilling		Elevation: 82.16'
Drilling Method: 10in and 6in roller bits; 2in core bar.		Conductor Casing: type: Steel dia: 10.00in fm: 0.00' to: 17.00'
Date Started: 08/01/00		Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: 0.8' to: 43.00'
Date Completed: 08/06/00		Screens: type: Slotted size: 0.010in dia: 2.00in fm: 43.00' to: 58.00'
Remarks: Diedrich D–120 Rig, 6.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.		Annular Fill: type: Bentonite fm: 0.33' to: 39.00' type: fm: 39.00' to: 40.00' type: fm: 40.00' to: 62.00'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
61										
62							End of boring at 62 feet.			
63										
64										
65										
66										
67										
68										
69										
70										
71										

Project Name: Cornell-Dubilier	Site Id: MW08
Project Number: 1945.1018	Static Water Level: 20.34'
Location: South Plainfield, NJ	X Coordinate: 516380.27
Logged By: T. Fowler	Y Coordinate: 634398.76
Contractor: Tabasco Drilling	Elevation: 75.47'
Drilling Method: 10in and 6in roller bits; 2in core barrel	Conductor Casing: type: Steel dia: 10.00in fm: -2.50' to: 6.00'
Date Started: 07/18/00	Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: -2.2' to: 42.00'
Date Completed: 07/25/00	Screens: type: Slotted size: 0.010in dia: 2.00in fm: 42.00' to: 57.00'
Remarks: Diedrich D-120 Rig, 6.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.	Annular Fill: type: Bentonite fm: 0.33' to: 39.00' type: #0 Quartz Sand fm: 39.00' to: 40.50' type: #1 Quartz Sand fm: 40.50' to: 57.50'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
	7/18/00	1115	70	2 2 3 3	ML		Red-brown SILT; low plasticity; slightly moist.	0.0 ppm 0.0 ppm		Samples collected to 6' with 3" split spoon. Borehole advanced with 6.25" HSA.
1										
2	7/18/00	1122	80	3 6 7 8			Same as above.	0.0 ppm 0.0 ppm		
3										Sample: CDE-MW08-02
4	7/18/00	1130	90	8 18 38 42			Red-brown SILT; low plasticity; becomes bedded weathered SILTSTONE; slightly moist.	0.0 ppm 0.0 ppm		
5										Sample: CDE-MW08-04
6	7/18/00	1145	100	38 100/.25			Red-brown SILTSTONE with silt; weathered; platey; dry.	0.0 ppm 0.0 ppm		10" Outer Casing to 7'. Sample: CDE-MW08-06
7	7/19/00	1230	20		SL/MS		Red-brown SILTSTONE to MUDSTONE; 0.04-0.16 ft pieces and silt-size material.	0.0 ppm 0.0 ppm		Core run #1: From 7-17'. Standard 2" core barrel. RQD=0%.
8										
9										
10										
11										

Project Name: Cornell–Dubilier	Site Id: MW08
Project Number: 1945.1018	Static Water Level: 20.34'
Location: South Plainfield, NJ	X Coordinate: 516380.27
Logged By: T. Fowler	Y Coordinate: 634398.76
Contractor: Tabasco Drilling	Elevation: 75.47'
Drilling Method: 10in and 6in roller bits; 2in core barrel	Conductor Casing: type: Steel dia: 10.00in fm: –2.50' to: 6.00'
Date Started: 07/18/00	Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: –2.2' to: 42.00'
Date Completed: 07/25/00	Screens: type: Slotted size: 0.010in dia: 2.00in fm: 42.00' to: 57.00'
Remarks: Diedrich D–120 Rig, 6.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.	Annular Fill: type: Bentonite fm: 0.33' to: 39.00' type: #0 Quartz Sand fm: 39.00' to: 40.50' type: #1 Quartz Sand fm: 40.50' to: 57.50'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
13										
14										
15										
16										
17	7/24/00	1100	50		SL		17.5–24 Red–brown SILTSTONE; horizontal fractures along bedding planes, creating pieces of <0.08–0.25 ft. 24–27.5 Red–brown SILTSTONE. At 24 ft, fine bedding. At 25 ft, blue weathering and blue mineralization in vug. At 26 ft, fracture at 60 degrees.	0.0 ppm 0.0 ppm		6" Inner Casing to 17'. Core run #2: From 17.5–27.5'. Standard 2" core barrel. RQD=0%.
18										
19										
20										
21										
22										
23										

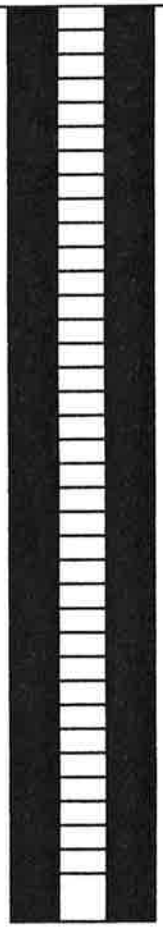
FW	Project Name: Cornell-Dubilier	Site Id: MW08
	Project Number: 1945.1018	Static Water Level: 20.34'
	Location: South Plainfield, NJ	X Coordinate: 516380.27
	Logged By: T. Fowler	Y Coordinate: 634398.76
Contractor: Tabasco Drilling		Elevation: 75.47'
Drilling Method: 10in and 6in roller bits; 2in core barrel		Conductor Casing: type: Steel dia: 10.00in fm: -2.50' to: 6.00'
Date Started: 07/18/00		Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: -2.2' to: 42.00'
Date Completed: 07/25/00		Screens: type: Slotted size: 0.010in dia: 2.00in fm: 42.00' to: 57.00'
Remarks: Diedrich D-120 Rig, 6.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.		Annular Fill: type: Bentonite fm: 0.33' to: 39.00' type: #0 Quartz Sand fm: 39.00' to: 40.50' type: #1 Quartz Sand fm: 40.50' to: 57.50'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
25										
26										
27										
	7/24/00	1345	100				Red-brown SILTSTONE; vugs with blue weathering. At 26, 26.7, and 27 ft, 0-10 degree fractures. At 27.5 ft, frequent fractures. At 28-28.8, 29.9-31.5, 33-33.6, and 34.2-34.5 ft, fractures at 0-10 degrees. 31.8-32.7 Red-brown SILTSTONE; vugs with blue weathering; fracture at 70 degrees.	0.0 ppm 0.0 ppm		Core run #3: From 27.5-37.5'. Standard 2" core barrel. RQD=30%.
28										
29										
30										
31										
32										
33										
34										
35										

	Project Name: Cornell–Dubilier	Site Id: MW08
	Project Number: 1945.1018	Static Water Level: 20.34'
	Location: South Plainfield, NJ	X Coordinate: 516380.27
	Logged By: T. Fowler	Y Coordinate: 634398.76
Contractor: Tabasco Drilling		Elevation: 75.47'
Drilling Method: 10in and 6in roller bits; 2in core barrel		Conductor Casing: type: Steel dia: 10.00in fm: –2.50' to: 6.00'
Date Started: 07/18/00		Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: –2.2' to: 42.00'
Date Completed: 07/25/00		Screens: type: Slotted size: 0.010in dia: 2.00in fm: 42.00' to: 57.00'
Remarks: Diedrich D–120 Rig, 6.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.		Annular Fill: type: Bentonite fm: 0.33' to: 39.00' type: #0 Quartz Sand fm: 39.00' to: 40.50' type: #1 Quartz Sand fm: 40.50' to: 57.50'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
37										Water loss of ~100 gallons from 37.5'.
	7/24/00	1600	75				37.5–47.5 Red–brown SILTSTONE.	0.0 ppm		Core run #4:
38							38–39 Red–brown SILTSTONE; frequent fractures at 10 degrees.	0.0 ppm		From 37.5–4 Standard 2" barrel.
39							At 38.5, 39.2, 41.8, 42, and 42.5 ft, horizontal bedding fractures. 39.9–40.5 Red–brown SILTSTONE; horizontal bedding. 43.3–43.5 Red–brown SILTSTONE; horizontal bedding fractures. At 44.3, bedding fractures.			RQD=50%. Water loss of ~20 gallons from 37.5–43'.
40							44.5–47.5 Red–brown SILTSTONE; frequent fractures.			
41										
42										2" Screen top at 42'.
43										Water loss of ~20 gallons from 43–47.5'.
44										Rapid barrel advance from 44–47.5'.
45										
46										
47										Water loss of ~400 gallons from 47–54'.
	7/25/00	1000	95				47.5–48 Red–brown SILTSTONE; fractured.	0.0 ppm		Core run #5:
							48–49.5 Red–brown SILTSTONE.	0.0 ppm		From 47.5–57.5'.

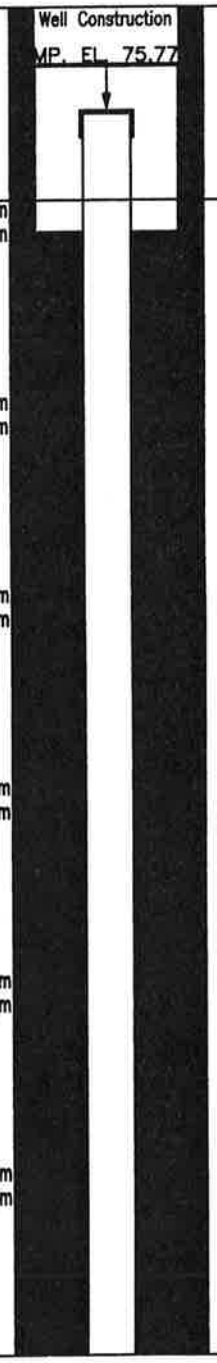
FW	Project Name: Cornell–Dubilier	Site Id: MW08
	Project Number: 1945.1018	Static Water Level: 20.34'
	Location: South Plainfield, NJ	X Coordinate: 516380.27
	Logged By: T. Fowler	Y Coordinate: 634398.76
Contractor: Tabasco Drilling		Elevation: 75.47'
Drilling Method: 10in and 6in roller bits; 2in core barrel		Conductor Casing: type: Steel dia: 10.00in fm: –2.50' to: 6.00'
Date Started: 07/18/00		Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: –2.2' to: 42.00'
Date Completed: 07/25/00		Screens: type: Slotted size: 0.010in dia: 2.00in fm: 42.00' to: 57.00'
Remarks: Diedrich D–120 Rig, 6.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.		Annular Fill: type: Bentonite fm: 0.33' to: 39.00' type: #0 Quartz Sand fm: 39.00' to: 40.50' type: #1 Quartz Sand fm: 40.50' to: 57.50'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
49 50 51 52 53 54 55 56 57							At 48.5 ft, bedding planes. At 49.5 ft, fractures at 15 degrees. 49.5–52 Blue–red SILTSTONE. At 51.5 ft, horizontal fracture. 52–53 Blue–red SILTSTONE; frequent horizontal bedding fractures. 53–54.3 Red–brown to brown zone with whitish bedding and frequent horizontal fractures. 54–54.3, white bed. 54.3–55.5 Blue–red SILTSTONE. At 54.2, 54.5 ft, horizontal fractures. At 54.8, 55.1, 55.5, 55.8, 56.2, 56.6, 57, 57.5 ft, fractures at 20 degrees.			Standard 2" core barrel. RQD=68%.
58 59							End of boring at 57.5 feet.			2" Screen bottom at 57.5'. Water loss of ~20 gallons to 57.5'.

Project Name: Cornell–Dubilier	Site Id: MW09
Project Number: 1945.1018	Static Water Level: 17.40'
Location: South Plainfield, NJ	X Coordinate: 516874.58
Logged By: C. Prothro	Y Coordinate: 634402.92
Contractor: Tabasco Drilling	Elevation: 74.83'
Drilling Method: 10in and 6in roller bits; 2in core barrel	Conductor Casing: type: Steel dia: 10.00in fm: –3.00' to: 15.00'
Date Started: 09/18/00	Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: –0.9' to: 29.00'
Date Completed: 09/22/00	Screens: type: Slotted size: 0.010in dia: 2.00in fm: 29.00' to: 54.00'
Remarks: Diedrich D–120 Rig, 6.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.	Annular Fill: type: Bentonite fm: 0.33' to: 28.00' type: #0 Quartz Sand fm: 28.00' to: 29.00' type: #1 Quartz Sand fm: 29.00' to: 54.00'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Notes
1	9/18/00	0930	75	10 14 12 6	SM		Red–brown silty f–m SAND and subrounded to subangular diabase and sandstone Gravel; black unknown material and fill (cinders, ash, brick); some m–c sand; loose; dry.	0.0 ppm 3.8 ppm	Samples collected to 14' with 3" split spoon. Borehole advanced with 6.25" HSA. Sample: CDE–MW09–00
2 3	9/18/00	0935	43	4 3 2 2			2–2.15 Red–brown silty SAND; some subrounded to subangular f gravel. 2.15–2.85 Black and white silty SAND; some blue–green unknown material; some orange unknown material; loose to dense; dry to semi–moist.	0.0 ppm 5.4 ppm	
4 5	9/18/00	0940	63	1 1 1 1	SP/SM		4–4.4 Black and white silty SAND; some blue, green, and orange unknown material and blue–white unknown material; loose to dense; dry to semi–moist. 4.4–5.25 Red–brown f–m SAND; trace fill (metal wire); semi–dense; moist.	0.0 ppm 5.6 ppm	Sample: CDE–MW09–04
6 7	9/18/00	0950	45	2 3 4 3			Red–brown f–m SAND; trace fill (metal wire); semi–dense; moist to wet.	0.0 ppm 3.8 ppm	
8 9	9/18/00	1000	95	5 8 9 15			8–8.5 Red–brown f–m SAND; trace fill (metal wire); semi–dense; moist to wet. 8.5–9.9 Red–brown f–m SAND; trace fill (metal wire) and subangular f–m siltstone and sandstone gravel; dense to semi–dense; moist.	0.0 ppm 3.7 ppm	Sample: CDE–MW09–08
10 11	9/18/00	1045	65	100/.42 100/.25 35 100/.42	CL		10–10.2 Red–brown f–m SAND; trace fill (metal wire) and subangular f–m siltstone and sandstone gravel; dense to semi–dense; moist. 10.2–11.3 Red–brown SILTSTONE (weathered), dry silty Clay, and subangular f–c siltstone and sandstone Gravel.	0.0 ppm 3.5 ppm	

Well Construction



	Project Name: Cornell-Dubilier	Site Id: MW09
	Project Number: 1945.1018	Static Water Level: 17.40'
	Location: South Plainfield, NJ	X Coordinate: 516874.58
	Logged By: C. Prothro	Y Coordinate: 634402.92
Contractor: Tabasco Drilling		Elevation: 74.83'
Drilling Method: 10in and 6in roller bits; 2in core barrel		Conductor Casing: type: Steel dia: 10.00in fm: -3.00' to: 15.00'
Date Started: 09/18/00		Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: -0.9' to: 29.00'
Date Completed: 09/22/00		Screens: type: Slotted size: 0.010in dia: 2.00in fm: 29.00' to: 54.00'
Remarks: Diedrich D-120 Rig, 6.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.		Annular Fill: type: Bentonite fm: 0.33' to: 28.00' type: #0 Quartz Sand fm: 28.00' to: 29.00' type: #1 Quartz Sand fm: 29.00' to: 54.00'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
	9/18/00	1120	45	35 100/.25			Red-brown SILTSTONE (weathered), silty Clay (dry), and subangular f-c siltstone and sandstone Gravel.	0.0 ppm 5.4 ppm		
13										Sample: CDE-MW09-12
14					SL/MS					
15	9/19/00	1000	83				15-15.8 Red-brown SILTSTONE to MUDSTONE; heavily bioturbated; Skolithos and Rhizocorallium; white calcareous-filled veins; six horizontal fractures at <0.08-0.33 ft spacing. 15.9-17 Red-brown SILTSTONE to MUDSTONE; white calcareous deposits; trace to some sedimentary structures (cross-bedding and bioturbation); frequent fracturing; weathered. 17-17.4 Red-brown SILTSTONE to MUDSTONE; vertical fracture with dark staining. 17.4-20 Red-brown SILTSTONE to MUDSTONE; numerous white calcareous laminations; numerous horizontal fractures at <0.08-0.16 ft spacing; becomes red-purple-brown at 20 ft. 20-21 Purple-red SILTSTONE to sandy MUDSTONE; frequent fractures. 21-21.4 Purple-red SILTSTONE to sandy MUDSTONE; white f calcite sand interbedd and cross-bedded. 21.4-25 Purple-red SILTSTONE to sandy MUDSTONE; fractures at 0.08-0.25 ft spacing.			10" Outer Casing to 15'. Core run #1: From 15-25'. Standard 2" core barrel. RQD=4%.
16										
17										
18										
19										
20										
21										
22										
23										

Project Name: Cornell-Dubilier	Site Id: MW09
Project Number: 1945.1018	Static Water Level: 17.40'
Location: South Plainfield, NJ	X Coordinate: 516874.58
Logged By: C. Prothro	Y Coordinate: 634402.92
Contractor: Tabasco Drilling	Elevation: 74.83'
Drilling Method: 10in and 6in roller bits; 2in core barrel	Conductor Casing: type: Steel dia: 10.00in fm: -3.00' to: 15.00'
Date Started: 09/18/00	Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: -0.9' to: 29.00'
Date Completed: 09/22/00	Screens: type: Slotted size: 0.010in dia: 2.00in fm: 29.00' to: 54.00'
Remarks: Diedrich D-120 Rig, 6.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.	Annular Fill: type: Bentonite fm: 0.33' to: 28.00' type: #0 Quartz Sand fm: 28.00' to: 29.00' type: #1 Quartz Sand fm: 29.00' to: 54.00'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
25	9/21/00	1024	87		SS		25-28.1 White-gray to blue-black f-m SANDSTONE; sandy mudstone with frequent horizontal and low-angle fractures interbedded at <0.08-0.21 ft spacing; emerald-green and deep blue mineral deposits; cross-bedding; black luster on broken and planar surfaces; becoming red-brown SILTSTONE. At 26.7 ft, vertical fracture. 28.1-30 Red-brown SILTSTONE to sandy MUDSTONE; frequent horizontal fractures at <0.08-0.21 ft spacing; weathered. 30-34 Red-brown SILTSTONE to sandy MUDSTONE; massive; fractures at 0.13-0.5 ft spacing; trace white calcareous material in veins and well-rounded quartz sand grains. At 31.2 ft, green-gray anaerobic deposits with dark f minerals.	0.0 ppm 0.0 ppm		6" Outer Casing to 25'. Core run #2: From 25-34'. Standard 2" core barrel. RQD=12.7%.
26										
27										
28					SL/MS					Water loss of ~12.5 gallons from 28-30'. 2" Screen top at 29'.
29										
30										
31										
32										
33										
34	9/21/00	1146	94				34-35.3 Red-brown SILTSTONE to sandy MUDSTONE; frequent horizontal fractures; weathering; cross bedding; trace white calcareous material. At 35.1 ft, vertical fracture. 35.3-35.5 Red-brown SILTSTONE to sandy MUDSTONE; low-angle fractures at 0.1-0.25 ft spacing. 35.5-35.7 Red-brown SILTSTONE to sandy MUDSTONE; defined cross-bedding with ovoid-shaped dark spots;	0.0 ppm 0.0 ppm		Core run #3: From 34-44'. Standard 2" core barrel. RQD=32%. Water loss slight from 34'.
35										

Project Name: Cornell–Dubilier	Site Id: MW09
Project Number: 1945.1018	Static Water Level: 17.40'
Location: South Plainfield, NJ	X Coordinate: 516874.58
Logged By: C. Prothro	Y Coordinate: 634402.92
Contractor: Tabasco Drilling	Elevation: 74.83'
Drilling Method: 10in and 6in roller bits; 2in core barrel	Conductor Casing: type: Steel dia: 10.00in fm: –3.00' to: 15.00'
Date Started: 09/18/00	Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: –0.9' to: 29.00'
Date Completed: 09/22/00	Screens: type: Slotted size: 0.010in dia: 2.00in fm: 29.00' to: 54.00'
Remarks: Diedrich D–120 Rig, 6.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.	Annular Fill: type: Bentonite fm: 0.33' to: 28.00' type: #0 Quartz Sand fm: 28.00' to: 29.00' type: #1 Quartz Sand fm: 29.00' to: 54.00'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
							low–angle fractures at 0.1–0.25 ft spacing. 35.7–36.3 Red–brown SILTSTONE to sandy MUDSTONE; low–angle fractures at 0.1–0.25 ft spacing. 36.3–36.7 Red–brown SILTSTONE to sandy MUDSTONE; low–angle fractures at 0.1–0.25 ft spacing; quartz sand grains becoming m–c. 36.7–37.5 Red–brown SILTSTONE to sandy MUDSTONE; low–angle fractures at 0.1–0.25 ft spacing; quartz sand grains becoming variable in size. 37.5–37.7 Red–brown SILTSTONE to sandy MUDSTONE; massive. 37.7–40.1 Red–brown SILTSTONE to sandy MUDSTONE; horizontal fractures at 0.16 ft spacing; massive. 40.1–41.1 Red–brown SILTSTONE to sandy MUDSTONE; frequent horizontal fractures; trace vertical fractures; massive. 41.1–43.2 Red–brown SILTSTONE to sandy MUDSTONE; massive. 43.2–43.5 Red–brown SILTSTONE to sandy MUDSTONE; massive; weathered; fractured. 43.5–44 Red–brown SILTSTONE to sandy MUDSTONE; massive. At 43.9 ft, diagonal fracture at 45 degrees.			Water loss of ~19 gallons from 42'.
44	9/21/00	1342	100				44–49.4 Red–brown SILTSTONE to sandy MUDSTONE; massive; horizontal fractures at 0.33–0.54 ft spacing; trace to some white calcareous material in vugs and laminations. 49.4–49.9 Red–brown SILTSTONE to sandy MUDSTONE; massive; becoming frequent horizontal fractures at <0.08–0.25 ft spacing. 49.9–51 Red–brown SILTSTONE to sandy MUDSTONE; weathered; pits and vugs; frequent horizontal fractures at <0.08–0.25 ft spacing. 51–52.7 Red–brown SILTSTONE to sandy MUDSTONE; massive; frequent horizontal fractures at <0.08–0.25 ft spacing. 52.7–53.4 Red–brown SILTSTONE to sandy MUDSTONE; massive; weathered pits; vugs; voids; frequent fractures.	0.0 ppm 0.0 ppm		Core run #4: From 44–54'. Standard 2" core barrel. RQD=30%.

	Project Name: Cornell–Dubilier	Site Id: MW09
	Project Number: 1945.1018	Static Water Level: 17.40'
	Location: South Plainfield, NJ	X Coordinate: 516874.58
	Logged By: C. Prothro	Y Coordinate: 634402.92
Contractor: Tabasco Drilling		Elevation: 74.83'
Drilling Method: 10in and 6in roller bits; 2in core barrel		Conductor Casing: type: Steel dia: 10.00in fm: –3.00' to: 15.00'
Date Started: 09/18/00		Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: –0.9' to: 29.00'
Date Completed: 09/22/00		Screens: type: Slotted size: 0.010in dia: 2.00in fm: 29.00' to: 54.00'
Remarks: Diedrich D–120 Rig, 6.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.		Annular Fill: type: Bentonite fm: 0.33' to: 28.00' type: #0 Quartz Sand fm: 28.00' to: 29.00' type: #1 Quartz Sand fm: 29.00' to: 54.00'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
							53.4–54 Red-brown SILTSTONE to sandy MUDSTONE; massive; weathered pits; vugs; voids; very frequently fractured.			
49										
50										
51										Water loss of ~19 gallons from 51'.
52										
53										
54							End of boring at 54 feet.			2" Screen bottom at 54'.
55										
56										
57										
58										
59										

Project Name: Cornell-Dubilier	Site Id: MW10
Project Number: 1945.1018	Static Water Level: 15.89'
Location: South Plainfield, NJ	X Coordinate: 516755.26
Logged By: T. Fowler	Y Coordinate: 634104.15
Contractor: Tabasco Drilling	Elevation: 72.82'
Drilling Method: 10in and 6in roller bits; 2in core bar.	Conductor Casing: type: Steel dia: 10.00in fm: -2.35' to: 14.00'
Date Started: 07/20/00	Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: -1.5' to: 37.00'
Date Completed: 08/01/00	Screens: type: Slotted size: 0.010in dia: 2.00in fm: 37.00' to: 52.00'
Remarks: Diedrich D-120 Rig, 6.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.	Annular Fill: type: Bentonite fm: 0.33' to: 33.00' type: fm: 33.00' to: 35.00' type: fm: 35.00' to: 52.50'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
	7/20/00	1130	60	4 11 28 52	ML		0-0.83 Lt brown to red-brown SILT; some f sand. 0.83-1.2 Red-brown SILTSTONE; weathered; horizontal bedding.	0.0 ppm 0.0 ppm		Samples collected to 2' with 2" split spoon and from 2-4' with 3" split spoon. Sample: CDE-MW10-00
1										
2	7/20/00	1150	100	38 78 1 /.33			2-4 Red-brown SILTSTONE; weathered; silt-size and .25-1" pieces; dry.	0.0 ppm 0.0 ppm		Borehole advanced with 6.25" HSA.
3										Sample: CDE-MW10-02 10" Outer Casing to 4'.
4	7/20/00 7/27/00	1200 1345	100 72	1 /.5	SL		Red-brown SILTSTONE; silt-size particles to 0.08' pieces; weathered; dry. 4-8 Red-brown SILTSTONE; very broken (0.5-2" pieces); horizontal bedding fractures; some fractures at 80 degrees. 8-9.5 Red-brown SILTSTONE; bedding fractures at 0.04-0.16 ft spacing. 9.5-10 Red-brown SILTSTONE; fractures at horizontal and 30 degrees. 10-11.2 Red-brown SILTSTONE. At 10.2 ft, fracture at 30 degrees. At 10.5 ft, fracture at 0 degrees. At 10.8 ft, fracture at 30 degrees. At 11, 11.2, 11.4, and 11.7 ft, horizontal fractures. At 11.5 ft, fracture at 70 degrees. At 12 ft, bedding fracture. 12.3-12.7 fractures at 30 degrees. At 12.4 ft, fracture. At 12.8 ft, horizontal 70 degree bedding fracture filled with silt and gravel.	0.0 ppm 0.0 ppm		Core run #1: From 4-14'. Standard 2" core barrel. RQD=4%.
5										
6										
7										
8										
9										
10										
11										

	Project Name: Cornell–Dubilier	Site Id: MW10
	Project Number: 1945.1018	Static Water Level: 15.89'
	Location: South Plainfield, NJ	X Coordinate: 516755.26
	Logged By: T. Fowler	Y Coordinate: 634104.15
Contractor: Tabasco Drilling		Elevation: 72.82'
Drilling Method: 10in and 6in roller bits; 2in core bar.		Conductor Casing: type: Steel dia: 10.00in fm: –2.35' to: 14.00'
Date Started: 07/20/00		Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: –1.5' to: 37.00'
Date Completed: 08/01/00		Screens: type: Slotted size: 0.010in dia: 2.00in fm: 37.00' to: 52.00'
Remarks: Diedrich D–120 Rig, 6.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.		Annular Fill: type: Bentonite fm: 0.33' to: 33.00' type: fm: 33.00' to: 35.00' type: fm: 35.00' to: 52.50'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
13										
14	7/28/00	0945	80				14–18 Red–brown SILTSTONE; fractures along bedding planes; some near–vertical fractures in 0.02–0.25 ft pieces. 18–19.8 Red–brown SILTSTONE; some vertical fractures in 0.02–0.25 ft pieces. At 18, 18,2, 18.3, and 18.8 ft, fractures at 10 degrees. At 19 ft, fractured. At 19.3 ft, fractured at 0 degrees with blue weathering. At 19.7 ft, fractured at 0 degrees. 19.8–20 Red–brown SILTSTONE; vugs; some near–vertical fractures in 0.02–0.25 ft pieces. 20–20.8 Red–brown SILTSTONE; some vertical fractures in 0.02–0.25 ft pieces. At 20.5, 21.0, and 21.2 ft, horizontal fractures. At 21.7 and 21.8 ft, fracture at 0 degrees.	0.0 ppm 0.0 ppm		6" Outer Casing to 14'. Core run [illegible] From 14–22[illegible]. Standard 2" core barrel. RQD=30%.
15										
16										
17										
18										
19										
20										
21										
22										
23	7/28/00	1245	95				22.5–23 Red–brown SILTSTONE. At 22.5 ft, vugs. At 22.7 ft, fracture at 30 degrees. 23–24 Red–brown SILTSTONE; fractured at 20–30 degrees. 24–26 Red–brown SILTSTONE. At 24.3, 24.5, 24.8, 25, 25.1, 25.2, 25.5, 26, bedding	0.0 ppm 0.0 ppm		Core run [illegible] From 22.5–32.5'. Standard 2" core barrel. RQD=72%.

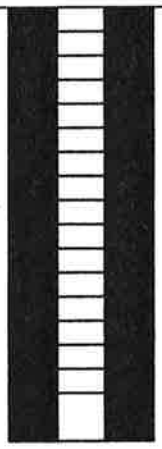
	Project Name: Cornell–Dubilier	Site Id: MW10
	Project Number: 1945.1018	Static Water Level: 15.89'
	Location: South Plainfield, NJ	X Coordinate: 516755.26
	Logged By: T. Fowler	Y Coordinate: 634104.15
Contractor: Tabasco Drilling		Elevation: 72.82'
Drilling Method: 10in and 6in roller bits; 2in core bar.		Conductor Casing: type: Steel dia: 10.00in fm: −2.35' to: 14.00'
Date Started: 07/20/00		Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: −1.5' to: 37.00'
Date Completed: 08/01/00		Screens: type: Slotted size: 0.010in dia: 2.00in fm: 37.00' to: 52.00'
Remarks: Diedrich D–120 Rig, 6.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.		Annular Fill: type: Bentonite fm: 0.33' to: 33.00' type: fm: 33.00' to: 35.00' type: fm: 35.00' to: 52.50'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
							fractures at 0 degrees. 26–26.3 Red–brown SILTSTONE; frequent fractures. 26.3–27 Red–brown SILTSTONE. At 26.6 and 26.8 ft, fractures at 20 degrees. 27.0–27.5 Red–brown SILTSTONE. At 28.1 ft, horizontal bedding fracture at 10–20 degrees. At 29.5 ft, fracture at 30 degrees. At 30 ft, possible fracture at 45 degrees. At 31 ft, fracture at 10 degrees; gray weathering. At 31.8 ft, healed horizontal fracture (whitish fill). At 33.2 and 33.5 ft, fracture at 10 degrees; gray weathering. 27.2–30 Red–brown SILTSTONE.			
25										
26										
27										
28										
29										
30										
31										
32										
33	7/28/00	1515	100				32.5–34.8 Red–brown SILTSTONE. At 33.5 ft, horizontal fracture. At 33.5 ft, fracture at 15 degrees. At 34.1 ft, horizontal fracture. 34.8–36.3 Red–brown SILTSTONE; fracture at 70 degrees. 36.3–38.6 Red–brown SILTSTONE. At 36.4 ft, horizontal fracture. At 36.9 ft, fracture at 0 degrees. At 37.4 ft, fracture at 60 degrees. At 38 ft, horizontal fracture. At 38.3 and 38.4 ft, fractures at 15 degrees. 38.6–40.3 Red–brown SILTSTONE; nearly vertical fracture. At 39, 39.3, 39.6, 39.9, and 40.3 ft, fractures at 0			Core run #4: From 32.5–42.5'. Standard 2" core barrel. RQD=70%. Water loss of ~20–30 gallons from 28–35'.
34										
35										

Project Name: Cornell–Dubilier	Site Id: MW10
Project Number: 1945.1018	Static Water Level: 15.89'
Location: South Plainfield, NJ	X Coordinate: 516755.26
Logged By: T. Fowler	Y Coordinate: 634104.15
Contractor: Tabasco Drilling	Elevation: 72.82'
Drilling Method: 10in and 6in roller bits; 2in core bar.	Conductor Casing: type: Steel dia: 10.00in fm: –2.35' to: 14.00'
Date Started: 07/20/00	Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: –1.5' to: 37.00'
Date Completed: 08/01/00	Screens: type: Slotted size: 0.010in dia: 2.00in fm: 37.00' to: 52.00'
Remarks: Diedrich D–120 Rig, 6.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.	Annular Fill: type: Bentonite fm: 0.33' to: 33.00' type: fm: 33.00' to: 35.00' type: fm: 35.00' to: 52.50'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
							degrees. At 40.5 ft, small vugs with white fill. At 40.9 ft, fracture at 20 degrees. 40.3–41.5 Red–brown SILTSTONE. At 41.1 ft, fracture at 0 degrees. 41.5–41.7 Red–brown SILTSTONE;gray inclusion and near–vertical and near–horizontal fractures. 41.7–42.5 Red–brown SILTSTONE.			
37										2" Screen top at 37'.
38										
39										
40										
41										
42										
43	7/28/00	1715	48				Red–brown SILTSTONE. At 44.3, 44.8, 45.3, 46.3, 46.5, 48, 49.1, fractures. At 46.3 and 48.3 ft, pitting. At 49.9 and 50.9 ft, vertical fractures. At 50.2 ft, weathered zone. At 52.5 ft, fractures at 70 degrees and weathering.	0.0 ppm 0.0 ppm		Core run #5: From 42.5–52.5'. Standard 2" core barrel. RQD=23%.
44										
45										Water loss of ~50 gallons from 40–45'.
46										
47										

FW	Project Name: Cornell-Dubilier	Site Id: MW10
	Project Number: 1945.1018	Static Water Level: 15.89'
	Location: South Plainfield, NJ	X Coordinate: 516755.26
	Logged By: T. Fowler	Y Coordinate: 634104.15
Contractor: Tabasco Drilling		Elevation: 72.82'
Drilling Method: 10in and 6in roller bits; 2in core bar.		Conductor Casing: type: Steel dia: 10.00in fm: -2.35' to: 14.00'
Date Started: 07/20/00		Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: -1.5' to: 37.00'
Date Completed: 08/01/00		Screens: type: Slotted size: 0.010in dia: 2.00in fm: 37.00' to: 52.00'
Remarks: Diedrich D-120 Rig, 6.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.		Annular Fill: type: Bentonite fm: 0.33' to: 33.00' type: fm: 33.00' to: 35.00' type: fm: 35.00' to: 52.50'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
49										
50										Water loss of ~30 gallons from 45-50'.
51										
52										2" Screen bottom at 52'.
							End of boring at 52.5 feet.			
53										
54										
55										
56										
57										
58										
59										

Project Name: Cornell–Dubilier	Site Id: MW11
Project Number: 1945.1018	Static Water Level: 19.42'
Location: South Plainfield, NJ	X Coordinate: 516578.87
Logged By: C. Prothro, T. Brooks	Y Coordinate: 634521.40
Contractor: Tabasco Drilling	Elevation: 75.18'
Drilling Method: 10in and 6in roller bits; 2in core bar.	Conductor Casing: type: Steel dia: 10.00in fm: –3.00' to: 14.00'
Date Started: 08/22/00	Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: –1.9' to: 34.00'
Date Completed: 08/29/00	Screens: type: Slotted size: 0.010in dia: 2.00in fm: 34.00' to: 59.00'
Remarks: Diedrich D–120, 6.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.	Annular Fill: type: Bentonite fm: 0.33' to: 30.00' type: fm: 30.00' to: 32.00' type: fm: 32.00' to: 59.00'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
	8/22/00	0920	92	5 18 18 9	ML SM		0–0.42 Dk brown sandy SILT and Organics. 0.42–0.66 Dk brown sandy SILT, Organics, and 0.02–ft Gravel. 0.66–1.83 Black silty Sand and 0.02–ft Gravel (Fill).	110 ppm 54.0 ppm		Samples collected to 14' with 3" split spoon. Borehole advanced with 6.25" HSA. Sample: CDE–MW11–00
1										
2	8/22/00	0926	83	3 5 2 6			2–2.33 Black silty Sand and 0.02–ft Gravel (Fill). 2.33–3.66 Black silty Sand and 0.02–0.04–ft Gravel (FILL); wet; wood debris at bottom.	130 ppm 0.0 ppm		
3										
4	8/22/00	0933	87	2 1 2 1	ML		4–5.25 Black sandy SILT and 0.08–ft Gravel; satd. 5.25–5.75 Black–brown clayey SILT; wet.	190 ppm 0.0 ppm		
5										Sample: CDE–MW11–04
6	8/22/00	0944	50	1 2 4 7	SM/CL		6–6.25 Black sandy SILT; satd. 6.25–6.58 Orange–brown to red CLAY; tight; moist. 6.58–6.75 Brown SILTSTONE. 6.75–7 Lt gray to red–brown CLAY; mottled; dry.	22.3 ppm 0.0 ppm		
7										Sample: CDE–MW11–06
8	8/22/00	1000	83	4 7 7 11			8–8.33 Red–brown silty SAND; satd. 8.33–9.33 Orange–brown and lt gray CLAY and red–brown CLAY; tight. 9.33–9.67 Red–brown silty (0.08–ft) GRAVEL; satd.	58.0 ppm 0.0 ppm		
9										
10	8/22/00	1020	75	30 90 100/.16	CL SL/MS		10–10.33 Red–brown silty CLAY and weathered SILTSTONE. 10.33–10.50 Red–brown SILTSTONE to MUDSTONE; weathered.	4.7 ppm 0.0 ppm		
11										Sample: CDE–MW11–12. Bailer sample:

	Project Name: Cornell-Dubilier	Site Id: MW11
	Project Number: 1945.1018	Static Water Level: 19.42'
	Location: South Plainfield, NJ	X Coordinate: 516578.87
	Logged By: C. Prothro, T. Brooks	Y Coordinate: 634521.40
Contractor: Tabasco Drilling		Elevation: 75.18'
Drilling Method: 10in and 6in roller bits; 2in core bar.		Conductor Casing: type: Steel dia: 10.00in fm: -3.00' to: 14.00'
Date Started: 08/22/00		Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: -1.9' to: 34.00'
Date Completed: 08/29/00		Screens: type: Slotted size: 0.010in dia: 2.00in fm: 34.00' to: 59.00'
Remarks: Diedrich D-120, 6.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.		Annular Fill: type: Bentonite fm: 0.33' to: 30.00' type: fm: 30.00' to: 32.00' type: fm: 32.00' to: 59.00'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
	8/22/00	1046	42	85 1 /.16			Red-brown SILTSTONE to MUDSTONE and silty Matrix; weathered; oily sheen; satd.	40.0 ppm 0.0 ppm		CDE-MWG-11
13										
14	8/23/00	1730	93				14-15.4 Red-brown SILTSTONE to sandy MUDSTONE; horizontal fractures at 0.04-0.08 ft spacing. At 15.1 ft, calcareous deposit.	48.2 ppm 8.9 ppm		10" Outer Casing to 14'. Core run from 14-24'. Standard 2" core barrel. Rate of barrel advance ~0.07'/min. RQD=3.6%. Sheen present on core.
15							15.4-15.7 Red-brown SILTSTONE to sandy MUDSTONE; vertical fractures; horizontal fractures at 0.04-0.08 ft spacing.			
16							15.7-16 Red-brown SILTSTONE to sandy MUDSTONE; horizontal fractures at 0.04-0.08 ft spacing. 16-17 Red-brown SILTSTONE to sandy MUDSTONE; horizontal fractures at 0.16 ft spacing.			
17							17-17.2 Red-brown SILTSTONE to sandy MUDSTONE; vertical fractures; horizontal fractures at 0.16 ft spacing. At 17.2, gray weathering.			
18							17.2-17.4 Red-brown SILTSTONE to sandy MUDSTONE; calcareous deposits; horizontal fractures at 0.16 ft spacing. 17.4-18.5 Red-brown SILTSTONE to sandy MUDSTONE; horizontal fractures at 0.16 ft spacing. At 17.3, vugs.			
19							At 17.3 and 17.4 ft, diagonal fractures. 18.5-18.7 Red-brown SILTSTONE to sandy MUDSTONE; calcareous deposits; horizontal fractures at 0.16 ft spacing.			
20							At 18.7, vugs. 18.7-18.8 Red-brown SILTSTONE to sandy MUDSTONE; horizontal fractures at 0.16 ft spacing. At 18.8, calcareous deposits.			
21							18.8-18.9 Red-brown SILTSTONE to sandy MUDSTONE; vugs; horizontal fractures at 0.16 ft spacing. 18.9-19 Red-brown SILTSTONE to sandy MUDSTONE; horizontal fractures at 0.16 ft spacing.			
22							19-20.3 Red-brown SILTSTONE to sandy MUDSTONE; horizontal fractures at 0.21-0.25 ft spacing; calcareous deposits at 20-20.2 ft. At 19.6, gray weathering.			
23							20.3-20.4 Red-brown SILTSTONE to sandy MUDSTONE. 20.4-21.1 Red-brown SILTSTONE to sandy MUDSTONE; heavily weathered; vertical fractures. 21.1-21.8 Red-brown SILTSTONE to sandy MUDSTONE.			6" Inner Casing

	Project Name: Cornell–Dubilier	Site Id: MW11
	Project Number: 1945.1018	Static Water Level: 19.42'
	Location: South Plainfield, NJ	X Coordinate: 516578.87
	Logged By: C. Prothro, T. Brooks	Y Coordinate: 634521.40
Contractor: Tabasco Drilling		Elevation: 75.18'
Drilling Method: 10in and 6in roller bits; 2in core bar.		Conductor Casing: type: Steel dia: 10.00in fm: –3.00' to: 14.00'
Date Started: 08/22/00		Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: –1.9' to: 34.00'
Date Completed: 08/29/00		Screens: type: Slotted size: 0.010in dia: 2.00in fm: 34.00' to: 59.00'
Remarks: Diedrich D–120, 6.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.		Annular Fill: type: Bentonite fm: 0.33' to: 30.00' type: fm: 30.00' to: 32.00' type: fm: 32.00' to: 59.00'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
	8/28/00	1115	0				21.8–22 Red–brown SILTSTONE to sandy MUDSTONE; vugs. 22–22.5 Red–brown SILTSTONE to sandy MUDSTONE. 22.5–22.8 Red–brown SILTSTONE to sandy MUDSTONE; calcareous deposits. 22.8–23.25 Red–brown SILTSTONE to sandy MUDSTONE; horizontal fractures at 0.21–0.25 ft spacing. 24–34 No recovery.	0.0 ppm 0.0 ppm		to 24'. Core run #2: From 24–34'. Standard 2" core barrel. Strong solvent–like odor noted during drilling. No recovery most likely due to 1.5"–diameter piece of steel lodged in core barrel.
25										
26										
27										
28										
29										
30										
31										
32										
33										
34	8/28/00	1505	92				34–34.4 Red–brown SILTSTONE to sandy MUDSTONE; frequent horizontal fractures at 0.1–0.2 ft spacing; some sedimentary structures (cross–bedding) and bioturbation; trace white calcareous–filled vugs and veins. 34.4–35.25 Red–brown SILTSTONE; massive; diagonal fracture at 34.7 ft; some sedimentary structures (cross–bedding)and bioturbation; trace white calcareous–	0.0 ppm 0.0 ppm		2" Screen top at 34'. Core run #3: From 34–44'. Standard 2" core barrel. Rate of barrel advance ~0.07'/min.
35										

	Project Name: Cornell–Dubilier	Site Id: MW11
	Project Number: 1945.1018	Static Water Level: 19.42'
	Location: South Plainfield, NJ	X Coordinate: 516578.87
	Logged By: C. Prothro, T. Brooks	Y Coordinate: 634521.40
Contractor: Tabasco Drilling		Elevation: 75.18'
Drilling Method: 10in and 6in roller bits; 2in core bar.		Conductor Casing: type: Steel dia: 10.00in fm: –3.00' to: 14.00'
Date Started: 08/22/00		Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: –1.9' to: 34.00'
Date Completed: 08/29/00		Screens: type: Slotted size: 0.010in dia: 2.00in fm: 34.00' to: 59.00'
Remarks: Diedrich D–120, 6.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.		Annular Fill: type: Bentonite fm: 0.33' to: 30.00' type: fm: 30.00' to: 32.00' type: fm: 32.00' to: 59.00'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
							filled vugs and veins. 35.25–36.5 Red-brown SILTSTONE to sandy MUDSTONE; frequent horizontal fractures; some sedimentary structures (cross-bedding) and bioturbation; trace white calcareous-filled vugs and veins. 36.5–37.5 Red-brown sandy MUDSTONE; massive; horizontal fractures at 0.2–0.4 foot spacing; some sedimentary structures (cross-bedding) and bioturbation; trace white calcareous-filled vugs and veins. 37.5–38.5 Red-brown SILTSTONE to sandy MUDSTONE; heavily cross-bedded sedimentary structures; bioturbation; trace white calcareous-filled vugs and veins. 38.5–39.4 Red-brown SILTSTONE to sandy MUDSTONE; frequent horizontal fractures; some sedimentary structures (cross-bedding) and bioturbation; trace white calcareous-filled vugs and veins. 39.4–41.5 Red-brown SILTSTONE; massive; horizontal fractures at 0.1 ft spacing; some sedimentary structures (cross-bedding) and bioturbation; trace white calcareous-filled vugs and veins. 41.5–44 MUDSTONE; massive; some sedimentary structures (cross-bedding) and bioturbation; trace white calcareous-filled vugs and veins; becomes increasingly bioturbated with depth.			RQD=14.5%.
37										
38										
39										
40										
41										
42										
43										
44	8/28/00	1602	83				44–45.5 Red-brown SILTSTONE to sandy MUDSTONE; frequent horizontal fractures at <0.1 ft spacing; bioturbation; sedimentary structures. 45.5–46.1 Red-brown SILTSTONE to sandy MUDSTONE; very frequent horizontal fractures at <0.1 ft spacing; bioturbation; sedimentary structures. 46.1–46.5 Red-brown SILTSTONE to sandy MUDSTONE; frequent horizontal fractures at <0.1 ft spacing; bioturbation; sedimentary structures. 46.5–46.8 Gray-white to purple-white f SANDSTONE; sedimentary structures. 46.8–49 Red-brown SILTSTONE to sandy MUDSTONE; fractured and pitted.	0.0 ppm 0.0 ppm		Core run #4: From 44–49'. Standard 2" core barrel. Rate of barrel advance ~0.09'/min. RQD=0.0%.
45										
46										
47										

FW	Project Name: Cornell–Dubilier	Site Id: MW11
	Project Number: 1945.1018	Static Water Level: 19.42'
	Location: South Plainfield, NJ	X Coordinate: 516578.87
	Logged By: C. Prothro, T. Brooks	Y Coordinate: 634521.40
Contractor: Tabasco Drilling		Elevation: 75.18'
Drilling Method: 10in and 6in roller bits; 2in core bar.		Conductor Casing: type: Steel dia: 10.00in fm: −3.00' to: 14.00'
Date Started: 08/22/00		Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: −1.9' to: 34.00'
Date Completed: 08/29/00		Screens: type: Slotted size: 0.010in dia: 2.00in fm: 34.00' to: 59.00'
Remarks: Diedrich D−120, 6.25" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.		Annular Fill: type: Bentonite fm: 0.33' to: 30.00' type: fm: 30.00' to: 32.00' type: fm: 32.00' to: 59.00'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
49	8/29/00	1026	93				Red-brown SILTSTONE; massive; frequent horizontal fractures at 0.16 ft spacing; trace to some white calcareous-filled vugs and veins. At 56 ft, very frequent horizontal fractures. At 49.8 ft, diagonal fracture at high angle.	0.0 ppm 0.0 ppm		Core run #5: From 49–59'. Standard 2" core barrel. Rate of barrel advance ~0.09'/min. RQD=14.4%.
50										
51										
52										
53										
54										
55										
56										
57										
58										
59							End of boring at 59 feet.			2" Screen bottom at 59'.

Project Name: Cornell–Dubilier	Site Id: MW12
Project Number: 1945.1018	Static Water Level: 18.28'
Location: South Plainfield, NJ	X Coordinate: 516414.93
Logged By: C. Prothro	Y Coordinate: 634627.91
Contractor: Tabasco Drilling	Elevation: 75.92'
Drilling Method: 10in and 6in roller bits; 2in core barrel	Conductor Casing: type: Steel dia: 10.00in fm: 0.00' to: 10.00'
Date Started: 09/05/00	Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: 0.3' to: 35.00'
Date Completed: 09/11/00	Screens: type: Slotted size: 0.010in dia: 2.00in fm: 35.00' to: 60.00'
Remarks: Diedrich D–120 Rig, 625" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.	Annular Fill: type: Bentonite fm: 0.33' to: 31.00'; type: #0 Quartz Sand fm: 31.00' to: 33.00'; type: #1 Quartz Sand fm: 33.00' to: 60.00'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction (MP. EL. 75.67)	Notes
	9/5/00	1000	90	24 50 56	SM/ML		Gray-black f silty to f SAND and subrounded to angular m diabase GRAVEL; dense; dry; strong odor.	50.6 ppm 84.1 ppm		Samples collected to 10' with 3" split spoon. Borehole advanced with 6.25" HSA. Sample: CDE–MW12-00.
1										
2	9/5/00	1013	60	12 14 15 15			2–2.25 Gray-black f silty to f SAND and subrounded to angular m diabase GRAVEL; dense; dry. 2.25–3 Red-brown silty CLAY; trace organic material (roots); dense; dry. 3–3.2 Black organic rich PEAT; dense; dry.			
3										
4	9/5/00	1021	80	3 5 7 10			4–4.5 Black to dk brown organic PEAT. 4.5–5.6 Dk red-brown m SAND; semi-dense; moist to wet.			
5										Sample: CDE–MW12-04
6	9/5/00	1027	84	5 10 75 50	SL		6–6.6 Dk red-brown m SAND; semi-dense; moist to wet. 6.6–7.68 Red-brown SILTSTONE pieces and silty CLAY; weathered; firm; wet; dense; becomes SILTSTONE; weathered with trace black staining.	19.2 ppm 58.7 ppm		
7										Slight black stain.
8	9/5/00	1040	40	100			Red-brown SILTSTONE; weathered; wet.	9.2 ppm 22.3 ppm		
9										Sample: CDE–MW12-08 Bailer Sample: CDE–MWG–12 10" Outer Casing to 10'.
10	9/6/00	1005	47		SL/MS		10–19 Red-brown SILTSTONE; frequent horizontal, diagonal, and vertical fractures; white calcareous-filled vugs; trace to some black staining. At 18–19 ft, intermittent sedimentary structures (cross bedding).	26.6 ppm 3.3 ppm		Core run #1: From 10–19'. Standard 2" core barrel. Rate of barrel advance ~0.1'/min. RQD=0.0%
11										

	Project Name: Cornell-Dubilier	Site Id: MW12
	Project Number: 1945.1018	Static Water Level: 18.28'
	Location: South Plainfield, NJ	X Coordinate: 516414.93
	Logged By: C. Prothro	Y Coordinate: 634627.91
Contractor: Tabasco Drilling		Elevation: 75.92'
Drilling Method: 10in and 6in roller bits; 2in core barrel		Conductor Casing: type: Steel dia: 10.00in fm: 0.00' to: 10.00'
Date Started: 09/05/00		Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: 0.3' to: 35.00'
Date Completed: 09/11/00		Screens: type: Slotted size: 0.010in dia: 2.00in fm: 35.00' to: 60.00'
Remarks: Diedrich D-120 Rig, 625" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.		Annular Fill: type: Bentonite fm: 0.33' to: 31.00' type: #0 Quartz Sand fm: 31.00' to: 33.00' type: #1 Quartz Sand fm: 33.00' to: 60.00'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
13										
14										At 13.5' Slight solvent odor.
15										
16										
17										
18										
19	9/6/00	1151	65		SL		19-20 Red-brown SILTSTONE; frequently fractured horizontal fractures of 0.08-0.25 ft spacing. 20-21 Red-brown SILTSTONE; massive; white calcareous-filled vugs; horizontal fractures of 0.08-0.25 ft spacing. 21-25 Red-brown SILTSTONE; massive; horizontal fractures of 0.08-0.25 ft spacing. At 20 and 23 ft, vertical fractures with trace to some dark staining. At 23 ft, possible void space.			Solvent odor remains. Core run #2: From 19-25'. Standard 2" core barrel. Rate of barrel advance ~0.07'/min. RQD=32.9%. Trace to some dark stain along vertical fractures in core.
20								NM		
21										
22										
23										

	Project Name: Cornell-Dubilier	Site Id: MW12
	Project Number: 1945.1018	Static Water Level: 18.28'
	Location: South Plainfield, NJ	X Coordinate: 516414.93
	Logged By: C. Prothro	Y Coordinate: 634627.91
Contractor: Tabasco Drilling		Elevation: 75.92'
Drilling Method: 10in and 6in roller bits; 2in core barrel		Conductor Casing: type: Steel dia: 10.00in fm: 0.00' to: 10.00'
Date Started: 09/05/00		Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: 0.3' to: 35.00'
Date Completed: 09/11/00		Screens: type: Slotted size: 0.010in dia: 2.00in fm: 35.00' to: 60.00'
Remarks: Diedrich D-120 Rig, 625" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.		Annular Fill: type: Bentonite fm: 0.33' to: 31.00' type: #0 Quartz Sand fm: 31.00' to: 33.00' type: #1 Quartz Sand fm: 33.00' to: 60.00'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
25	9/7/00	1130	52		SL/MS		25-26 Red-brown SILTSTONE to sandy MUDSTONE; horizontal fractures at 0.13-0.25 ft spacing; white calcareous filled vugs; some vugs with visible aragonite crystals.	0.0 ppm 4.7 ppm		Water loss slight at 25'. 6" Inner Casing to 25'. Core run #3: From 25-34'. Standard 2" core barrel. Rate of barrel advance ~0.08'/min. RQD=0.0%.
26							26-27 Red-brown SILTSTONE to sandy MUDSTONE; weathered; grey-green anaerobic zone; numerous pits and vugs.			
27							27-28 Red-brown SILTSTONE to sandy MUDSTONE; horizontal fractures at 0.13-0.25 ft spacing; white calcareous filled vugs; some vugs with visible aragonite crystals.			
28							28-29 Red-brown SILTSTONE to sandy MUDSTONE; diagonal fracture. 28.5-29 Red-brown SILTSTONE to sandy MUDSTONE; diagonal fracture; sedimentary structures (skolithos, angular shrinkage, mudcrack-like feature; cross-bedding; laminations).			
29							29-33.5 Red-brown SILTSTONE to sandy MUDSTONE; horizontal fractures at 0.13-0.25 ft spacing; white calcareous filled vugs; sedimentary structures (skolithos, angular shrinkage, mudcrack-like feature; cross-bedding; laminations); some vugs with visible aragonite crystals. At 30 ft, diagonal fracture.			
30										
31							33.5-34 Red-brown SILTSTONE; massive.			
32								NM		
33										
34	9/7/00	1320	91				34-34.6 Red-brown SILTSTONE and Mudstone; massive; trace to some white calcareous-filled vugs; horizontal fractures at <0.04 ft spacing.	0.0 ppm 4.3 ppm		Water loss of ~6.2 gallons from 34'. Core run #4: From 34-44'. Standard 2" core barrel. Rate of barrel advance ~0.09'/min. 2" Screen top at
35							34.6-37.5 Red-brown SILTSTONE; massive; trace to some white calcareous-filled vugs; horizontal fractures with 0.08-0.33 ft spacing. At 36.1 ft, diagonal fracture. 37.5-39 Red-brown SILTSTONE and Mudstone; trace to			

	Project Name: Cornell-Dubilier	Site Id: MW12
	Project Number: 1945.1018	Static Water Level: 18.28'
	Location: South Plainfield, NJ	X Coordinate: 516414.93
	Logged By: C. Prothro	Y Coordinate: 634627.91
Contractor: Tabasco Drilling		Elevation: 75.92'
Drilling Method: 10in and 6in roller bits; 2in core barrel		Conductor Casing: type: Steel dia: 10.00in fm: 0.00' to: 10.00'
Date Started: 09/05/00		Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: 0.3' to: 35.00'
Date Completed: 09/11/00		Screens: type: Slotted size: 0.010in dia: 2.00in fm: 35.00' to: 60.00'
Remarks: Diedrich D-120 Rig, 625" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.		Annular Fill: type: Bentonite fm: 0.33' to: 31.00' type: #0 Quartz Sand fm: 31.00' to: 33.00' type: #1 Quartz Sand fm: 33.00' to: 60.00'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
							some white calcareous-filled vugs; sedimentary structures; bioturbation; white calcareous structures. At 39 ft, diagonal fractures. 39-41.3 Red-brown SILTSTONE and Mudstone; massive; trace to some white calcareous-filled vugs; two weathered horizontal fractures; one low-angle diagonal fracture. 41.3-44 Red-brown SILTSTONE; massive; trace to some white calcareous-filled vugs; trace sedimentary lamination structure; fractures with 0.13-0.33 ft spacing. At 42.2 ft, vertical fracture with possible staining.			35'. RQD=25.6%.
37										
38										
39										
40										
41										
42										
43										
44	9/7/00	1447	79				44-44.7 Red-brown SILTSTONE to MUDSTONE; massive; frequent horizontal fractures with 0.08-0.33 ft spacing. 44.7-46.1 Red-brown SILTSTONE to MUDSTONE; massive; heavily weathered; gray-green anoerobic zone; fractures at <0.08 ft spacing. 46.1-48.75 Red-brown SILTSTONE to MUDSTONE; massive; frequent horizontal fractures with 0.08-0.33 ft spacing.	NM		Water loss from 34-44'. Core run #5: From 44-50'. Standard 2" core barrel. Rate of barrel advance ~0.08'/min. RQD=14%.
45										
46										
47										

FW	Project Name: Cornell-Dubilier	Site Id: MW12
	Project Number: 1945.1018	Static Water Level: 18.28'
	Location: South Plainfield, NJ	X Coordinate: 516414.93
	Logged By: C. Prothro	Y Coordinate: 634627.91
Contractor: Tabasco Drilling		Elevation: 75.92'
Drilling Method: 10in and 6in roller bits; 2in core barrel		Conductor Casing: type: Steel dia: 10.00in fm: 0.00' to: 10.00'
Date Started: 09/05/00		Blank Casing: type: TP 304 S. Steel dia: 2.00in fm: 0.3' to: 35.00'
Date Completed: 09/11/00		Screens: type: Slotted size: 0.010in dia: 2.00in fm: 35.00' to: 60.00'
Remarks: Diedrich D-120 Rig, 625" id HSA, 6" and 10" roller bits. SS: Sandstone, SL: Siltstone, MS: Mudstone Static water level values collected during synoptic water level round on 10/05/00.		Annular Fill: type: Bentonite fm: 0.33' to: 31.00' type: #0 Quartz Sand fm: 31.00' to: 33.00' type: #1 Quartz Sand fm: 33.00' to: 60.00'

Depth (ft)	Date	Time	Recovery Percent	Blow Count	USCS Code	Graphic Log	Material Description	PID/FID (ppm)	Well Construction	Notes
49										
50	9/7/00	1717	96				50-50.6 Red-brown SILTSTONE to MUDSTONE; vertical fracture. 50.6-51.2 Red-brown SILTSTONE to MUDSTONE; frequent horizontal fractures with green-gray anaerobic zone. 51.2-51.4 Red-brown SILTSTONE to MUDSTONE; diagonal fracture. 51.4-54 Red-brown SILTSTONE to MUDSTONE; massive; white calcareous-filled vugs; horizontal fractures with 0.08-0.42 ft spacing. 54-54.5 Red-brown SILTSTONE to MUDSTONE; diagonal fracture. 54.5-56 Red-brown SILTSTONE to MUDSTONE; voids and vugs with horizontal fractures. 56-60 Red-brown SILTSTONE to MUDSTONE; horizontal fractures with 0.16 ft spacing. At 57.25 ft, diagonal fracture and several large white calcareous-filled vugs. At 57.7 ft, vertical fracture. At 60 ft, horizontal fractures with spacing becoming 0.16 ft.	0.0 ppm 3.7 ppm		Water loss from 44-50'. Core run #6: From 50-60'. Standard 2" core barrel. Rate of barrel advance ~0.08'/min. RQD=13.8%.
51										
52										
53										
54	9/7/00									
55										
56								NM		
57										
58										
59							End of boring at 60 feet.			2" Screen bottom at 60'.

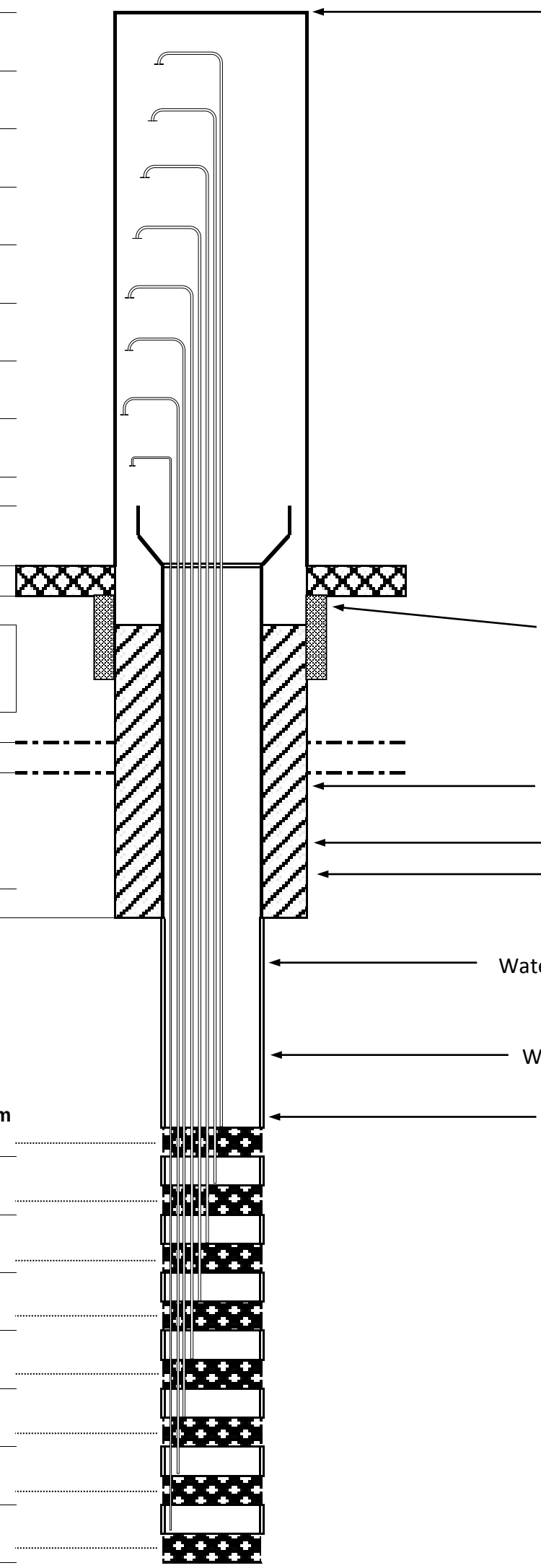
APPENDIX C

MALCOLM PIRNIE, INC.			BEDROCK FLUTe™ Well ERT-1
Client: USACE/USEPA	**Project:** Cornell - Dubilier Electronics Superfund Site	**Job Number:** 4553066	
Drilling Method: Hollow Stem Auger/Air Rotary Tricone	**Development Method**: Air Lifting		**Subcontractor:** Summit Drilling Co.
DATES:	**Drilling/Installation:**	1/17/2008 - 1/17/2008	**Measuring Point (MP)**
	Development/Temporary Liner Installation:	1/17/2008 - 1/24/2008	**Type: STICKUP - VARIABLE**
	Water FLUTe™ Installation Date:	6/12/2008	**PVC Elevation (ft):** 72.84

Item	Depth Below PVC (ft)	Elevation (ft msl)
Stickup	-2.99	73.46
Top of Port 1 Tube	-0.18	73.02
Top of Port 2 Tube	-0.19	73.03
Top of Port 3 Tube	-0.18	73.02
Top of Port 4 Tube	-0.18	73.02
Top of Port 5 Tube	-0.19	73.03
Top of Port 6 Tube	-0.17	73.01
Top of Port 7 Tube	-0.19	73.03
Top of Port 8 Tube	-0.18	73.02
Top of PVC Riser	0.00	72.84
Recommended Liner Water Level	1.63	71.21
Grade	2.37	70.47

	Depth Below Grade (ft)	Elevation (ft msl)
Base of Overburden	3.0	67.47
Base of Weathered Bedrock	10.0	60.47
Top of Open Hole with Water FLUTe™ Liner	25.0	45.47

Port Number:	Interval Top	Interval Bottom	Elevation Top	Elevation Bottom
1	24	29	46	99
2	33	43	37	113
3	46	56	24	126
4	59	64	11	134
5	67	77	3	147
6	100	105	-30	175
7	112	117	-42	187
8	135	140	-65	210
Total Depth	150		-80	



Description

Stickup Type: Steel Casing Cover
Stickup Diameter: 6 (in.)

Surface Seal Type: Concrete
Casing Type: Steel

Borehole Diameter: 10 (in.)

Casing ID: 6 (in.)
Grout Type: Cement-bentonite

Water FLUTe™ Diameter: 6 (in.)

Water FLUTe™ Length: 125.0 (ft.)

Borehole Diameter: 6 (in.)

T Transducer

Notes:

MALCOLM PIRNIE, INC.			BEDROCK FLUTe™ Well ERT-2
Client: USACE/USEPA	**Project:** Cornell - Dubilier Electronics Superfund Site	**Job Number:** 4553066	
Drilling Method: Hollow Stem Auger/Air Rotary Tricone	**Development Method**: Air Lifting		**Subcontractor:** Summit Drilling Co.
DATES:	**Drilling/Installation:**	1/7/2008 - 1/10/2008	**Measuring Point (MP)**
	Development/Temporary Liner Installation:	1/10/2008 - 1/16/2008	**Type: FLUSHMOUNT - VARIABLE**
	Water FLUTe™ Installation Dates:	6/7/2008	**GS Elevation (ft):** 80.99

Item	Depth Below Grade (ft)	Elevation (ft msl)
Grade	0.00	80.99
Top of Port 1 Tube	0.43	80.56
Top of Port 2 Tube	0.42	80.57
Top of Port 3 Tube	0.43	80.56
Top of Port 4 Tube	0.44	80.55
Top of Port 5 Tube	0.48	80.51
Top of Port 6 Tube	0.44	80.55
Top of Port 7 Tube	0.43	80.56
Top of PVC Riser	0.63	80.36
Base of Overburden	3.0	77.5
Recommended Liner Water Level	9.66	71.33
Base of Weathered Bedrock	10.0	70.55
Top of Open Hole with Water FLUTe™ Liner	25.0	55.99

Description

Vault Dimensions: 2 x 2 (ft.)

Surface Seal Type: Concrete

Casing Type: Steel

Casing ID: 6 (in.)

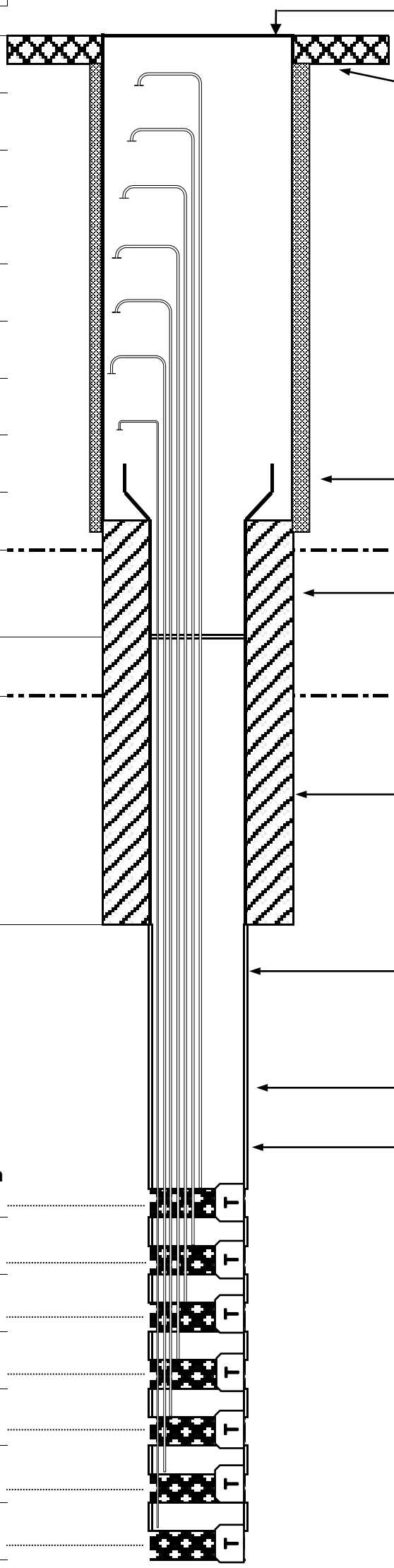
Grout Type: Cement-bentonite

Borehole Diameter: 10 (in.)

Water FLUTe™ Diameter: 6 (in.)

Water FLUTe™ Length: 125.0 (ft.)

Borehole Diameter: 6 (in.)



Port Number:	Interval Top	Interval Bottom	Elevation Top	Elevation Bottom
1	24	29	57	52
2	33	43	48	38
3	46	56	35	25
4	59	64	22	17
5	67	77	14	4
6	100	105	-19	-24
7	112	117	-31	-36
Total Depth	150		-69	

Notes:

T **Transducer**

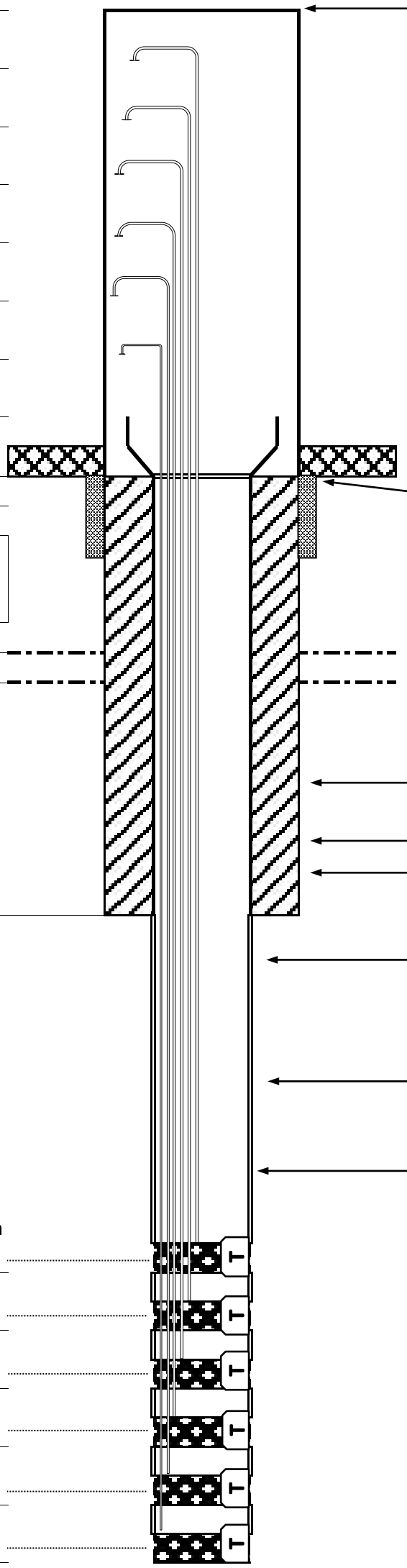
MALCOLM PIRNIE, INC.			BEDROCK FLUTe™ Well ERT-3
Client: USACE/USEPA	**Project:** Cornell - Dubilier Electronics Superfund Site	**Job Number:** 4553066	
Drilling Method: Hollow Stem Auger/Air Rotary Tricone	**Development Method**: Air Lifting		**Subcontractor:** Summit Drilling Co.
DATES:	**Drilling/Installation:**	1/15/2008 - 1/15/2008	**Measuring Point (MP)**
	Development/Temporary Liner Installation:	1/15/2008 - 1/22/2008	**Type: STICKUP - VARIABLE**
	Water FLUTe™ Installation Date:	6/11/2008	**PVC Elevation (ft):** 68.69

Item	Depth Below PVC (ft)	Elevation (ft msl)
Stickup	-0.4	69.10
Top of Port 1 Tube	-0.2	68.69
Top of Port 2 Tube	-0.3	68.97
Top of Port 3 Tube	-0.3	68.97
Top of Port 4 Tube	-0.2	68.90
Top of Port 5 Tube	-0.3	68.95
Top of Port 6 Tube	-0.3	68.95
Top of PVC Riser	0.0	68.69
Recommended Liner Water Level	0.50	68.19
Grade	2.8	65.84

	Depth Below Grade (ft)	Elevation (ft msl)
Base of Overburden	3.0	62.84
Base of Weathered Bedrock	10.0	55.84
Top of Open Hole with Water FLUTe™ Liner	25.0	40.84

Port Number:	Interval Top	Interval Bottom	Elevation Top	Elevation Bottom
1	27	37	39	29
2	55	65	11	1
3	90	105	-24	-39
4	110	120	-44	-54
5	124	134	-58	-68
6	138	148	-72	-82
Total Depth	150		-84	

Notes:



Description

Stickup Type: Steel Casing Cover
Stickup Diameter: 6 (in.)

Surface Seal Type: Concrete
Casing Type: Steel

Borehole Diameter: 10 (in.)

Casing ID: 6 (in.)
Grout Type: Cement-bentonite

Water FLUTe™ Diameter: 6 (in.)

Water FLUTe™ Length: 125.0 (ft.)

Borehole Diameter: 6 (in.)

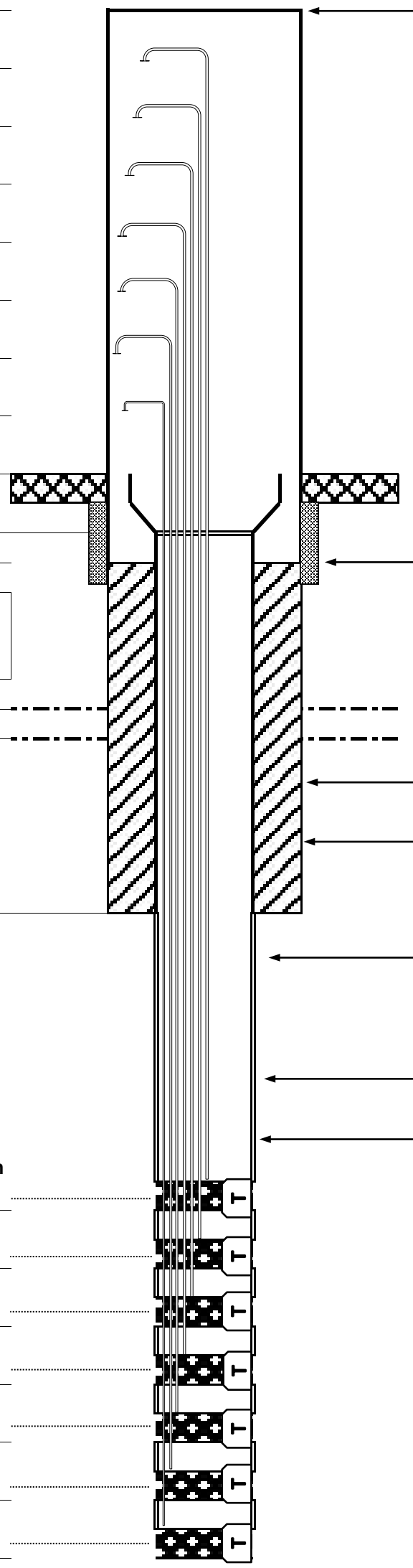
T Transducer

MALCOLM PIRNIE, INC.			BEDROCK FLUTe™ Well ERT-4
Client: USACE/USEPA	**Project:** Cornell - Dubilier Electronics Superfund Site	**Job Number:** 4553066	
Drilling Method: Hollow Stem Auger/Air Rotary Tricone	**Development Method**: Air Lifting		**Subcontractor:** Summit Drilling Co.
DATES:	**Drilling/Installation:**	1/14/2008 - 1/14/2008	**Measuring Point (MP)**
	Development/Temporary Liner Installation:	1/14/2008 - 1/16/2008	**Type: STICKUP - VARIABLE**
	Water FLUTe™ Installation Date:	6/10/2008	**PVC Elevation (ft):** 61.77

Item	Depth Below PVC (ft)	Elevation (ft msl)
Stickup	-0.7	62.43
Top of Port 1 Tube	-0.3	62.03
Top of Port 2 Tube	-0.3	62.03
Top of Port 3 Tube	-0.2	62.01
Top of Port 4 Tube	-0.4	62.17
Top of Port 5 Tube	-0.4	62.16
Top of Port 6 Tube	-0.4	62.17
Top of Port 7 Tube	-0.4	62.19
Top of PVC Riser	0.0	61.77
Recommended Liner Water Level	0.50	61.27
Grade	2.6	59.21

	Depth Below Grade (ft)	Elevation (ft msl)
Base of Overburden	3.0	56.21
Base of Weathered Bedrock	10.0	49.21
Top of Open Hole with Water FLUTe™ Liner	25.0	34.21

Port Number:	Interval Top	Interval Bottom	Elevation Top	Elevation Bottom
1	27	37	32	22
2	46	56	13	3
3	61	66	-2	-7
4	83	88	-24	-29
5	91	106	-32	-47
6	111	116	-52	-57
7	128	138	-69	-79
Total Depth	150		-91	



Description

Stickup Type: Steel Casing Cover
Stickup Diameter: 6 (in.)

Surface Seal Type: Concrete
Casing Type: Steel

Borehole Diameter: 10 (in.)

Casing ID: 6 (in.)
Grout Type: Cement-bentonite

Water FLUTe™ Diameter: 6 (in.)

Water FLUTe™ Length: 125.0 (ft.)

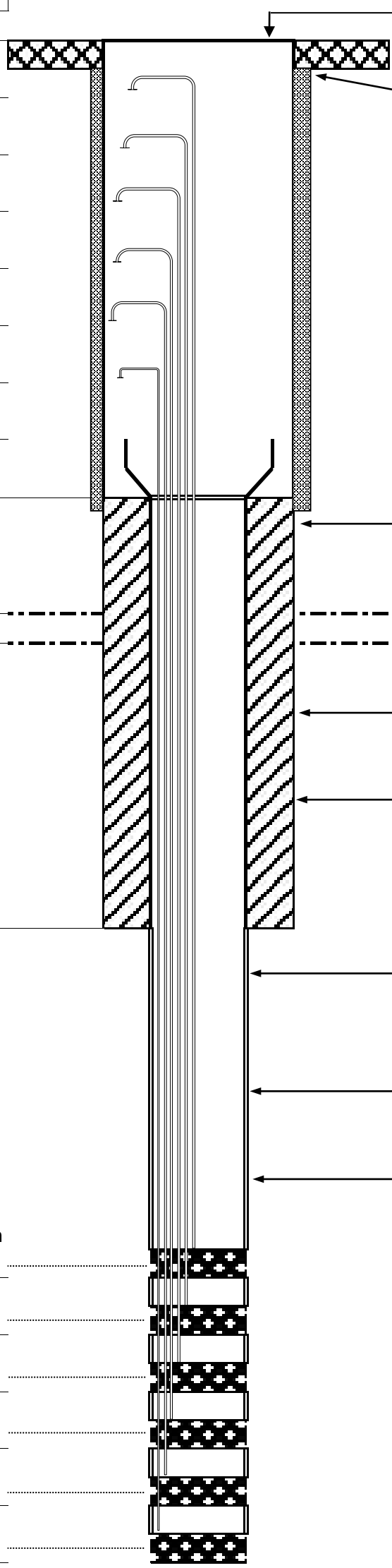
Borehole Diameter: 6 (in.)

T Transducer

Notes:

MALCOLM PIRNIE, INC.			BEDROCK FLUTe™ Well ERT-5
Client: USACE/USEPA	**Project:** Cornell - Dubilier Electronics Superfund Site	**Job Number:** 4553066	
Drilling Method: Hollow Stem Auger/Air Rotary Tricone	**Development Method**: Air Lifting		**Subcontractor:** Summit Drilling Co.
DATES:	**Drilling/Installation:**	1/2/2008 - 1/4/2008	**Measuring Point (MP)**
	Development/Temporary Liner Installation:	1/4/2008 - 1/8/2008	**Type: FLUSHMOUNT - VARIABLE**
	Water FLUTe™ Installation Dates:	6/7/2008	**GS Elevation (ft):** 69.72

Item	Depth Below Grade (ft)	Elevation (ft msl)
Grade	0.0	69.72
Top of Port 1 Tube	0.5	69.23
Top of Port 2 Tube	0.5	69.23
Top of Port 3 Tube	0.5	69.24
Top of Port 4 Tube	0.6	69.14
Top of Port 5 Tube	0.5	69.24
Top of Port 6 Tube	0.5	69.24
Top of PVC Riser	0.7	69.03
Recommended Liner Water Level	1.19	68.53
Base of Overburden	3.0	66.72
Base of Weathered Bedrock	10.0	59.72
Top of Open Hole with Water FLUTe™ Liner	25.0	44.72



Description

Vault Dimensions:	2 x 2	(ft.)
Surface Seal Type:	Concrete	
Casing Type:	Steel	
Casing ID:	6	(in.)
Grout Type:	Cement-bentonite	
Borehole Diameter:	10	(in.)
Water FLUTe™ Diameter:	6	(in.)
Water FLUTe™ Length:	125.0	(ft.)
Borehole Diameter:	6	(in.)

Port Number:	Interval Top	Interval Bottom	Elevation Top	Elevation Bottom
1	24	34	46	36
2	37	47	33	23
3	50	60	20	10
4	77	87	-7	-17
5	93	98	-23	-28
6	120	130	-50	-60
Total Depth	150		-80	

Notes:

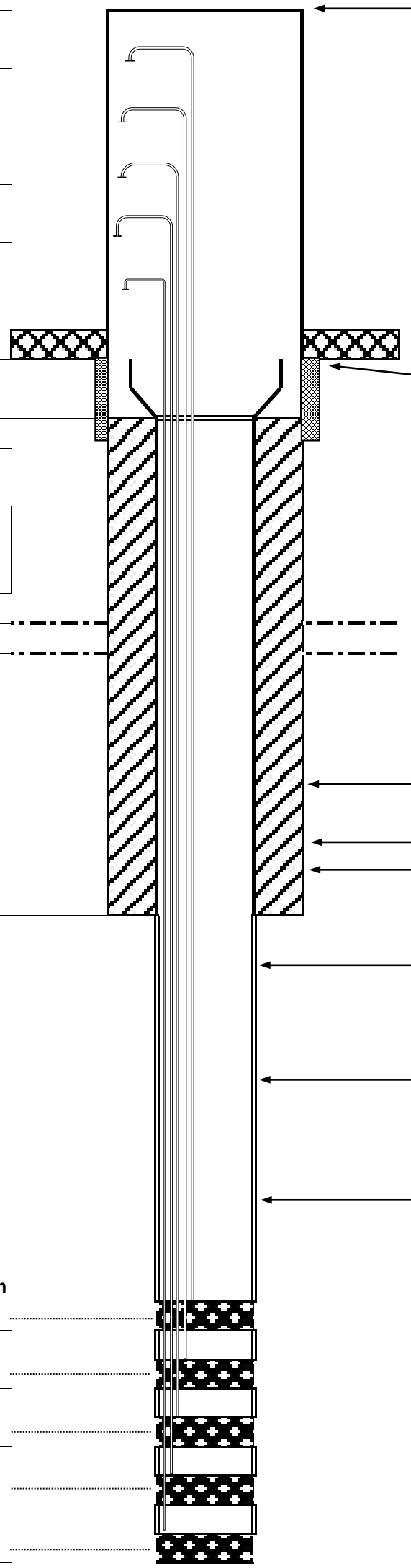
T **Transducer**

MALCOLM PIRNIE, INC.			BEDROCK FLUTe™ Well ERT-6
Client: USACE/USEPA	**Project:** Cornell - Dubilier Electronics Superfund Site	**Job Number:** 4553066	
Drilling Method: Hollow Stem Auger/Air Rotary Tricone	**Development Method**: Air Lifting		**Subcontractor:** Summit Drilling Co.
DATES:	**Drilling/Installation:**	1/11/2008 - 1/11/2008	**Measuring Point (MP)**
	Development/Temporary Liner Installation:	1/11/2008 - 1/16/2008	**Type: STICKUP - VARIABLE**
	Water FLUTe™ Installation Date:	6/11/2008	**PVC Elevation (ft):** 67.52

Item	Depth Below PVC (ft)	Elevation (ft msl)
Stickup	-0.5	68.04
Top of Port 1 Tube	-0.2	67.73
Top of Port 2 Tube	-0.2	67.71
Top of Port 3 Tube	-0.2	67.72
Top of Port 4 Tube	-0.2	67.72
Top of Port 5 Tube	-0.2	67.72
Top of PVC Riser	0.0	67.52
Recommended Liner Water Level	0.50	67.02
Grade	2.0	65.49

	Depth Below Grade (ft)	Elevation (ft msl)
Base of Overburden	3.0	62.49
Base of Weathered Bedrock	10.0	55.49
Top of Open Hole with Water FLUTe™ Liner	25.0	42.52

Port Number:	Interval Top	Interval Bottom	Elevation Top	Elevation Bottom
1	26	36	39	29
2	75	85	-10	-20
3	93	103	-28	-38
4	107	117	-42	-52
5	128	138	-63	-73
Total Depth	150		-85	



Description

Stickup Type: Steel Casing Cover
Stickup Diameter: 6 (in.)

Surface Seal Type: Concrete
Casing Type: Steel

Borehole Diameter: 10 (in.)

Casing ID: 6 (in.)
Grout Type: Cement-bentonite

Water FLUTe™ Diameter: 6 (in.)

Water FLUTe™ Length: 125.0 (ft.)

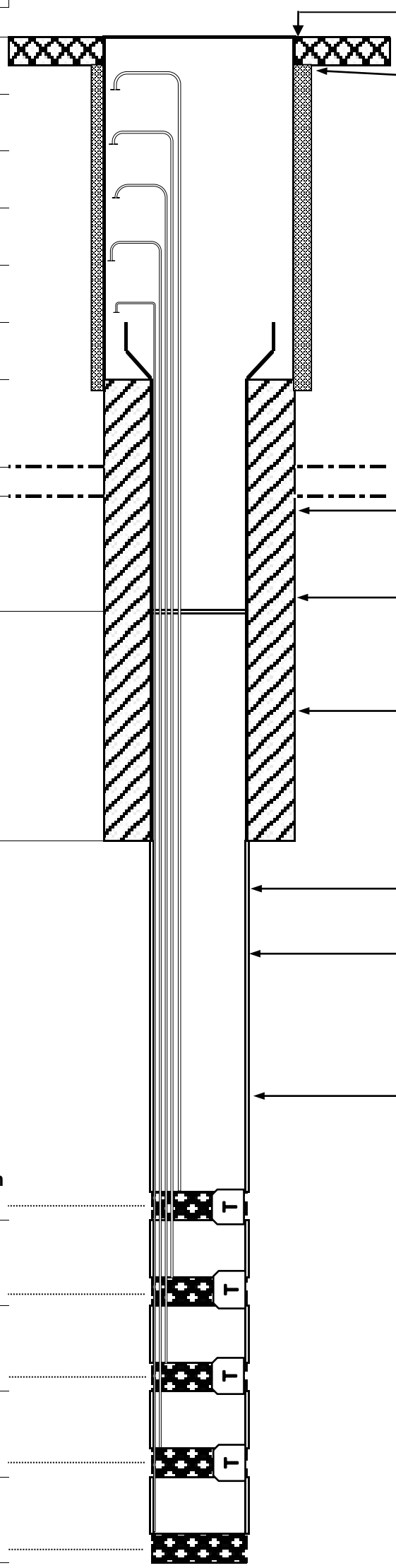
Borehole Diameter: 6 (in.)

T Transducer

Notes:

MALCOLM PIRNIE, INC.			BEDROCK FLUTe™ Well ERT-7
Client: USACE/USEPA	**Project:** Cornell - Dubilier Electronics Superfund Site	**Job Number:** 4553066	
Drilling Method: Hollow Stem Auger/Air Rotary Tricone	**Development Method**: Air Lifting		**Subcontractor:** Summit Drilling Co.
DATES:	**Drilling/Installation:**	1/16/2008 - 1/16/2008	**Measuring Point (MP)**
	Development/Temporary Liner Installation:	1/17/2008 - 1/21/2008	**Type: FLUSHMOUNT**
	Water FLUTe™ Installation Dates:	9/23/2009 - 9/28/2009	**GS Elevation (ft):** 81.00

Item	Depth Below Grade (ft)	Elevation (ft msl)
Grade	0.0	81.00
Top of Port 1 Tube		
Top of Port 2 Tube		
Top of Port 3 Tube		
Top of Port 4 Tube		
Top of Port 5 Tube		
Top of PVC Riser	0.8	80.19
Base of Overburden	3.0	78.00
Depth to Bedrock	3.0	78.00
Recommended Liner Water Level	9.28	71.72
Top of Open Hole with Water FLUTe™ Liner	25.0	56.00



Description

Vault Dimensions:	2 x 2	(ft.)
Surface Seal Type:	Concrete	
Casing Type:	Steel	
Casing ID:	6	(in.)
Grout Type:	Cement-bentonite	
Borehole Diameter:	10	(in.)
Water FLUTe™ Diameter:	6	(in.)
Water FLUTe™ Length:	125.0	(ft.)
Borehole Diameter:	6	(in.)

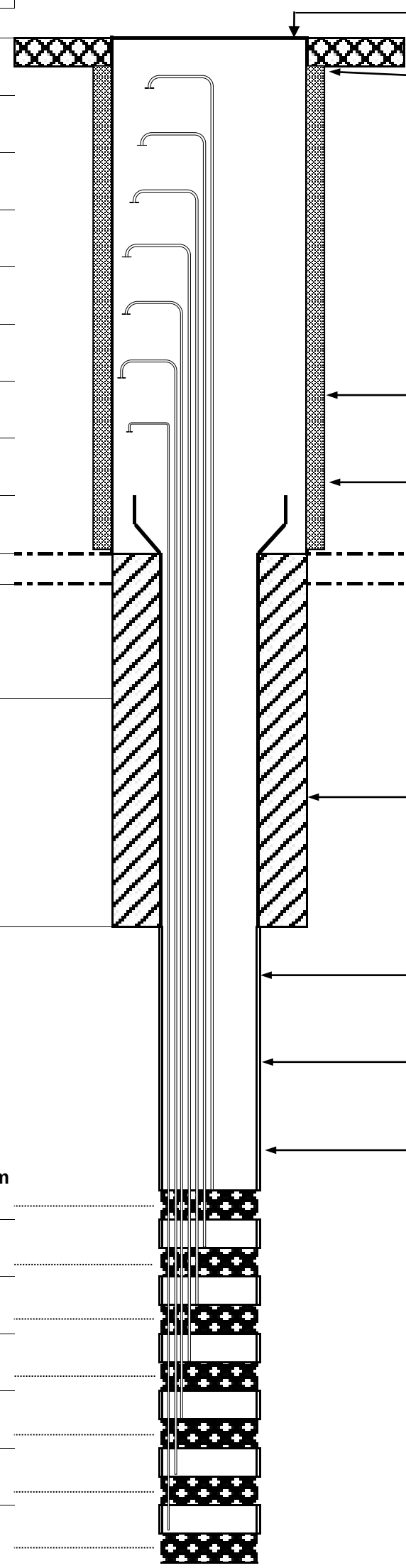
Port Number:	Interval Top	Interval Bottom	Elevation Top	Elevation Bottom
1	25	35	56	46
2	45	55	36	26
3	65	75	16	6
4	100	110	-19	-29
5	130	140	-49	-59
Total Depth	150		-69	

Notes:

T **Transducer**

MALCOLM PIRNIE, INC.			BEDROCK FLUTe™ Well ERT-8
Client: USACE/USEPA	**Project:** Cornell - Dubilier Electronics Superfund Site	**Job Number:** 4553066	
Drilling Method: Hollow Stem Auger/Air Rotary Tricone	**Development Method**: Air Lifting		**Subcontractor:** Summit Drilling Co.
DATES:	**Surface Casing Installation:**	2/21/2008 - 2/25/2008	**Measuring Point (MP)**
	Development/Temporary Liner Installation:	2/25/2008 - 3/7/2008	**Type: FLUSHMOUNT**
	Water FLUTe™ Installation Dates:	6/9/2008	**GS Elevation (ft):** 83.36

Item	Depth Below Grade (ft)	Elevation (ft msl)
Grade	0.0	83.36
Top of Port 1 Tube		
Top of Port 2 Tube		
Top of Port 3 Tube		
Top of Port 4 Tube		
Top of Port 5 Tube		
Top of Port 6 Tube		
Top of Port 7 Tube		
Top of PVC Riser	-2.7	82.74
Base of Overburden	2.0	81.36
Depth to Bedrock	2.0	81.36
Recommended Liner Water Level	10.98	72.38
Top of Open Hole with Water FLUTe™ Liner	17.0	66.36



Description		
Vault Dimensions:	2 x 2	(ft.)
Surface Seal Type:	Concrete	
Casing Type:	Steel	
Casing ID:	6	(in.)
Grout Type:	Cement-bentonite	
Borehole Diameter:	10	(in.)
Water FLUTe™ Diameter:	6	(in.)
Water FLUTe™ Length:	133.0	(ft.)
Borehole Diameter:	6	(in.)

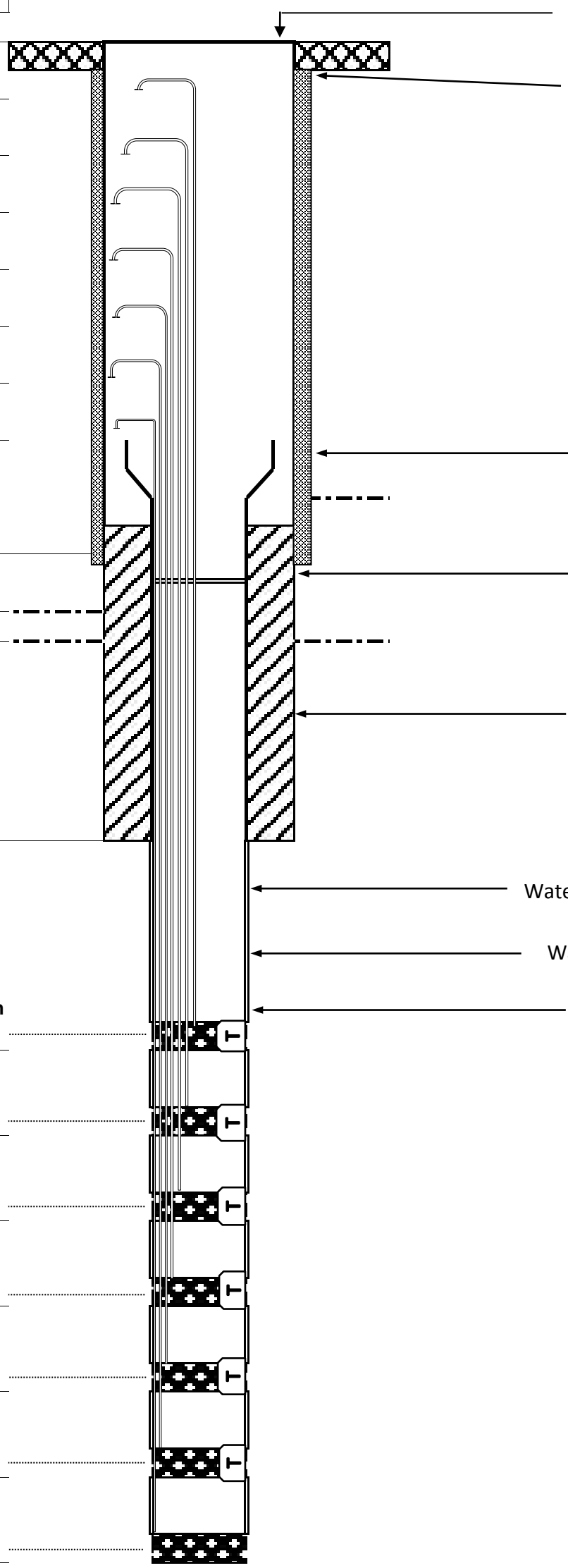
Port Number:	Interval Top	Interval Bottom	Elevation Top	Elevation Bottom
1	17	27	66	56
2	31	41	52	42
3	44	54	39	29
4	57	62	26	21
5	87	97	-4	-14
6	107	112	-24	-29
7	135	145	-52	-62
Total Depth	150		-67	

Notes:

T **Transducer**

MALCOLM PIRNIE, INC.			BEDROCK FLUTe™ Well MW-13
Client: USACE/USEPA	**Project:** Cornell - Dubilier Electronics Superfund Site	**Job Number:** 4553066	
Drilling Method: Hollow Stem Auger/Mud Rotary Tricone **Development Method**: 3" Electrosubmersible Pump			**Subcontractor:** Advanced Drilling
DATES:	**Surface Casing Installation:**	3/24/2009 - 3/24/2009	**Measuring Point (MP)**
	Development/Temporary Liner Installation:	3/27/2009 - 3/27/2009	**Type: FLUSHMOUNT - VARIABLE**
	Water FLUTe™ Installation Dates:	9/28/2009 - 9/29/2009	**GS Elevation (ft):** 67.23

Item	Depth Below Grade (ft)	Elevation (ft msl)
Grade	0.0	67.2
Top of Port 1 Tube	0.3	66.9
Top of Port 2 Tube	0.3	66.9
Top of Port 3 Tube	0.3	66.9
Top of Port 4 Tube	0.4	66.8
Top of Port 5 Tube	0.4	66.8
Top of Port 6 Tube	0.3	66.9
Top of Port 7 Tube	0.4	66.9
Top of PVC Riser	0.7	66.5
Recommended Liner Water Level	1.23	66.00
Base of Overburden	5.0	62.23
Base of Weathered Bedrock	8.0	59.23
Top of Open Hole with Water FLUTe™ Liner	18.0	49.23



Description

Vault Dimensions:	2 x 2	(ft.)
Surface Seal Type:	Concrete	
Casing Type:	Steel	
Casing ID:	6	(in.)
Grout Type:	Cement-bentonite	
Borehole Diameter:	8	(in.)
Water FLUTe™ Diameter:	6	(in.)
Water FLUTe™ Length:	232.0	(ft.)
Borehole Diameter:	6	(in.)

Port Number:	Interval Top	Interval Bottom	Elevation Top	Elevation Bottom
1	18	28	49	39
2	35	45	32	22
3	63	73	4	-6
4	95	105	-28	-38
5	115	125	-48	-58
6	150	160	-83	-93
7	230	240	-163	-173
Total Depth	250		-183	

Notes:

T **Transducer**

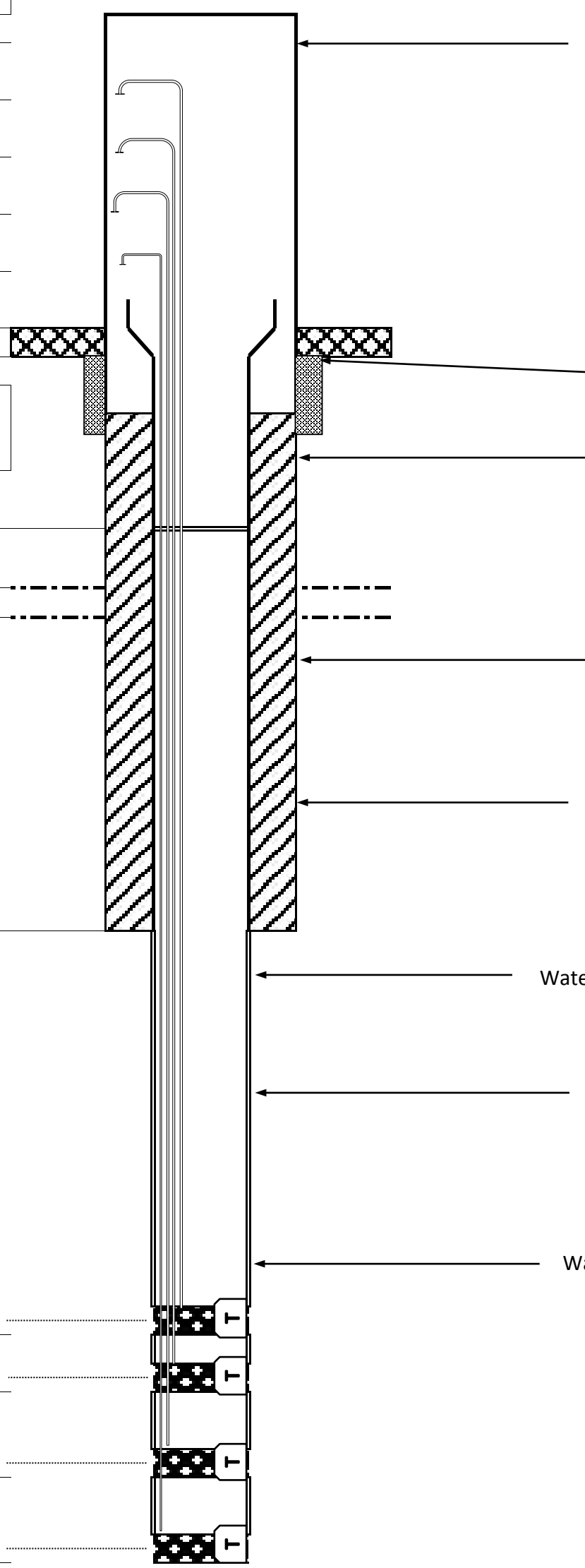
MALCOLM PIRNIE, INC.			BEDROCK FLUTe™ Well MW-14S
Client: USACE/USEPA	**Project:** Cornell - Dubilier Electronics Superfund Site	**Job Number:** 4553066	
Drilling Method: Hollow Stem Auger/HQ Triple Tube Core **Development Method:** 3'' Electrosubmersible Pump			**Subcontractor:** Advanced Drilling
DATES:	**Surface Casing Installation:**	5/27/2009 - 5/27/2009	**Measuring Point (MP)**
	Development/Temporary Liner Installation:	5/29/2009 - 6/1/2009	**Type: STICKUP**
	Water FLUTe™ Installation Dates:	9/18/2009 - 9/21/2009	**PVC Elevation (ft):** 77.05

Item	Depth Below PVC (ft)	Elevation (ft msl)
Stickup	-0.9	77.91
Top of Port 1 Tube		
Top of Port 2 Tube		
Top of Port 3 Tube		
Top of Port 4 Tube		
Top of PVC Riser	0.0	77.05
Grade	2.0	75.08

	Depth Below Grade (ft)	Elevation (ft msl)
Recommended Liner Water Level	3.59	71.49
Base of Overburden	10.0	67.05
Base of Weathered Bedrock	13.0	64.05
Top of Open Hole with Water FLUTe™ Liner	23.0	54.05

Port Number:	Interval Top	Interval Bottom	Elevation Top	Elevation Bottom
1	30	35	45	40
2	41	46	34	29
3	55	60	20	15
4	65	70	10	5
Total Depth	70		5	

Notes:



Description

Stickup Type: Steel
Stickup Diameter: 13 (in.)

Surface Seal Type: Concrete

Casing Type: Steel
Casing ID: 6 (in.) (in.)

Grout Type: Cement-bentonite

Borehole Diameter: 10 (in.)

Water FLUTe™ Diameter: 6 (in.)

Borehole Diameter: 6 (in.)

Water FLUTe™ Length: 47.0 (ft.)

T **Transducer**

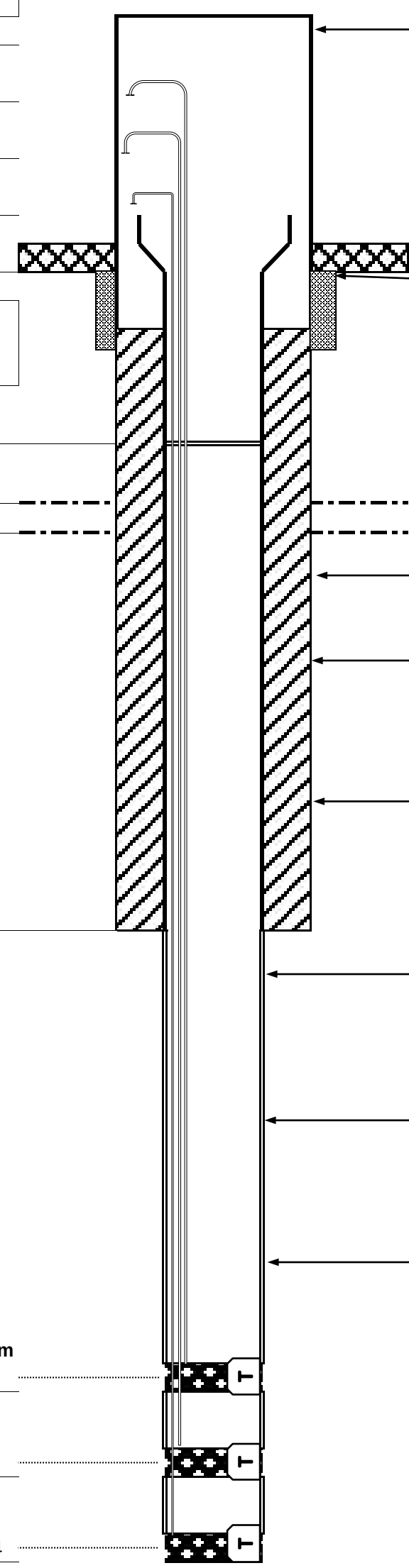
MALCOLM PIRNIE, INC.			BEDROCK FLUTe™ Well MW-14D
Client: USACE/USEPA	**Project:** Cornell - Dubilier Electronics Superfund Site	**Job Number:** 4553066	
Drilling Method: Hollow Stem Auger/HQ Triple Tube Core **Development Method:** 3'' Electrosubmersible Pump			**Subcontractor:** Advanced Drilling
DATES:	**Surface Casing Installation:**	2/16/2009 - 2/16/2009	**Measuring Point (MP)**
	Development/Temporary Liner Installation:	3/5/2009 - 3/6/2009	**Type: STICKUP**
	Water FLUTe™ Installation Dates:	9/30/2009	**PVC Elevation (ft):** 76.79

Item	Depth Below PVC (ft)	Elevation (ft msl)
Stickup	-2.7	77.92
Top of Port 1 Tube		
Top of Port 2 Tube		
Top of Port 3 Tube		
Top of PVC Riser	-2.7	76.79
Grade	0.0	75.29

	Depth Below Grade (ft)	Elevation (ft msl)
Recommended Liner Water Level	4.05	71.24
Base of Overburden	9.0	66.29
Base of Weathered Bedrock	10.0	65.29
Top of Open Hole with Water FLUTe™ Liner	69.0	7.79

Port Number:	Interval Top	Interval Bottom	Elevation Top	Elevation Bottom
1	80	85	-5	-10
2	123	133	-48	-58
3	199	209	-124	-134
Total Depth	233		-155	

Notes:



Description		
Stickup Type:	Steel	
Stickup Diameter:	13	(in.)
Surface Seal Type:	Concrete	
Casing Type:	Steel	
Casing ID:	6	(in.)
Grout Type:	Cement-bentonite	
Borehole Diameter:	10	(in.)
Water FLUTe™ Diameter:	6	(in.)
Borehole Diameter:	6	(in.)
Water FLUTe™ Length:	164.0	(ft.)

T Transducer

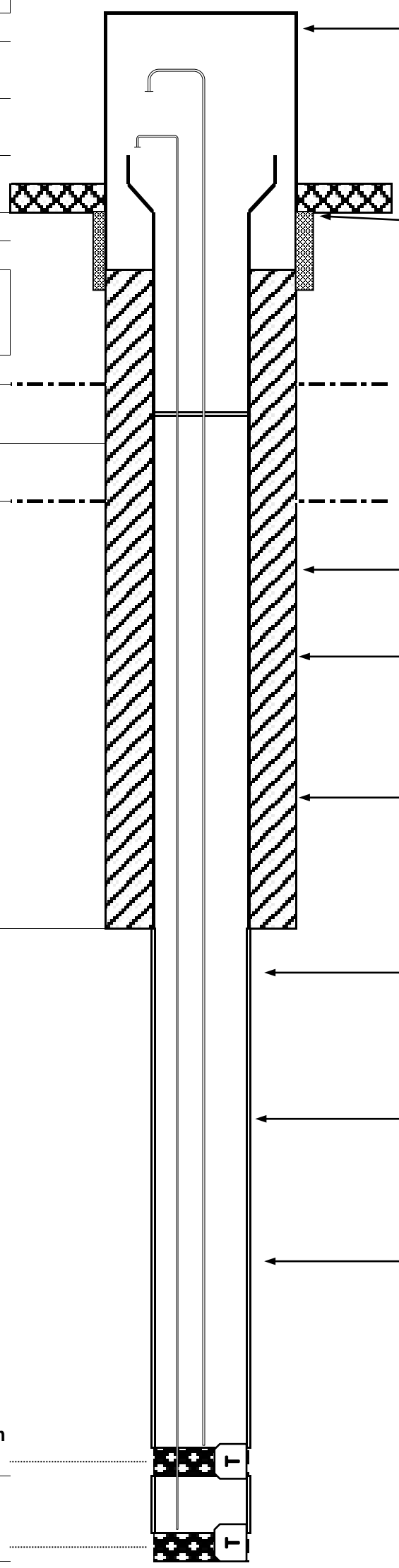
MALCOLM PIRNIE, INC.			BEDROCK FLUTe™ Well MW-15S
Client: USACE/USEPA	**Project:** Cornell - Dubilier Electronics Superfund Site	**Job Number:** 4553066	
Drilling Method: Hollow Stem Auger/Mud Rotary Tricone **Development Method:** 3" Electrosubmersible Pump			**Subcontractor:** Advanced Drilling
DATES:	**Surface Casing Installation:**	3/31/2009 - 3/31/2009	**Measuring Point (MP)**
	Development/Temporary Liner Installation:	4/2/2009 - 4/3/2009	**Type: STICKUP - VARIABLE**
	Water FLUTe™ Installation Dates:	10/1/2009 - 10/2/2009	**PVC Elevation (ft):** 77.46

Item	Depth Below PVC (ft)	Elevation (ft msl)
Stickup	-0.7	78.14
Top of Port 1 Tube	-0.4	77.90
Top of Port 2 Tube	-0.4	77.89
Top of PVC Riser	0.0	77.46
Grade	2.0	75.42

	Depth Below Grade (ft)	Elevation (ft msl)
Base of Overburden	4.0	71.42
Recommended Liner Water Level	4.02	71.40
Base of Weathered Bedrock	8.0	67.42
Top of Open Hole with Water FLUTe™ Liner	18.0	57.42

Port Number:	Interval Top	Interval Bottom	Elevation Top	Elevation Bottom
1	30	40	45	35
2	70	80	5	-5
Total Depth	100		-25	

Notes:



Description

Stickup Type: Steel
Stickup Diameter: 13 (in.)

Surface Seal Type: Concrete

Casing Type: Steel
Casing ID: 6 (in.)

Grout Type: Cement-bentonite

Borehole Diameter: 10 (in.)

Water FLUTe™ Diameter: 6 (in.)

Borehole Diameter: 6 (in.)

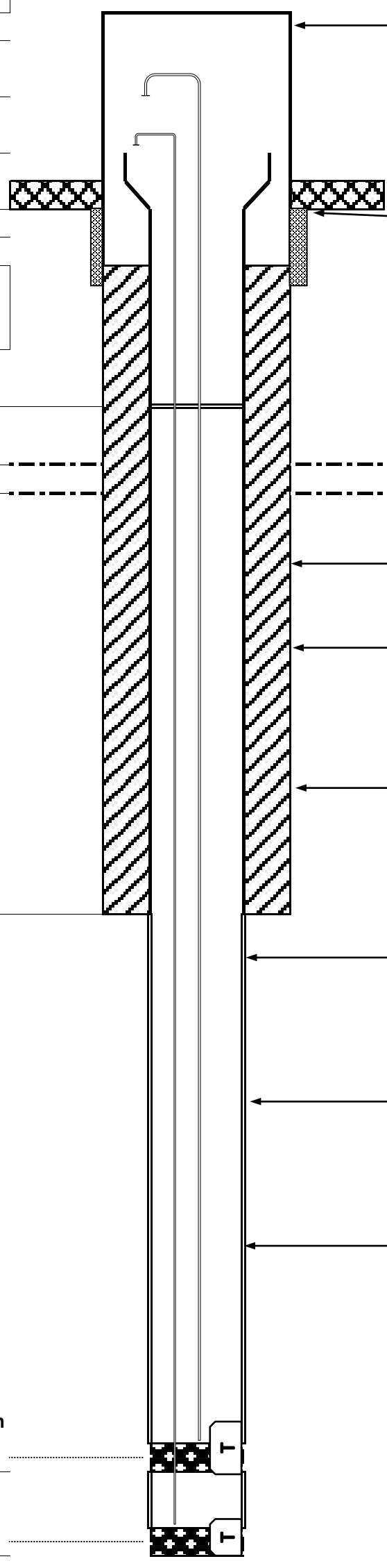
Water FLUTe™ Length: 82.0 (ft.)

T **Transducer**

MALCOLM PIRNIE, INC.			BEDROCK FLUTe™ Well MW-15D
Client: USACE/USEPA	**Project:** Cornell - Dubilier Electronics Superfund Site	**Job Number:** 4553066	
Drilling Method: Hollow Stem Auger/Mud Rotary Tricone **Development Method:** 3" Electrosubmersible Pump			**Subcontractor:** Advanced Drilling
DATES:	**Surface Casing Installation:**	4/1/2009 - 4/3/2009	**Measuring Point (MP)**
	Development/Temporary Liner Installation:	4/7/2009 - 4/9/2009	**Type: STICKUP VARIABLE**
	Water FLUTe™ Installation Dates:	10/1/2009 - 10/2/2009	**PVC Elevation (ft):** 77.35

Item	Depth, below Measuring Point (ft)	Elevation (ft msl)
Stickup	-0.8	78.2
Top of Port 1 Tube	-0.4	77.75
Top of Port 2 Tube	-0.4	77.73
Top of PVC Riser	0.0	77.4
Grade	2.1	75.3

	Depth Below Grade (ft)	Elevation (ft msl)
Recommended Liner Water Level	3.81	71.45
Base of Overburden	4.0	71.26
Base of Weathered Bedrock	8.0	67.26
Top of Open Hole with Water FLUTe™ Liner	100.0	-24.74



Description

Stickup Type: Steel
Stickup Diameter: 13 (in.)

Surface Seal Type: Concrete

Casing Type: Steel
Casing ID: 6 (in.)

Grout Type: Cement-bentonite

Borehole Diameter: 10 (in.)

Water FLUTe™ Diameter: 6 (in.)

Borehole Diameter: 6 (in.)

Water FLUTe™ Length: 133.0 (ft.)

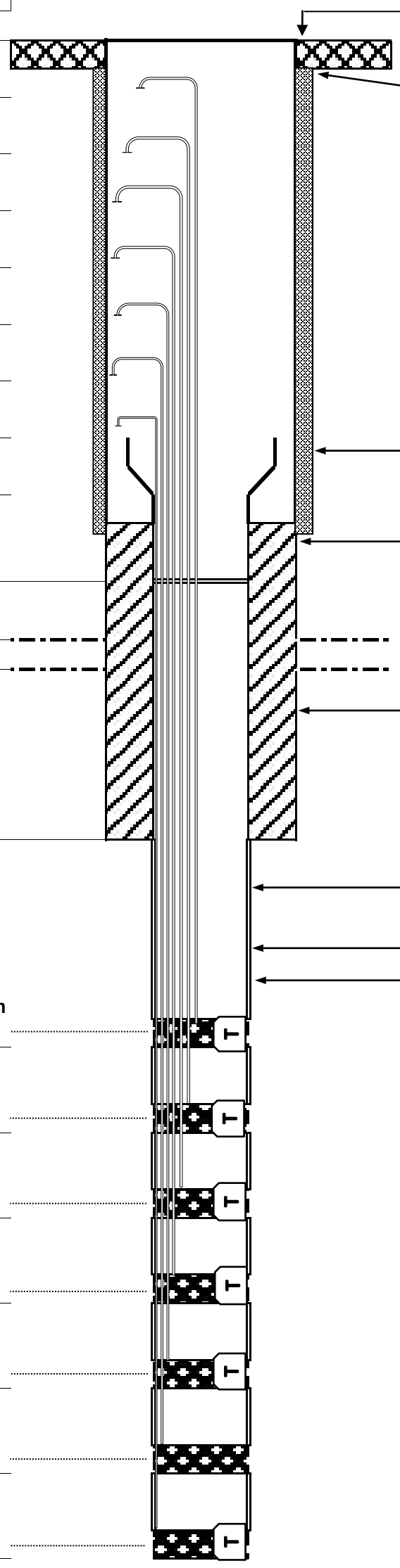
Port Number:	Interval Top	Interval Bottom	Elevation Top	Elevation Bottom
1	125	135	-50	-60
2	185	195	-110	-119.7
Total Depth	233		-158	

Notes:

T **Transducer**

MALCOLM PIRNIE, INC.			BEDROCK FLUTe™ Well MW-16
Client: USACE/USEPA	**Project:** Cornell - Dubilier Electronics Superfund Site	**Job Number:** 4553066	
Drilling Method: Hollow Stem Auger/HQ Triple Tube Core **Development Method:** 3'' Electrosubmersible Pump			**Subcontractor:** Advanced Drilling
DATES:	**Surface Casing Installation:**	1/19/2009 - 3/16/2009	**Measuring Point (MP)**
	Development/Temporary Liner Installation:	2/4/2009 - 2/6/2009	**Type: FLUSHMOUNT - VARIABLE**
	Water FLUTe™ Installation Dates:	9/17/2009 - 2/23/2009	**GS Elevation (ft):** 70.73

Item	Depth Below Grade (ft)	Elevation (ft msl)
Grade	0.0	70.73
Top of Port 1 Tube	1.6	69.16
Top of Port 2 Tube	1.5	69.20
Top of Port 3 Tube	1.6	69.16
Top of Port 4 Tube	1.5	69.20
Top of Port 5 Tube	1.6	69.14
Top of Port 6 Tube	1.6	69.10
Top of Port 7 Tube	1.6	69.12
Top of PVC Riser	1.9	68.87
Recommended Liner Water Level	2.36	68.37
Base of Overburden	9.0	61.73
Base of Weathered Bedrock	10.0	60.73
Top of Open Hole with Water FLUTe™ Liner	20.0	50.73



Description

Vault Dimensions:	2 x 2	(ft.)
Surface Seal Type:	Concrete	
Casing Type:	Steel	
Casing ID:	6	(in.)
Grout Type:	Cement-bentonite	
Borehole Diameter:	10	(in.)
Water FLUTe™ Diameter:	6	(in.)
Water FLUTe™ Length:	230.0	(ft.)
Borehole Diameter:	6	(in.)

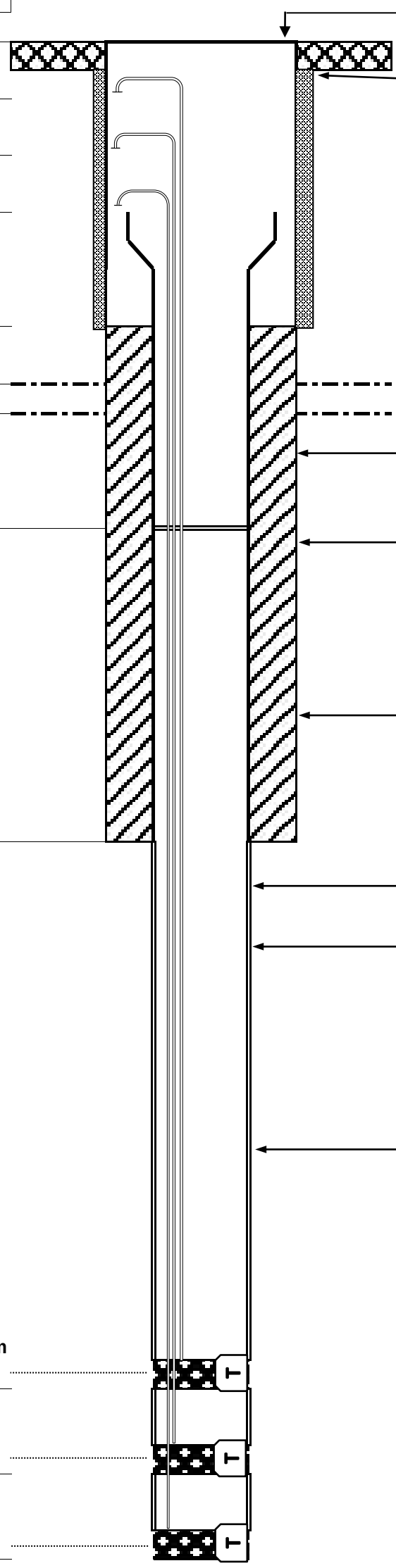
Port Number:	Interval Top	Interval Bottom	Elevation Top	Elevation Bottom
1	20	30	51	41
2	40	50	31	21
3	85	95	-14	-24
4	108	118	-37	-47
5	135	145	-64	-74
6	170	180	-99	-109
7	195	205	-124	-134
Total Depth	250		-179	

Notes:

T **Transducer**

MALCOLM PIRNIE, INC.			BEDROCK FLUTe™ Well MW-17
Client: USACE/USEPA	**Project:** Cornell - Dubilier Electronics Superfund Site	**Job Number:** 4553066	
Drilling Method: Hollow Stem Auger/Mud Rotary Tricone **Development Method**: 3'' Electrosubmersible Pump			**Subcontractor:** Advanced Drilling
DATES:	**Surface Casing Installation:**	3/9/2009 - 3/9/2009	**Measuring Point (MP)**
	Development/Temporary Liner Installation:	3/13/2009 - 3/13/2009	**Type: FLUSHMOUNT - VARIABLE**
	Water FLUTe™ Installation Dates:	9/11/2009 - 9/12/2009	**GS Elevation (ft):** 81.03

Item	Depth Below Grade (ft)	Elevation (ft msl)
Grade	0.0	81.03
Top of Port 1 Tube	0.5	80.54
Top of Port 2 Tube	0.6	80.41
Top of Port 3 Tube	0.5	80.49
Top of PVC Riser	0.9	80.14
Base of Overburden	9.0	72.03
Base of Weathered Bedrock	10.0	71.03
Recommended Liner Water Level	10.09	70.94
Top of Open Hole with Water FLUTe™ Liner	20.0	61.03



Description

Vault Dimensions:	2 x 2	(ft.)
Surface Seal Type:	Concrete	
Casing Type:	Steel	
Casing ID:	6	(in.)
Grout Type:	Cement-bentonite	
Borehole Diameter:	10	(in.)
Water FLUTe™ Diameter:	6	(in.)
Water FLUTe™ Length:	230.0	(ft.)
Borehole Diameter:	6	(in.)

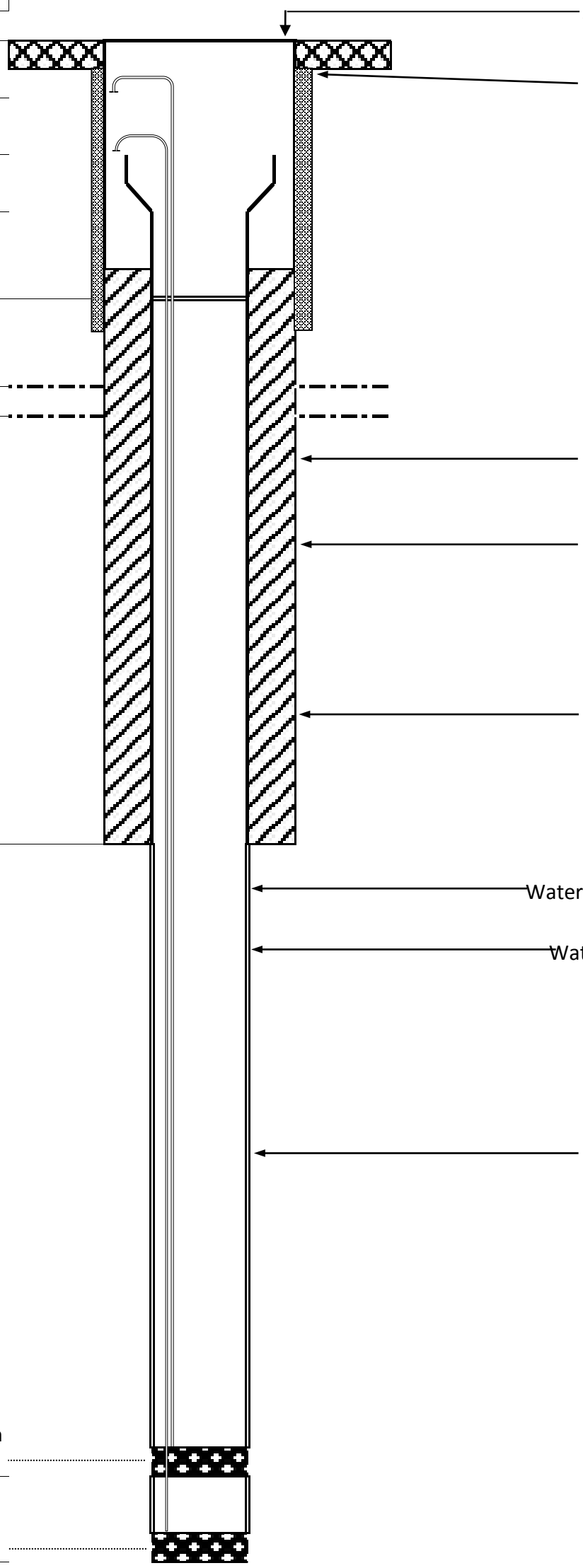
Port Number:	Interval Top	Interval Bottom	Elevation Top	Elevation Bottom
1	170	180	-89	-99
2	205	215	-124	-134
3	235	245	-154	-164
Total Depth	250		-169	

Notes:

T **Transducer**

MALCOLM PIRNIE, INC.			BEDROCK FLUTe™ Well MW-18
Client: USACE/USEPA	**Project:** Cornell - Dubilier Electronics Superfund Site	**Job Number:** 4553066	
Drilling Method: Hollow Stem Auger/Mud Rotary Tricone **Development Method**: 3'' Electrosubmersible Pump			**Subcontractor:** Advanced Drilling
DATES:	**Surface Casing Installation:**	3/17/2009 - 3/17/2009	**Measuring Point (MP)**
	Development/Temporary Liner Installation:	3/20/2009 - 3/23/2009	**Type: FLUSHMOUNT**
	Water FLUTe™ Installation Dates:	9/14/2009 - 9/16/2009	**GS Elevation (ft):** 68.24

Item	Depth Below Grade (ft)	Elevation (ft msl)
Grade	0.0	68.24
Top of Port 1 Tube	0.5	67.72
Top of Port 2 Tube	0.5	67.71
Top of PVC Riser	0.9	67.38
Recommended Liner Water Level	1.36	66.88
Base of Overburden	10.0	58.24
Base of Weathered Bedrock	12.0	56.24
Top of Open Hole with Water FLUTe™ Liner	22.0	46.24



Description

Vault Dimensions:	2 x 2	(ft.)
Surface Seal Type:	Concrete	
Casing Type:	Steel	
Casing ID:	6	(in.)
Grout Type:	Cement-bentonite	
Borehole Diameter:	8	(in.)
Water FLUTe™ Diameter:	6	(in.)
Water FLUTe™ Length:	228.0	(ft.)
Borehole Diameter:	6	(in.)

Port Number:	Interval Top	Interval Bottom	Elevation Top	Elevation Bottom
1	160	170	-92	-102
2	210	220	-142	-152
Total Depth	250		-182	

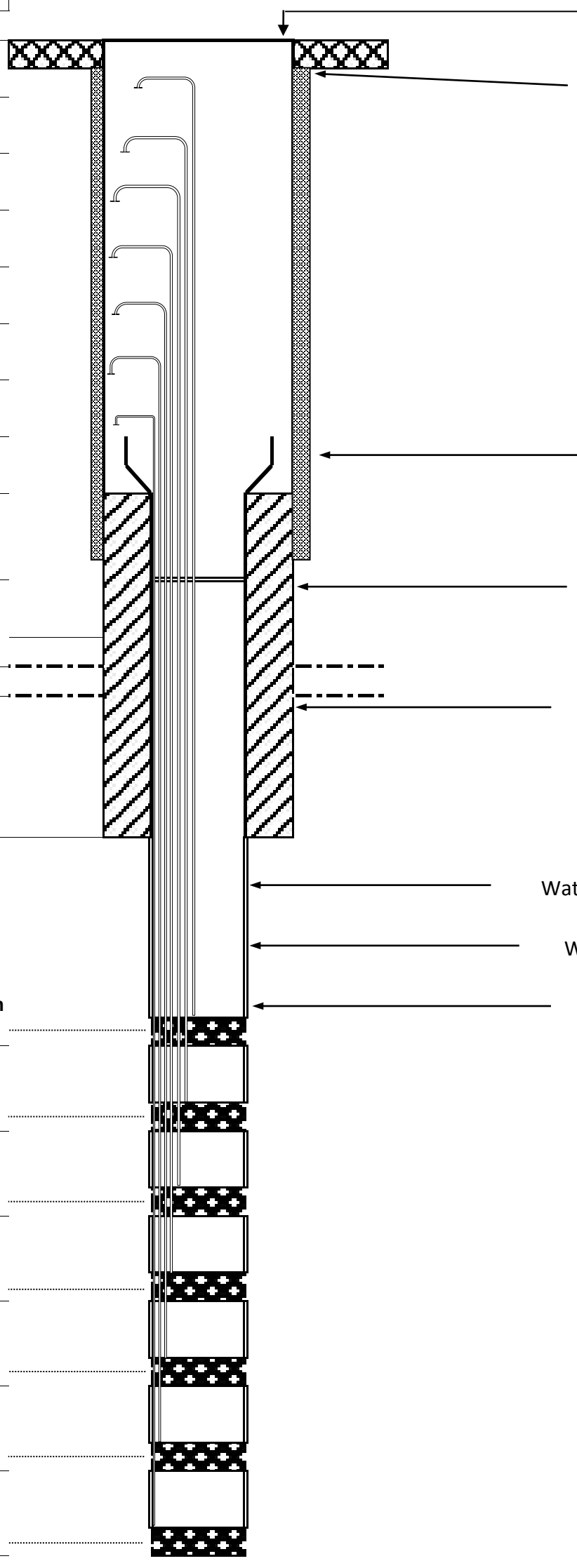
Notes:

T **Transducer**

MALCOLM PIRNIE, INC.			BEDROCK FLUTe™ Well MW-19
Client: USACE/USEPA	**Project:** Cornell - Dubilier Electronics Superfund Site	**Job Number:** 4553066	
Drilling Method: Hollow Stem Auger/Mud Rotary Tricone **Development Method**: 3'' Electrosubmersible Pump			**Subcontractor:** Advanced Drilling
DATES:	**Surface Casing Installation:**	5/12/2009 - 5/12/2009	**Measuring Point (MP)**
	Development/Temporary Liner Installation:	5/22/2009 - 5/30/2009	**Type: FLUSHMOUNT**
	Water FLUTe™ Installation Dates:	9/12/2009 - 9/21/2009	**GS Elevation (ft):** 64.53

Item	Depth Below Grade (ft)	Elevation (ft msl)
Grade	0.0	64.53
Top of Port 1 Tube		
Top of Port 2 Tube		
Top of Port 3 Tube		
Top of Port 4 Tube		
Top of Port 5 Tube		
Top of Port 6 Tube		
Top of Port 7 Tube		
Top of PVC Riser	0.8	63.78
Recommended Liner Water Level	1.25	63.28
Base of Overburden	25.0	39.53
Base of Weathered Bedrock	28.0	36.53
Top of Open Hole with Water FLUTe™ Liner	57.0	7.53

Port Number:	Interval Top	Interval Bottom	Elevation Top	Elevation Bottom
1	65	75	0	-10
2	132	142	-67	-77
3	200	210	-135	-145
4	257	267	-192	-202
5	367	377	-302	-312
6	480	490	-415	-425
7	545	555	-480	-490
Total Depth	600		-535	



Description

Vault Dimensions:	2 x 2	(ft.)
Surface Seal Type:	Concrete	
Casing Type:	Steel	
Casing ID:	6	(in.)
Grout Type:	Cement-bentonite	
Borehole Diameter:	10	(in.)
Water FLUTe™ Diameter:	6	(in.)
Water FLUTe™ Length:	543.0	(ft.)
Borehole Diameter:	6	(in.)

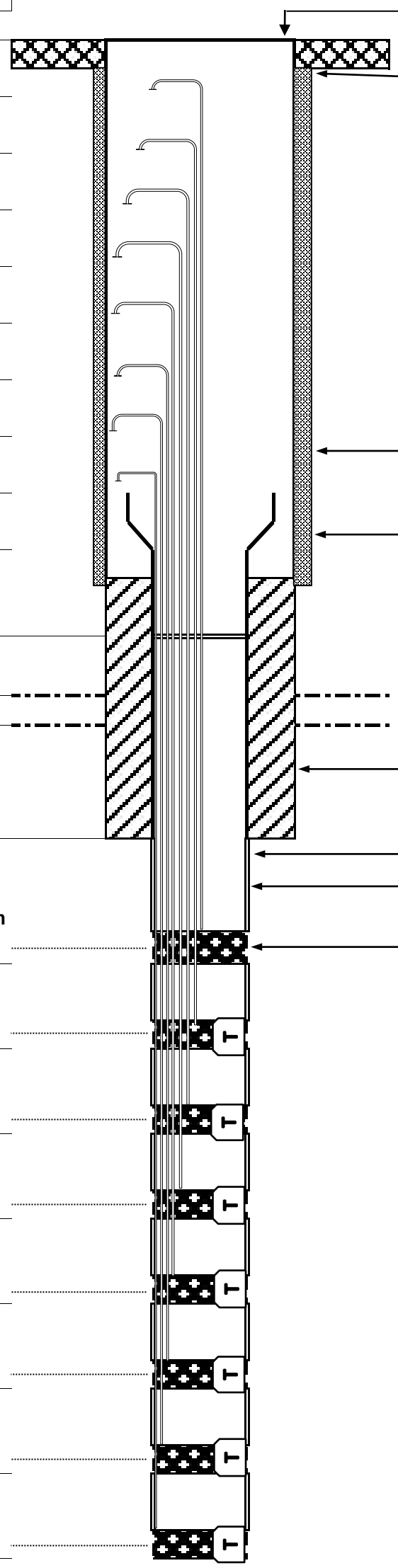
T Transducer

Notes:

MALCOLM PIRNIE, INC.			BEDROCK FLUTe™ Well MW-20
Client: USACE/USEPA	**Project:** Cornell - Dubilier Electronics Superfund Site	**Job Number:** 4553066	
Drilling Method: Hollow Stem Auger/HQ Triple Tube Core **Development Method:** 3'' Electrosubmersible Pump			**Subcontractor:** Advanced Drilling
DATES:	**Surface Casing Installation:**	2/6/2009 - 2/6/2009	**Measuring Point (MP)**
	Development/Temporary Liner Installation:	2/27/2009 - 2/28/2009	**Type: FLUSHMOUNT - VARIABLE**
	Water FLUTe™ Installation Dates:	9/11/2009 - 9/12/2009	**GS Elevation (ft):** 66.22

Item	Depth Below Grade (ft)	Elevation (ft msl)
Grade	0.0	66.22
Top of Port 1 Tube	0.7	65.54
Top of Port 2 Tube	0.7	65.54
Top of Port 3 Tube	0.7	65.49
Top of Port 4 Tube	0.7	65.56
Top of Port 5 Tube	0.6	65.58
Top of Port 6 Tube	0.7	65.53
Top of Port 7 Tube	0.6	65.57
Top of Port 8 Tube	0.6	65.42
Top of PVC Riser	1.0	65.22
Recommended Liner Water Level	1.50	64.72
Base of Overburden	12.0	54.22
Base of Weathered Bedrock	15.0	51.22
Top of Open Hole with Water FLUTe™ Liner	25.0	41.22

Port Number:	Interval Top	Interval Bottom	Elevation Top	Elevation Bottom
1	25	35	41	31
2	85	95	-19	-29
3	125	135	-59	-69
4	175	185	-109	-119
5	205	215	-139	-149
6	250	260	-184	-194
7	297	307	-231	-241
8	355	365	-289	-299
Total Depth	413		-347	



Description

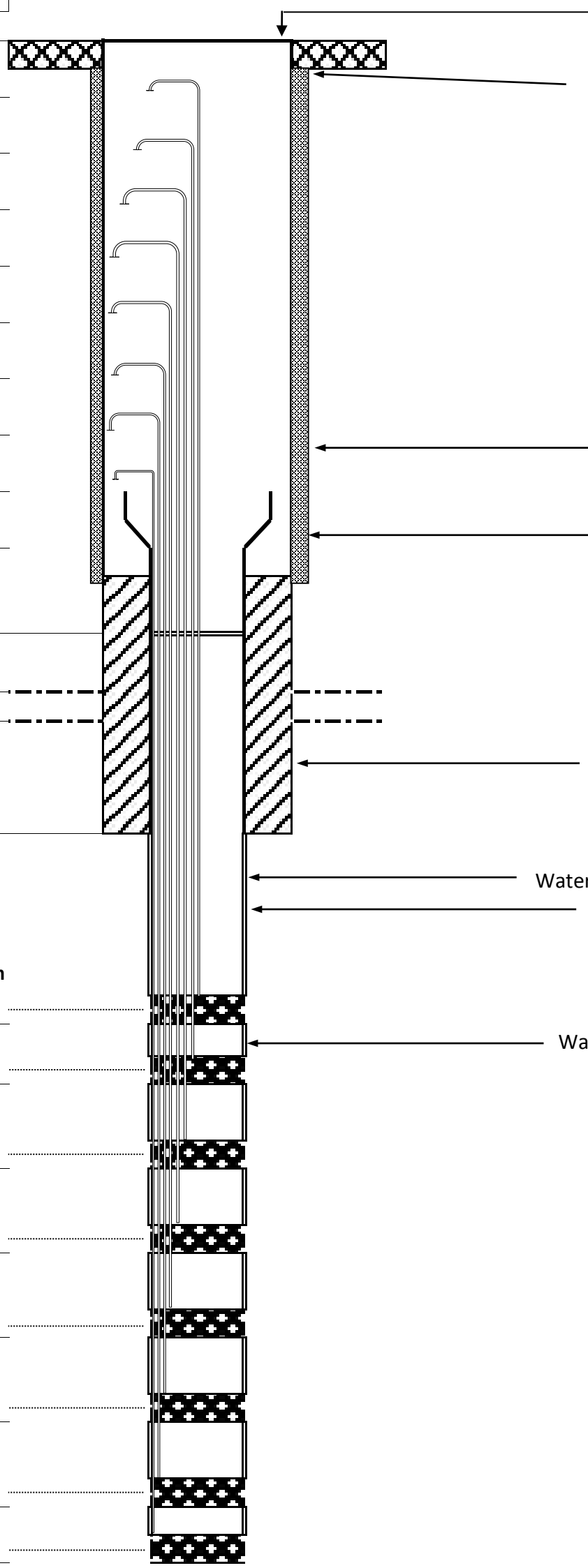
Vault Dimensions:	2 x 2	(ft.)
Surface Seal Type:	Concrete	
Casing Type:	Steel	
Casing ID:	6	(in.)
Grout Type:	Cement-bentonite	
Borehole Diameter:	10	(in.)
Borehole Diameter:	6	(in.)
Water FLUTe™ Diameter:	6	(in.)
Water FLUTe™ Length:	388.0	(ft.)

Notes:

T **Transducer**

MALCOLM PIRNIE, INC.			BEDROCK FLUTe™ Well MW-21
Client: USACE/USEPA	**Project:** Cornell - Dubilier Electronics Superfund Site	**Job Number:** 4553066	
Drilling Method: Hollow Stem Auger/Mud Rotary Tricone **Development Method**: 3" Electrosubmersible Pump			**Subcontractor:** Advanced Drilling
DATES:	**Surface Casing Installation:**	4/13/2009 - 4/13/2009	**Measuring Point (MP)**
	Development/Temporary Liner Installation:	4/23/2009 - 4/28/2009	**Type: FLUSHMOUNT**
	Water FLUTe™ Installation Dates:	9/16/2009 - 9/28/2009	**GS Elevation (ft):** 59.17

Item	Depth Below Grade (ft)	Elevation (ft)
Grade	0.0	59.17
Top of Port 1 Tube		
Top of Port 2 Tube		
Top of Port 3 Tube		
Top of Port 4 Tube		
Top of Port 5 Tube		
Top of Port 6 Tube		
Top of Port 7 Tube		
Top of Port 8 Tube		
Top of PVC Riser	0.7	58.50
Recommended Liner Water Level	1.17	58.00
Base of Overburden	18.0	41.17
Base of Weathered Bedrock	20.0	39.17
Top of Open Hole with Water FLUTe™ Liner	30.0	29.17



Description

Vault Dimensions: 2 x 2 (ft.)

Surface Seal Type: Concrete

Casing Type: Steel

Casing ID: 6 (in.)

Grout Type: Cement-bentonite

Borehole Diameter: 10 (in.)

Water FLUTe™ Diameter: 6 (in.)

Borehole Diameter: 6 (in.)

Water FLUTe™ Length: 520.0 (ft.)

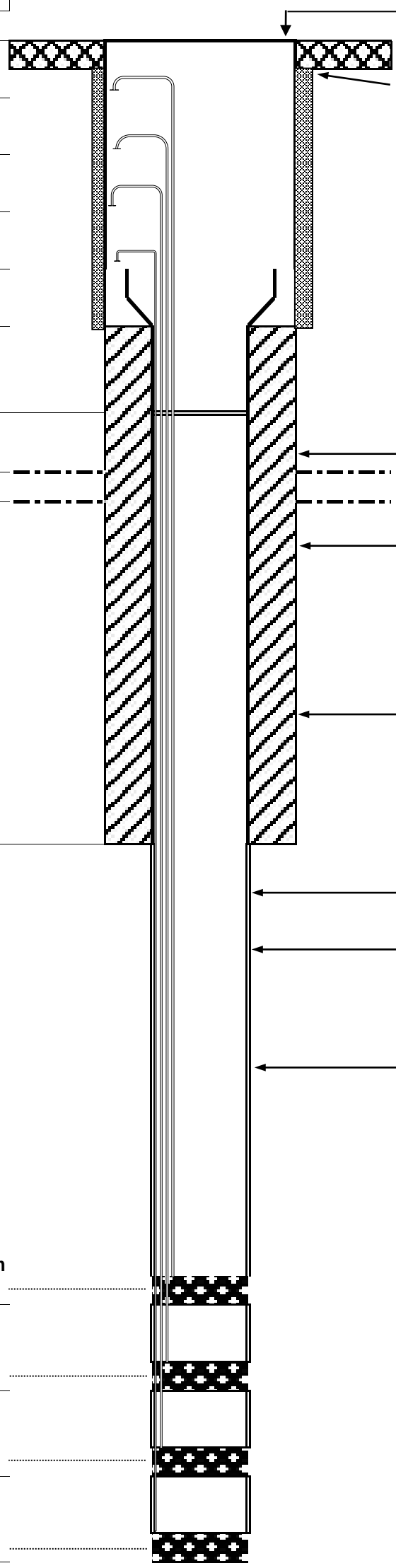
Port Number:	Interval Top	Interval Bottom	Elevation Top	Elevation Bottom
1	50	60	9	-60
2	87	97	-87	-97
3	150	160	-150	-160
4	205	215	-205	-215
5	260	270	-260	-270
6	428	438	-428	-438
7	485	495	-485	-495
8	505	515	-505	-515
Total Depth	550		-491	

Notes:

T **Transducer**

MALCOLM PIRNIE, INC.			BEDROCK FLUTe™ Well MW-22
Client: USACE/USEPA	**Project:** Cornell - Dubilier Electronics Superfund Site	**Job Number:** 4553066	
Drilling Method: Hollow Stem Auger/Mud Rotary Tricone **Development Method**: 3'' Electrosubmersible Pump			**Subcontractor:** Advanced Drilling
DATES:	**Surface Casing Installation:**	4/29/2009 - 4/29/2009	**Measuring Point (MP)**
	Development/Temporary Liner Installation:	5/5/2009 - 6/5/2009	**Type: FLUSHMOUNT**
	Water FLUTe™ Installation Dates:	9/14/2009 - 9/15/2009	**GS Elevation (ft):** 69.28

Item	Depth Below Grade (ft)	Elevation (ft msl)
Grade	0.0	69.28
Top of Port 1 Tube		
Top of Port 2 Tube		
Top of Port 3 Tube		
Top of Port 4 Tube		
Top of PVC Riser	0.8	68.52
Recommended Liner Water Level	1.26	68.02
Base of Overburden	18.0	51.28
Base of Weathered Bedrock	20.0	49.28
Top of Open Hole with Water FLUTe™ Liner	29.0	40.28



Description

Vault Dimensions:	2 x 2	(ft.)
Surface Seal Type:	Concrete	
Casing Type:	Steel	
Casing ID:	6	(in.)
Grout Type:	Cement-bentonite	
Borehole Diameter:	8	(in.)
Water FLUTe™ Diameter:	6	(in.)
Water FLUTe™ Length:	321.0	(ft.)
Borehole Diameter:	6	(in.)

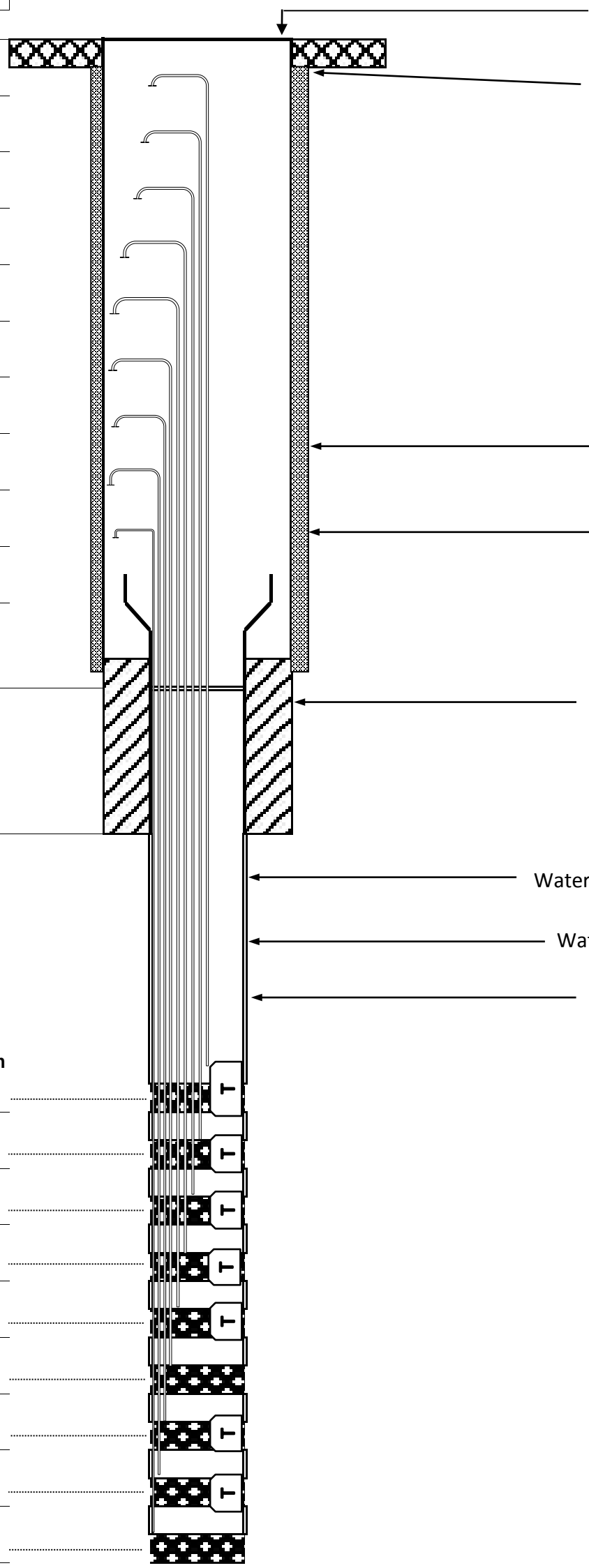
Port Number:	Interval Top	Interval Bottom	Elevation Top	Elevation Bottom
1	45	55	24	-55
2	125	135	-125	-135
3	210	220	-210	-220
4	305	315	-305	-315
Total Depth	350		-281	

Notes:

T **Transducer**

MALCOLM PIRNIE, INC.			BEDROCK FLUTe™ Well FPW
Client: USACE/USEPA	**Project:** Cornell - Dubilier Electronics Superfund Site	**Job Number:** 4553066	
Drilling Method: Hollow Stem Auger/Mud Rotary Tricone **Development Method**: 3'' Electrosubmersible Pump			**Subcontractor:** Advanced Drilling
DATES:	**Surface Casing Installation:**	unknown	**Measuring Point (MP)**
	Development/Temporary Liner Installation:	unknown	**Type: FLUTE VAULT - VARIABLE**
	Water FLUTe™ Installation Dates:	10/5/2009 - 10/6/2009	**GS Elevation (ft):** 72.43

Item	Depth Below Grade (ft)	Elevation (ft msl)
Grade	0.0	72.43
Top of Port 1 Tube		
Top of Port 2 Tube		
Top of Port 3 Tube		
Top of Port 4 Tube		
Top of Port 5 Tube		
Top of Port 6 Tube		
Top of Port 7 Tube		
Top of Port 8 Tube		
Top of Port 9 Tube		
Top of PVC Riser	0.8	71.64
Recommended Liner Water Level	1.14	71.29
Top of Open Hole with Water FLUTe™ Liner	31.0	41.43



Description

Vault Dimensions:	2 x 2	(ft.)
Surface Seal Type:	Concrete	
Casing Type:	Steel	
Casing ID:	6	(in.)
Grout Type:	Cement-bentonite	
Borehole Diameter:	10	(in.)
Water FLUTe™ Diameter:	6	(in.)
Water FLUTe™ Length:	285.0	(ft.)
Borehole Diameter:	6	(in.)

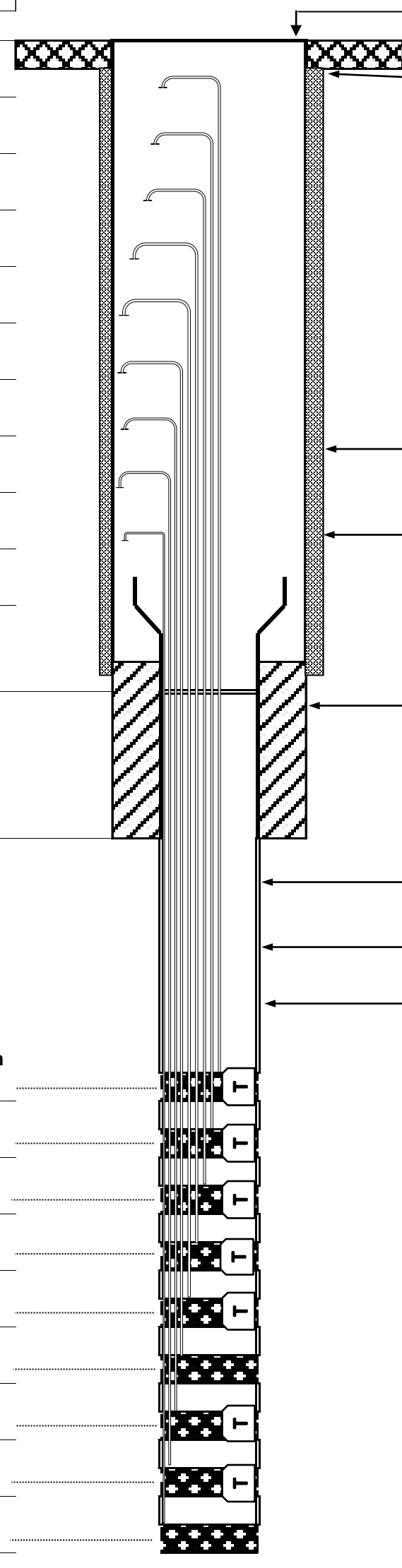
Port Number:	Interval Top	Interval Bottom	Elevation Top	Elevation Bottom
1	31	41	41	31
2	46	51	26	21
3	100	110	-28	-38
4	125	135	-53	-63
5	180	190	-108	-118
6	200	205	-128	-133
7	235	245	-163	-173
8	268	278	-196	-206
9	300	310	-228	-238
Total Depth	316		-244	

Notes:

T **Transducer**

MALCOLM PIRNIE, INC.			BEDROCK FLUTe™ Well MW-23
Client: USACE/USEPA	**Project:** Cornell - Dubilier Electronics Superfund Site	**Job Number:** 4553066	
Drilling Method: Hollow Stem Auger/Mud Rotary Tricone **Development Method**: 3'' Electrosubmersible Pump			**Subcontractor:** Advanced Drilling
DATES:	**Surface Casing Installation:**	9/7/2010 - 9/8/2010	**Measuring Point (MP)**
	Development/Temporary Liner Installation:	9/21/2010 - 9/25/2010	**Type: FLUTE VAULT - VARIABLE**
	Water FLUTe™ Installation Dates:	12/16/2010 - 12/17/2010	**GS Elevation (ft):** 70.43

Item	Depth Below Grade (ft)	Elevation (ft msl)
Grade	0.0	70.43
Top of Port 1 Tube		
Top of Port 2 Tube		
Top of Port 3 Tube		
Top of Port 4 Tube		
Top of Port 5 Tube		
Top of Port 6 Tube		
Top of Port 7 Tube		
Top of Port 8 Tube		
Top of Port 9 Tube		
Top of PVC Riser	0.75	69.68
Recommended Liner Water Level	2.42	68.01
Top of Open Hole with Water FLUTe™ Liner	52.0	18.43



Description

Vault Dimensions: 2 x 2 (ft.)

Surface Seal Type: Concrete

Casing Type: Steel

Casing ID: 6 (in.)

Grout Type: Cement-bentonite

Borehole Diameter: 10 (in.)

Water FLUTe™ Diameter: 6.5 (in.)

Water FLUTe™ Length: 500.0 (ft.)

Borehole Diameter: 6 (in.)

Port Number:	Interval Top	Interval Bottom	Elevation Top	Elevation Bottom
1	60	70	10	0
2	120	130	-50	-60
3	170	180	-100	-110
4	226	236	-156	-166
5	258	268	-188	-198
6	316	326	-246	-256
7	350	360	-280	-290
8	406	416	-336	-346
9	444	454	-374	-384
Total Depth	500		-430	

Notes:

T **Transducer**

MONITORING WELL CERTIFICATION FORM B - LOCATION CERTIFICATION

Name of Owner: Cornell-Dubilier Electronics

Name of Facility: Cornell-Dubilier Electronics Superfund Site

Location: 333 Hamilton Blvd. South Plainfield, Middlesex County, New Jersey

Case Number(s): NJD981557879

LAND SURVEYOR'S CERTIFICATION
Well Permit Number: 2500056570
(This number must be permanently affixed to the well casing.)

Owners Well Number (As shown on application or plans): TW-1

Geographic Coordinate NAD 83 (to nearest 1/1000 of second):

Longitude: West 74° 24' 43.261" Latitude: North 40° 34' 31.264"

New Jersey State Plane Coordinates NAD 83 to nearest 0.01 feet:
North 634509.34 East: 516564.05
Elevation of Top of Inner PVC Casing (cap off) at 77.18 PVC
reference mark (NAVD 88 nearest 0.01'): 77.67 OUTER CASING
75.05 GROUND
Source of elevation datum (benchmark, number/description and elevation/datum. If an on-site datum is used, identify here, assume datum of 100', and give approximated actual elevation.)

Significant observations and notes
NGS BENCHMARK
DESIGNATION 12 W 3, PID#AG9916, USGS QUAD PLAINFIELD (1995) N40°33'26.21313" W74°26'46.04499 ELEVATION =25.191 DATUMS NAD 1983/NAVD 1988

AUTHENTICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

SEAL

PROFESSIONAL LAND SURVEYOR'S SIGNATURE

6/2/10
DATE

DENNIS S. DIBLASIO – PROFESSIONAL LAND SURVEYOR'S #28307
PROFESSIONAL LAND SURVEYOR'S NAME AND LICENSE NUMBER
(Please print or type)

515 GROVE STREET, HADDON HEIGHTS, NJ 08035 (856)547-0505
PROFESSIONAL LAND SURVEYOR'S ADDRESS AND PHONE NUMBER

MONITORING WELL CERTIFICATION FORM B - LOCATION CERTIFICATION

Name of Owner: Cornell-Dubilier Electronics

Name of Facility: Cornell-Dubilier Electronics Superfund Site

Location: 333 Hamilton Blvd. South Plainfield, Middlesex County, New Jersey

Case Number(s): NJD981557879

LAND SURVEYOR'S CERTIFICATION
Well Permit Number: 2500056570
(This number must be permanently affixed to the well casing.)

Owners Well Number (As shown on application or plans): TW-2

Geographic Coordinate NAD 83 (to nearest 1/1000 of second):

Longitude: West 74° 24' 43.341" Latitude: North 40° 34' 31.254"

New Jersey State Plane Coordinates NAD 83 to nearest 0.01 feet:
North 634508.28 East: 516557.83
Elevation of Top of Inner PVC Casing (cap off) at reference mark (NAVD 88 nearest 0.01'): 77.26 PVC
N/A OUTER CASING
75.02 GROUND

Source of elevation datum (benchmark, number/description and elevation/datum. If an on-site datum is used, identify here, assume datum of 100', and give approximated actual elevation.)

Significant observations and notes
NGS BENCHMARK
DESIGNATION 12 W 3, PID#AG9916, USGS QUAD PLAINFIELD (1995) N40°33'26.21313" W74°26'46.04499 ELEVATION =25.191 DATUMS NAD 1983/NAVD 1988

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MONITORING WELL CERTIFICATION FORM B - LOCATION CERTIFICATION

Name of Owner: Cornell-Dubilier Electronics

Name of Facility: Cornell-Dubilier Electronics Superfund Site

Location: 333 Hamilton Blvd. South Plainfield, Middlesex County, New Jersey

Case Number(s): NJD981557879

LAND SURVEYOR'S CERTIFICATION
Well Permit Number:
(This number must be permanently affixed to the well casing.)

Owners Well Number (As shown on application or plans): PRODUCTION WELL

Geographic Coordinate NAD 83 (to nearest 1/1000 of second):

Longitude: West 74° 24'41.951" Latitude: North 40° 34'36.076"

New Jersey State Plane Coordinates NAD 83 to nearest 0.01 feet:
North 634996.33 East: 516664.59

Elevation of Top of Inner PVC Casing (cap off) at 71.64 PVC
reference mark (NAVD 88 nearest 0.01'): 72.43 OUTER CASING
72.43 GROUND
Source of elevation datum (benchmark, number/description and elevation/datum. If an on-site datum is used, identify here, assume datum of 100', and give approximated actual elevation.)

Significant observations and notes
NGS BENCHMARK
DESIGNATION 12 W 3, PID#AG9916, USGS QUAD PLAINFIELD (1995) N40°33'26.21313" W74°26'46.04499 ELEVATION =25.191 DATUMS NAD 1983/NAVD 1988

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MONITORING WELL CERTIFICATION FORM B - LOCATION CERTIFICATION

Name of Owner: Cornell-Dubilier Electronics

Name of Facility: Cornell-Dubilier Electronics Superfund Site

Location: 333 Hamilton Blvd. South Plainfield, Middlesex County, New Jersey

Case Number(s): NJD981557879

LAND SURVEYOR'S CERTIFICATION

Well Permit Number: 2500069797
(This number must be permanently affixed to the well casing.)

Owners Well Number (As shown on application or plans): ERT-1

Geographic Coordinate NAD 83 (to nearest 1/1000 of second):

Longitude: West 74° 24' 37.586" Latitude: North 40° 34'28.794"

New Jersey State Plane Coordinates NAD 83 to nearest 1 feet:
North 634259.79 East: 517002.19

Elevation of Top of Inner PVC Casing (cap off) at 72.84 PVC
reference mark (NAVD 88 nearest 0.01'): 73.46 OUTER CASING
70.47 GROUND

Source of elevation datum (benchmark, number/description and elevation/datum. If an on-site datum is used, identify here, assume datum of 100', and give approximated actual elevation.)

Significant observations and notes:
NGS BENCHMARK
DESIGNATION 12 W 3, PID#AG9916, USGS QUAD PLAINFIELD (1995) N40°33'26.21313" W74°26'46.04499 ELEVATION =25.191 DATUMS NAD 1983/NAVD 1988

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MONITORING WELL CERTIFICATION FORM B - LOCATION CERTIFICATION

Name of Owner: Cornell-Dubilier Electronics

Name of Facility: Cornell-Dubilier Electronics Superfund Site

Location: 333 Hamilton Blvd. South Plainfield, Middlesex County, New Jersey

Case Number(s): NJD981557879

LAND SURVEYOR'S CERTIFICATION
Well Permit Number: 2500069798
(This number must be permanently affixed to the well casing.)

Owners Well Number (As shown on application or plans): ERT-2

Geographic Coordinate NAD 83 (to nearest 1/1000 of second):

Longitude: West 74° 24' 51.840" Latitude: North 40° 34'35.985"

New Jersey State Plane Coordinates NAD 83 to nearest 1 feet:
North 634986.40 East: 515901.59

Elevation of Top of Inner PVC Casing (cap off) at 80.36 PVC
reference mark (NAVD 88 nearest 0.01'): 80.99 OUTER CASING
80.99 GROUND

Source of elevation datum (benchmark, number/description and elevation/datum. If an on-site datum is used, identify here, assume datum of 100', and give approximated actual elevation.)

Significant observations and notes
NGS BENCHMARK
DESIGNATION 12 W 3, PID#AG9916, USGS QUAD PLAINFIELD (1995) N40°33'26.21313" W74°26'46.04499 ELEVATION =25.191 DATUMS NAD 1983/NAVD 1988

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MONITORING WELL CERTIFICATION FORM B - LOCATION CERTIFICATION

Name of Owner: Cornell-Dubilier Electronics

Name of Facility: Cornell-Dubilier Electronics Superfund Site

Location: 333 Hamilton Blvd. South Plainfield, Middlesex County, New Jersey

Case Number(s): NJD981557879

LAND SURVEYOR'S CERTIFICATION
Well Permit Number: 2500069795
(This number must be permanently affixed to the well casing.)

Owners Well Number (As shown on application or plans): ERT-3

Geographic Coordinate NAD 83 (to nearest 1/1000 of second):

Longitude: West 74° 24' 49.583" Latitude: North 40° 34'48.005"

New Jersey State Plane Coordinates NAD 83 to nearest 1 feet:
North 636202.86 East: 516074.60

Elevation of Top of Inner PVC Casing (cap off) at 68.69 PVC
reference mark (NAVD 88 nearest 0.01'): 69.10 OUTER CASING
65.84 GROUND

Source of elevation datum (benchmark, number/description and elevation/datum. If an on-site datum is used, identify here, assume datum of 100', and give approximated actual elevation.)

Significant observations and notes
NGS BENCHMARK
DESIGNATION 12 W 3, PID#AG9916, USGS QUAD PLAINFIELD (1995) N40°33'26.21313" W74°26'46.04499 ELEVATION =25.191 DATUMS NAD 1983/NAVD 1988

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MONITORING WELL CERTIFICATION FORM B - LOCATION CERTIFICATION

Name of Owner: Cornell-Dubilier Electronics

Name of Facility: Cornell-Dubilier Electronics Superfund Site

Location: 333 Hamilton Blvd. South Plainfield, Middlesex County, New Jersey

Case Number(s): NJD981557879

LAND SURVEYOR'S CERTIFICATION
Well Permit Number: 2500069801
(This number must be permanently affixed to the well casing.)

Owners Well Number (As shown on application or plans): ERT-4

Geographic Coordinate NAD 83 (to nearest 1/1000 of second):

Longitude: West 74° 24' 58.829" Latitude: North 40° 34'47.258"

New Jersey State Plane Coordinates NAD 83 to nearest 1 feet:
North 636126.60 East: 515361.98

Elevation of Top of Inner PVC Casing (cap off) at 61.77 PVC
reference mark (NAVD 88 nearest 0.01'): 62.43 OUTER CASING
59.21 GROUND

Source of elevation datum (benchmark, number/description and elevation/datum. If an on-site datum is used, identify here, assume datum of 100', and give approximated actual elevation.)

Significant observations and notes
NGS BENCHMARK
DESIGNATION 12 W 3, PID#AG9916, USGS QUAD PLAINFIELD (1995) N40°33'26.21313" W74°26'46.04499 ELEVATION =25.191 DATUMS NAD 1983/NAVD 1988

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MONITORING WELL CERTIFICATION FORM B - LOCATION CERTIFICATION

Name of Owner: Cornell-Dubilier Electronics

Name of Facility: Cornell-Dubilier Electronics Superfund Site

Location: 333 Hamilton Blvd. South Plainfield, Middlesex County, New Jersey

Case Number(s): NJD981557879

LAND SURVEYOR'S CERTIFICATION
Well Permit Number: 2500069802
(This number must be permanently affixed to the well casing.)

Owners Well Number (As shown on application or plans): ERT-5

Geographic Coordinate NAD 83 (to nearest 1/1000 of second):

Longitude: West 74° 25' 10.151" Latitude: North 40° 34'31.529"

New Jersey State Plane Coordinates NAD 83 to nearest 1 feet:
North 634534.09 East: 514489.22

Elevation of Top of Inner PVC Casing (cap off) at 73.09 PVC
reference mark (NAVD 88 nearest 0.01'): 69.72 OUTER CASING
69.72 GROUND

Source of elevation datum (benchmark, number/description and elevation/datum. If an on-site datum is used, identify here, assume datum of 100', and give approximated actual elevation.)

Significant observations and notes
NGS BENCHMARK
DESIGNATION 12 W 3, PID#AG9916, USGS QUAD PLAINFIELD (1995) N40°33'26.21313" W74°26'46.04499 ELEVATION =25.191 DATUMS NAD 1983/NAVD 1988

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MONITORING WELL CERTIFICATION FORM B - LOCATION CERTIFICATION

Name of Owner: Cornell-Dubilier Electronics

Name of Facility: Cornell-Dubilier Electronics Superfund Site

Location: 333 Hamilton Blvd. South Plainfield, Middlesex County, New Jersey

Case Number(s): NJD981557879

LAND SURVEYOR'S CERTIFICATION
Well Permit Number: 2500069796
(This number must be permanently affixed to the well casing.)

Owners Well Number (As shown on application or plans): ERT-6

Geographic Coordinate NAD 83 (to nearest 1/1000 of second):

Longitude: West 74° 25' 07.972" Latitude: North 40° 34'38.308"

New Jersey State Plane Coordinates NAD 83 to nearest 1 feet:
North 635220.22 East: 514656.72

Elevation of Top of Inner PVC Casing (cap off) at 67.52 PVC
reference mark (NAVD 88 nearest 0.01'): 68.04 OUTER CASING
65.49 GROUND

Source of elevation datum (benchmark, number/description and elevation/datum. If an on-site datum is used, identify here, assume datum of 100', and give approximated actual elevation.)

Significant observations and notes
NGS BENCHMARK
DESIGNATION 12 W 3, PID#AG9916, USGS QUAD PLAINFIELD (1995) N40°33'26.21313" W74°26'46.04499 ELEVATION =25.191 DATUMS NAD 1983/NAVD 1988

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MONITORING WELL CERTIFICATION FORM B - LOCATION CERTIFICATION

Name of Owner: Cornell-Dubilier Electronics

Name of Facility: Cornell-Dubilier Electronics Superfund Site

Location: 333 Hamilton Blvd. South Plainfield, Middlesex County, New Jersey

Case Number(s): NJD981557879

LAND SURVEYOR'S CERTIFICATION
Well Permit Number: 2500069793
(This number must be permanently affixed to the well casing.)

Owners Well Number (As shown on application or plans): ERT-7

Geographic Coordinate NAD 83 (to nearest 1/1000 of second):

Longitude: West 74° 24'52.154" Latitude: North 40° 34'29.501"

New Jersey State Plane Coordinates NAD 83 to nearest 0.01 feet:
North 634330.28 East: 515878.03

Elevation of Top of Inner PVC Casing (cap off) at 80.19 PVC
reference mark (NAVD 88 nearest 0.01'): 81.00 OUTER CASING
81.00 GROUND

Source of elevation datum (benchmark, number/description and elevation/datum. If an on-site datum is used, identify here, assume datum of 100', and give approximated actual elevation.)

Significant observations and notes
NGS BENCHMARK
DESIGNATION 12 W 3, PID#AG9916, USGS QUAD PLAINFIELD (1995) N40°33'26.21313" W74°26'46.04499 ELEVATION =25.191 DATUMS NAD 1983/NAVD 1988

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MONITORING WELL CERTIFICATION FORM B - LOCATION CERTIFICATION

Name of Owner: Cornell-Dubilier Electronics

Name of Facility: Cornell-Dubilier Electronics Superfund Site

Location: 333 Hamilton Blvd. South Plainfield, Middlesex County, New Jersey

Case Number(s): NJD981557879

LAND SURVEYOR'S CERTIFICATION
Well Permit Number: 2500069799
(This number must be permanently affixed to the well casing.)

Owners Well Number (As shown on application or plans): ERT-8

Geographic Coordinate NAD 83 (to nearest 1/1000 of second):

Longitude: West 74° 25'54.069" Latitude: North 40° 34'22.896"

New Jersey State Plane Coordinates NAD 83 to nearest 0.01 feet:
North 633661.75 East: 515730.94

Elevation of Top of Inner PVC Casing (cap off) at 82.74 PVC
reference mark (NAVD 88 nearest 0.01'): 83.36 OUTER CASING
83.36 GROUND
Source of elevation datum (benchmark, number/description and elevation/datum. If an on-site datum is used, identify here, assume datum of 100', and give approximated actual elevation.)

Significant observations and notes
NGS BENCHMARK
DESIGNATION 12 W 3, PID#AG9916, USGS QUAD PLAINFIELD (1995) N40°33'26.21313" W74°26'46.04499 ELEVATION =25.191 DATUMS NAD 1983/NAVD 1988

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MONITORING WELL CERTIFICATION FORM B - LOCATION CERTIFICATION

Name of Owner: Cornell-Dubilier Electronics

Name of Facility: Cornell-Dubilier Electronics Superfund Site

Location: 333 Hamilton Blvd. South Plainfield, Middlesex County, New Jersey

Case Number(s): NJD981557879

LAND SURVEYOR'S CERTIFICATION
Well Permit Number: 2500056561
(This number must be permanently affixed to the well casing.)

Owners Well Number (As shown on application or plans): MW-1A

Geographic Coordinate NAD 83 (to nearest 1/1000 of second):

Longitude: West 74° 24' 46.739" Latitude: North 40° 34'38.333"

New Jersey State Plane Coordinates NAD 83 to nearest 0.01 feet:
North 635224.38 East: 516294.93

Elevation of Top of Inner PVC Casing (cap off) at 70.43 PVC
reference mark (NAVD 88 nearest 0.01'): 70.70 OUTER CASING
70.70 GROUND
Source of elevation datum (benchmark, number/description and elevation/datum. If an on-site datum is used, identify here, assume datum of 100', and give approximated actual elevation.)

Significant observations and notes
NGS BENCHMARK
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Name of Facility: Cornell-Dubilier Electronics Superfund Site

Location: 333 Hamilton Blvd. South Plainfield, Middlesex County, New Jersey

Case Number(s): NJD981557879

LAND SURVEYOR'S CERTIFICATION
Well Permit Number: 2500056562
(This number must be permanently affixed to the well casing.)

Owners Well Number (As shown on application or plans): MW-2A

Geographic Coordinate NAD 83 (to nearest 1/1000 of second):

Longitude: West 74° 24' 42.288" Latitude: North 40° 34'37.580"

New Jersey State Plane Coordinates NAD 83 to nearest 1 feet:
North 635148.54 East: 516638.44

Elevation of Top of Inner PVC Casing (cap off) at 70.98 PVC
reference mark (NAVD 88 nearest 0.01'): 71.44 OUTER CASING
71.44 GROUND

Source of elevation datum (benchmark, number/description and elevation/datum. If an on-site datum is used, identify here, assume datum of 100', and give approximated actual elevation.)

Significant observations and notes
NGS BENCHMARK
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Case Number(s): NJD981557879

LAND SURVEYOR'S CERTIFICATION
Well Permit Number: 2500056563
(This number must be permanently affixed to the well casing.)

Owners Well Number (As shown on application or plans): MW-3

Geographic Coordinate NAD 83 (to nearest 1/1000 of second):

Longitude: West 74° 24' 39.893" Latitude: North 40° 34'34.865"

New Jersey State Plane Coordinates NAD 83 to nearest 1 feet:
North 634873.98 East: 516823.50

Elevation of Top of Inner PVC Casing (cap off) at 70.53 PVC
reference mark (NAVD 88 nearest 0.01'): 71.11 OUTER CASING
71.11 GROUND

Source of elevation datum (benchmark, number/description and elevation/datum. If an on-site datum is used, identify here, assume datum of 100', and give approximated actual elevation.)

Significant observations and notes
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DESIGNATION 12 W 3, PID#AG9916, USGS QUAD PLAINFIELD (1995) N40°33'26.21313" W74°26'46.04499 ELEVATION =25.191 DATUMS NAD 1983/NAVD 1988

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Name of Owner: Cornell-Dubilier Electronics

Name of Facility: Cornell-Dubilier Electronics Superfund Site

Location: 333 Hamilton Blvd. South Plainfield, Middlesex County, New Jersey

Case Number(s): NJD981557879

LAND SURVEYOR'S CERTIFICATION
Well Permit Number: 2500056564
(This number must be permanently affixed to the well casing.)

Owners Well Number (As shown on application or plans): MW-4

Geographic Coordinate NAD 83 (to nearest 1/1000 of second):

Longitude: West 74° 24' 39.559" Latitude: North 40° 34'32.895"

New Jersey State Plane Coordinates NAD 83 to nearest 1 feet:
North 634674.67 East: 516849.47

Elevation of Top of Inner PVC Casing (cap off) at 71.65 PVC
reference mark (NAVD 88 nearest 0.01'): 72.59 OUTER CASING
72.59 GROUND
Source of elevation datum (benchmark, number/description and elevation/datum. If an on-site datum is used, identify here, assume datum of 100', and give approximated actual elevation.)

Significant observations and notes
NGS BENCHMARK
DESIGNATION 12 W 3, PID#AG9916, USGS QUAD PLAINFIELD (1995) N40°33'26.21313" W74°26'46.04499 ELEVATION =25.191 DATUMS NAD 1983/NAVD 1988

AUTHENTICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

SEAL

PROFESSIONAL LAND SURVEYOR'S SIGNATURE

12/7/09
DATE

DENNIS S. DIBLASIO – PROFESSIONAL LAND SURVEYOR'S #28307
PROFESSIONAL LAND SURVEYOR'S NAME AND LICENSE NUMBER
(Please print or type)

515 GROVE STREET, HADDON HEIGHTS, NJ 08035 (856)547-0505
PROFESSIONAL LAND SURVEYOR'S ADDRESS AND PHONE NUMBER

MONITORING WELL CERTIFICATION FORM B - LOCATION CERTIFICATION

Name of Owner: Cornell-Dubilier Electronics

Name of Facility: Cornell-Dubilier Electronics Superfund Site

Location: 333 Hamilton Blvd. South Plainfield, Middlesex County, New Jersey

Case Number(s): NJD981557879

LAND SURVEYOR'S CERTIFICATION
Well Permit Number: 2500056565
(This number must be permanently affixed to the well casing.)

Owners Well Number (As shown on application or plans): MW-5

Geographic Coordinate NAD 83 (to nearest 1/1000 of second):

Longitude: West 74° 24' 36.802" Latitude: North 40° 34'30.384"

New Jersey State Plane Coordinates NAD 83 to nearest 1 feet:
North 634420.79 East: 517062.48

Elevation of Top of Inner PVC Casing (cap off) at 72.79 PVC
reference mark (NAVD 88 nearest 0.01'): 73.92 OUTER CASING
70.84 GROUND

Source of elevation datum (benchmark, number/description and elevation/datum. If an on-site datum is used, identify here, assume datum of 100', and give approximated actual elevation.)

Significant observations and notes
NGS BENCHMARK
DESIGNATION 12 W 3, PID#AG9916, USGS QUAD PLAINFIELD (1995) N40°33'26.21313" W74°26'46.04499 ELEVATION =25.191 DATUMS NAD 1983/NAVD 1988

AUTHENTICATION

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515 GROVE STREET, HADDON HEIGHTS, NJ 08035 (856)547-0505
PROFESSIONAL LAND SURVEYOR'S ADDRESS AND PHONE NUMBER

MONITORING WELL CERTIFICATION FORM B - LOCATION CERTIFICATION

Name of Owner: Cornell-Dubilier Electronics

Name of Facility: Cornell-Dubilier Electronics Superfund Site

Location: 333 Hamilton Blvd. South Plainfield, Middlesex County, New Jersey

Case Number(s): NJD981557879

LAND SURVEYOR'S CERTIFICATION
Well Permit Number: 2500056566
(This number must be permanently affixed to the well casing.)

Owners Well Number (As shown on application or plans): MW-6

Geographic Coordinate NAD 83 (to nearest 1/1000 of second):

Longitude: West 74° 24' 43.549" Latitude: North 40° 34'33.571"

New Jersey State Plane Coordinates NAD 83 to nearest 0.01 feet:
North 634742.76 East: 516541.56

Elevation of Top of Inner PVC Casing (cap off) at 74.38 PVC
reference mark (NAVD 88 nearest 0.01'): 74.73 OUTER CASING
74.73 GROUND

Source of elevation datum (benchmark, number/description and elevation/datum. If an on-site datum is used, identify here, assume datum of 100', and give approximated actual elevation.)

Significant observations and notes
NGS BENCHMARK
DESIGNATION 12 W 3, PID#AG9916, USGS QUAD PLAINFIELD (1995) N40°33'26.21313" W74°26'46.04499 ELEVATION =25.191 DATUMS NAD 1983/NAVD 1988

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515 GROVE STREET, HADDON HEIGHTS, NJ 08035 (856)547-0505
PROFESSIONAL LAND SURVEYOR'S ADDRESS AND PHONE NUMBER

MONITORING WELL CERTIFICATION FORM B - LOCATION CERTIFICATION

Name of Owner: Cornell-Dubilier Electronics

Name of Facility: Cornell-Dubilier Electronics Superfund Site

Location: 333 Hamilton Blvd. South Plainfield, Middlesex County, New Jersey

Case Number(s): NJD981557879

LAND SURVEYOR'S CERTIFICATION
Well Permit Number: 2500056567
(This number must be permanently affixed to the well casing.)

Owners Well Number (As shown on application or plans): MW-7

Geographic Coordinate NAD 83 (to nearest 1/1000 of second):

Longitude: West 74° 24' 49.377" Latitude: North 40° 34'33.825"

New Jersey State Plane Coordinates NAD 83 to nearest 0.01 feet:
North 634767.95 East: 516091.88

Elevation of Top of Inner PVC Casing (cap off) at 81.35 PVC
reference mark (NAVD 88 nearest 0.01'): 82.14 OUTER CASING
81.28 GROUND

Source of elevation datum (benchmark, number/description and elevation/datum. If an on-site datum is used, identify here, assume datum of 100', and give approximated actual elevation.)

Significant observations and notes
NGS BENCHMARK
DESIGNATION 12 W 3, PID#AG9916, USGS QUAD PLAINFIELD (1995) N40°33'26.21313" W74°26'46.04499 ELEVATION =25.191 DATUMS NAD 1983/NAVD 1988

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515 GROVE STREET, HADDON HEIGHTS, NJ 08035 (856)547-0505
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MONITORING WELL CERTIFICATION FORM B - LOCATION CERTIFICATION

Name of Owner: Cornell-Dubilier Electronics

Name of Facility: Cornell-Dubilier Electronics Superfund Site

Location: 333 Hamilton Blvd. South Plainfield, Middlesex County, New Jersey

Case Number(s): NJD981557879

LAND SURVEYOR'S CERTIFICATION
Well Permit Number: 2500056568
(This number must be permanently affixed to the well casing.)

Owners Well Number (As shown on application or plans): MW-8

Geographic Coordinate NAD 83 (to nearest 1/1000 of second):

Longitude: West 74° 24' 45.684" Latitude: North 40° 34'30.121"

New Jersey State Plane Coordinates NAD 83 to nearest 0.01 feet:
North 634393.44 East: 516377.17

Elevation of Top of Inner PVC Casing (cap off) at 77.57 PVC
reference mark (NAVD 88 nearest 0.01'): 77.90 OUTER CASING
75.23 GROUND

Source of elevation datum (benchmark, number/description and elevation/datum. If an on-site datum is used, identify here, assume datum of 100', and give approximated actual elevation.)

Significant observations and notes
NGS BENCHMARK
DESIGNATION 12 W 3, PID#AG9916, USGS QUAD PLAINFIELD (1995) N40°33'26.21313" W74°26'46.04499 ELEVATION =25.191 DATUMS NAD 1983/NAVD 1988

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PROFESSIONAL LAND SURVEYOR'S ADDRESS AND PHONE NUMBER

MONITORING WELL CERTIFICATION FORM B - LOCATION CERTIFICATION

Name of Owner: Cornell-Dubilier Electronics

Name of Facility: Cornell-Dubilier Electronics Superfund Site

Location: 333 Hamilton Blvd. South Plainfield, Middlesex County, New Jersey

Case Number(s): NJD981557879

LAND SURVEYOR'S CERTIFICATION
Well Permit Number: 2500056570
(This number must be permanently affixed to the well casing.)

Owners Well Number (As shown on application or plans): MW-9

Geographic Coordinate NAD 83 (to nearest 1/1000 of second):

Longitude: West 74° 24' 39.286" Latitude: North 40° 34'30.164"

New Jersey State Plane Coordinates NAD 83 to nearest 0.01 feet:
North 634398.32 East: 516870.83

Elevation of Top of Inner PVC Casing (cap off) at 75.76 PVC
reference mark (NAVD 88 nearest 0.01'): 76.79 OUTER CASING
75.09 GROUND

Source of elevation datum (benchmark, number/description and elevation/datum. If an on-site datum is used, identify here, assume datum of 100', and give approximated actual elevation.)

Significant observations and notes
NGS BENCHMARK
DESIGNATION 12 W 3, PID#AG9916, USGS QUAD PLAINFIELD (1995) N40°33'26.21313" W74°26'46.04499 ELEVATION =25.191 DATUMS NAD 1983/NAVD 1988

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PROFESSIONAL LAND SURVEYOR'S SIGNATURE

8/2/10
DATE

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515 GROVE STREET, HADDON HEIGHTS, NJ 08035 (856)547-0505
PROFESSIONAL LAND SURVEYOR'S ADDRESS AND PHONE NUMBER

MONITORING WELL CERTIFICATION FORM B - LOCATION CERTIFICATION

Name of Owner: Cornell-Dubilier Electronics

Name of Facility: Cornell-Dubilier Electronics Superfund Site

Location: 333 Hamilton Blvd. South Plainfield, Middlesex County, New Jersey

Case Number(s): NJD981557879

LAND SURVEYOR'S CERTIFICATION
Well Permit Number: 2500056570
(This number must be permanently affixed to the well casing.)

Owners Well Number (As shown on application or plans): MW-10

Geographic Coordinate NAD 83 (to nearest 1/1000 of second):

Longitude: West 74° 24' 40.828" Latitude: North 40° 34'27.215"

New Jersey State Plane Coordinates NAD 83 to nearest 0.01 feet:
North 634099.75 East: 516752.16

Elevation of Top of Inner PVC Casing (cap off) at 74.41 PVC
reference mark (NAVD 88 nearest 0.01'): 75.44 OUTER CASING
72.94 GROUND

Source of elevation datum (benchmark, number/description and elevation/datum. If an on-site datum is used, identify here, assume datum of 100', and give approximated actual elevation.)

Significant observations and notes
NGS BENCHMARK
DESIGNATION 12 W 3, PID#AG9916, USGS QUAD PLAINFIELD (1995) N40°33'26.21313" W74°26'46.04499 ELEVATION =25.191 DATUMS NAD 1983/NAVD 1988

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515 GROVE STREET, HADDON HEIGHTS, NJ 08035 (856)547-0505
PROFESSIONAL LAND SURVEYOR'S ADDRESS AND PHONE NUMBER

MONITORING WELL CERTIFICATION FORM B - LOCATION CERTIFICATION

Name of Owner: Cornell-Dubilier Electronics

Name of Facility: Cornell-Dubilier Electronics Superfund Site

Location: 333 Hamilton Blvd. South Plainfield, Middlesex County, New Jersey

Case Number(s): NJD981557879

LAND SURVEYOR'S CERTIFICATION
Well Permit Number: 2500056571
(This number must be permanently affixed to the well casing.)

Owners Well Number (As shown on application or plans): MW-11

Geographic Coordinate NAD 83 (to nearest 1/1000 of second):

Longitude: West 74° 24' 43.116" Latitude: North 40° 34'31.333"

New Jersey State Plane Coordinates NAD 83 to nearest 0.01 feet:
North 634516.26 East: 516575.18

Elevation of Top of Inner PVC Casing (cap off) at 77.04 PVC
reference mark (NAVD 88 nearest 0.01'): 77.23 OUTER CASING
75.09 GROUND

Source of elevation datum (benchmark, number/description and elevation/datum. If an on-site datum is used, identify here, assume datum of 100', and give approximated actual elevation.)

Significant observations and notes
NGS BENCHMARK
DESIGNATION 12 W 3, PID#AG9916, USGS QUAD PLAINFIELD (1995) N40°33'26.21313" W74°26'46.04499 ELEVATION =25.191 DATUMS NAD 1983/NAVD 1988

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SEAL

PROFESSIONAL LAND SURVEYOR'S SIGNATURE

12/7/08
DATE

DENNIS S. DIBLASIO – PROFESSIONAL LAND SURVEYOR'S #28307
PROFESSIONAL LAND SURVEYOR'S NAME AND LICENSE NUMBER
(Please print or type)

515 GROVE STREET, HADDON HEIGHTS, NJ 08035 (856)547-0505
PROFESSIONAL LAND SURVEYOR'S ADDRESS AND PHONE NUMBER

MONITORING WELL CERTIFICATION FORM B - LOCATION CERTIFICATION

Name of Owner: Cornell-Dubilier Electronics

Name of Facility: Cornell-Dubilier Electronics Superfund Site

Location: 333 Hamilton Blvd. South Plainfield, Middlesex County, New Jersey

Case Number(s): NJD981557879

LAND SURVEYOR'S CERTIFICATION
Well Permit Number: 2500056891
(This number must be permanently affixed to the well casing.)

Owners Well Number (As shown on application or plans): MW-12

Geographic Coordinate NAD 83 (to nearest 1/1000 of second):

Longitude: West 74° 24' 45.238" Latitude: North 40° 34'32.386"

New Jersey State Plane Coordinates NAD 83 to nearest 0.01 feet:
North 634622.67 East: 516411.39

Elevation of Top of Inner PVC Casing (cap off) at 75.63 PVC
reference mark (NAVD 88 nearest 0.01'): 75.90 OUTER CASING
75.90 GROUND

Source of elevation datum (benchmark, number/description and elevation/datum. If an on-site datum is used, identify here, assume datum of 100', and give approximated actual elevation.)

Significant observations and notes
NGS BENCHMARK
DESIGNATION 12 W 3, PID#AG9916, USGS QUAD PLAINFIELD (1995) N40°33'26.21313" W74°26'46.04499 ELEVATION =25.191 DATUMS NAD 1983/NAVD 1988

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12/5/04
DATE

DENNIS S. DIBLASIO – PROFESSIONAL LAND SURVEYOR'S #28307
PROFESSIONAL LAND SURVEYOR'S NAME AND LICENSE NUMBER
(Please print or type)

515 GROVE STREET, HADDON HEIGHTS, NJ 08035 (856)547-0505
PROFESSIONAL LAND SURVEYOR'S ADDRESS AND PHONE NUMBER

MONITORING WELL CERTIFICATION FORM B - LOCATION CERTIFICATION

Name of Owner: Cornell-Dubilier Electronics

Name of Facility: Cornell-Dubilier Electronics Superfund Site

Location: 333 Hamilton Blvd. South Plainfield, Middlesex County, New Jersey

Case Number(s): NJD981557879

LAND SURVEYOR'S CERTIFICATION
Well Permit Number: P200900523
(This number must be permanently affixed to the well casing.)

Owners Well Number (As shown on application or plans): MW-13

Geographic Coordinate NAD 83 (to nearest 1/1000 of second):

Longitude: West 74° 24' 36.634" Latitude: North 40° 34'37.885"

New Jersey State Plane Coordinates NAD 83 to nearest 0.01 feet:
North 635179.85 East: 517074.65

Elevation of Top of Inner PVC Casing (cap off) at 66.49 PVC
reference mark (NAVD 88 nearest 0.01'): 67.23 OUTER CASING
67.23 GROUND

Source of elevation datum (benchmark, number/description and elevation/datum. If an on-site datum is used, identify here, assume datum of 100', and give approximated actual elevation.)

Significant observations and notes
NGS BENCHMARK
DESIGNATION 12 W 3, PID#AG9916, USGS QUAD PLAINFIELD (1995) N40°33'26.21313" W74°26'46.04499 ELEVATION =25.191 DATUMS NAD 1983/NAVD 1988

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515 GROVE STREET, HADDON HEIGHTS, NJ 08035 (856)547-0505
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MONITORING WELL CERTIFICATION FORM B - LOCATION CERTIFICATION

Name of Owner: Cornell-Dubilier Electronics

Name of Facility: Cornell-Dubilier Electronics Superfund Site

Location: 333 Hamilton Blvd. South Plainfield, Middlesex County, New Jersey

Case Number(s): NJD981557879

LAND SURVEYOR'S CERTIFICATION
Well Permit Number: P200900800
(This number must be permanently affixed to the well casing.)

Owners Well Number (As shown on application or plans): MW-14D

Geographic Coordinate NAD 83 (to nearest 1/1000 of second):

Longitude: West 74° 24' 42.901" Latitude: North 40° 34'31.386"

New Jersey State Plane Coordinates NAD 83 to nearest 0.01 feet:
North 634521.70 East: 516591.77

Elevation of Top of Inner PVC Casing (cap off) at 76.79 PVC
reference mark (NAVD 88 nearest 0.01'): 77.92 OUTER CASING
75.29 GROUND

Source of elevation datum (benchmark, number/description and elevation/datum. If an on-site datum is used, identify here, assume datum of 100', and give approximated actual elevation.)

Significant observations and notes
NGS BENCHMARK
DESIGNATION 12 W 3, PID#AG9916, USGS QUAD PLAINFIELD (1995) N40°33'26.21313" W74°26'46.04499 ELEVATION =25.191 DATUMS NAD 1983/NAVD 1988

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515 GROVE STREET, HADDON HEIGHTS, NJ 08035 (856)547-0505
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MONITORING WELL CERTIFICATION FORM B - LOCATION CERTIFICATION

Name of Owner: Cornell-Dubilier Electronics

Name of Facility: Cornell-Dubilier Electronics Superfund Site

Location: 333 Hamilton Blvd. South Plainfield, Middlesex County, New Jersey

Case Number(s): NJD981557879

LAND SURVEYOR'S CERTIFICATION
Well Permit Number: P200906623
(This number must be permanently affixed to the well casing.)

Owners Well Number (As shown on application or plans): MW-14S

Geographic Coordinate NAD 83 (to nearest 1/1000 of second):

Longitude: West 74° 24' 42.852" Latitude: North 40° 34'31.451"

New Jersey State Plane Coordinates NAD 83 to nearest 0.01 feet:
North 634528.25 East: 516595.58

Elevation of Top of Inner PVC Casing (cap off) at 77.05 PVC
reference mark (NAVD 88 nearest 0.01'): 77.91 OUTER CASING
75.08 GROUND

Source of elevation datum (benchmark, number/description and elevation/datum. If an on-site datum is used, identify here, assume datum of 100', and give approximated actual elevation.)

Significant observations and notes
NGS BENCHMARK
DESIGNATION 12 W 3, PID#AG9916, USGS QUAD PLAINFIELD (1995) N40°33'26.21313" W74°26'46.04499 ELEVATION =25.191 DATUMS NAD 1983/NAVD 1988

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515 GROVE STREET, HADDON HEIGHTS, NJ 08035 (856)547-0505
PROFESSIONAL LAND SURVEYOR'S ADDRESS AND PHONE NUMBER

MONITORING WELL CERTIFICATION FORM B - LOCATION CERTIFICATION

Name of Owner: Cornell-Dubilier Electronics

Name of Facility: Cornell-Dubilier Electronics Superfund Site

Location: 333 Hamilton Blvd. South Plainfield, Middlesex County, New Jersey

Case Number(s): NJD981557879

LAND SURVEYOR'S CERTIFICATION
Well Permit Number: P200900801
(This number must be permanently affixed to the well casing.)

Owners Well Number (As shown on application or plans): MW-15D

Geographic Coordinate NAD 83 (to nearest 1/1000 of second):

Longitude: West 74° 24' 45.129" Latitude: North 40° 34'29.865"

New Jersey State Plane Coordinates NAD 83 to nearest 0.01 feet:
North 634367.62 East: 516420.05

Elevation of Top of Inner PVC Casing (cap off) at 77.35 PVC
reference mark (NAVD 88 nearest 0.01'): 78.17 OUTER CASING
75.26 GROUND

Source of elevation datum (benchmark, number/description and elevation/datum. If an on-site datum is used, identify here, assume datum of 100', and give approximated actual elevation.)

Significant observations and notes
NGS BENCHMARK
DESIGNATION 12 W 3, PID#AG9916, USGS QUAD PLAINFIELD (1995) N40°33'26.21313" W74°26'46.04499 ELEVATION =25.191 DATUMS NAD 1983/NAVD 1988

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515 GROVE STREET, HADDON HEIGHTS, NJ 08035 (856)547-0505
PROFESSIONAL LAND SURVEYOR'S ADDRESS AND PHONE NUMBER

MONITORING WELL CERTIFICATION FORM B - LOCATION CERTIFICATION

Name of Owner: Cornell-Dubilier Electronics

Name of Facility: Cornell-Dubilier Electronics Superfund Site

Location: 333 Hamilton Blvd. South Plainfield, Middlesex County, New Jersey

Case Number(s): NJD981557879

LAND SURVEYOR'S CERTIFICATION
Well Permit Number: P200904372
(This number must be permanently affixed to the well casing.)

Owners Well Number (As shown on application or plans): MW-15S

Geographic Coordinate NAD 83 (to nearest 1/1000 of second):

Longitude: West 74° 24' 45.200" Latitude: North 40° 34'29.751"

New Jersey State Plane Coordinates NAD 83 to nearest 0.01 feet:
North 634356.06 East: 516414.60

Elevation of Top of Inner PVC Casing (cap off) at 77.46 PVC
reference mark (NAVD 88 nearest 0.01'): 78.14 OUTER CASING
75.42 GROUND

Source of elevation datum (benchmark, number/description and elevation/datum. If an on-site datum is used, identify here, assume datum of 100', and give approximated actual elevation.)

Significant observations and notes
NGS BENCHMARK
DESIGNATION 12 W 3, PID#AG9916, USGS QUAD PLAINFIELD (1995) N40°33'26.21313" W74°26'46.04499 ELEVATION =25.191 DATUMS NAD 1983/NAVD 1988

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12/9/09
DATE

DENNIS S. DIBLASIO – PROFESSIONAL LAND SURVEYOR'S #28307
PROFESSIONAL LAND SURVEYOR'S NAME AND LICENSE NUMBER
(Please print or type)

515 GROVE STREET, HADDON HEIGHTS, NJ 08035 (856)547-0505
PROFESSIONAL LAND SURVEYOR'S ADDRESS AND PHONE NUMBER

MONITORING WELL CERTIFICATION FORM B - LOCATION CERTIFICATION

Name of Owner: Cornell-Dubilier Electronics

Name of Facility: Cornell-Dubilier Electronics Superfund Site

Location: 333 Hamilton Blvd. South Plainfield, Middlesex County, New Jersey

Case Number(s): NJD981557879

LAND SURVEYOR'S CERTIFICATION
Well Permit Number: P200900524
(This number must be permanently affixed to the well casing.)

Owners Well Number (As shown on application or plans): MW-16

Geographic Coordinate NAD 83 (to nearest 1/1000 of second):

Longitude: West 74° 24' 46.883" Latitude: North 40° 34'38.417"

New Jersey State Plane Coordinates NAD 83 to nearest 0.01 feet:
North 635232.87 East: 516283.83

Elevation of Top of Inner PVC Casing (cap off) at 69.87 PVC
reference mark (NAVD 88 nearest 0.01'): 70.73 OUTER CASING
70.73 GROUND

Source of elevation datum (benchmark, number/description and elevation/datum. If an on-site datum is used, identify here, assume datum of 100', and give approximated actual elevation.)

Significant observations and notes
NGS BENCHMARK
DESIGNATION 12 W 3, PID#AG9916, USGS QUAD PLAINFIELD (1995) N40°33'26.21313" W74°26'46.04499 ELEVATION =25.191 DATUMS NAD 1983/NAVD 1988

AUTHENTICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

SEAL

PROFESSIONAL LAND SURVEYOR'S SIGNATURE

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DENNIS S. DIBLASIO – PROFESSIONAL LAND SURVEYOR'S #28307
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515 GROVE STREET, HADDON HEIGHTS, NJ 08035 (856)547-0505
PROFESSIONAL LAND SURVEYOR'S ADDRESS AND PHONE NUMBER

MONITORING WELL CERTIFICATION FORM B - LOCATION CERTIFICATION

Name of Owner: Cornell-Dubilier Electronics

Name of Facility: Cornell-Dubilier Electronics Superfund Site

Location: 333 Hamilton Blvd. South Plainfield, Middlesex County, New Jersey

Case Number(s): NJD981557879

LAND SURVEYOR'S CERTIFICATION

Well Permit Number: P200900525
(This number must be permanently affixed to the well casing.)

Owners Well Number (As shown on application or plans): MW-17

Geographic Coordinate NAD 83 (to nearest 1/1000 of second):

Longitude: West 74° 24' 51.753" Latitude: North 40° 34'35.937"

New Jersey State Plane Coordinates NAD 83 to nearest 0.01 feet:
North 634981.53 East: 515908.37

Elevation of Top of Inner PVC Casing (cap off) at 80.14 PVC
reference mark (NAVD 88 nearest 0.01'): 81.03 OUTER CASING
81.03 GROUND

Source of elevation datum (benchmark, number/description and elevation/datum. If an on-site datum is used, identify here, assume datum of 100', and give approximated actual elevation.)

Significant observations and notes
NGS BENCHMARK
DESIGNATION 12 W 3, PID#AG9916, USGS QUAD PLAINFIELD (1995) N40°33'26.21313" W74°26'46.04499 ELEVATION =25.191 DATUMS NAD 1983/NAVD 1988

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MONITORING WELL CERTIFICATION FORM B - LOCATION CERTIFICATION

Name of Owner: Cornell-Dubilier Electronics

Name of Facility: Cornell-Dubilier Electronics Superfund Site

Location: 333 Hamilton Blvd. South Plainfield, Middlesex County, New Jersey

Case Number(s): NJD981557879

LAND SURVEYOR'S CERTIFICATION
Well Permit Number: P200900522
(This number must be permanently affixed to the well casing.)

Owners Well Number (As shown on application or plans): MW-18

Geographic Coordinate NAD 83 (to nearest 1/1000 of second):

Longitude: West 74° 25'09.665" Latitude: North 40° 34'32.379"

New Jersey State Plane Coordinates NAD 83 to nearest 0.01 feet:
North 634620.15 East: 514526.61

Elevation of Top of Inner PVC Casing (cap off) at 67.38 PVC
reference mark (NAVD 88 nearest 0.01'): 68.24 OUTER CASING
68.24 GROUND

Source of elevation datum (benchmark, number/description and elevation/datum. If an on-site datum is used, identify here, assume datum of 100', and give approximated actual elevation.)

Significant observations and notes
NGS BENCHMARK
DESIGNATION 12 W 3, PID#AG9916, USGS QUAD PLAINFIELD (1995) N40°33'26.21313" W74°26'46.04499 ELEVATION =25.191 DATUMS NAD 1983/NAVD 1988

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515 GROVE STREET, HADDON HEIGHTS, NJ 08035 (856)547-0505
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MONITORING WELL CERTIFICATION FORM B - LOCATION CERTIFICATION

Name of Owner: Cornell-Dubilier Electronics

Name of Facility: Cornell-Dubilier Electronics Superfund Site

Location: 333 Hamilton Blvd. South Plainfield, Middlesex County, New Jersey

Case Number(s): NJD981557879

LAND SURVEYOR'S CERTIFICATION
Well Permit Number: P200904823
(This number must be permanently affixed to the well casing.)

Owners Well Number (As shown on application or plans): MW-19

Geographic Coordinate NAD 83 (to nearest 1/1000 of second):

Longitude: West 74° 24'54.738" Latitude: North 40° 35'10.822"

New Jersey State Plane Coordinates NAD 83 to nearest 0.01 feet:
North 638511.33 East: 515674.60

Elevation of Top of Inner PVC Casing (cap off) at 63.78 PVC
reference mark (NAVD 88 nearest 0.01'): 64.53 OUTER CASING
64.53 GROUND
Source of elevation datum (benchmark, number/description and elevation/datum. If an on-site datum is used, identify here, assume datum of 100', and give approximated actual elevation.)

Significant observations and notes
NGS BENCHMARK
DESIGNATION 12 W 3, PID#AG9916, USGS QUAD PLAINFIELD (1995) N40°33'26.21313" W74°26'46.04499 ELEVATION =25.191 DATUMS NAD 1983/NAVD 1988

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515 GROVE STREET, HADDON HEIGHTS, NJ 08035 (856)547-0505
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MONITORING WELL CERTIFICATION FORM B - LOCATION CERTIFICATION

Name of Owner: Cornell-Dubilier Electronics

Name of Facility: Cornell-Dubilier Electronics Superfund Site

Location: 333 Hamilton Blvd. South Plainfield, Middlesex County, New Jersey

Case Number(s): NJD981557879

LAND SURVEYOR'S CERTIFICATION
Well Permit Number: P200900528
(This number must be permanently affixed to the well casing.)

Owners Well Number (As shown on application or plans): MW-20

Geographic Coordinate NAD 83 (to nearest 1/1000 of second):

Longitude: West 74° 24'49.477" Latitude: North 40° 34'57.184"

New Jersey State Plane Coordinates NAD 83 to nearest 0.01 feet:
North 637131.70 East: 516081.83

Elevation of Top of Inner PVC Casing (cap off) at 65.42 PVC
reference mark (NAVD 88 nearest 0.01'): 66.22 OUTER CASING
66.22 GROUND

Source of elevation datum (benchmark, number/description and elevation/datum. If an on-site datum is used, identify here, assume datum of 100', and give approximated actual elevation.)

Significant observations and notes
NGS BENCHMARK
DESIGNATION 12 W 3, PID#AG9916, USGS QUAD PLAINFIELD (1995) N40°33'26.21313" W74°26'46.04499 ELEVATION =25.191 DATUMS NAD 1983/NAVD 1988

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515 GROVE STREET, HADDON HEIGHTS, NJ 08035 (856)547-0505
PROFESSIONAL LAND SURVEYOR'S ADDRESS AND PHONE NUMBER

MONITORING WELL CERTIFICATION FORM B - LOCATION CERTIFICATION

Name of Owner: Cornell-Dubilier Electronics

Name of Facility: Cornell-Dubilier Electronics Superfund Site

Location: 333 Hamilton Blvd. South Plainfield, Middlesex County, New Jersey

Case Number(s): NJD981557879

LAND SURVEYOR'S CERTIFICATION
Well Permit Number: P200904831
(This number must be permanently affixed to the well casing.)

Owners Well Number (As shown on application or plans): MW-21

Geographic Coordinate NAD 83 (to nearest 1/1000 of second):

Longitude: West 74° 24'04.417" Latitude: North 40° 34'56.576"

New Jersey State Plane Coordinates NAD 83 to nearest 0.01 feet:
North 637069.08 East: 514929.26

Elevation of Top of Inner PVC Casing (cap off) at 58.50 PVC
reference mark (NAVD 88 nearest 0.01'): 59.17 OUTER CASING
59.17 GROUND

Source of elevation datum (benchmark, number/description and elevation/datum. If an on-site datum is used, identify here, assume datum of 100', and give approximated actual elevation.)

Significant observations and notes
NGS BENCHMARK
DESIGNATION 12 W 3, PID#AG9916, USGS QUAD PLAINFIELD (1995) N40°33'26.21313" W74°26'46.04499 ELEVATION =25.191 DATUMS NAD 1983/NAVD 1988

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MONITORING WELL CERTIFICATION FORM B - LOCATION CERTIFICATION

Name of Owner: Cornell-Dubilier Electronics

Name of Facility: Cornell-Dubilier Electronics Superfund Site

Location: 333 Hamilton Blvd. South Plainfield, Middlesex County, New Jersey

Case Number(s): NJD981557879

LAND SURVEYOR'S CERTIFICATION
Well Permit Number: P200904824
(This number must be permanently affixed to the well casing.)

Owners Well Number (As shown on application or plans): MW-22

Geographic Coordinate NAD 83 (to nearest 1/1000 of second):

Longitude: West 74° 24'29.333" Latitude: North 40° 34'55.263"

New Jersey State Plane Coordinates NAD 83 to nearest 0.01 feet:
North 636938.91 East: 517636.13

Elevation of Top of Inner PVC Casing (cap off) at 68.52 PVC
reference mark (NAVD 88 nearest 0.01'): 69.28 OUTER CASING
69.28 GROUND

Source of elevation datum (benchmark, number/description and elevation/datum. If an on-site datum is used, identify here, assume datum of 100', and give approximated actual elevation.)

Significant observations and notes
NGS BENCHMARK
DESIGNATION 12 W 3, PID#AG9916, USGS QUAD PLAINFIELD (1995) N40°33'26.21313" W74°26'46.04499 ELEVATION =25.191 DATUMS NAD 1983/NAVD 1988

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SEAL

PROFESSIONAL LAND SURVEYOR'S SIGNATURE

12/7/04
DATE

DENNIS S. DIBLASIO – PROFESSIONAL LAND SURVEYOR'S #28307
PROFESSIONAL LAND SURVEYOR'S NAME AND LICENSE NUMBER
(Please print or type)

515 GROVE STREET, HADDON HEIGHTS, NJ 08035 (856)547-0505
PROFESSIONAL LAND SURVEYOR'S ADDRESS AND PHONE NUMBER

MONITORING WELL CERTIFICATION FORM B - LOCATION CERTIFICATION

Name of Owner: Cornell-Dubilier Electronics

Name of Facility: Cornell-Dubilier Electronics Superfund Site

Location: 333 Hamilton Blvd. South Plainfield, Middlesex County, New Jersey

Case Number(s): NJD981557879

LAND SURVEYOR'S CERTIFICATION
Well Permit Number:
(This number must be permanently affixed to the well casing.)

Owners Well Number (As shown on application or plans): MW-23

Geographic Coordinate NAD 83 (to nearest 1/1000 of second):

Longitude: West 74° 24'38.559" Latitude: North 40° 35'16.556"

New Jersey State Plane Coordinates NAD 83 to nearest 0.01 feet:
North 639092.88 East: 516922.12

Elevation of Top of Inner PVC Casing (cap off) at 69.68 PVC
reference mark (NAVD 88 nearest 0.01'): 70.43 OUTER CASING
70.43GROUND
Source of elevation datum (benchmark, number/description and elevation/datum. If an on-site datum is used, identify here, assume datum of 100', and give approximated actual elevation.)

Significant observations and notes
NGS BENCHMARK
DESIGNATION 12 W 3, PID#AG9916, USGS QUAD PLAINFIELD (1995) N40°33'26.21313" W74°26'46.04499 ELEVATION =25.191 DATUMS NAD 1983/NAVD 1988

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PROFESSIONAL LAND SURVEYOR'S SIGNATURE

08-18-2011
DATE

DENNIS S. DIBLASIO – PROFESSIONAL LAND SURVEYOR'S #GS 02830700
PROFESSIONAL LAND SURVEYOR'S NAME AND LICENSE NUMBER
(Please print or type)

515 GROVE STREET, HADDON HEIGHTS, NJ 08035 (856)547-0505
PROFESSIONAL LAND SURVEYOR'S ADDRESS AND PHONE NUMBER