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Itron Inc.
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Itron

November 14, 2013

Ms. Carol Minsk
Bureau of Land and Waste Management
SCDHEC
2600 Bull Street
Columbia, South Carolina 29201-1708

Subject: **Re: Remedial Investigation (RI) Work Plan**
Itron, Inc.
1310 Emerald Road, Greenwood, South Carolina 29646

Dear Ms. Minsk:

Please find enclosed two hard copies and one electronic copy of the Remedial Investigation (RI) Work Plan for the Itron, Inc. property located at 1310 Emerald Road, Greenwood, South Carolina. This plan is being submitted in accordance with the Responsible Party Voluntary Cleanup Contract (RPVCC) 13-6078-RP, which was executed by the Department on October 2, 2013.

We look forward to working with you on this project. If you have any questions or require additional information, please do not hesitate to contact us.

Sincerely,

Itron, Inc.

Jeffery S. Stewart

Jeffery S. Stewart
Senior Director,
Sustainability & HSE

Enclosure

cc: Ludmilla Badicke, Itron, Inc.
James Flynn, URS Corporation
Aaron S. Council, URS Corporation
James Narkunas, URS Corporation

Endorsement Page

This work plan was prepared under my direction or supervision in accordance with a system designed such that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

James Narkunas 11/6/13

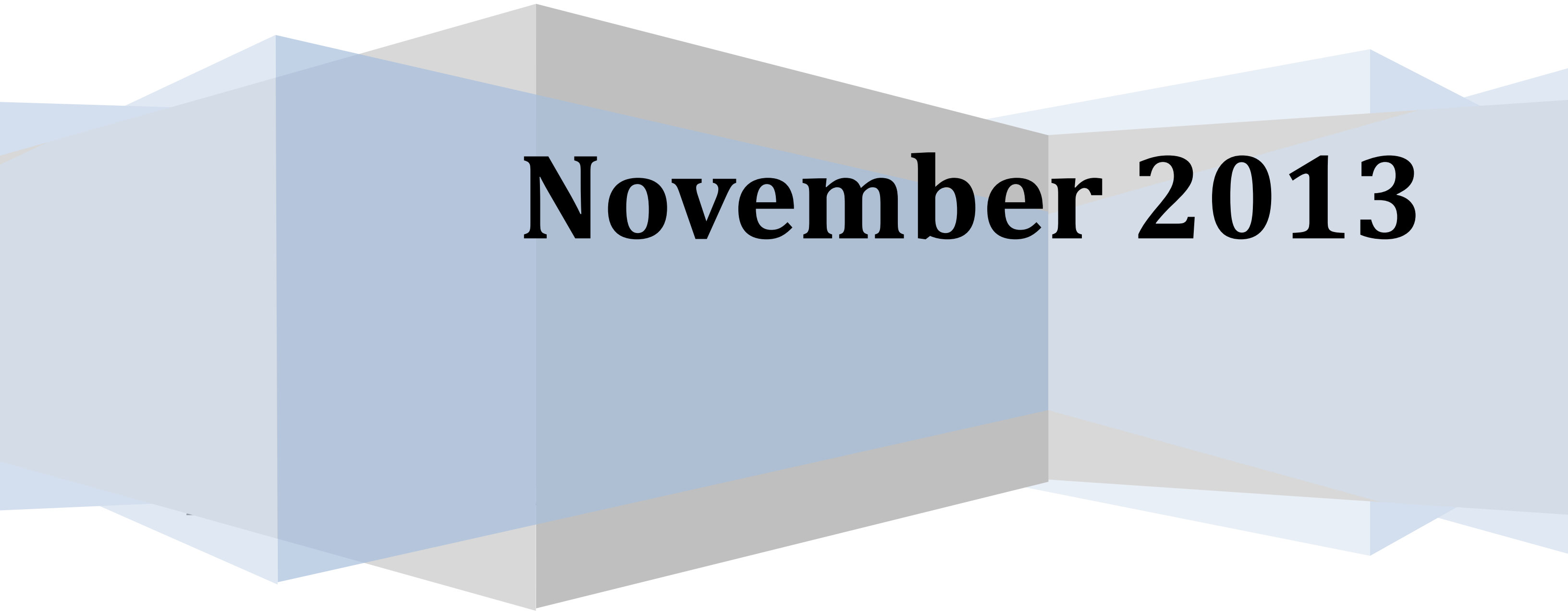
James Narkunas, P.G.
SC License No. 385

Date

URS Corporation

Remedial Investigation Work Plan

Itron, Greenwood, South Carolina



November 2013

This work plan was prepared under my direction or supervision in accordance with a system designed such that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

James Narkunas, P.G. Date
SC License No. 385

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APPENDICES

1.0 INTRODUCTION

URS Corporation (URS) was retained by Itron Inc. (Itron) to conduct environmental due diligence at the Itron facility located at 1310 Emerald Road in Greenwood, South Carolina, hereafter known as the "Site" (Figure 1). Itron is the legal owner of the Site but has not operated the facility since 2012 after the business was sold to Measurement Technology Group, Inc.. A Phase I Environmental Site Assessment (ESA) was performed in December 2011 which identified three (3) Recognized Environmental Conditions (RECs). Based on the findings of the Phase I ESA, soil, groundwater, and indoor air quality at the Site were assessed during a Phase II ESA conducted in January 2012 and during a subsequent Site Assessment conducted in March 2012. The investigations detected tetrachloroethene (PCE) and other hazardous substances in soil and groundwater at concentrations exceeding applicable screening levels. Due to the nature of the contamination encountered, Itron and the South Carolina Department of Health and Environmental Control (SCDHEC) entered into a Responsible Party Voluntary Cleanup Contract (RPVCC) 13-6078-RP, dated October 2, 2013, to conduct a Remedial Investigation (RI) to assess the soil and groundwater contamination at the Site.

This RI Work Plan (the "Work Plan") outlines the protocols and methodologies that will be used to more fully define the nature and extent of the potential soil and groundwater contamination at the Site. Accordingly, this Work Plan considers the existing Site data and outlines the steps to further investigate the soil and groundwater conditions at the Site. This comprehensive Work Plan describes a proposed field investigation to characterize site conditions, including the nature and extent of contamination at the Site.

The primary objectives of the RI are to:

- Assess the horizontal and vertical extent of soil contamination in suspected source areas;
- Assess the horizontal and vertical extent of the groundwater contamination in the surficial and bedrock aquifers;

- Assess the potential extent of dense non-aqueous phase liquid (DNAPL) in the suspected source areas; and
- Assess whether the contaminants present constitute a potential threat to human health and the environment through a baseline risk assessment.

Following SCDHEC approval of this Work Plan, these objectives will be achieved by combining information gathered during the previous field investigations with data obtained from the proposed RI field investigation. Upon completion of the proposed field investigation and analysis of all data, a RI Report will be prepared and submitted to SCDHEC. Based on the results presented in the draft RI Report, the need for the additional site characterization will be determined.

2.0 PROJECT TEAM AND SAFETY MANAGEMENT

2.1 Project Organization

The core project team will consist of the following team members:

Jeff Stewart
Itron Project Manager
Director of Global Sustainability & HSE
2111 North Molter Road
Liberty Lake, Washington 99019
(509) 891-3699

James Flynn, RG, LHG
URS Project Manager
Senior Hydrogeologist
1501 4th Avenue, Suite 1400
Seattle, Washington 98101
(206) 438-2113

James Narkunas, P.G.
URS Senior Geologist
1600 Perimeter Park Drive
Morrisville, North Carolina 27560
(919) 461-1324

Ronald Paulling, P.G.
URS Senior Geologist
4016 Salt Pointe Parkway, Suite 200
Charleston, South Carolina 29405
(843) 767-4602

Aaron Council
URS Field Team Leader
128 Millport Circle, Suite 100
Greenville, South Carolina 29607
(864) 527-4737

Additional URS team members may be involved in the project as necessary. URS will manage the field work, which includes a soil investigation in the source areas, groundwater monitoring well installation and sampling, and on-site investigative derived waste (IDW) management.

It is intended that Shealy Environmental Services, Inc. will be the analytical laboratory for the project. URS anticipates contracting with Shealy Environmental Services, Inc. and with several other contractors to complete the Work Plan, but has not done so at this point. Potential contractors and their specialties are listed below:

- SAEDACCO, Inc. of Fort Mill, South Carolina – Sonic well drilling, Geoprobe® direct-push technology, environmental construction
- Southern Sonic Solutions of Aiken, South Carolina – Sonic well drilling
- Boart Longyear of New Ellenton, South Carolina – Sonic well drilling
- NYEG Drilling, Inc. of Greenville, South Carolina - Geoprobe® direct-push technology
- Taylor Wiseman Taylor of Charlotte, North Carolina – Utility locating services
- EnviroEquipment, Inc. of Pineville, NC – Environmental sampling supplies and equipment
- A&D Environmental Services, Inc. of Lexington, South Carolina – Environmental construction and vacuum truck services
- 3R Environmental, Inc. of Charleston, South Carolina –Waste transporter and disposal hauler

2.2 Safety Management

URS has developed a Health and Safety Plan (HASP) to assign responsibilities, establish personal protection standards and mandatory safety procedures, and provide for contingencies that may arise while operations are being conducted at the Site under this Work Plan. The HASP complies with Federal Health and Safety Regulations, as set forth in 29 CFR 1910 and 1926, and applicable state regulations.

URS implements a behavior-based safety program. URS personnel are trained to recognize unsafe conditions and practice near-miss reporting. Subcontractors and other on-site personnel directly involved with the investigation and sampling have the potential to be exposed to hazardous substances. They will be required to have health and safety training in accordance with the Occupational Safety and Health Administration (OSHA) 29 CFR 1910.120, and other applicable local, state, or federal regulation as warranted. Evidence of training will be furnished to URS prior to the start of work and retained in project archives.

Before the start of work, URS will implement the following safety management approach to ensure that all appropriate front-end safety planning is in place:

- **Develop Draft Schedule and Scope of Work.** The key to effective and efficient safety planning and project execution is a well thought-out scope of work and implementation schedule.
- **Safety Kick-off Meeting.** Prior to the start of work, URS will hold a safety kick-off meeting at the Site with client representatives, subcontractors engaged by URS to perform responsibilities under this Work Plan and other on-site personnel as may be necessary to review Site specific safety concerns and provide program and site-specific training for attendees. Morning tailgate safety meetings will be held daily and documented in the field activity logs.
- **Safety Performance Metrics.** Prior to the start of work, performance targets are set for safety observations, Near Miss and Incident Reports, and site and program safety audits.

3.0 SITE BACKGROUND

3.1 Site Location and Topography

The Site is located approximately 3 miles northeast of the town of Greenwood in a mixed, light-industrial, warehouse/distribution and residential area. As shown on the United States Geological Survey (USGS) 7.5 minute Greenwood, South Carolina Quadrangle map (Figure 1), the Site is located on the southern side of Emerald Road at the intersection of Parkland Place Road. A Seaboard Railroad line runs east-west, just north of Emerald Road. A Greenwood County natural gas line runs east-west, just south of the Site.

Ground surface elevations range from 578 feet above mean sea level (msl) near the northwest corner of the Site to 550 feet msl in the central portion of the Site. The ground surface elevation drops to 500 feet msl in the heavily-wooded area located southeast of the Site. This change in topographic relief causes surface runoff on the Site to flow overland from northwest to southeast. Additionally, there are obvious ravine-type features in the heavily-wooded area southeast of the Site. Some are approximately 20 feet deep, and do not appear to be of natural origin. The ravines are likely former borrow areas which may have been used when the facility at the Site was constructed about 40 years ago.

3.2 Site History

Prior to 1972, the Site was reportedly used for agricultural purposes. The current building was constructed in 1972 for flow meter manufacturing by Neptune Carolina, Inc. In April 1972, Neptune Carolina transferred ownership of the property to Greenwood County. While the property was owned by Greenwood County for nearly 30 years, flow meter manufacturing continued under the operation of Allied Signal, Wheelabrator Frye, and Schlumberger Industries. In September 2001, the ownership of the property reverted from Greenwood County to Schlumberger Industries. Schlumberger transferred ownership of the Site to Actaris U.S. Liquid Measurement on October 26, 2001. Itron, Inc. acquired Actaris in April 2007. In 2012, Itron sold the operations at the facility (i.e., Itron's Liquid

Measurement Business) to Measurement Technology Group, Inc. which is now doing business at the facility as Red Seal Measurement. Itron is currently leasing the facility to Red Seal Measurement, but has retained ownership of the Site, including the building and the real property. Figure 2 depicts the approximate locations of current and historic Site features.

3.3 Current Site Conditions

The current Site consists of a 130,000 square-foot building (the "Building") on a 24.04-acre parcel of property located at 1310 Emerald Road in Greenwood, South Carolina. The facility manufactures flow meters for industrial and municipal uses. As part of the manufacturing process, the facility stores pre-formed brass, stainless steel, steel and aluminum parts on site. Additional materials manufactured at the facility include electronic circuit boards, wiring, casings, and other smaller components.

3.3.1 Climate

The average annual temperature in Greenwood, South Carolina is 60.3 degrees, with the average high temperature being 72.7 degrees and the average low being 47.9 degrees. Average annual precipitation is 46.3 inches.

The hottest month on average in Greenwood is July with an average high of 91 degrees and a low of 67 degrees, while the coldest month on average is January with an average high of 52 degrees and an average low of 30 degrees. The most precipitation typically falls in the month of January with an average of 5 inches while the driest month is typically April with an average of 3.11 inches of precipitation. (www.usclimatedata.com)

3.3.2 Surface Water

Wilson Creek, an eastward flowing perennial stream, is located approximately ½ mile south of the Site (Figure 1). Two intermittent streams that are unnamed tributaries to Wilson Creek are located east and west of the Site. The east tributary has been impounded at several locations near its headwaters forming three ponds that are located upstream of the Site.

3.3.3 Geology

The following sections identify the geological conditions typically encountered in the Piedmont of South Carolina, in addition to site-specific geological conditions encountered at the Site. The description of site-specific conditions is based on the borings and wells previously drilled at the Site by URS (URS 2012a and 2012c).

3.3.3.1 Regional Geology

The Site is situated in the Piedmont physiographic province and within the Inner Piedmont geologic terrain. The Piedmont is characterized by gently rolling topography, weathered bedrock, and relatively few rock outcrops. Regolith, consisting of soil and weathered rock overlies metamorphic and igneous basement rocks throughout the region. The regolith is generally comprised of varying quantities of silt, fine to coarse sands, and non-plastic clay commonly with weathered biotite and weathered feldspar. Less common are laterally restricted, narrow quartz or quartzite stringers. At some locations, the regolith includes material that has been transported and deposited as alluvium or colluvium. At other locations, the regolith consists only of saprolite, which remains above the parent rock from which it has weathered. Because saprolite is the product of in-place weathering, some of the textural features of the bedrock, such as relict quartz veins, dikes, and shear zones, are retained within the saprolite. The thickness of the regolith varies widely, ranging from 5 to 70 feet.

Regolith can be divided into three zones that include the soil zone, saprolite, and a transition zone between the saprolite and unweathered bedrock. Saprolite is typically the principal component of the regolith because alluvium is restricted to the locations of active and former stream channels while soil is usually limited to a thin mantle that overlies both the saprolite and alluvium. Where the regolith is lacking transported deposits, the three horizons represent progressive stages in the weathering of bedrock. The typical profile consists of clayey soils near the surface, where weathering is more advanced, underlain by sandy silts and silty sands.

In the transition zone, unconsolidated material grades into bedrock. The transition zone consists of partially weathered bedrock and lesser amounts of saprolite. Particle sizes range from silts and clays to large blocks of unweathered bedrock. The thickness and texture of the transition zone depend on the texture and composition of the parent rock. Well defined transition zones are typically associated with highly foliated metamorphic bedrock, whereas poorly defined zones, characterized by saprolite present between large blocks of unweathered rock, are associated with massive igneous rocks (Harned and Daniel, 1989).

The Inner Piedmont is a northeast trending belt of medium- to high-rank metamorphic rocks along with a complicated sequence of igneous rock intrusions. The predominant rock types near the Site are undifferentiated granitoid gneisses (Overstreet and Bell, 1965; Horton and Dicken, 2001). Bedrock in the region is exposed only in stream channels where the regolith has eroded or in areas of rugged topography.

3.3.3.2 Site-Specific Geology

The subsurface geology encountered at the Site was essentially similar between borings. It consisted of an alluvial, low to moderately plastic sandy silt deposit, ranging in color from primarily dark yellowish orange to yellowish gray to light brown, with differing degrees of mottling. Interbedded sand lenses were observed in well borings MW-7, MW-8 and MW-9. The sandy silt deposit extended from the land surface to approximately 25 feet below grade, where poorly-graded sand was encountered. The sand, which became moist to wet at a depth of 25 feet, extended from 25 feet to 34 feet below grade. Underlying the sand deposit was a highly-weathered saprolite comprised of micaceous silty clay. The deeper borings at the Site were terminated in the saprolite at depths of 47 feet to 57 feet below grade. Bedrock was encountered at a depth of about 47 feet below grade on the northeastern side of the Building at well MW-3 without encountering saprolite. The depth to bedrock appears to be considerably deeper on the southeastern side of the Site, as two well borings (MW-8 and MW-9) were advanced approximately 55 feet below grade without encountering bedrock.

3.3.4 Hydrogeology

The following sections identify the hydrogeological conditions typically encountered in the Piedmont of South Carolina, in addition to site-specific hydrogeological conditions encountered at the Site.

3.3.4.1 Regional Hydrogeology

The groundwater system in the Piedmont consists of the unconsolidated regolith overlying fractured, consolidated bedrock. Because of the relatively high porosity of the regolith, recharge from precipitation is stored in the regolith until it subsequently enters the underlying bedrock. Consequently, groundwater occurs both in the pore spaces between the particles that comprise the regolith and in the network of interconnected fractures that occurs in the uppermost part of the bedrock.

In the regolith, groundwater movement is by intergranular flow. At locations where the transition zone is sufficiently thick, a potentially high-flow zone of groundwater movement can exist because the transition zone is often more permeable than the overlying saprolite. The higher permeability of the transition zone is attributed to less advanced weathering in the lower regolith where chemical alteration of the bedrock has progressed to a point that expansion of certain minerals causes extensive minute fracturing in the rock, yet has not progressed so far that the formation of clay has clogged the fractures (Harned and Daniel, 1989). In the bedrock, groundwater occurs in interconnected vertical and horizontal fractures, as well as within the rock foliations. As a general rule, the frequency of fracture occurrence, especially horizontal fractures, tends to decrease with depth; although, very productive fractures and fracture zones have been encountered at greater bedrock depths (reportedly up to 500 feet).

Conceptually, groundwater flow systems in the Piedmont are characterized by slope aquifers in which flow is restricted to areas between ridge tops and perennial streams. The shape of the water table is a subdued replica of the land surface topography and groundwater flows toward the streams, which typically are located within 3000 feet of the ridge tops. Rarely under-flowing the perennial streams, groundwater discharges into the streams resulting in short flow paths (LeGrand, 1989).

Groundwater resources in the region are generally suitable for domestic, agricultural, and some industrial uses.

3.3.4.2 Site-Specific Hydrogeology

The water table at the Site occurs in the alluvium at some well locations and in the saprolite at other well locations.Therefore, two distinct water-bearing units have been identified based on data collected to date. Water levels at the eleven (11) groundwater monitoring wells range from approximately 26 to 39 feet below ground surface (bgs). Groundwater contour maps depicting groundwater elevations measured during the April 2012 and August 2012 sampling events are included as Figures 3 and 4. In general, shallow groundwater beneath the Site flows in an easterly to southeasterly direction. The average horizontal hydraulic gradient between the steel sump source area and well MW-9 is relatively steep ranging from 0.04 to 0.05 feet per foot (ft/ft). In the northern portion of the Site near MW-2, the calculated hydraulic gradient is 0.03 ft/ft to the east. Near the southeast corner of the Building, in the vicinity of MW-6, the calculated hydraulic gradient is 0.04 ft/ft to the southeast, and in the vicinity of monitoring well MW-10, the calculated hydraulic gradient is 0.02 ft/ft to the southeast.

4.0 PRELIMINARY SCREENING LEVELS

This section identifies the preliminary screening levels for chemicals of potential concern that have been detected during previous phases of investigation at the Site. The screening levels are based on the EPA's Region IV Regional Screening Levels (RSLs) (EPA 2012) and risk-based screening levels (RBSLs) developed by SCDHEC (2001). EPA's RSLs are updated periodically and may be revised during the course of the RI. Screening levels for soil, groundwater and indoor air are described below. Results of previous investigations are described in the context of these screening levels in Section 5.0 of this Work Plan.

4.1 Soil

Three potentially applicable Soil Screening Levels (SSLs) are included in the EPA RSLs: 1) Maximum Contaminant Level (MCL)-based for Protection of Groundwater SSLs; 2) Resident Soil SSLs; and 3) Industrial Soil SSLs (EPA 2012). Other potentially applicable screening levels are the RBSLs listed in the SCDHEC's Risk-Based Corrective Action (RBCA) guidance document (SCDHEC 2001). The chemicals of concern that have been identified in soil at the Site, to date, and have exceeded one of the potentially applicable screening levels listed below in Table 4.1.

Table 4.1: Chemicals of Concern and Potentially Applicable Screening Levels

Chemical of Concern (COC)	SSL for Protection of Groundwater	Resident Soil SSL	Industrial Soil SSL	RBSL
Tetrachloroethene (PCE)	0.0023 mg/kg	22 mg/kg	110 mg/kg	NSL
Trichloroethene (TCE)	0.0018 mg/kg	0.91 mg/kg	64 mg/kg	NSL
cis-1,2-Dichloroethene	0.021 mg/kg	160 mg/kg	2,000 mg/kg	NSL
1,1,2 – Trichloroethane	0.0016 mg/kg	1.1 mg/kg	5.3 mg/kg	NSL
Dibromochloromethane	0.021 mg/kg	0.68 mg/kg	3.3 mg/kg	NSL
Naphthalene	NSL	3.6 mg/kg	18 mg/kg	0.036 mg/kg

Notes:
1. mg/kg = milligrams per kilogram
2. NSL = No Screening Level Listed
3. SSL = Soil Screening Level
4. RBSL = Risk-Based Screening Level

For the purposes of this RI, URS will use the more restrictive screening criteria (SSLs for Protection of Groundwater or the RBSLs) when evaluating soil analytical data during the field investigation. Any additional contaminants that are detected during sampling activities will be compared to applicable screening levels.

4.2 Groundwater

The screening levels for groundwater are based on the EPA's Region IV MCLs, which are based on National Primary Drinking Water Standards (EPA 2012) and the RBSLs, established by SCDHEC and listed in the RBCA guidance document (SCDHEC 2001). The chemicals of concern that have been identified in groundwater at the Site, to date, and have exceeded one of the applicable screening levels listed below in Table 4.2.

Table 4.2: Chemicals of Concern and Applicable Screening Levels

Chemical of Concern (COC)	Maximum Contaminant Level (MCL)	RBSL
Tetrachloroethene (PCE)	5 µg/l	NSL
Trichloroethene (TCE)	5 µg/l	NSL
cis-1,2-Dichloroethene	70 µg/l	NSL
Benzene	5 µg/l	5 µg/l
Naphthalene	NSL	25 µg/l

Notes:
1. µg/L = micrograms per liter
2. NSL = No Screening Level Listed

All groundwater samples associated with the Site will be screened against the criteria in Table 4.2 above. Any additional contaminants that are detected during sampling activities will be compared to the MCL in the EPA's Summary Table or the RBSLs in the RBCA guidance document, if applicable.

4.3 Indoor Air

Screening levels for indoor air are based on the EPA's Region IV industrial air criteria (EPA 2012). The chemicals of concern that have been identified in the indoor air at the Site, to date, and have exceeded one of the applicable screening levels listed below in Table 4.3.

Table 4.3: Chemicals of Concern and Applicable Screening Levels

Chemical of Concern (COC)	Industrial Air
Tetrachloroethene (PCE)	47 µg/m3
Trichloroethene (TCE)	3 µg/m3

Notes:
1. µg/m3 = micrograms per cubic meter

5.0 PREVIOUS INVESTIGATIONS

This section describes the investigations conducted by URS at the Site in 2011 and 2012 prior to Itron entering into the VCC for the Remedial Investigation with SCDHEC. Analytical results are discussed in the context of the preliminary screening levels described in Section 4.0.

5.1 Phase I ESA – December 2011

URS was retained by Itron to perform a Phase I Environmental Site Assessment (ESA) of the Site in December 2011 (URS 2011). The purpose of the Phase I ESA was to identify Recognized Environmental Conditions (RECs) on the basis of readily available information. The assessment was accomplished by, and limited to, a reconnaissance of the Site, a drive-by survey of the Site vicinity, a review of publicly available records, interviews of pertinent individuals and regulatory and public agency personnel, and a review of pertinent documentation provided by Itron or readily available through URS' standard information sources. Findings and conclusions from the Phase I ESA were as follows:

- The Site covers 24.04 acres and is occupied by an approximately 130,000 square-foot Building that is bordered by an asphalt parking area to the north and truck approaches to the west and northeast. The facility has manufactured and assembled flow meters for industrial and municipal uses since it was developed in 1972, under different ownerships. Itron acquired ownership of the Site in 2007.
- The facility stored pre-formed brass, stainless steel, and aluminum parts for the manufacture of industrial and municipal flow meters. Additional materials included electronic circuit boards, wiring, casings and smaller components. Machine oil, resin, general cleaner and water-soluble coolants are stored in 55-gallon drums inside the Building or in covered areas throughout the Site. Lubricants, paints and xylene are also stored on site, typically in 5-gallon buckets.
- The subject property was listed on the RCRA-CESQG database. A few violations were identified in the past; however, each appears to be in the general or

records/reporting categories.

- Several ASTs were located at the Site. Each was designed with aboveground piping and secondary containment. The ASTs include two 250-gallon mineral spirits tanks, a 12,000-gallon water tank, a 10,000-gallon No. 2 fuel oil tank, a 12,000-gallon mineral spirits tank, a 250-gallon white mineral oil tank, two propane tanks of 250 and 2,500 gallons, and two 250-gallon waste oil, coolant and mineral spirits tanks. Some staining of the concrete near one of the waste oil tanks in the recycling area was noted. This tank has concrete secondary containment, which drains directly to an oil-water separator. No other significant staining was observed on the subject property.
- According to information included in a Phase I ESA Update performed in 2007, approximately 10 gallons of waste oil/coolant was released from a metal catch pan/containment structure as a result of heavy rainfall on July 17, 1992. Soil and surface water were impacted on site and in a neighboring ditch. No record of confirmation sampling following clean-up activities is available. In addition, PCE was reportedly used in 1978 as a cleaning solvent for paint guns in the vicinity of the paint booth near the northeast corner of the Building.
- A hazardous material spill incident report provided by a Site representative indicates a spill of approximately 13 gallons of mineral spirits outside the test room on the east side of the Building on April 29, 2009. The affected rock and soil, approximately 3 feet around the tank and 1 foot deep was excavated, placed in 55-gallon drums, removed from the Site and properly disposed of by Environmental Services of Charlotte, North Carolina.
- A hazardous material spill incident report provided by Site contacts indicates a spill of approximately 5,162 gallons of mineral spirits 66 in a test room on site on January 31, 2004. Absorbent pads and pigs were used to clean up the spill on Site. Material that entered the sanitary sewer was skimmed and vacuumed at the

Greenwood Metropolitan District's facility and disposed of by 3R Inc. SCDHEC was notified about the incident.

- Four underground storage tanks (USTs) were removed from the subject property in 1987. The USTs were located on the northeast side of the Building. The removed tanks included the following: 1,000-gallon gasoline, 5,000-gallon No. 2 Fuel Oil, 12,000-gallon No. 2 Fuel Oil and 12,000-gallon mineral spirits. No soil samples were reportedly collected during the tank removal process. These four USTs were listed in the UST database.
- A 12,000-gallon mineral spirits UST was removed from the subject property in June 2009. Low concentrations of SVOCs and VOCs were detected in two confirmatory soil samples. SCDHEC issued a letter dated September 18, 2009 indicating no further assessment or rehabilitation was required for the 12,000-gallon UST.

According to the Phase I ESA report, the following Recognized Environmental Conditions (RECs) associated with the facility were identified.

- In 2007, as part of a previous Phase I ESA, facility personnel reported the use of PCE in 1978 as a cleaning solvent for the paint guns. The PCE was reportedly used near the paint booth in the north-central portion of the Building. Current Site contacts interviewed by URS have no knowledge regarding the past use or storage of chlorinated solvents and current operations preclude the use of chlorinated solvents.
- Four USTs were located outside the Building in the northeastern portion of the facility and were removed from the Site in 1987. The tanks included a 1,000-gallon gasoline tank, a 5,000-gallon No. 2 fuel oil tank, a 12,000-gallon No. 2 fuel oil tank and a 12,000-gallon mineral spirits tank. No soil samples were collected during the tank removal process.
- Due to the age of the oil water separator on the northwest side of the Site, the potential exists for the integrity of this system to have been compromised. It could,

therefore, represent a potential pathway for contaminants to impact the soil and/or groundwater through the associated piping.

The waste oil/coolant release and the two mineral spirit releases appear to have been adequately addressed and cleaned up appropriately. All three incidents were discovered within a short time of their occurrence and no regulatory documentation requiring additional action was identified.

Due to the identification of the RECs, URS recommended that a Phase II ESA be conducted. The scope of work and findings of the Phase II ESA are discussed in the following section.

5.2 Phase II ESA – January 2012

URS completed a Phase II ESA (URS 2012a) in January 2012 to determine if soil and groundwater had been affected by the operations at the Site. The assessment included collecting nineteen (19) soil samples from eleven (11) boring locations (SB-1 through SB-11) and collecting nine (9) grab groundwater samples from temporary monitoring wells (GW-1 through GW-9). The sampling locations were selected based on information obtained during the Phase I ESA site visit and subsequent information provided by facility personnel. Areas investigated included the locations of the former USTs, a gasoline dispenser, an oil-water separator, and a paint spray booth and parts washing area where PCE was reportedly used.

Odors and photoionization detector (PID) readings indicated the presence of petroleum hydrocarbons or other potentially hazardous substances in soil samples collected from borings SB-2 through SB-5, which were located near the reported gasoline dispenser and the former USTs. Groundwater was encountered at depths between 28 and 35 feet bgs.

The soil and groundwater samples were analyzed for Target Compound List (TCL) volatile organic compounds (VOCs) by USEPA Method 8260B and semi-volatile organic compounds (SVOCs) and polynuclear aromatic hydrocarbons (PAHs) by USEPA Method 8270C, with the exception of groundwater samples GW-4 and GW-8, which were not analyzed for PAHs because a sufficient volume of water could not be collected from the sample locations. Soil and groundwater analytical parameters for the Phase II ESA and subsequent assessment activities are summarized on Tables 1 and 2. Analytical results from the Phase II ESA are summarized on Figures 5 and 6 and Tables 3 and 4.

Based on the findings from the Phase II ESA, URS concluded that:

- PCE has been released to the ground in the vicinity of boring SB-3 based on the detection of PCE in the soil at shallow depths at concentrations exceeding the SSL at this location. Additionally, PCE in groundwater, at concentrations potentially exceeding the MCL, extended over a distance of at least 400 feet southeast from the Building.
- PCE was detected at the highest concentration in groundwater at sampling location, GW-3. The concentration (10,000 µg/l) exceeded one percent of the solubility of PCE, suggesting the groundwater potentially contacted DNAPL.
- PCE degradation products (e.g., trichloroethene [TCE] and cis-1,2-dichloroethene [cis-1,2-DCE]) were detected in soil, but not at concentrations exceeding SSLs. PCE degradation products were not detected in groundwater, but this may be partially attributed to elevated laboratory reporting limits.
- PAHs and other common petroleum constituents such as benzene, toluene, ethylbenzene, and xylenes were detected in soil and/or groundwater near the former gasoline dispenser and USTs indicating that releases from the UST system had occurred. Benzene concentrations exceeded the MCL and naphthalene concentrations exceeded the RBSL in groundwater along the northeast side of the facility near the former USTs, but did not appear to extend a significant distance downgradient.
- No impacts to soil or groundwater were detected near the oil-water separator on the southwestern side of the Building, and as a result, this area does not appear to be a concern.

The extent of impacts to soil and groundwater was partially delineated during the Phase II ESA. Further site investigation was recommended.

5.3 Soil and Groundwater Site Assessment – March/April 2012

In March and April 2012, URS was instructed by Itron to perform additional soil and groundwater assessment at the Site (URS 2012c). The primary objective of the assessment was to further assess the horizontal and vertical extent of PCE impacts in on-site soils as well as assess the horizontal extent of impacts in the shallow groundwater. Potential sources of PCE releases were also investigated. The assessment included investigation of a steel sump, a membrane interface probe (MIP) investigation to provide screening level data, drilling of soil borings and installation of monitoring wells, and soil and groundwater sampling and analysis.

5.3.1 Sump Assessment and Cleanout

URS personnel provided oversight of the clean-out of a concrete sump and a steel sump located outside the southeast side of the main Building (Figure 2). The two inter-connected sumps appear to have been used to accumulate process water from on-site manufacturing activities including a tumbler inside the main Building. URS conducted a visual assessment of the sumps following the clean-out and the integrity of the sumps did not appear to be compromised. Itron personnel collected a sample of sludge from the steel sump on February 21, 2012 and submitted the sample to Davis & Floyd for Toxicity Characteristic Leaching Procedure (TCLP) analysis for VOCs only to characterize the waste prior to disposal. Sample results were non-detect for VOCs.

A PVC drain line connected to the steel sump, which appeared to have been manually plugged at the time of the clean-out, leads east toward the Site fence line and then turns to the southeast (Figure 2). This drain line was identified initially by a private utility locator. A map (Neptune, dated 1972) provided by Itron personnel shows the drain line terminating at the Site property line southeast of the facility. Several attempts were made to locate the outfall of the drain line, but were unsuccessful. Upon further investigation, it was discovered that a concrete floor sump located inside the main Building near the southeast corner is also connected to the steel sump.

5.3.2 Membrane Interface Probe (MIP)

URS procured the services of Vironex, a MIP contractor, to further investigate soil and groundwater conditions across the Site. A direct-push rig was used to advance the MIP probe, which is outfitted with instrumentation that detects VOCs and other contaminants in the subsurface. As the MIP probe is advanced through the subsurface, it heats the soil and/or groundwater. The increase in temperature causes the VOCs in the subsurface media to volatilize and enter into the vapor phase of the compound. The vapors are then identified based on their specific MS/GC signatures of the compound. The MIP produces a continuous down-hole boring log coupled with an electrical conductivity log of the soil and the responses of a photoionization detector (PID) and flame ionization detector (FID) to potential contaminants of concern. The locations for the MIP borings were based on the Geoprobe® boring results conducted during the Phase II ESA, knowing that location GW-3 was a potential "hot spot". The MIP boring locations are depicted on Figure 7.

The MIP survey results, including a graphics package provided by Vironex, supplemented by field observations made by URS personnel indicated high concentrations of VOCs near the southeast corner of the Building extending from the Building toward the southeast. The Vironex MIP Investigation Report was included in the Phase II ESA. Pertinent portions of the report are included in Appendix A.

The results from the MIP Investigation in conjunction with earlier soil and groundwater analytical results reported in the Phase II report were used to select the locations for subsequent soil borings and groundwater monitoring wells described below in Section 5.3.3 and 5.3.4.

5.3.3 Soil Investigation

A total of twenty-three (23) soil samples from eleven (11) boring locations were collected and analyzed. (Note: Several soil samples were collected from borings advanced at proposed monitoring well locations, so the samples were designated as such). The soil sampling points were located as follows and are depicted on Figure 5:

- MW-1 near the loading dock on the northeast corner of the Building.
- MW-6 near the southeast corner of the Building adjacent to a drain line extending eastward from a steel sump pit.
- MW-7 near the southeast corner of the Building close to the steel sump pit.
- MW-9 near the fence line approximately 400 feet southeast of the southeast corner of the Building.
- SB-12 and SB-13 located near the east corner of the Building close to the drain line.
- SB-14 and SB-15 located in and just outside the cardboard storage room on the east side of the Building.
- SB-16, SB-17 and SB-18 located in the southern portion of the Building near the heavy machining area of the facility where parts cleaning reportedly took place.

During soil boring and monitoring well installation on site, URS personnel conducted field screening of soils using olfactory senses and a PID. Solvent odors were detected at soil boring locations SB-14 and SB-15 near the cardboard warehouse on the east side of the Building; odors were not observed at the remaining borings.

Soil samples collected at various depths from selected borings (SB-12 through SB-18, MW-1, MW-6, MW-7 and MW-9) were analyzed for VOCs by EPA Method 5035A/8260B by Shealy Environmental Services, Inc. (Shealy) of West Columbia, South Carolina. Soil analytical results for the March 2012 assessment activities are summarized in Table 5. Twelve VOCs were detected in the samples, four of which exceeded the SSLs at least once. PCE was the predominant VOC to exceed its SSL. TCE exceeded the SSL twice and 1,1,2-trichloroethane and dibromochloromethane each exceeded the SSLs once.

5.3.4 Groundwater Investigation

Eleven (11) permanent Type II groundwater monitoring wells (MW-1 through MW-11) were installed on site in March and April 2012 at locations shown on Figure 7 to further delineate the extent of PCE in groundwater. SAEDACCO, Inc. of Fort Mill, South Carolina installed the monitoring wells. Groundwater monitoring well construction details and elevations are summarized in Table 7.

URS personnel collected samples from the newly installed groundwater monitoring wells on April 19, 2012. The groundwater samples were analyzed for TCL VOCs by USEPA Method 8260B by Shealy. The analytical results are summarized in Table 6, and depicted on Figure 6. Thirteen VOCs were detected in the samples, four of which exceeded the MCLs at least once. PCE was the predominant VOC to exceed the MCL followed by TCE, cis 1,2-dichloroethene , and benzene.

5.3.5 Conclusions

Based on the findings from the Site investigation, URS offered the following conclusions:

- PCE appears to have been released to the ground in at least two locations on the Site. The first being near boring SB-3, which was drilled during the initial Phase II ESA. This was corroborated by results detected in the shallow soil at boring SB-14 (1 foot), which exceeded the MCL-based SSL with a PCE concentration of 8.3 mg/kg. The PCE concentration of 62 mg/kg detected at boring MW-7 (2 feet) suggests that this boring is also located near a PCE source area. This boring is located close to a metal sump, which appears to have been connected to a floor sump located inside the Building.

- The analytical results indicated that PCE in groundwater is moving to the south and southeast. PCE concentrations exceeding the MCL extend at least 500 feet to the east and southeast of the potential source areas near the eastern corner of the Building. The highest concentrations of PCE (19,000 ug/l) exceed one percent of the solubility limit of PCE, which potentially suggests the presence of dense non-aqueous phase liquid (DNAPL), i.e., free phase PCE.
- PCE degradation products (e.g., TCE and cis-1,2-DCE) were detected in soil at boring SB-14 on the northeast side of the Building. These degradation products were not detected in any other soil sampling locations across the Site. However, these products, specifically TCE and cis-1,2-DCE were detected in groundwater at monitoring wells MW-3, MW-4, MW-9 and MW-11 at concentrations above their respective MCLs.
- Benzene concentrations in groundwater exceeded the MCL along the northeast side of the Site near the former USTs in wells MW-2 and MW-3, indicating a release from the former UST system. Additional petroleum constituents including ethylbenzene and xylenes were also detected below their established MCLs. It does not appear that these constituents extend a significant distance downgradient, suggesting petroleum impacts are limited to the vicinity of the former USTs.
- The horizontal and vertical extent of PCE groundwater impacts has only been partially delineated based on the available data. Further investigation of the Site was recommended to develop a comprehensive Site charaterization.

5.4 Indoor Air Quality Investigation – March/April 2012

Due to high concentrations of VOCs detected beneath the concrete slab on grade inside the Building, URS collected indoor air quality samples throughout the Building to determine if the concentration of VOCs in the air inside exceeded screening levels for VOCs (URS

2012b). In March 2012, a closed door scenario sampling event was performed. The sampling locations and results are shown in Figure 8. Only one sampling location (IA-4) exceeded PCE and TCE screening levels. An open door scenario sampling event was performed in April 2012. The sampling locations and results for the open-door event are shown in Figure 9. No exceedances were detected during the open door test. As a follow-up measure, Itron retained an industrial hygienist to conduct additional air testing by placing sample devices on individual employees within the workplace. URS understands that on the basis of this sampling that no further measures were necessary pertaining to air quality at the Site.

5.5 Groundwater Sampling – August 2012

URS conducted a comprehensive groundwater sampling event to confirm contaminant concentrations detected during the previous groundwater sampling event in April 2012. The samples were collected on August 23, 2012, and analyzed by a different analytical laboratory as a quality control measure. Gulf Coast Analytical Laboratories (GCAL), Inc. of Baton Rouge, Louisiana (GCAL) used the same analytical methods utilized by Shealy for the previous sampling event. The analytical results from August 2012 sampling event are summarized in Table 6, and depicted on Figure 6.

Analytical results from the August 2012 monitoring event indicated the presence of PCE, cis-1,2-Dichloroethene and benzene at concentrations exceeding the MCLs. Overall, the August 2012 analytical results were comparable to the previous sampling event conducted at the Site in April 2012, with the exception of the significant increase of PCE noted in monitoring well MW-7.

6.0 PRELIMINARY CONCEPTUAL MODEL

This section presents a preliminary conceptual model that describes the known releases on the Site, subsurface conditions, contaminant distribution, transport mechanisms, and data gaps. Potential receptors and exposure pathways will be evaluated as part of the baseline risk assessment described below in Section 9.2.

6.1 Human Population and Land Use

The Site is located approximately 3 miles northeast of the town of Greenwood in a mixed light industrial, warehouse/distribution and residential area. Approximately one-third of the Site is surrounded by a 6-foot high chain-link fence and is accessible only to workers. The remaining two-thirds of the property are accessible to the general public along various roads and right-of-ways that surround the Site.

The area north of the Site includes Emerald Road and a railway line, beyond which is primarily undeveloped woodland. Areas east and south of the Site are occupied by numerous single-family residences within a residential subdivision. The neighborhood is well-established and appears to have been developed during the 1970s. Parkland Place Road adjoins the Site on the west and two single-family residences, an abandoned church building, and a restaurant are located on the west side of the road near the southwest corner of the Site.

6.2 Potential Source Areas and Releases

Historic operations at the Site reportedly used PCE for cleaning of paint guns. Part washing was also reportedly conducted at the Site and may have included the use of solvents. In addition, several USTs were formerly located along the exterior of the northeast side of the Building. Based on the results of previous investigations, the following three source areas associated with the former solvent usage and the USTs have been identified at the Site:

- **Steel Sump and Drain Line** - PCE was detected in the soil at monitoring well MW-7 at a concentration of 62 mg/kg at 2 feet below ground surface and the concentration in the groundwater from the monitoring well was as high as 56,900 micrograms per liter (µg/l) during the August 2012 sampling event. The shallow depth of the soil contamination indicates the well is located in the source area and probably near the release point. The elevated concentrations detected in groundwater suggest the potential presence of DNAPL . Releases detected at MW-7 may be related to discharges to the nearby sumps and drain lines.

- **Cardboard Storage Room and Vicinity** - PCE was detected in the soil at concentrations of 5.4 mg/kg (0 – 2 feet) and 6.8 mg/kg (8 – 10 feet) in boring SB-3 located near the cardboard storage room on the east side of the Building. In addition, PCE was detected at concentrations exceeding 7 mg/kg in samples from nearby borings SB-14 and SB-15 at depths between 22 and 24 feet bgs. The relatively high concentrations of PCE in near surface soil indicate that releases occurred close to boring SB-3. According to Site personnel, several USTs were located in this location and were previously removed. Site personnel were unclear as to the size and contents of the USTs in this area, but believed they were small tanks (500 gallons or less) that may have been used for collecting waste oil.
- **Former UST and Gasoline Dispenser Area** - In addition to PCE, constituents including benzene, naphthalene and xylenes have been detected in soil and/or groundwater on the northeast side of the Building. The source of these contaminants appears to have been a previous gasoline dispenser and gasoline UST that was located in the vicinity of boring SB-2 where naphthalene was detected in the soil at concentrations of up to 8.5 mg/kg. The dispenser and UST were reportedly removed in 1987. At least three other USTs, which contained No. 2 fuel oil and Mineral Spirits 66, were also removed from the Site and could be a potential source of the petroleum hydrocarbons detected on site. Naphthalene was also detected in groundwater at temporary monitoring wells GW-5, GW-6, GW-7 and GW-9, at concentrations of 210 µg/l, 230 µg/l, 170 µg/l and 27 µg/l respectively, which exceed the RBSL of 25 µg/l.

Other historic releases were discussed in section 5.1 of this Work Plan. The incidents appear to have been adequately addressed and cleaned up appropriately. No further action related to these former releases appears to be required.

6.3 Transport Mechanisms

Contaminants associated with former operations at the Site, primarily PCE, appear to have been released at the surface and infiltrated into to the subsurface. The PCE appears to have leached from the soil and migrated vertically into the underlying groundwater which occurs at depths between 26 and 39 feet bgs. Groundwater flows east-southeast across the Site. The PCE plume in groundwater extends at least 500 feet southeast of the source areas identified above. If DNAPL is present in the subsurface, it will tend to migrate downward through more permeable deposits to the water table and may pool or migrate laterally on low permeability layers such as clay or competent bedrock. If present, residual DNAPL represents a potential long-term secondary source of contamination.

Releases of petroleum hydrocarbons on the northeast side of the Building may have occurred at the surface or directly into the subsurface from leaks in the UST system. Contaminant transport mechanisms for the petroleum hydrocarbons are similar to those for PCE (e.g., migrate vertically through soil and then dissolved into groundwater), but these is no evidence that NAPL is present in this area. In addition, the available data suggest that the extent of the source area is much smaller than for the PCE releases and the resulting impacts to groundwater appears to extend less than 300 feet downgradient of the source area, based on the absence of elevated levels of petroleum hydrocarbons in well MW-6.

Additional transport mechanisms at the Site potentially include vapor intrusion and surface water runoff. Vapor intrusion for the Building has been addressed under previous assessment activities in section 5.4. Transport by surface water runoff, while possible, is unlikely to be significant due to the volatile nature of the COCs. Nevertheless, during the course of this remedial investigation, the analytical results from surface soils will help in determining if surface runoff may be an issue.

6.4 Data Gaps

At this point of the investigation, URS has identified several data gaps that will be addressed through the scope of work outlined in Section 7 of this RI Work Plan. The data gaps are as follows:

- The horizontal and vertical extent of VOCs (primarily PCE) and naphthalene in soil have not been fully delineated in potential source areas on the northeast side of the Building near the former UST systems and the cardboard storage room or on the southeast side of the Building near the steel sump and drain line. This includes the extent of the potential DNAPL source zone in the areas where elevated PCE has been detected in soil and groundwater.
- The horizontal extent of VOCs (primarily PCE) and naphthalene in groundwater has not been fully delineated across the Site.
- The vertical extent of VOCs (primarily PCE) in groundwater beneath the Site has not been investigated.
- Other Site characteristics that may control the fate and transport of contaminants such as hydraulic conductivity and organic carbon have not been evaluated.

7.0 PROPOSED SCOPE OF WORK FOR THE REMEDIAL INVESTIGATION

This section describes the objectives and rationale and scope of the RI at the Site and summarizes the technical approach that will be used to further investigate Site conditions. The details of the technical approach including sampling methods and procedures are described in detail in the Field Sampling and Analysis Plan (Appendix B) and in the Quality Assurance Project Plan (Appendix C).

7.1 Soil Investigation

Based on the analytical results of soil sampling conducted at the Site in January 2012 and March 2012, the following three suspected source areas have been identified:

- A suspected source area is located on the southeast of the Building in the vicinity of the steel sump.
- A suspected source area is located near the cardboard storage room on the east-northeast side of the Building.
- A suspected source near the former UST and gasoline dispenser near the northern corner of the Building.

The suspected source areas are shown relative to each other on Figure 5. Each suspected source area is shown in more detail on Figures 10-1 (Steel Sump), 10-2 (Cardboard Storage) and 10-3 (UST and Gasoline Dispenser). Corresponding soil boring locations and analytical data are included on the figures. Investigations proposed in each of the areas are described below. Additionally, during the investigation of these soil source areas, URS will use the following methods to potentially detect the presence of any DNAPL or free-phase PCE. Field screening methods that will potentially be utilized include:

- Headspace test using a PID
- Fluorescence test
- Hydrophobic dye shake test

The fluorescence test and hydrophobic dye shake test will only be utilized in instances where PID headspace readings are >100 parts per million (ppm). Specifics regarding the field screening methods above are detailed in the FSAP.

In the event DNAPL is encountered, drilling at that particular location will cease to avoid creating a potential pathway for downward vertical migration. Immediately following completion of each individual sample location, the boring will be filled to the surface using a cement-grout mixture following South Carolina Well Regulations R.61-71.

Steel Sump Source Area

At MW-7, PCE was detected at 2 feet below grade at a concentration of 62 milligrams per kilogram (mg/kg), which exceeds the MCL-based-SSL. To further delineate the soil contamination detected near the southeast corner of the facility, soil samples will be collected using a Geoprobe® rig from the existing ground surface to an approximate depth of 30 feet below grade (approximate depth of water table) on an approximate 20-foot grid pattern. Boring locations depicted on Figure 10-1 show potential sampling locations within the grid. The soil investigation in this area will initially include borings near MW-7 and other areas where PCE exceeds the screening level (i.e., SB-12, SB-13, SB-16, SB-17, SB-18 and MW-6). The soils will be screened using a PID in 1-foot intervals to the termination depth. Samples selected for laboratory analysis will be the two samples exhibiting the highest PID readings from each boring if DNAPL is not detected. If DNAPL is detected, those samples will be submitted for laboratory analysis. A minimum of two samples per boring will be submitted to the laboratory. However, additional samples will be submitted if justified by field-screening results. In the event all PID readings at a particular location are "0", one soil sample will be selected from the 1-2 foot interval and the other will be selected from just above the water table. Surface samples (0-1 foot) will also be submitted for laboratory analysis from select sampling locations (See Table B-1 of FSAP) for use in the Baseline Risk Assessment described in Section 9.2 of this Work Plan. The selected samples will be analyzed for VOCs per EPA Method 5035A/8260B and the results will be compared to applicable screening levels outlined in Section 4 of this plan. A second round of borings will be considered based on the analytical results and may be completed as part of this RI.

Cardboard Storage Room and Vicinity

The second suspected source area is located in the cardboard storage room and surrounding area. Soil samples from boring locations SB-3, SB-5 and SB-14, all had PCE concentrations exceeding the applicable screening levels. As described above, soil samples will be collected using a Geoprobe® rig from the existing ground surface to a depth of 30 feet below grade on an approximate 20-foot grid pattern to further assess the extent of soil contamination.

Boring locations depicted on Figure 10-2 show potential sampling locations within the grid. The soil investigation will initially include borings near SB-3, SB-14 and SB-15 and other areas where PCE exceeds the screening level (i.e., SB-5 and SB-6). The soils will be screened using a PID in 1-foot intervals to the termination depth. Samples selected for laboratory analysis will be the two samples exhibiting the highest PID readings from each boring if DNAPL is not detected. If DNAPL is detected, those samples will be submitted for laboratory analysis. A minimum of two samples per boring will be submitted to the laboratory. However, additional samples will be submitted if justified by field-screening results. In the event all PID readings at a particular location are "0", one soil sample will be selected from the 1-2 foot interval and the other will be selected from just above the water table. Surface samples (0-1 foot) will also be submitted for laboratory analysis from select sampling locations (See Table B-1 of FSAP) for use in the Baseline Risk Assessment described in Section 9.2 of this Work Plan. The selected samples will be analyzed for VOCs per EPA Method 5035A/8260B and PAHs per EPA Method 8270D and the results will be compared to applicable screening levels outlined in Section 4 of this plan. The boring pattern depicted in Figure 10-2 will be completed.

Former UST and Gasoline Dispenser Area

The third suspected source area is near the northeast corner of the Building where a UST and gasoline dispenser were formerly located. A soil sample from boring locations SB-2, had concentrations of napthalene exceeding the applicable screening levels. As described above, soil samples will be collected using a Geoprobe® rig from next to boring location SB-2 and approximately 20 feet to the northeast, northwest, southeast and southwest of that boring from the existing ground surface to a depth of 30 feet below grade to further assess the extent of soil contamination.

Boring locations depicted on Figure 10-3 show potential sampling locations within the grid. The soils will be screened using a PID in 1-foot intervals to the termination depth. Samples selected for laboratory analysis will be the two samples exhibiting the highest PID readings from each boring if DNAPL is not detected. If DNAPL is detected, those samples will be submitted for laboratory analysis. A minimum of two samples per boring will be submitted to the laboratory. However, additional samples will be submitted if justified by field-screening results. In the event all PID readings at a particular location are “0”, one soil sample will be selected from the 1-2 foot interval and the other will be selected from just above the water table. Surface samples (0-1 foot) will also be submitted for laboratory analysis from select sampling locations (See Table B-1 of FSAP) for use in the Baseline Risk Assessment described in Section 9.2 of this Work Plan. The selected samples will be analyzed for VOCs per EPA Method 5035A/8260B and PAHs per EPA Method 8270D and the results will be compared to applicable screening levels outlined in Section 4 of this plan. The boring pattern depicted in Figure 10-3 will be completed.

7.2 Groundwater Investigation

7.2.1 Shallow Well Installation

Seven (7) shallow groundwater monitoring wells are proposed for installation. The purpose of the proposed shallow wells is to further delineate the horizontal extent of PCE and naphthalene impacts in the shallow groundwater at the Site. The shallow wells will be designated as wells MW-12 through MW-18 and will be installed in various upgradient, crossgradient and downgradient locations, which are shown on Figure 11. The shallow wells will be installed using roto-sonic drilling techniques. Well screen intervals will be selected based on the lithology encountered and the presence of water-bearing zones rather than on specific depths. The rationale for individual wells is summarized in Table 7.2.1 below:

Table 7.2.1: Proposed Shallow Monitoring Well Locations and Rationale

Monitoring Well No.	Location	Hydrostragraphic Unit	Rationale
MW-12	200 ft. east of MW-3	Alluvium/Saprolite	Assess eastern edge of plume
MW-13	200 ft. east of MW-5	Alluvium/Saprolite	Assess eastern edge of plume
MW-14	400 ft. southeast of MW-11(200 ft. southwest of MW-10	Alluvium/Saprolite	Assess southwestern edge of plume
MW-15	150’ southeast of MW-10	Alluvium/Saprolite	Assess southern edge of plume
MW-16	125’ south of MW-6 and MW-7	Alluvium/Saprolite	Assess lower southeastern edge of plume
MW-17	Inside Building	Alluvium/Saprolite	Assess PCE plume underneath Building
MW-18	Northwest corner of main parking area	Alluvium/Saprolite	Monitor upgradient groundwater water quality northwest of Site

Note: All shallow monitoring wells will be used to assess the lateral extent of groundwater impacts and refine the groundwater flow direction in the shallow portion of the surficial aquifer at the Site. See Figure 11 for the proposed well locations. The proposed screened intervals are based on lithology encountered in previous phases of well installation. These proposed wells will be screened at optimal depths encountered during the installation of the proposed wells.

All of the newly proposed monitoring wells described above will be “shallow,” ranging in depth from approximately 35 feet to 55 feet below grade. The well depths are approximate and the screen (10-feet of 0.010-inch slot) for each well will be located at a depth based upon the lithology encountered. That is, the well must be sufficiently deep enough to encounter groundwater, but (preferably) should also be installed in a productive sand or silt layer, rather than clay layer, to provide sufficient water for sampling purposes. Generally, the monitoring wells proximal to the plant will be flush-mounted; however, monitoring wells MW-12, MW-13, and MW-15 will be constructed with above-grade surface completions because they are located in heavily-wooded areas, and above-grade construction will help to make these wells easier to locate during future sampling events.

Additionally, at well location MW-18, URS will drill to bedrock in order to develop an understanding of the geologic profile of the Site. It is anticipated the surficial water-bearing zone will be encountered prior to the bedrock. In this instance, the boring will be backfilled using a cement grout mixture to the desired depth to construct the well.

As part of shallow well installation activities, URS proposes collecting soil samples at varying depths at each monitoring well location to determine if the soil has been impacted above the water table. Specific soil samples will be collected based on PID readings to determine if VOCs are present in the soil. Sample screening will continue to the termination of the borehole. A minimum of two soil samples will be selected for analysis from each well. The soil samples will be analyzed for VOCs by EPA Method 5035A/8260B. In addition, select soil samples (anticipated to be “clean”) will be collected from various stratigraphic units from proposed well locations MW-13, MW-14, MW-15 and MW-18 and analyzed for Total Organic Carbon (TOC) using the Walkley-Black method. TOC samples will be collected from the saturated zone as well as the unsaturated zone.

During this phase of the Work Plan, DNAPL screening techniques will also be performed as described in section 7.1. If DNAPL is encountered, then drilling will cease at that location to avoid creating a potential pathway for downward vertical migration.

7.2.2 Deep Well Installation

Four (4) deep monitoring wells are proposed for installation. The purpose of the proposed deep wells is to determine the water quality in the next significant (in terms of thickness and water-transmitting capacity) hydrostratigraphic unit below the unit monitored by the shallow well at that location. The deep wells will be installed downgradient and crossgradient of the source area located south and southeast of the Building. The deep wells will be paired with wells MW-5, MW-9, MW-10 and MW-16 as shown on Figure 11. The four deep wells will serve as the deep member of a shallow/deep well couplet. The couplets will be used to determine vertical hydraulic gradients. Water elevation from all four deeper wells will be used to estimate the horizontal direction of groundwater flow in the deep portion of the surficial aquifer and /or bedrock aquifer. Chemical data from the wells will be used to assess the vertical extent of contaminant impacts.

The deep wells will also be installed using roto-sonic drilling techniques. In the past for Type III well installation, a permanent surface casing grouted in-place was installed and served the purpose to separate the overlying water-bearing surficial geological strata from hydraulically communicating with the underlying geologic formations. With sonic drilling, installation of a permanent surface casing is no longer necessary. Instead, with sonic drilling, an 8-inch or 10-inch diameter carbon steel casing will be installed to the required depth to serve as a temporary surface casing during the installation of four (4) 2-inch diameter deep wells. The borehole will then be advanced further after the temporary casing is installed and the wells will then be constructed within the temporary casing with 5 or 10 feet of 0.010-inch slot screen above the terminal depth of the boring. Generally, the large-diameter outer casing will be set approximately 4 to 5 feet into a low permeability layer and then the boring will be advanced with the small-diameter casing into the next water bearing zone. If a low permeability layer is not encountered, it is anticipated that the large-diameter casing will be advanced to bedrock. At this point, the intent of the deep well installation will be to extend the boring 15 feet deeper and then construct the well with 5 to 10-foot of screen above the termination depth. The actual depth and screened intervals will be dependent on the lithology encountered. Proposed deep well monitoring well locations and approximated depths are shown below in Table 7.2.2.

Table 7.2.2: Proposed Deep Monitoring Well Locations, Depths and Rationale

Monitoring Well No.	8 to 10-inch diameter Temporary Casing Depth (feet below grade)	Location	Hydrostratigraphic Unit	Rationale
MW-5D	0 to 55	Adjacent to MW-5	Transition Zone/Upper Bedrock	Assess vertical extent of plume southeast of the plume at MW-5
MW-9D	0 to 70	Adjacent to MW-9	Transition Zone/Upper Bedrock	Assess the vertical extent of the plume at well MW-9
MW-10D	0 to 70	Adjacent to MW-10	Transition Zone/Upper Bedrock	Assess the vertical extent of the plume at well MW-10
MW-16D	0 to 50	Adjacent to MW-16	Transition Zone/Upper Bedrock	Assess the vertical extent of the plume between MW-7 MW-10.

Note: All deep monitoring wells will additionally be used to determine the groundwater flow direction in the deeper portion of the surficial/bedrock aquifer at the Site. See Figure 11 for proposed well locations.

A URS geologist will be present during the entire drilling operation, taking detailed notes, and ensuring the wells are constructed in accordance with the SC Well Standards and Regulations for deep Type III monitoring wells. The geologist will also log the boring and record detailed descriptions of the unconsolidated deposits and the rock/core. Additionally, at well location MW-9D, URS will drill to bedrock in order to develop an understanding of the geologic profile of the Site. If the transition zone or a permeable layer is encountered prior to the bedrock, the boring will be backfilled using a cement grout mixture to the desired depth to construct the well.

As proposed with shallow well installation activities, URS also proposes collecting soil samples at varying depths at each proposed deep well to determine if the soil has been impacted above the water table, and if so, to what extent. Specific soil samples will be collected based on field screening techniques such as PID readings to determine if VOCs are present in the soil. Sample screening will continue to the termination of the borehole. A minimum of two soil samples will be collected for analysis from each of these wells. The soil samples will be analyzed for VOCs by EPA Method 5035A/8260B. In addition, soil samples (anticipated to be "clean") will be collected from different stratigraphic units from proposed well location MW-9D and analyzed for Total Organic Carbon (TOC) using the Walkley-Black method. TOC samples will be collected from the saturated zone as well as the unsaturated zone.

During this phase of the Work Plan, DNAPL screening techniques will also be performed as described in section 7.1. If DNAPL is encountered, then drilling will cease at that location to avoid creating a potential pathway for downward vertical migration.

7.2.3 Well Development

Upon installation, the wells will be developed by removing a sufficient amount of water to flush the filter pack and allow proper groundwater movement into the well. Development will be accomplished by alternately bailing, surging, and pumping. During development, turbidity will be monitored and development will continue until the turbidity readings are below 10 NTUs or until no further improvement is possible.

7.2.4 Groundwater Gauging and Sampling

Water level measurements will be collected by URS from all on-site groundwater monitoring wells following installation and development activities. A water level meter (meter accuracy of 0.01 +/- feet) will be used to measure the depth to water from the top of the well casing which will be surveyed as described below in Section 7.4. The groundwater elevation data will be used to prepare potentiometric surface contour maps and to calculate vertical gradients. In addition, an interface probe will be lowered to the bottom of the wells suspected of containing DNAPL to measure for its presence. Another field technique that will be utilized includes removing liquid from the bottom of the wells using a pump or bailer and then examining the sample for DNAPL. Detection may be enhanced by examining under a UV lamp or by adding hydrophobic dye.

Groundwater samples will be collected from all groundwater monitoring wells associated with the Site. Prior to sample collection, the water level will be measured in each monitoring well. The monitoring wells will be sampled using low-flow techniques. Field parameters including pH, temperature, turbidity, oxidation reduction potential (ORP), dissolved oxygen (DO) and specific conductance will be measured and recorded during purging. Groundwater samples will be collected once pH and specific conductance have stabilized and turbidity has either stabilized or is below 10 NTUs. Procedures for collecting field parameters are discussed in detail in the FSAP. During previous sampling events, some wells were purged to near dryness; in this situation, the monitoring well will be allowed to recover and the sample will then be collected. The total volume of water removed during purging will be recorded. The groundwater samples will be analyzed for VOCs per EPA Method 8260B. Groundwater samples from wells MW-1 through MW-6, MW-12, MW-17, MW-18 and MW-5D will also be sampled for PAHs per EPA Method 8270D.

7.2.5 Slug Tests

URS personnel will conduct slug tests at selected wells screened in the various lithologic units at the Site to determine the horizontal hydraulic conductivity across the Site.

Data collected during the slug tests will be consistent with analysis by the Bouwer and Rice method. A water level meter (meter accuracy of 0.01 +/- feet) will initially be placed inside the well to measure the depth to water as well as total depth. A Troll©, pressure transducer will be inserted into the well, approximately 3 feet from the bottom, allowing an adequate water column (10 to 15 feet) above the device for introduction of a slug into the well. The water level will then be allowed to equilibrate. Once the Troll© is set, it will be programmed to record readings every 10 seconds. At this point, a decontaminated slug is slowly and smoothly introduced into the water column to approximately 2 feet below the water level of the well. The water level will rise, and slowly fall back down until it equilibrates; this is a falling head slug test. Wells selected for the falling head slug test will have fully saturated screens only.

After approximately 20 minutes, the water level will be checked with the water level indicator. If the water level has returned to its original level, it has equilibrated, thus a rising head slug test can be performed. With the Troll© still taking the 10 second programmed readings, slowly and smoothly remove the slug completely from the well. The water level will drop and then slowly rise back to the original depth to water. Once the water level has equilibrated, the slug test is completed, and the Troll© can be shut down and removed from the well. All reusable down hole equipment should then be decontaminated in accordance with the Site specific FSAP, and the process can be repeated at another monitoring well. The water level data can then be downloaded from the data logger to a laptop and entered into Excel for semi logarithmic graphing.

7.3 Drain Line Investigation

A drain line originates near the southeast corner of the Building at a steel sump and extends to the east-southeast. The purpose of the drain line investigation is to determine if the line is open and unobstructed, if it contains pockets of free-phase PCE and where the outfall of the line is located. The location of the drain line is depicted on Figure 12.

A map was provided to URS by Itron indicating the line terminated approximately 550 feet to the southeast at the property line. However, URS and the private utility locator were only able to trace the line just into the tree line, approximately 250 feet from the steel sump. The aforementioned map was provided to URS at a later date following utility locating efforts; therefore, the utility locator was not utilized to trace the line from the Site southeast property line.

To initiate the investigation of the drain line, a private utility locator will be utilized to re-mark the line. URS and the private utility locator will also attempt to locate the outfall of the drain line. Once utility locating is completed, the 4-inch diameter PVC pipe will be breached approximately 2 feet east of the steel sump. The drain line appears to have been manually plugged and is no longer in use, therefore, there are no plans to repair the line during or after the exploratory process. A small back hoe or mini-excavator will be used to breach the drain line. Once this is done, a video camera will then be placed into the line to view the contents and potentially identify any obstructions. This process of breaching the line near obstructions and re-inserting the camera will be repeated along the drain line until the outfall is located or the drain line cannot be traced any further. URS does not intend to excavate any soils during this process.

7.4 Surveying of Investigation Areas

Following the completion of all fieldwork, URS will procure the services of a State of South Carolina licensed surveyor to provide top of casing and ground surface elevations and horizontal coordinates for all newly installed groundwater monitoring wells. Accuracy for horizontal measurements is 0.10 foot and 0.01 foot for vertical measurements. The elevations and coordinates will be used to develop an updated groundwater flow map for the Site. Additionally, URS personnel will use a GPS unit to determine coordinates and elevations for all soil sampling locations in the suspected source areas (including any areas of concern discovered during the drain line investigation).

7.5 Investigative Derived Waste Management

The environmental investigative work will generate soil cuttings, decontamination fluids, and monitoring well development and purge waters. The IDW will be stored in 55-gallon drums and staged at a designated location on the Site until analytical results have been received allowing the waste to be profiled for disposal. It is anticipated that approximately 40 drums of soil and 40 drums of liquid IDW will be generated during this phase of work.

It is also anticipated that all IDW will be disposed of offsite at a permitted disposal facility following waste profiling. Additionally, all waste manifests will be signed by Itron personnel.

Uncontaminated disposable personal protective equipment (PPE) will consist primarily of nitrile gloves. Miscellaneous solid wastes consist of paper, plastic wrappers, aluminum cans, and other miscellaneous types of debris. Total volume is expected to be one large plastic bag per day, which will be disposed of in municipal waste containers at the facility.

Additional details regarding sampling for waste characterization are described in the FSAP, included as Appendix B of this RI Work Plan.

8.0 DATA MANAGEMENT PLAN

The Data Management Plan (DMP) for the RI at the Site describes the records control, document filing and access, computer data storage, data reduction methods and project related progress reports that will be used to ensure that all data produced during the project work performed within the scope of this Work Plan will be accurately gathered, recorded, maintained and reported. Data will include all information from surveys, drilling, sampling and testing.

8.1 Records Control

Information generated from field activities will be documented on the appropriate forms and include the following:

- URS Drilling Log
- Monitoring Well Construction Summary
- Monitoring Well Development Log
- Daily Field Logs
- Ground-Water Level Data Summary
- Field Data Information Log for Ground-Water Sampling
- Chain-of-Custody

Analytical documentation received from the laboratory will be retained and filed in an electronic format. Notes from project meetings and telephone conversations will be documented. A file of these notes will be maintained by the project PM.

8.2 Computer Data Storage

During implementation of this RI, various types of information will be compiled. Data related to the RI will be stored electronically. The electronic files will contain soil and groundwater data collected during the RI field work as well as laboratory analysis sheets.

The electronic file structure will provide an integrated and detailed organization of the existing information. Data will be categorized and compiled according to information type and source.

Data presented in the RI Report will be in the following forms: listed, sorted, tabulated, graphed or charted, or any combination of the above. Figures and charts will be used to clearly highlight relationships of data or significant contamination in relation to a regulatory requirement.

9.0 REPORTING

Following the investigation and characterization field tasks, a draft RI report will be prepared for the Site. The RI will include a Human Health Baseline Risk Assessment. In addition, based on the results presented in the draft RI Report, the need for the additional site characterization and development of a feasibility study (FS) or other study to evaluate remedial alternatives will be determined by SCDHEC.

9.1 Remedial Investigation

The RI report will present a summary of the field remedial investigations performed at the Site and an evaluation of the data and comparison of analytical results with the preliminary screening levels discussed in Section 4 of this Work Plan. At a minimum, the Remedial Investigation report will include the following:

- General facility information
- Site conditions map
- Summary of Field Activities
- Results (updated conceptual site model, soil and groundwater impacts)
- Groundwater flow characteristics
- Land use
- Ecological receptors

10.0 PROJECT SCHEDULE

The project will be implemented as expeditiously as possible in Itron's best interest. URS estimates that the project schedule will be as follows following receipt of SCDHEC's comments on the Draft RI Work Plan:

- Revise/finalize Draft RI Work Plan – 30 days from receipt of SCDHEC's comments on Draft RI Work Plan
- Complete RI Field Work – 90 days from SCDHEC approval of the RI Work Plan
- Submit Draft RI Report to SCDHEC – 120 days from completion of RI field work and receipt of analytical results

11.0 REFERENCES

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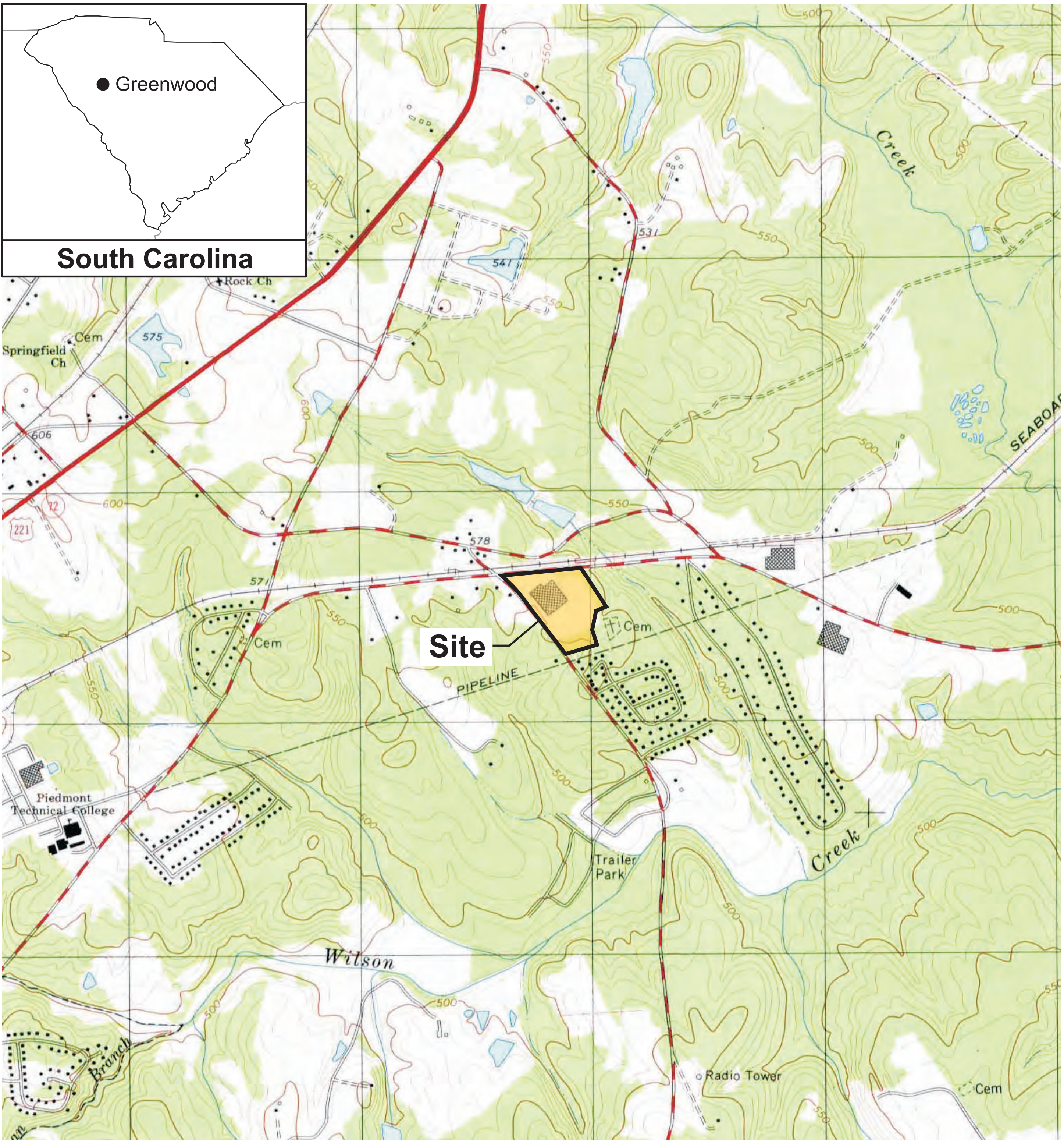


Source: *USGS 7.5-minute topographic quadrangle, Greenwood, South Carolina, 1978*

Figure 1

Site Location Map

Job No. 33763353

URS

Greenwood Facility
1310 Emerald Road
Greenwood, South Carolina

Figure 2
Site Features Map
ITRON, Inc.
Greenwood, S.C.

Legend

- ▲ Soil Boring
- ⊕ Groundwater Well
- ⊙ Temporary GW Well
- ☒ Floor Sump
- ♦ Concrete Sump Pit
- ⬟ Metal Sump Pit
- ▣ Oil Water Seperator
- - - - On-Site Drain Line
- 🟥 Property Line
- 🟨 Parcel

South Carolina State Plane, NAD 83
Zone 3900, International Feet

N

0 30 60 120
Feet

File: U:Projects\GIS\
ITRON\Site-Map.mxd
Job No. 33763353
Date: August, 2012

URS
Itron

Figure 3
Groundwater Contour Map
(April 19, 2012)

Legend

⊕	Monitoring Well
- - -	Groundwater Contours
☐	Itron Property Line
531.68	Groundwater Elevation (feet above mean sea level)

N

South Carolina State Plane, NAD 83
Zone 3900, International Feet
Aerial: 2012 from Bing

0 150 300 Feet

File: N:Public Share\Itron\Graphic Files\
Contour-Map_Fig8_11.27.12.mxd
Job No. 33763353
Date: November, 2012

URS

Itron

Figure 4
Groundwater Contour Map
(August 23, 2012)

Legend

⌖	Monitoring Well
- - -	Groundwater Contours
🟥	Itron Property Line
530.86	Groundwater Elevation (feet above mean sea level)

South Carolina State Plane, NAD 83
Zone 3900, International Feet
Aerial: 2012 from Bing

N

0 150 300 Feet

File: N:Public Share\Itron\Graphic Files
Contour-Map_Fig9_11.27.12.mxd
Job No. 33763353
Date: November, 2012

URS Itron

Figure 5
Soil Sample Results Map
January 2012 and March 2012

January 2012

SB-1 (4'-6')
ND
SB-1 (20'-22')
ND
SB-2 (8'-10')
Naphthalene - 8.5 mg/kg
SB-2 (14'-16')
Naphthalene - 5.3 mg/kg
SB-3 (0'-2')
cis-1,2-DCE - 0.13 mg/kg
trans-1,2-DCE - 0.008 mg/kg
PCE - 5.4 mg/kg
TCE - 0.38 mg/kg
SB-3 (8'-10')
PCE - 6.8 mg/kg
TCE - 0.0075 mg/kg
SB-4 (10'-12')
ND
SB-4 (18'-20')
ND
SB-5 (14'-16')
cis-1,2-DCE - 0.011 mg/kg
PCE - 0.037 mg/kg
SB-5 (18'-20')
cis-1,2-DCE - 0.02 mg/kg
PCE - 0.12 mg/kg
SB-6 (4'-6')
PCE - 0.069 mg/kg
SB-6 (12'-14')
PCE - 0.024 mg/kg
SB-7 (16'-18')
ND
SB-8 (10'-12')
ND
SB-9 (16'-18')
ND
SB-10 (2'-4')
ND
SB-10 (14'-16')
ND
SB-11 (0'-2')
ND
SB-11 (6'-8')
ND

March 2012

MW-1 (20')
ND
MW-6 (20')
PCE - 0.029 mg/kg
MW-6 (30')
PCE - 0.39 mg/kg
MW-7 (2')
PCE - 62 mg/kg
MW-7 (14')
PCE - 0.72 mg/kg
MW-7 (20')
PCE - 0.6 mg/kg
Dibromochloromethane - 0.98 mg/kg
MW-7 (28')
PCE - 3.4 mg/kg
MW-9 (30')
ND
SB-12 (1')
PCE - 0.25 mg/kg
SB-12 (10')
PCE - 0.049 mg/kg
SB-12 (28')
PCE - 1.8 mg/kg
SB-13 (18')
PCE - 0.024 mg/kg
SB-13 (28')
PCE - 0.19 mg/kg
SB-14 (1')
cis-1,2-DCE - 0.0087 mg/kg
PCE - 8.3 mg/kg
TCE - 0.067 mg/kg
SB-14 (14')
PCE - 0.27 mg/kg
SB-14 (22')
1,1,2-TCA - 0.023 mg/kg
PCE - 7.4 mg/kg
TCE - 0.013 mg/kg
SB-15 (8')
ND
SB-15 (24')
PCE - 7.3 mg/kg
SB-16 (8')
PCE - 0.0078 mg/kg
SB-16 (14')
PCE - 0.013 mg/kg
SB-17 (6')
PCE - 0.054 mg/kg
SB-17 (24')
PCE - 0.43 mg/kg
SB-18 (14')
PCE - 0.052 mg/kg
SB-18 (22')
PCE - 0.16 mg/kg

NOTES:
1,1,2-TCA = 1,1,2-Trichloroethane
cis-1,2-DCE = cis-1,2-Dichloroethene
mg/kg = milligrams per kilogram
ND = Not Detected
TCE = Trichloroethene
PCE = Tetrachloroethene
Red highlighted text indicates concentrations above RSL (for protection of groundwater).
Samples Collected March 13-15, 2012 and January 10-10, 2012.
Soil data are summarized in Table 6

South Carolina State Plane, NAD 83
Zone 3900, International Feet
Aerial: 2012 from Bing

N
0 50 100 Feet

File: N:Public Share\Itron\Graphic Files\
SB-Map_Fig6_10.11.12.mxd
Job No. 33763353
Date: October, 2012

URS
Itron

Figure 6
Groundwater Sample Results Map
January 2012, April 2012 & August 2012

Legend

⊕ Monitoring Well

● Temp Groundwater Well

🟨 Estimated PCE Plume

▭ Itron Property Line

January 2012

GW-1
ND
GW-2
PCE - 280 ug/L
GW-3
PCE - 10,000 ug/L
GW-4
Xylenes - 16 ug/L
GW-5
PCE - 860 ug/L
Xylenes - 150 ug/L
Naphthalene - 210 ug/L
GW-6
Benzene - 15 ug/L
Xylenes - 38 ug/L
Naphthalene - 230 ug/L
GW-7
Benzene - 51 ug/L
Xylenes - 45 ug/L
Naphthalene - 170 ug/L
GW-8
Benzene - 7.6 ug/L
PCE - 43 ug/L
Xylenes - 6.2 ug/L
GW-9
PCE - 470 ug/L
Naphthalene - 27 ug/L

April 2012

MW-1
ND
MW-2
Benzene - 8.2 ug/L
MW-3
Benzene - 12 ug/L
cis-1,2-Dichloroethene - 280 ug/L
PCE - 50 ug/L
TCE - 43 ug/L
MW-4
TCE - 5.8 ug/L
MW-5
PCE - 3,900 ug/L
MW-6
PCE - 12,000 ug/L
MW-7
PCE - 7,000 ug/L
MW-8
PCE - 19,000 ug/L
MW-9
PCE - 10 ug/L
TCE - 54 ug/L
MW-10
PCE - 12,000 ug/L
MW-11
Bromoform - 5.3 ug/L
TCE - 5.2 ug/L

August 2012

MW-1
ND
MW-2
ND
MW-3
Benzene - 15.1 ug/L
cis-1,2-Dichloroethene - 389 ug/L
Xylenes - 41.5 ug/L
Isopropylbenzene - 19.5 ug/L
MW-4
ND
MW-5
PCE - 4,290 ug/L
MW-6
PCE - 14,400 ug/L
MW-7
PCE - 56,900 ug/L
MW-8
PCE - 25,200 ug/L
MW-9
ND
MW-10
PCE - 15,200 ug/L
MW-11
ND

NOTES:
ug/L = micrograms per liter
PCE = Tetrachloroethene
TCE = Trichloroethene
ND = Not Detected
Red highlighted text indicates concentrations above MCL
Samples Collected January 10 and 11, 2012, April 19, 2012 and August 23, 2012.

South Carolina State Plane, NAD 83
Zone 3900, International Feet
Aerial: 2012 from Bing

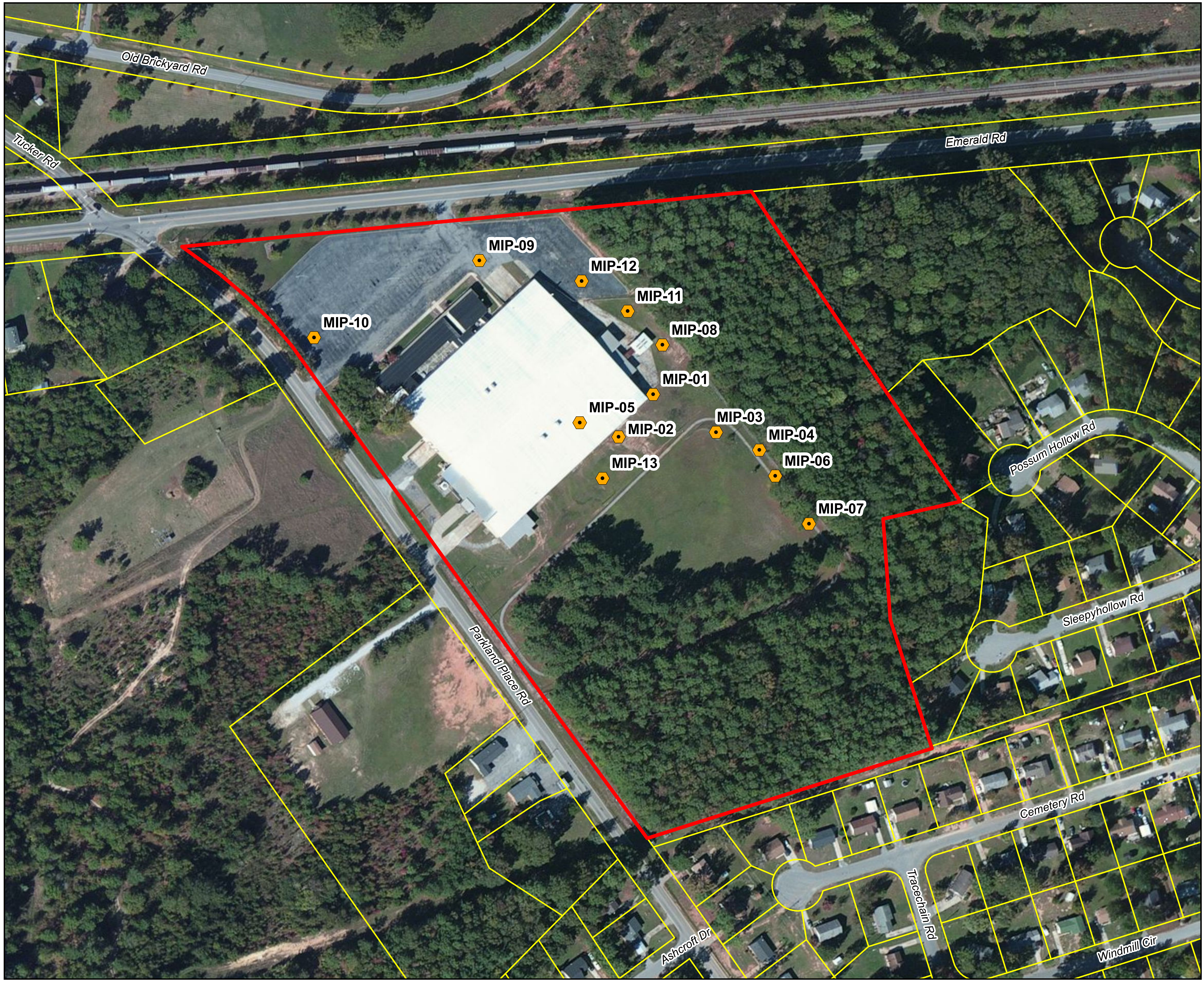
N

0 150 300 Feet

File: N:Public Share\ITRON\Graphic Files
GW-Sample_Map_Fig7_10.22.12.mxd
Job No. 33763353
Date: October, 2012

URS Itron

Figure 7
MIP Boring Location Map



Legend

- ● MIP Location
- 🟥 Itron Property Line
- ☐ Parcel

South Carolina State Plane, NAD 83
Zone 3900, International Feet
Aerial: 2012 from Bing

N

0 200 400
Feet

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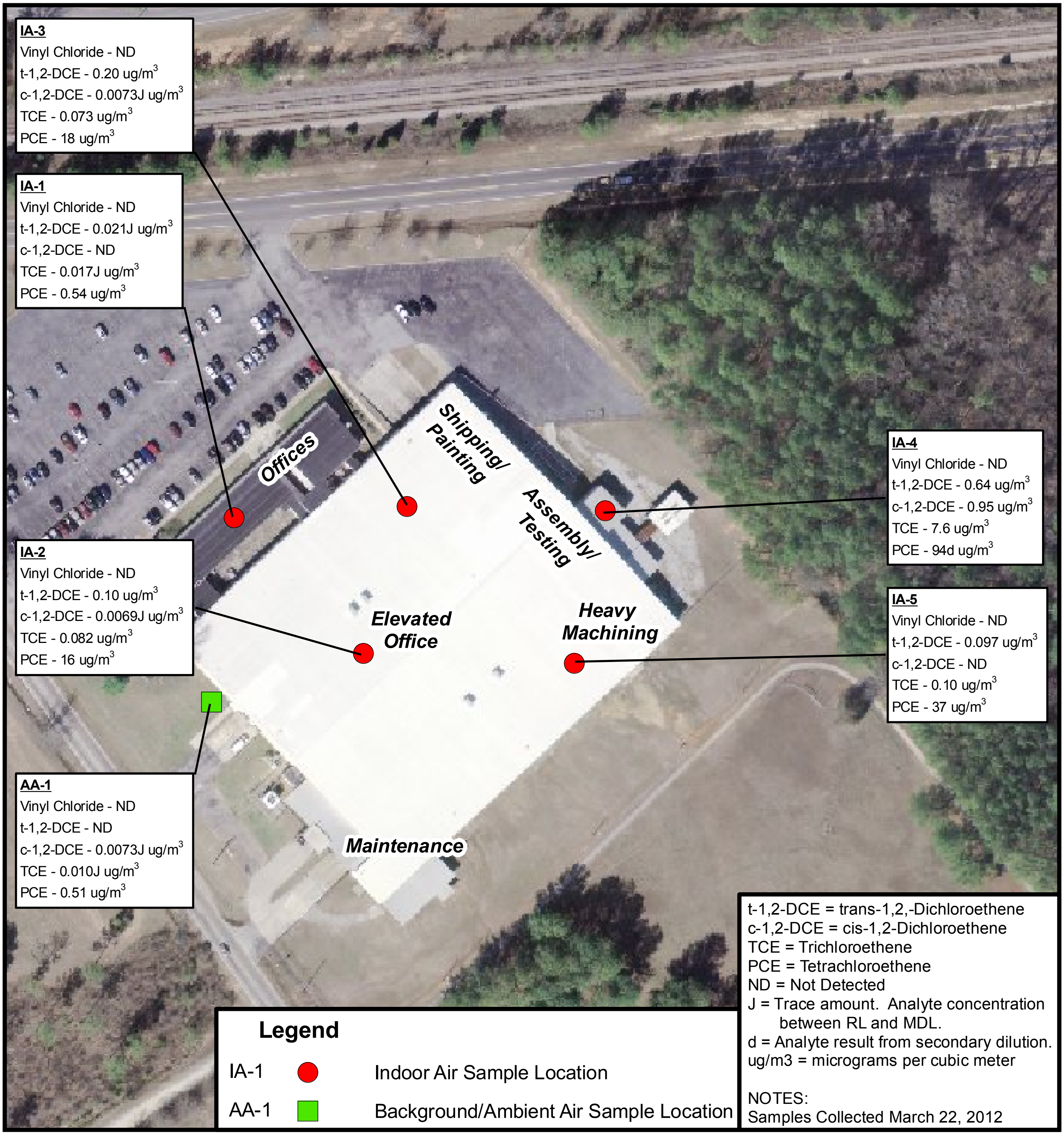
ITRON\MIP-Map_9-12.mxd
Job No. 33763353
Date: September, 2012

URS

Itron



t-1,2-DCE = trans-1,2,-Dichloroethene
c-1,2-DCE = cis-1,2-Dichloroethene
TCE = Trichloroethene
PCE = Tetrachloroethene
ND = Not Detected
J = Trace amount. Analyte concentration between RL and MDL.
d = Analyte result from secondary dilution.
ug/m3 = micrograms per cubic meter

NOTES:
Samples Collected March 22, 2012

Source: 2008 aerial photo from Greenwood County GIS.

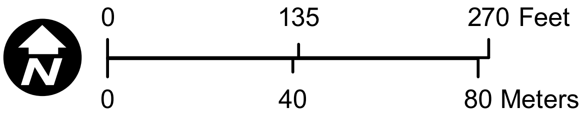


Figure 8

Job No. 33763353

Indoor Air Sample Results - Closed Door Scenario

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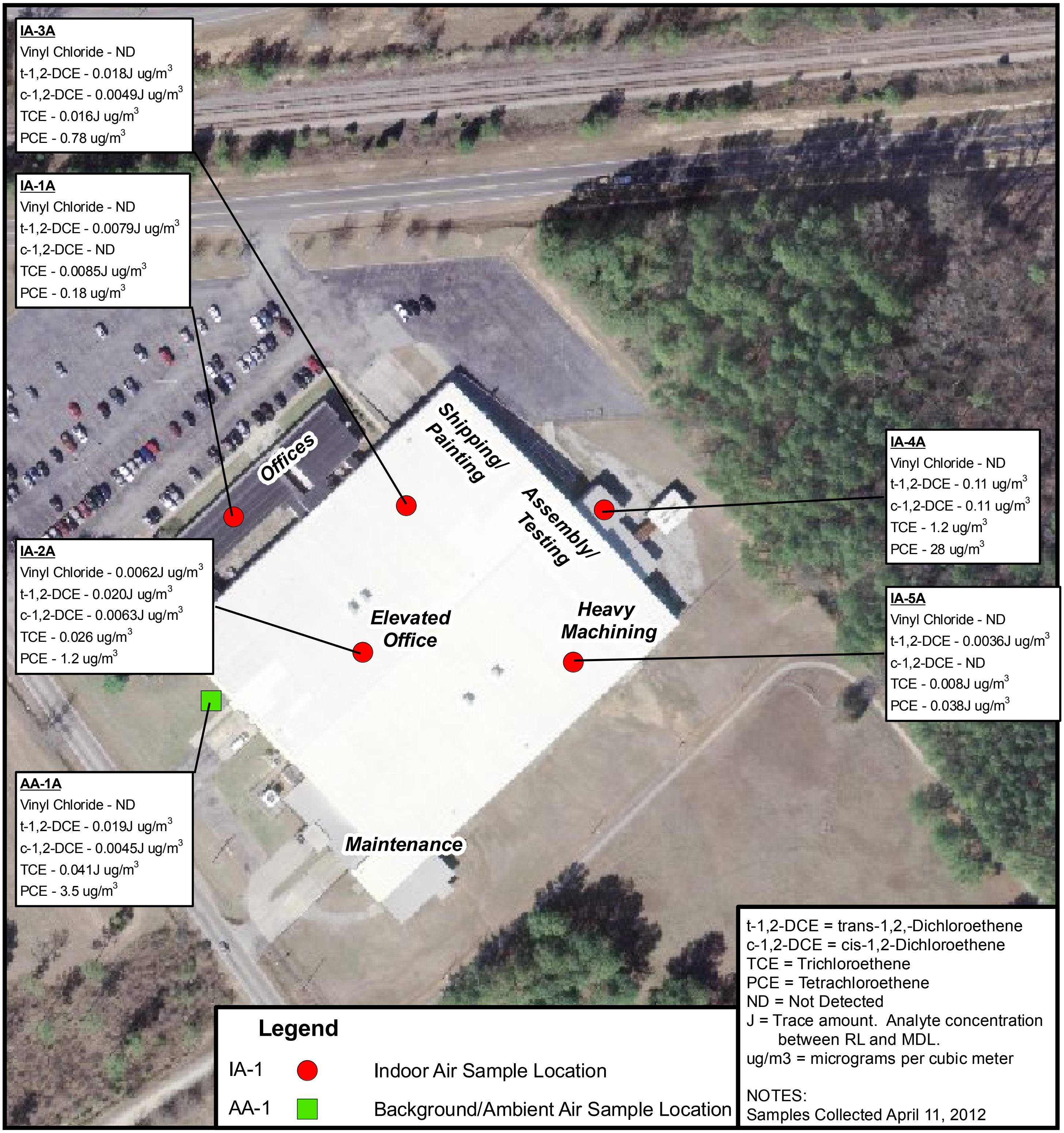
Itron, Inc.
Greenwood Facility
1310 Emerald Road
Greenwood, South Carolina



IA-3A
Vinyl Chloride - ND
t-1,2-DCE - 0.018J ug/m^3
c-1,2-DCE - 0.0049J ug/m^3
TCE - 0.016J ug/m^3
PCE - 0.78 ug/m^3

IA-1A
Vinyl Chloride - ND
t-1,2-DCE - 0.0079J ug/m^3
c-1,2-DCE - ND
TCE - 0.0085J ug/m^3
PCE - 0.18 ug/m^3

IA-2A
Vinyl Chloride - 0.0062J ug/m^3
t-1,2-DCE - 0.020J ug/m^3
c-1,2-DCE - 0.0063J ug/m^3
TCE - 0.026 ug/m^3
PCE - 1.2 ug/m^3

AA-1A
Vinyl Chloride - ND
t-1,2-DCE - 0.019J ug/m^3
c-1,2-DCE - 0.0045J ug/m^3
TCE - 0.041J ug/m^3
PCE - 3.5 ug/m^3

IA-4A
Vinyl Chloride - ND
t-1,2-DCE - 0.11 ug/m^3
c-1,2-DCE - 0.11 ug/m^3
TCE - 1.2 ug/m^3
PCE - 28 ug/m^3

IA-5A
Vinyl Chloride - ND
t-1,2-DCE - 0.0036J ug/m^3
c-1,2-DCE - ND
TCE - 0.008J ug/m^3
PCE - 0.038J ug/m^3

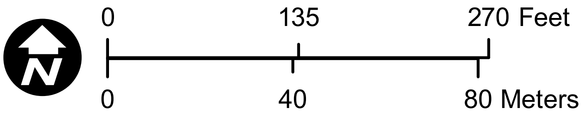
Legend

IA-1	🔴	Indoor Air Sample Location
AA-1	🟩	Background/Ambient Air Sample Location

t-1,2-DCE = trans-1,2,-Dichloroethene
c-1,2-DCE = cis-1,2-Dichloroethene
TCE = Trichloroethene
PCE = Tetrachloroethene
ND = Not Detected
J = Trace amount. Analyte concentration between RL and MDL.
ug/m3 = micrograms per cubic meter

NOTES:
Samples Collected April 11, 2012

Source: 2008 aerial photo from Greenwood County GIS.



Job No. 33763353

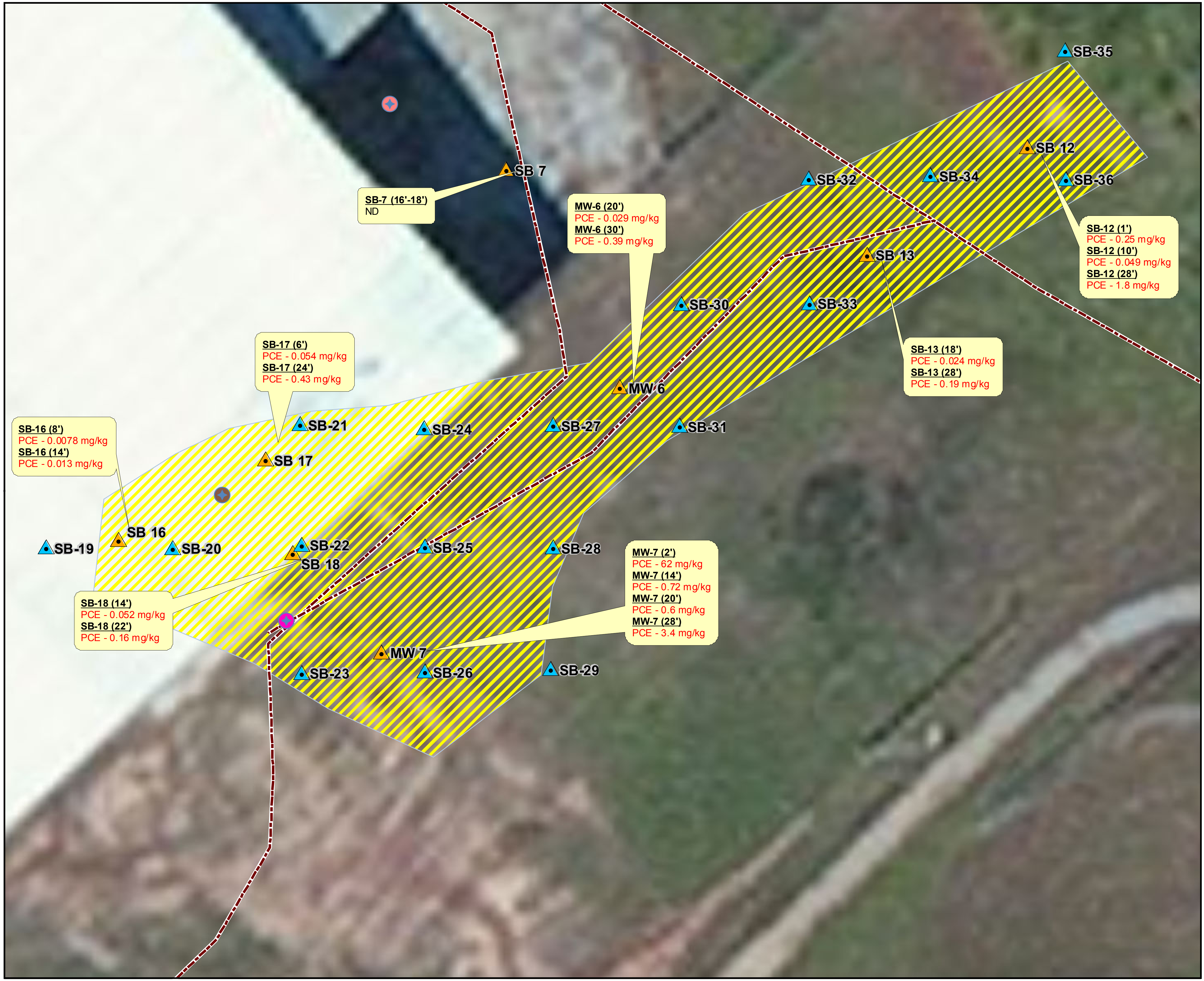
Figure 9

Indoor Air Sample Results - Open Door Scenario

URS

Itron, Inc.
Greenwood Facility
1310 Emerald Road
Greenwood, South Carolina

Figure 10-1
Proposed Soil Boring Location Map
(Steel Sump)



Legend

Soil Borings

- ▲ Existing
- ▲ Proposed

On-site Items

- ● Floor Sump
- ● Metal and Concrete Sump
- ● Sump Pit (for compressor room)
- ---- On-Site Drain Line
- ▨ Suspected Source Area

NOTES:
Proposed soil boring locations are for schematic purposes only. The soil investigation will begin in the suspected source area in a grid style pattern, as presented on this map. However, the actual number of boring locations will be determined based on analytical data provided by mobile laboratory in the field.

Soil borings will be designated begining with the next numeral in the numbering sequence (i.e., SB-19). Multiple samples from one boring location will be identified by depth [i.e., SB-19 (2-3')].

N

South Carolina State Plane, NAD 83
Zone 3900, International Feet
Aerial: 2012 from Bing

0 12 24
Feet

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Job No. 33763353
Date: November, 2012

URS Itron

Figure 10-2
Proposed Soil Boring Location Map (Cardboard Storage)

SB-5 (14'-16')
cis-1,2-DCE - 0.011 mg/kg
PCE - 0.037 mg/kg
SB-5 (18'-20')
cis-1,2-DCE - 0.02 mg/kg
PCE - 0.12 mg/kg

SB-9 (16'-18')
ND

SB-8 (10'-12')
ND

SB-3 (0'-2')
cis-1,2-DCE - 0.13 mg/kg
trans-1,2-DCE - 0.008 mg/kg
PCE - 5.4 mg/kg
TCE - 0.38 mg/kg
SB-3 (8'-10')
PCE - 6.8 mg/kg
TCE - 0.0075 mg/kg

SB-15 (8')
ND
SB-15 (24')
PCE - 7.3 mg/kg

SB-6 (4'-6')
PCE - 0.069 mg/kg
SB-6 (12'-14')
PCE - 0.024 mg/kg

SB-14 (1')
cis-1,2-DCE - 0.0087 mg/kg
PCE - 8.3 mg/kg
TCE - 0.067 mg/kg
SB-14 (14')
PCE - 0.27 mg/kg
SB-14 (22')
1,1,2-TCA - 0.023 mg/kg
PCE - 7.4 mg/kg
TCE - 0.013 mg/kg

Legend

Soil Borings

▲	Existing
△	Proposed

On-site Items

⊕	Abandoned Floor Drain
⊕	Sump Pit (for compressor room)
-·-·-	On-Site Drain Line
▨	Suspected Source Area

NOTES:
Proposed soil boring locations are for schematic purposes only. The soil investigation will begin in the suspected source area in a grid style pattern, as presented on this map. However, the actual number of boring locations will be determined based on analytical data provided by mobile laboratory in the field.

Soil borings will be designated begining with the next numeral in the numbering sequence (i.e., SB-19). Multiple samples from one boring location will be identified by depth [i.e., SB-19 (2-3')].

South Carolina State Plane, NAD 83
Zone 3900, International Feet
Aerial: 2012 from Bing

N

0 15 30
Feet

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PropSB_Fig10-2.mxd
Job No. 33763353
Date: November, 2012

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Figure 10-3
Proposed Soil Boring Location Map (UST/Gasoline Dispenser)

Legend

Soil Borings

▲	Existing
▲	Proposed

On-site Items

●	Abandoned Floor Drain
●	Sump Pit (for compressor room)
-·-·-·-	On-Site Drain Line
▨	Suspected Source Area

NOTES:
Proposed soil boring locations are for schematic purposes only. The soil investigation will begin in the suspected source area in a grid style pattern, as presented on this map. However, the actual number of boring locations will be determined based on analytical data provided by mobile laboratory in the field.

Soil borings will be designated begining with the next numeral in the numbering sequence (i.e., SB-19). Multiple samples from one boring location will be identified by depth [i.e., SB-19 (2-3')].

N

South Carolina State Plane, NAD 83
Zone 3900, International Feet
Aerial: 2012 from Bing

0 12 24 Feet

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PropSB_Fig10-3.mxd
Job No. 33763353
Date: November, 2012

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Figure 11
Proposed Monitoring Well Location Map

January 2012

GW-1
ND
GW-2
PCE - 280 ug/L
GW-3
PCE - 10,000 ug/L
GW-4
Xylenes - 16 ug/L
GW-5
PCE - 860 ug/L
Xylenes - 150 ug/L
GW-6
Benzene - 15 ug/L
Xylenes - 38 ug/L
GW-7
Benzene - 51 ug/L
Xylenes - 45 ug/L
GW-8
Benzene - 7.6 ug/L
PCE - 43 ug/L
Xylenes - 6.2 ug/L
GW-9
PCE - 470 ug/L

April 2012

MW-1
ND
MW-2
Benzene - 8.2 ug/L
MW-3
Benzene - 12 ug/L
cis-1,2-Dichloroethene - 280 ug/L
PCE - 50 ug/L
TCE - 43 ug/L
MW-4
TCE - 5.8 ug/L
MW-5
PCE - 3,900 ug/L
MW-6
PCE - 12,000 ug/L
MW-7
PCE - 7,000 ug/L
MW-8
PCE - 19,000 ug/L
MW-9
PCE - 10 ug/L
TCE - 54 ug/L
MW-10
PCE - 12,000 ug/L
MW-11
Bromoform - 5.3 ug/L
TCE - 5.2 ug/L

August 2012

MW-1
ND
MW-2
ND
MW-3
Benzene - 15.1 ug/L
cis-1,2-Dichloroethene - 389 ug/L
Xylenes - 41.5 ug/L
Isopropylbenzene - 19.5 ug/L
MW-4
ND
MW-5
PCE - 4,290 ug/L
MW-6
PCE - 14,400 ug/L
MW-7
PCE - 56,900 ug/L
MW-8
PCE - 25,200 ug/L
MW-9
ND
MW-10
PCE - 15,200 ug/L
MW-11
ND

NOTES:
ug/L = micrograms per liter
PCE = Tetrachloroethene
TCE = Trichloroethene
ND = Not Detected
Red highlighted text indicates concentrations above MCL
Samples Collected January 10 and 11, 2012, April 19, 2012 and August 23, 2012.

South Carolina State Plane, NAD 83
Zone 3900, International Feet
Aerial: 2012 from Bing

N

0 150 300
Feet

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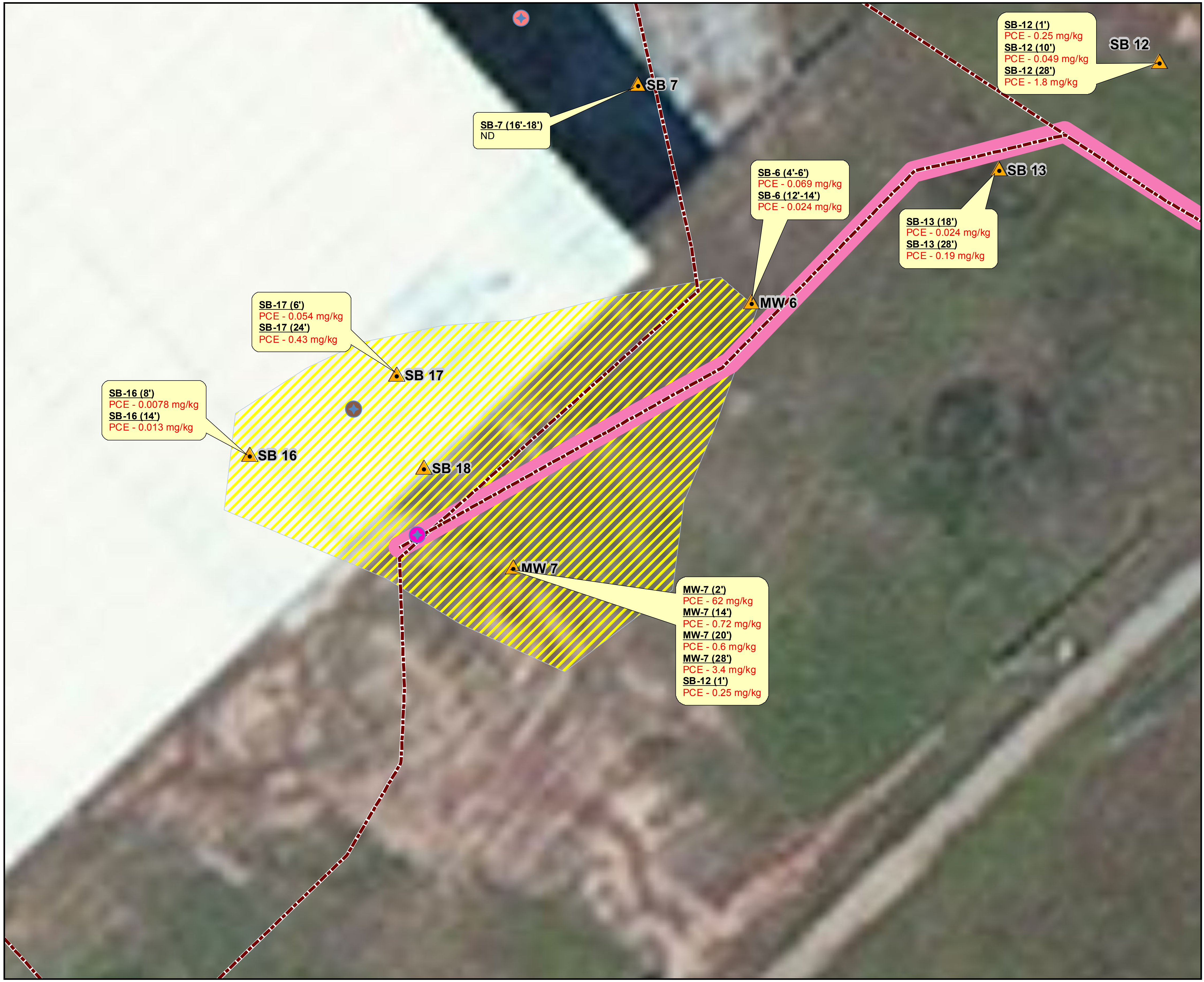
PropMW_Fig10_11.27.12.mxd
Job No. 33763353
Date: November, 2012

URS Itron

Figure 12
Drain Line Area



Legend

▲ Existing

On-site Items

● Floor Sump

● Metal and Concrete Sump

● Sump Pit (for compressor room)

-·-·- On-Site Drain Line

▬ DrainLineArea

▨ Suspected Source Area

NOTE:
To initiate the investigation of the drain line, the 4-inch diameter underground line will be breached beyond where it is currently plugged at the metal sump pit using a back hoe. Once opened, a video camera will be used to view the contents and any obstructions in the line.

This process will be continued until the outfall is located or the drain line cannot be traced any further.

South Carolina State Plane, NAD 83
Zone 3900, International Feet
Aerial: 2012 from Bing

N

0 15 30 Feet

File: N:Public Share\Itron\Graphic Files\
PropSB_Fig12_11.27.12.mxd
Job No. 33763353
Date: November, 2012

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Table 1
Soil Analytical Parameters
January 2012 and March 2012
Itron, Inc. - Greenwood, South Carolina

Soil Boring ID	Sample Date	Sample Depth (Feet bgs)	Soil Analytical Parameters	
			VOCs per EPA Method 8260	PAHs per EPA Method 8270
SB-1	1/10/2012	4 - 6	X	X
SB-1	1/10/2012	20 - 22	X	X
SB-2	1/10/2012	8 - 10	X	X
SB-2	1/10/2012	14 - 16	X	X
SB-3	1/11/2012	0 - 2	X	X
SB-3	1/11/2012	8 - 10	X	X
SB-4	1/11/2012	10 - 12	X	X
SB-4	1/11/2012	18 - 20	X	X
SB-5	1/11/2012	14 - 16	X	X
SB-5	1/11/2012	18 -20	X	X
SB-6	1/11/2012	4 - 6	X	X
SB-6	1/11/2012	12 - 14	X	X
SB-7	1/11/2012	16 - 18	X	X
SB-8	1/11/2012	10 - 12	X	X
SB-9	1/11/2012	16 - 18	X	X
SB-10	1/11/2012	2 - 4	X	X
SB-10	1/11/2012	14 - 16	X	X
SB-11	1/11/2012	0 - 2	X	X
SB-11	1/11/2012	6 - 8	X	X
MW-6	3/13/2012	20	X	
MW-6	3/13/2012	30	X	
MW-7	3/14/2012	2	X	
MW-7	3/14/2012	14	X	
MW-7	3/14/2012	20	X	
MW-7	3/14/2012	28	X	
SB-12	3/14/2012	1	X	
SB-12	3/14/2012	10	X	
SB-12	3/14/2012	28	X	
SB-13	3/14/2012	18	X	
SB-13	3/14/2012	28	X	
SB-14	3/14/2012	1	X	
SB-14	3/14/2012	14	X	
SB-14	3/14/2012	22	X	
SB-15	3/14/2012	8	X	
SB-15	3/14/2012	24	X	
SB-16	3/14/2012	8	X	
SB-16	3/14/2012	14	X	
SB-17	3/14/2012	6	X	
SB-17	3/14/2012	24	X	
SB-18	3/15/2012	14	X	
SB-18	3/15/2012	22	X	

Notes:
1. VOCs - Volatile Organic Compounds
2. PAHs - Polynuclear Aromatic Hydrocarbons
3. bgs - below ground surface.

Table 2
Groundwater Analytical Parameters
January 2012, April 2012 and August 2012
Itron, Inc. - Greenwood, South Carolina

Groundwater Sample Location	Sample Date	Screened Interval (Feet bgs)	Groundwater Analytical Parameters	
			VOCs per EPA Method 8260	PAHs per EPA Method 8270
GW-1	1/10/2012	28 - 32	X	X
GW-2	1/10/2012	32 - 36	X	X
GW-3	1/10/2012	32 - 36	X	X
GW-4	1/10/2012	34 - 38	X	
GW-5	1/11/2012	35 - 39	X	X
GW-6	1/11/2012	35 - 39	X	X
GW-7	1/11/2012	35 - 39	X	X
GW-8	1/11/2012	35 - 39	X	
GW-9	1/11/2012	35 - 39	X	X
MW-1	4/19/2012	21.5 - 31.5	X	
	8/23/2012			
MW-2	4/19/2012	24.8 - 34.8	X	
	8/23/2012			
MW-3	4/19/2012	37 - 47	X	
	8/23/2012			
MW-4	4/19/2012	36.8 - 46.8	X	
	8/23/2012			
MW-5	4/19/2012	37.9 - 47.9	X	
	8/23/2012			
MW-6	4/19/2012	28 - 38	X	
	8/23/2012			
MW-7	4/19/2012	27.4 - 37.4	X	
	8/23/2012			
MW-8	4/19/2012	45.6 - 55.6	X	
	8/23/2012			
MW-9	4/19/2012	42.3 - 52.3	X	
	8/23/2012			
MW-10	4/19/2012	25.1 - 35.1	X	
	8/23/2012			
MW-11	4/19/2012	30.4 - 40.4	X	
	8/23/2012			

Notes:
1. VOCs - Volatile Organic Compounds
2. PAHs - Polynuclear Aromatic Hydrocarbons
3. bgs - below ground surface

Table 3

Grab Groundwater Laboratory Analyses
Phase II ESA - January 2012

Itron, Inc.
Greenwood, South Carolina

Compounds	**MCLs**	**RBSLs**	**Temporary Monitoring Wells**								
			GW-1	**GW-2**	**GW-3**	**GW-4**	**GW-5**	**GW-6**	**GW-7**	**GW-8**	**GW-9**
			1/10/2012	1/10/2012	1/11/2012	1/11/2012	1/11/2012	1/11/2012	1/11/2012	1/11/2012	1/11/2012
Volatile Organic Compounds (EPA Method 8260)											
	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Acetone	NSL	NSL	<20	<20	<4,000	<20	<400	<20	<20	*23*	<200
Benzene	5	5	<5.0	<5.0	<1,000	<5.0	<100	**15**	**51**	**7.6**	<50
Bromoform	80	NSL	<5.0	<5.0	<1,000	<5.0	<100	<5.0	<5.0	<5.0	<50
cis -1,2-Dichloroethen	70	NSL	<5.0	<5.0	<1,000	<5.0	<100	<5.0	<5.0	<5.0	<50
Ethylbenzene	700	700	<5.0	<5.0	<1,000	<5.0	<100	<5.0	<5.0	<5.0	<50
Isopropylbenzene	NSL	NSL	<5.0	<5.0	<1,000	<5.0	<100	<5.0	<5.0	<5.0	<50
Styrene	100	NSL	<5.0	<5.0	<1,000	<5.0	<100	<5.0	<5.0	<5.0	<50
Xylenes (total)	10,000	10,000	<5.0	<5.0	<1,000	16	150	38	45	6.2	<50
2-Butanone (MEK)	NSL	NSL	<10	<10	<2,000	<10	<200	<10	<10	<10	<100
2-Hexanone	NSL	NSL	<10	<10	<2,000	<10	<200	<10	<10	<10	<100
4-Methyl-2-pentanone	NSL	NSL	<10	<10	<2,000	<10	<200	<10	<10	<10	<100
Tetrachloroethene	5	NSL	<5.0	**280**	**10,000**	<5.0	**860**	<5.0	<5.0	**43**	**470**
Trichloroethene	5	NSL	<5.0	<5.0	<1,000	<5.0	<100	<5.0	<5.0	<5.0	<50
Polynuclear Aromatic Hydrocarbons (EPA Method 8270)											
	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Acenaphthene	NSL	NSL	<5.2	<5.3	<5.2	NS	*7.4*	*7.3*	<5.1	NS	<6.2
Fluorene	NSL	NSL	<5.2	<5.3	<5.2	NS	*9*	*9.7*	<5.1	NS	<6.2
Naphthalene	NSL	25	<5.2	<5.3	<5.2	NS	**210**	**230**	**170**	NS	**27**
Phenanthrene	NSL	NSL	<5.2	<5.3	<5.2	NS	*11*	*11*	*5.1*	NS	<6.2

Notes:

1. Sample analysis performed by Shealy Environmental Services, Inc. of West Columbia, South Carolina.
2. MCL- Maximum Contaminant Level based on National Primary Drinking Water Standards.
3. RBSL - Risk Based Screening Level based on South Carolina Department of Health and Environmental Control (SCDHEC) Risk Based Corrective Action (RBCA).
4. NSL - No Standard Listed (No MCL and/or RBSL established for this compound).
5. ug/L - micrograms per liter.
6. Constituents not listed in this table, but analyzed as part of the analytical suite, were not detected above the reporting limit.
7. A bold value indicates a concentration which exceeds the MCL and/or the RBSL.
8. An italicized value indicates a detected concentration of a constituent that does not have a MCL or RBSL.
9. NS = Not Sampled (Insufficient volume of water produced from temporary monitoring wells).
10. All sampling points were temporary wells installed by Geoprobe® direct-push equipment.

Table 4

Soil Laboratory Analyses
Phase II ESA - January 2012

Itron, Inc.
Greenwood, South Carolina

Compounds	Industrial RSL	SSL - Protection of Groundwater	Resident RSL	RBSL	Soil Samples - Sample Depths in Feet									
					SB-1 (4-6')	**SB-1 (20-22')**	**SB-2 (8-10')**	**SB-2 (14-16')**	**SB-3 (0-2')**	**SB-3 (8-10')**	**SB-4 (10-12')**	**SB-4 (18-20')**	**SB-5 (14-16')**	**SB-5 (18-20')**
					1/10/2012	1/10/2012	1/10/2012	1/10/2012	1/10/2012	1/10/2012	1/10/2012	1/10/2012	1/11/2012	1/11/2012
Volatile Organic Compounds (EPA Method 8260)														
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Acetone	630,000	NE	61,000	NE	--	--	--	--	0.024	0.24	--	--	0.038	0.062
Benzene	5.4	0.0026	1.1	0.007	--	--	--	--	--	--	--	--	--	--
Bromoform	220	0.021	62	NE	--	--	--	--	--	--	--	--	--	--
cis -1,2-Dichloroethene	2,000	0.021	160	NE	--	--	--	--	**0.13**	--	--	--	0.011	0.02
trans -1,2-Dichloroethene	690	0.029	150	NE	--	--	--	--	0.008	--	--	--	--	--
1,1,2-Trichloroethane	5.3	0.0016	1.1	NE	--	--	--	--	--	--	--	--	--	--
Cyclohexane	29,000	NA	7,000	NE	--	--	--	--	--	--	--	--	0.022	0.048
Dibromochloromethane	3.3	0.021	0.68	NE	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	27	0.78	5.4	1.15	--	--	0.033	--	--	--	--	--	0.0071	0.014
Isopropylbenzene	NE	NE	NE	NE	--	--	*0.041*	--	--	--	--	--	*0.012*	*0.056*
Methylcyclohexane	NE	NE	NE	NE	--	--	--	--	--		--	--	*0.08*	*0.16*
Styrene	36,000	0.11	6,300	NE	--	--	--	--	--	--	--	--	--	--
Xylenes (total)	2,700	9.8	630	14.5	--	--	0.16	0.011	--	--	--	--	0.055	0.11
2-Butanone (MEK)	200,000	NE	28,000	NE	--	--	--	--	--	0.082	--	--	0.012	0.022
2-Hexanone	1,400	NE	210	NE	--	--	0.032	--	--	0.016	--	--	--	0.51
4-Methyl-2-pentanone	53,000	NE	5,300	NE	--	--	--	--	--	--	--	--	--	--
Toluene	45,000	0.69	5,000	1.45	--	--	--	--	--	--	--	--	--	0.0069
Tetrachloroethene	110	0.0023	22	NE	--	--	--	--	**5.4**	**6.8**	--	--	**0.037**	**0.12**
Trichloroethene	6.4	0.0018	0.91	NE	--	--	--	--	**0.38**	**0.0075**	--	--	--	--
Polynuclear Aromatic Hydrocarbons (EPA Method 8270)														
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Acenaphthene	33,000	NE	3,400	NE	--	--	2.9	1.9	--	--	--	--	--	--
Anthracene	170,000	NE	17,000	NE	--	--	0.86	0.52	--	--	--	--	--	--
Fluoranthene	22,000	NE	2,300	NE	--	--	0.44	--	--	--	--	--	--	--
Fluorene	22,000	NE	2,300	NE	--	--	4.2	2.6	--	--	--	--	--	--
Naphthalene	18	NE	3.6	0.036	--	--	**8.5**	**5.3**	--	--	--	--	--	--
Phenathrene	NE	NE	NE	NE	--	--	15	7.4	--	--	--	--	--	--
Pyrene	17,000	NE	1,700	NE	--	--	0.82	0.63	--	--	--	--	--	--

Notes:

1. Sample analysis performed by Shealy Environmental Services, Inc. of West Columbia, South Carolina.
2. -- compound not detected in sample.
3. RSL - Regional Screening Level.
4. SSL - Soil Screening Level - MCL-based for Protection of Groundwater.
5. RSLs and SSLs are established by Environmental Protection Agency (EPA).
6. RBSL - Risk Based Screening Level based on South Carolina Department of Health and Environmental Control (SCDHEC) Risk Based Corrective Action (RBCA).
7. mg/kg - milligrams per kilogram.
8. Constituents not listed in this table, but analyzed as part of the analytical suite, were not detected above the reporting limit.
9. A bold value indicates a concentration which exceeds the RSL, SSL and/or RBSL.
10. NE = None Established.
11. An italicized value indicates detected value with no established RSL, SSL or RBSL.

Table 4

Soil Laboratory Analyses
Phase II ESA - January 2012

Itron, Inc.
Greenwood, South Carolina

Compounds	**Industrial RSL**	**SSL - Protection of Groundwater**	**Resident RSL**	**RBSL**	**Soil Samples - Sample Depths in Feet**								
					SB-6 (4-6')	**SB-6 (12-14')**	**SB-7 (16-18')**	**SB-8 (10-12')**	**SB-9 (16-18')**	**SB-10 (2-4')**	**SB-10 (14-16')**	**SB-11 (0-2')**	**SB-11 (6-8')**
					1/11/2012	1/11/2012	1/11/2012	1/11/2012	1/11/2012	1/11/2012	1/11/2012	1/11/2012	1/11/2012
Volatile Organic Compounds (EPA Method 8260)													
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Acetone	630,000	NE	61,000	NE	--	--	--	--	--	--	--	--	0.027
Benzene	5.4	0.0026	1.1	0.007	--	--	--	--	--	--	--	--	--
Bromoform	220	0.021	62	NE	--	--	--	--	--	--	--	--	--
cis -1,2-Dichloroethene	2,000	0.021	160	NE	--	--	--	--	--	--	--	--	--
trans -1,2-Dichloroethene	690	0.029	150	NE	--	--	--	--	--	--	--	--	--
1,1,2-Trichloroethane	5.3	0.0016	1.1	NE	--	--	--	--	--	--	--	--	--
Cyclohexane	29,000	NE	7,000	NE	--	--	--	--	--	--	--	--	--
Dibromochloromethane	3.3	0.021	0.68	NE	--	--	--	--	--	--	--	--	--
Ethylbenzene	27	0.78	5.4	1.15	--	--	--	--	--	--	--	--	--
Isopropylbenzene	NE	NE	NE	NE	--	--	--	--	--	--	--	--	--
Methylcyclohexane	NE	NE	NE	NE	--	--	--	--	--	--	--	--	
Styrene	36,000	0.11	6,300	NE	--	--	--	--	--	--	--	--	--
Xylenes (total)	2,700	9.8	630	14.5	--	--	--	--	--	--	--	--	--
2-Butanone (MEK)	200,000	NE	28,000	NE	--	--	--	--	--	--	--	--	--
2-Hexanone	1,400	NE	210	NE	--	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone	53,000	NE	5,300	NE	--	--	--	--	--	--	--	--	--
Toluene	45,000	0.69	5,000	1.45	--	--	--	--	--	--	--	--	--
Tetrachloroethene	110	0.0023	22	NE	**0.069**	**0.024**	--	--	--	--	--	--	--
Trichloroethene	6.4	0.0018	0.91	NE	--	--	--	--	--	--	--	--	--
Polynuclear Aromatic Hydrocarbons (EPA Method 8270)													
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Acenaphthene	33,000	NE	3,400	NE	--	--	--	--	--	--	--	--	--
Anthracene	170,000	NE	17,000	NE	--	--	--	--	--	--	--	--	--
Fluoranthene	22,000	NE	2,300	NE	--	--	--	--	--	--	--	--	--
Fluorene	22,000	NE	2,300	NE	--	--	--	--	--	--	--	--	--
Naphthalene	18	NE	3.6	0.036	--	--	--	--	--	--	--	--	--
Phenathrene	NE	NE	NE	NE	--	--	--	--	--	--	--	--	--
Pyrene	17,000	NE	1,700	NE	--	--	--	--	--	--	--	--	--

Notes:

1. Sample analysis performed by Shealy Environmental Services, Inc. of West Columbia, South Carolina.
2. -- compound not detected in sample.
3. RSL - Regional Screening Level.
4. SSL - Soil Screening Level - MCL-based for Protection of Groundwater.
5. RSLs and SSLs are established by Environmental Protection Agency (EPA).
6. RBSL - Risk Based Screening Level based on South Carolina Department of Health and Environmental Control (SCDHEC) Risk Based Corrective Action (RBCA).
7. mg/kg - milligrams per kilogram.
8. Constituents not listed in this table, but analyzed as part of the analytical suite, were not detected above the reporting limit.
9. A bold value indicates a concentration which exceeds the RSL, SSL and/or RBSL.
10. NE = None Established.
11. An italicized value indicates detected value with no established RSL, SSL or RBSL.

Table 5

Soil Laboratory Analyses
Soil Site Assessment - March 2012

Itron, Inc.
Greenwood, South Carolina

Compounds	**Industrial RSL**	**SSL - Protection of Groundwater**	**Resident RSL**	**RBSL**	**Soil Samples - Sample Depths in Feet**											
					MW-1 (20')	**MW-6 (20')**	**MW-6 (30')**	**MW-7 (2')**	**MW-7 (14')**	**MW-7 (20')**	**MW-7 (28')**	**MW-9 (30')**	**SB-12 (1')**	**SB-12 (10')**	**SB-12 (28')**	**SB-13 (18')**
					3/13/2012	3/13/2012	3/13/2012	3/14/2012	3/14/2012	3/14/2012	3/14/2012	3/13/2012	3/14/2012	3/14/2012	3/14/2012	3/14/2012
Volatile Organic Compounds (EPA Method 8260)																
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Acetone	630,000	NE	61,000	NE	--	--	--	--	--	--	--	--	--	--	--	--
Benzene	5.4	0.0026	1.1	0.007	--	--	--	--	--	--	--	--	--	--	--	--
Bromoform	220	0.021	62	NE	--	--	--	--	--	--	--	--	--	--	--	--
cis -1,2-Dichloroethene	2,000	0.021	160	NE	--	--	--	--	--	--	--	--	--	--	--	--
trans -1,2-Dichloroethene	690	0.029	150	NE	--	--	--	--	--	--	--	--	--	--	--	--
1,1,2-Trichloroethane	5.3	0.0016	1.1	NE	--	--	--	--	--	--	--	--	--	--	--	--
Cyclohexane	29,000	NE	7,000	NE	--	--	--	--	--	--	--	--	--	--	--	--
Dibromochloromethane	3.3	0.021	0.68	NE	--	--	--	--	--	**0.98**	--	--	--	--	--	--
Ethylbenzene	27	0.78	5.4	1.15	--	--	--	--	--	--	--	--	--	--	--	--
Isopropylbenzene	NE	NE	NE	NE	--	--	--	--	--	--	--	--	--	--	--	--
Methylcyclohexane	NE	NE	NE	NE	--	--	--	--	--	--		--	--	--	--	--
Styrene	36,000	0.11	6,300	NE	--	--	--	--	--	--	--	--	--	--	--	--
Xylenes (total)	2,700	9.8	630	14.5	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone (MEK)	200,000	NE	28,000	NE	--	--	--	--	--	--	--	--	--	--	--	--
2-Hexanone	1,400	NE	210	NE	--	--	--	--	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone	53,000	NE	5,300	NE	--	--	--	--	--	--	--	--	--	--	--	--
Toluene	45,000	0.69	5,000	1.45	--	--	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene	110	0.0023	22	NE	--	**0.029**	**0.39**	**62**	**0.72**	**0.6**	**3.4**	--	**0.25**	**0.049**	**1.8**	**0.024**
Trichloroethene	6.4	0.0018	0.91	NE	--	--	--	--	--	--	--	--	--	--	--	--
Polynuclear Aromatic Hydrocarbons (EPA Method 8270)																
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Acenaphthene	33,000	NE	3,400	NE	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Anthracene	170,000	NE	17,000	NE	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Fluoranthene	22,000	NE	2,300	NE	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Fluorene	22,000	NE	2,300	NE	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Naphthalene	18	NE	3.6	0.036	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Phenathrene	NE	NE	NE	NE	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Pyrene	17,000	NE	1,700	NE	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Notes:

1. Sample analysis performed by Shealy Environmental Services, Inc. of West Columbia, South Carolina.
2. -- compound not detected in sample.
3. RSL - Regional Screening Level.
4. SSL - Soil Screening Level - MCL-based for Protection of Groundwater.
5. RSLs and SSLs are established by Environmental Protection Agency (EPA).
6. RBSL - Risk Based Screening Level based on South Carolina Department of Health and Environmental Control (SCDHEC) Risk Based Corrective Action (RBCA).
7. mg/kg - milligrams per kilogram.
8. Constituents not listed in this table, but analyzed as part of the analytical suite, were not detected above the reporting limit.
9. A bold value indicates a concentration which exceeds the RSL, SSL and/or RBSL.
10. NE = None Established.
11. An italicized value indicates detected value with no established RSL, SSL or RBSL.
12. NS = Not Sampled

Table 5

Soil Laboratory Analyses
Soil Site Assessment - March 2012
Itron, Inc.
Greenwood, South Carolina

Compounds	**Industrial RSL**	**SSL - Protection of Groundwater**	**Resident RSL**	**RBSL**	**Soil Samples - Sample Depths in Feet**											
					SB-13 (28')	**SB-14 (1')**	**SB-14 (14')**	**SB-14 (22')**	**SB-15 (8')**	**SB-15 (24')**	**SB-16 (8')**	**SB-16 (14')**	**SB-17 (6')**	**SB-17 (24')**	**SB-18 (14')**	**SB-18 (22')**
					3/14/2012	3/14/2012	3/14/2012	3/14/2012	3/14/2012	3/14/2012	3/14/2012	3/14/2012	3/14/2012	3/14/2012	3/15/2012	3/15/2012
Volatile Organic Compounds (EPA Method 8260)																
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Acetone	630,000	NE	61,000	NE	--	--	--	0.036	--	--	--	--	--	--	--	--
Benzene	5.4	0.0026	1.1	0.007	--	--	--	--	--	--	--	--	--	--	--	--
Bromoform	220	0.021	62	NE	--	--	--	--	--	--	--	--	--	--	--	--
cis -1,2-Dichloroethene	2,000	0.021	160	NE	--	0.0087	--	--	--	--	--	--	--	--	--	--
trans -1,2-Dichloroethene	690	0.029	150	NE	--	--	--	--	--	--	--	--	--	--	--	--
1,1,2-Trichloroethane	5.3	0.0016	1.1	NE	--	--	--	**0.023**	--	--	--	--	--	--	--	--
Cyclohexane	29,000	NE	7,000	NE	--	--	--	--	--	--	--	--	--	--	--	--
Dibromochloromethane	3.3	0.021	0.68	NE	--	--	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	27	0.78	5.4	1.15	--	--	--	--	--	0.022	--	--	--	--	--	--
Isopropylbenzene	NE	NE	NE	NE	--	--	--	--	--	0.18	--	--	--	--	--	--
Methylcyclohexane	NE	NE	NE	NE	--	--	--	0.012	--	0.0076		--	--	--	--	--
Styrene	36,000	0.11	6,300	NE	--	--	--	--	--	--	--	--	--	--	--	--
Xylenes (total)	2,700	9.8	630	14.5	--	--	--	0.018	--	0.33	--	--	--	--	--	--
2-Butanone (MEK)	200,000	NE	28,000	NE	--	--	--	0.013	--	--	--	--	--	--	--	--
2-Hexanone	1,400	NE	210	NE	--	--	--	0.012	--	0.25	--	--	--	--	--	--
4-Methyl-2-pentanone	53,000	NE	5,300	NE	--	--	--	--	--	--	--	--	--	--	--	--
Toluene	45,000	0.69	5,000	1.45	--	--	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene	110	0.0023	22	NE	**0.19**	**8.3**	**0.27**	**7.4**	--	**7.3**	**0.0078**	**0.013**	**0.054**	**0.43**	**0.052**	**0.16**
Trichloroethene	6.4	0.0018	0.91	NE	--	**0.067**	--	**0.013**	--	--	--	--	--	--	--	--
Polynuclear Aromatic Hydrocarbons (EPA Method 8270)																
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Acenaphthene	33,000	NE	3,400	NE	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Anthracene	170,000	NE	17,000	NE	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Fluoranthene	22,000	NE	2,300	NE	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Fluorene	22,000	NE	2,300	NE	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Naphthalene	18	NE	3.6	0.036	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Phenathrene	NE	NE	NE	NE	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Pyrene	17,000	NE	1,700	NE	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Notes:

1. Sample analysis performed by Shealy Environmental Services, Inc. of West Columbia, South Carolina.
2. -- compound not detected in sample.
3. RSL - Regional Screening Level.
4. SSL - Soil Screening Level - MCL-based for Protection of Groundwater.
5. RSLs and SSLs are established by Environmental Protection Agency (EPA).
6. RBSL - Risk Based Screening Level based on South Carolina Department of Health and Environmental Control (SCDHEC) Risk Based Corrective Action (RBCA).
7. mg/kg - milligrams per kilogram.
8. Constituents not listed in this table, but analyzed as part of the analytical suite, were not detected above the reporting limit.
9. A bold value indicates a concentration which exceeds the RSL, SSL and/or RBSL.
10. NE = None Established.
11. An italicized value indicates detected value with no established RSL, SSL or RBSL.
12. NS = Not Sampled

Table 6

Monitoring Well Groundwater Laboratory Analyses
April 2012 and August 2012

Itron, Inc.
Greenwood, South Carolina

Compounds	**MCLs**	**RBSLs**	**Monitoring Wells**																	
			MW-1		**MW-2**		**MW-3**		**MW-4**		**MW-5**		**MW-6**		**MW-7**		**MW-8**		**MW-9**	
			4/19/2012	8/23/2012	4/19/2012	8/23/2012	4/19/2012	8/23/2012	4/19/2012	8/23/2012	4/19/2012	8/23/2012	4/19/2012	8/23/2012	4/19/2012	8/23/2012	4/19/2012	8/23/2012	4/19/2012	8/23/2012
Volatile Organic Compounds (EPA Method 8260)																				
	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Acetone	NSL	NSL	<20	<20	<20	<20	*62*	<40	<20	<20	<400	<800	<4,000	<2,000	<2,000	<16,000	<8,000	<4,000	<20	<20
Benzene	5	5	<5.0	<5.0	**8.2**	<5.0	**12**	**15.1**	<5.0	<5.0	<100	<200	<1,000	<500	<500	<4,000	<2,000	<1,000	<5.0	<5.0
Bromoform	80	NSL	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<100	<200	<1,000	<500	<500	<4,000	<2,000	<1,000	<5.0	<5.0
cis-1,2-Dichloroethene	70	NSL	<5.0	<5.0	<5.0	<5.0	**280**	**389**	<5.0	<5.0	<100	<200	<1,000	<500	<500	<4,000	<2,000	<1,000	<5.0	<5.0
Ethylbenzene	700	700	<5.0	<5.0	<5.0	<5.0	11	<5.0	<5.0	<5.0	<100	<200	<1,000	<500	<500	<4,000	<2,000	<1,000	<5.0	<5.0
Isopropylbenzene	NSL	NSL	<5.0	<5.0	<5.0	<5.0	*9.5*	*19.5*	<5.0	<5.0	<100	<200	<1,000	<500	<500	<4,000	<2,000	<1,000	<5.0	<5.0
Styrene	100	NSL	<5.0	<5.0	<5.0	<5.0	14	<5.0	<5.0	<5.0	<100	<200	<1,000	<500	<500	<4,000	<2,000	<1,000	<5.0	<5.0
Xylenes (total)	10,000	10,000	<5.0	<5.0	10	<5.0	41	41.5	<5.0	<5.0	<100	<200	<1,000	<500	<500	<4,000	<2,000	<1,000	<5.0	<5.0
2-Butanone (MEK)	NSL	NSL	<10.0	<10.0	<10.0	<10.0	*30*	<20.0	<10.0	<10.0	<200	<400	<2,000	<1,000	<1,000	<8,000	<4,000	<2,000	<10.0	<10.0
2-Hexanone	NSL	NSL	<10.0	<10.0	<10.0	<10.0	*11*	<20.0	<10.0	<10.0	<200	<400	<2,000	<1,000	<1,000	<8,000	<4,000	<2,000	<10.0	<10.0
4-Methyl-2-pentanone	NSL	NSL	<10.0	<10.0	<10.0	<10.0	*10*	<20.0	<10.0	<10.0	<200	<400	<2,000	<1,000	<1,000	<8,000	<4,000	<2,000	<10.0	<10.0
Tetrachloroethene	5	NSL	<5.0	<5.0	<5.0	<5.0	**50**	<10.0	<5.0	<5.0	**3,900**	**4,290**	**12,000**	**14,400**	**7,000**	**56,900**	**19,000**	**25,200**	**10**	<5.0
Trichloroethene	5	NSL	<5.0	<5.0	<5.0	<5.0	**43**	<10.0	**5.8**	<5.0	<100	<200	<1,000	<500	<500	<4,000	<2,000	<1,000	**54**	<5.0

Compounds	**MCLs**	**RBSLs**	**Monitoring Wells**			
			MW-10		**MW-11**	
			4/19/2012	8/23/2012	4/19/2012	8/23/2012
Volatile Organic Compounds (EPA Method 8260)						
	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Acetone	NSL	NSL	<2,000	<2,000	<20	<20
Benzene	5	5	<500	<500	<5.0	<5.0
Bromoform	80	NSL	<500	<500	5.3	<5.0
cis-1,2-Dichloroethene	70	NSL	<500	<500	<5.0	<5.0
Ethylbenzene	700	700	<500	<500	<5.0	<5.0
Isopropylbenzene	NSL	NSL	<500	<500	<5.0	<5.0
Styrene	100	NSL	<500	<500	<5.0	<5.0
Xylenes (total)	10,000	10,000	<500	<500	<5.0	<5.0
2-Butanone (MEK)	NSL	NSL	<1,000	<1,000	<10.0	<10.0
2-Hexanone	NSL	NSL	<1,000	<1,000	<10.0	<10.0
4-Methyl-2-pentanone	NSL	NSL	<1,000	<1,000	<10.0	<10.0
Tetrachloroethene	5	NSL	**12,000**	**15,200**	<5.0	<5.0
Trichloroethene	5	NSL	<500	<500	**5.2**	<5.0

Notes:

1. Sample analysis performed by Shealy Environmental Services, Inc. of West Columbia, South Carolina (April 2012) and Gulf Coast Analytical Laboratories, Inc. of Baton Rouge, Louisiana (August 2012).
2. -- compound not detected in sample.
3. MCL- Maximum Contaminant Level based on National Primary Drinking Water Standards.
4. RBSL - Risk Based Screening Level based on South Carolina Department of Health and Environmental Control (SCDHEC) Risk Based Corrective Action (RBCA).
5. NSL - No Standard Listed (No MCL and/or RBSL established for this compound).
6. ug/L - micrograms per liter.
7. Constituents not listed in this table, but analyzed as part of the analytical suite, were not detected above the reporting limit.
8. A bold value indicates a concentration which exceeds the MCL and/or RBSL.
9. An italicized value indicates a detected concentration of a constituent that does not have a MCL and/or RBSL.
10. National Secondary Drinking Water Regulations (NSDWRs or secondary standards) are non-enforceable guidelines regulating contaminants. EPA recommends secondary standards to water systems but does not require systems to comply.

Table 7
Groundwater Monitoring Well Construction Details and Elevations
April 2012 and August 2012

Itron, Inc.
Greenwood, South Carolina

Monitoring Well	Well Diameter	Depth of Well	Screen Length	Screen Interval	Top of Well Casing Elevation	Screen Interval Elevation	4/19/2012			8/23/2012			Coordinates	
							Depth to Water	Depth to Product	Groundwater Elevation	Depth to Water	Depth to Product	Groundwater Elevation		
	inches	feet bgs	feet	feet bgs	feet above msl	feet above msl	feet below toc	feet below toc	feet above msl	feet below toc	feet below toc	feet above msl	Northing	Easting
MW-1	2	31.5	10	21.5 - 31.5	557.74	526.24 - 536.24	26.06	--	531.68	26.88	--	530.86	869224.644	1667988.237
MW-2	2	34.8	10	24.8 - 34.8	562.30	527.49 - 537.49	32.62	--	529.68	33.42	--	528.88	869207.038	1668204.679
MW-3	2	47.0	10	37.0 - 47.0	561.84	514.84 - 524.84	34.23	--	527.61	32.43	--	529.41	869104.002	1668261.237
MW-4	2	46.8	10	36.8 - 46.8	555.13	508.33 - 518.33	28.93	--	526.20	30.50	--	524.63	868958.364	1668477.977
MW-5	2	47.9	10	37.9 - 47.9	549.12	501.22 - 511.22	27.11	--	522.01	29.12	--	520.00	868892.212	1668553.549
MW-6	2	38.0	10	28.0 - 38.0	559.43	521.43 - 526.43	28.52	--	530.91	29.45	--	529.98	868936.457	1668319.405
MW-7	2	37.4	10	27.4 - 37.4	560.33	522.93 - 532.93	28.96	--	531.37	29.89	--	530.44	868894.361	1668279.797
MW-8	2	55.6	10	45.6 - 55.6	557.19	501.59 - 511.59	30.37	--	526.82	31.94	--	525.25	868870.317	1668410.386
MW-9	2	52.3	10	42.3 - 52.3	553.65	501.35 - 511.35	39.10	--	514.55	39.51	--	514.14	868681.764	1668650.676
MW-10	1	35.1	10	25.1 - 35.1	551.07	515.97 - 520.97	27.56	--	523.51	30.60	--	520.47	868593.655	1668484.530
MW-11	2	40.4	10	30.4 - 40.4	560.17	519.77- 529.77	28.23	--	531.94	29.82	--	530.35	868712.965	1668117.285

Notes:
1. bgs = below ground surface
2. msl = mean sea level
3. toc = top of casing

APPENDIX A

MIP Investigation Report

Membrane Interface Probe Investigation Report

Itron Inc.
1310 Emerald Road
Greenwood, South Carolina

Prepared for:

URS Corporation
128 Millport Circle, Suite 100
Greenville, South Carolina 29607

Prepared by:

Vironex, Inc.
4961 Telsa Drive, Suite E
Bowie, Maryland 20715

March 1, 2012

Project Summary

Project Name: Itron Inc.

Project Dates: February20th and 23rd, 2012

Equipment/Manpower: Vironex mobilized one (1) custom Membrane Interface Probe (MIP) System, one direct push technology unit, and two team members to the project site.

Contaminant(s) of Concern: Volatile Organic Compounds (VOCs)

Project Summary: Vironex advanced 13 direct push MIP borings from the ground surface to between approximately 25 and 63 feet below ground surface (bgs). For the purposes of this project, the MIP system was equipped with an electron capture detector (ECD), halogen-specific detector (XSD), photo-ionization detector (PID), and flame-ionization detector (FID). During the advancement of each boring, the response of each detector, relative to depth, was recorded in accordance with the standard operating procedures for the MIP system. Additionally, the electrical conductivity of soil, relative to depth, was collected during each MIP boring to provide a relative indication of soil types across the boring interval. The MIP boring logs are presented in Appendix A and B. The detector response scales for boring logs in Appendix A are automatically chosen based on the highest response during each boring. The detector response scales for boring logs in Appendix B are set to a common scaled based on the highest detector response observed across all boring at the site. Notes related to specifics of each individual MIP boring are provided in Appendix C. Additional information regarding the principals and procedures associated with the MIP system is presented in Appendix D.

Quality Assurance/Quality Control: In order to maintain quality assurance and quality control standards during the course of the project, a response test was completed before and after each MIP boring (additional details regarding response testing are provided in Appendix D). The response test indicates that the MIP system is operating properly, and therefore, may be advanced into the subsurface. All response testing conducted during the project were within the applicable Geoprobe guidelines. Additionally, the internal carrier gas pressure of the system and MIP temperature were monitored during the advancement of each MIP boring to ensure the system was functioning properly.

Appendix A – MIP Boring Logs (Auto-Scale)

VIRONEX

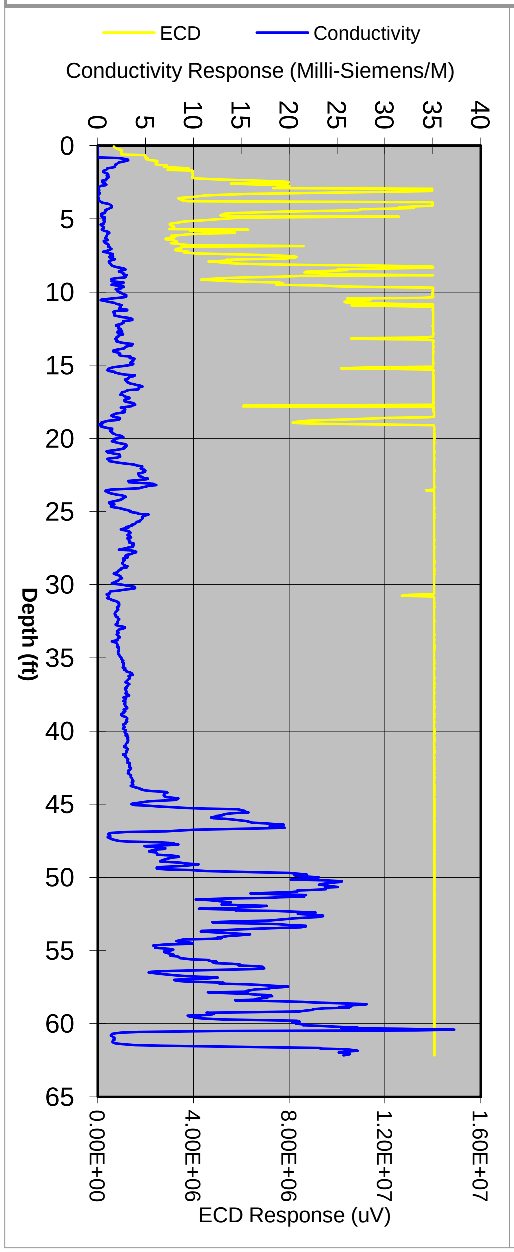
4961 Telsa Drive
Suite E
Bowie, MD 20715
P:301-352-6642
F:301-352-6643
www.vironex.com

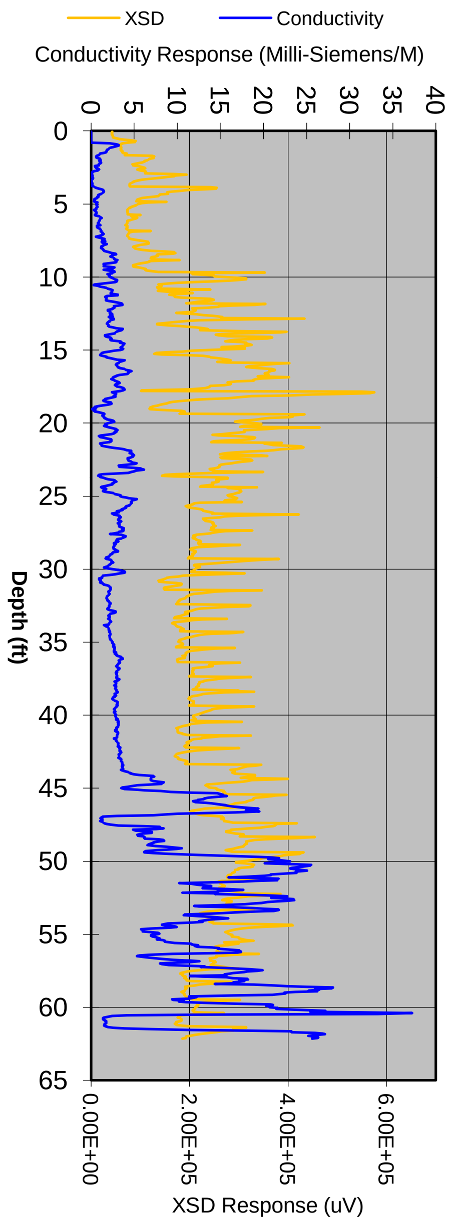
Boring Name: MIP01 Total Depth (ft): 62.15

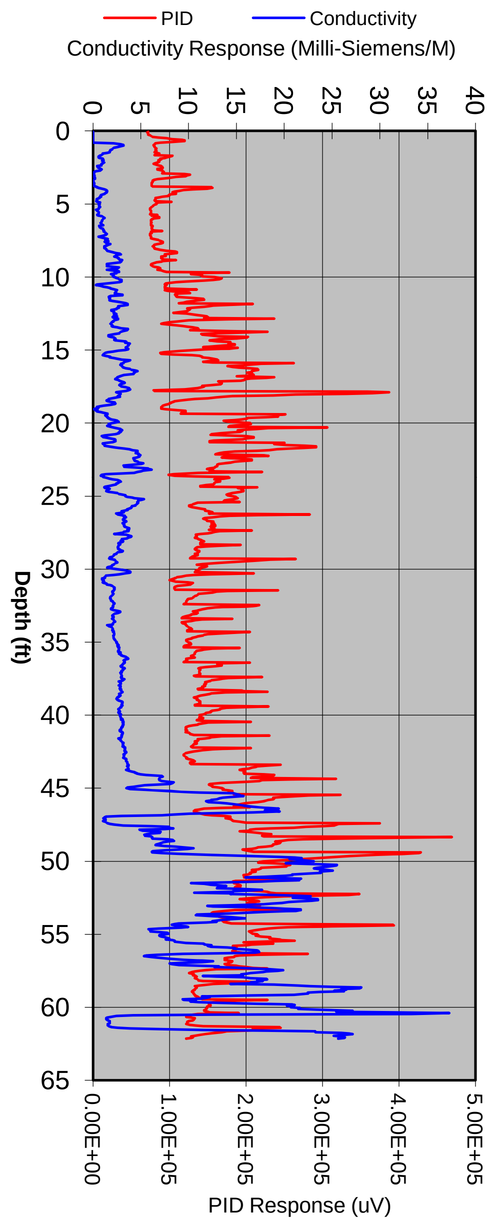
Notes:
New membrane. Heater failed at 18.80 feet bgs. Retracted tooling, repaired, and continued boring.

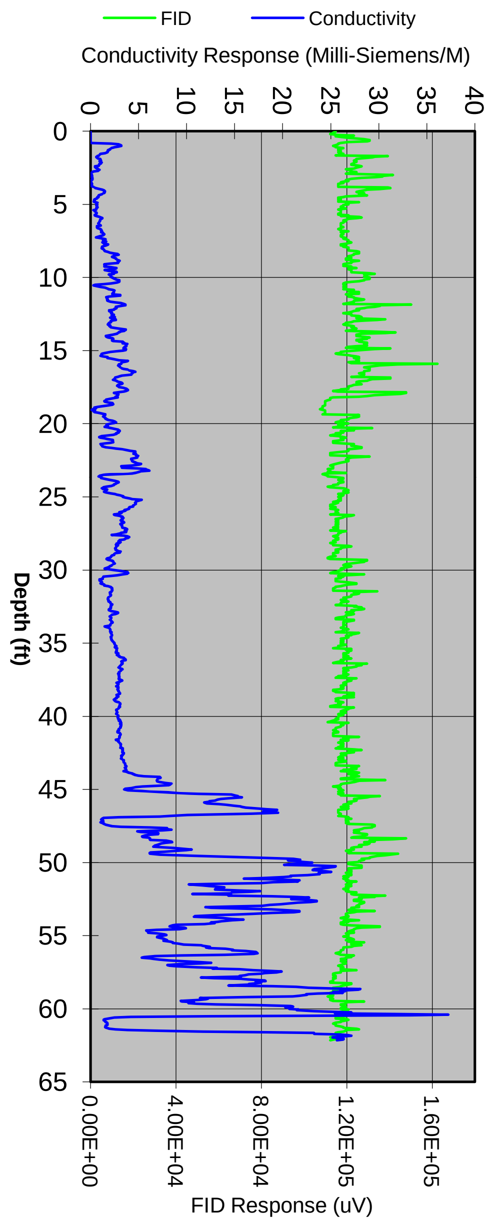
GW Depth
(ft):
Depth of GW Provided by Client

Job Information		MIP Sampling Information			
Client Company:	URS	Trunkline Length:	150	Start Boring Time:	Mon Feb 20 2012 14:30:55
Project Name:	Itron Inc.	Probe Type:	6520	End Boring Time:	Mon Feb 20 2012 16:55:43
Site Address:	1310 Emerald Rd. Greenwood, SC	Rig Type:	Geoprobe 7822	MIP Specialist:	Chuck Terry









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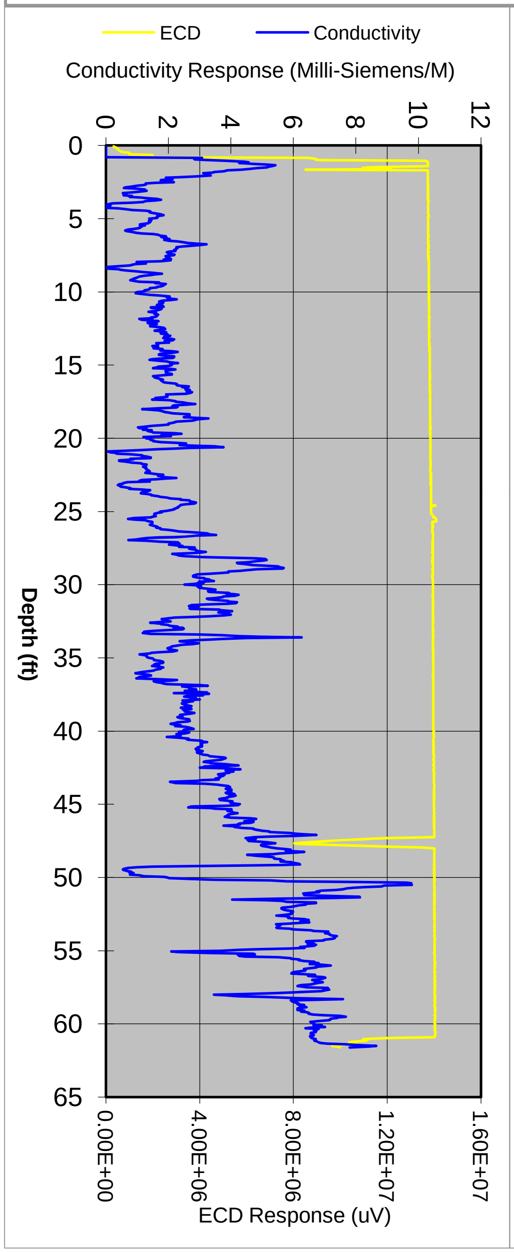
Boring Name: MIP02

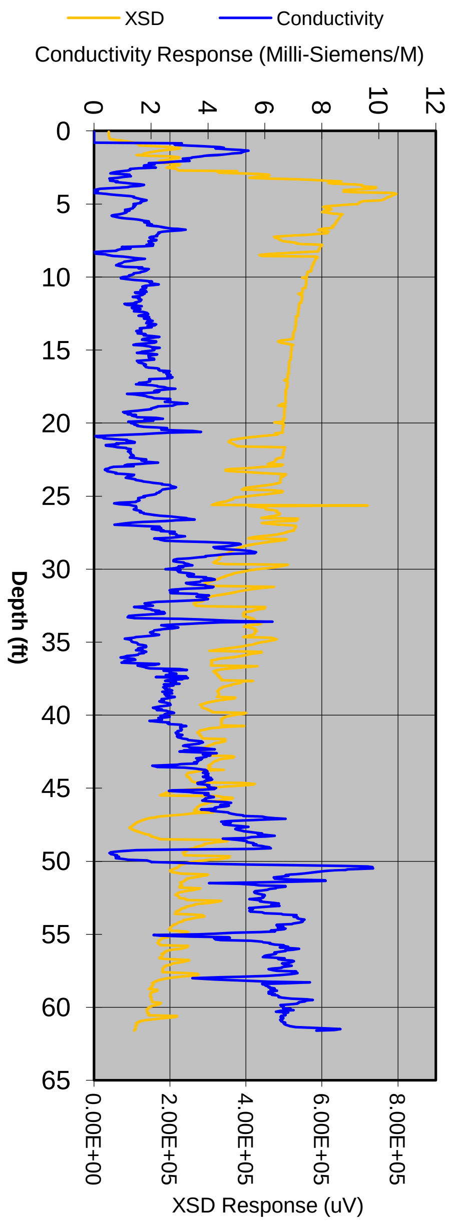
Total Depth (ft): 61.60

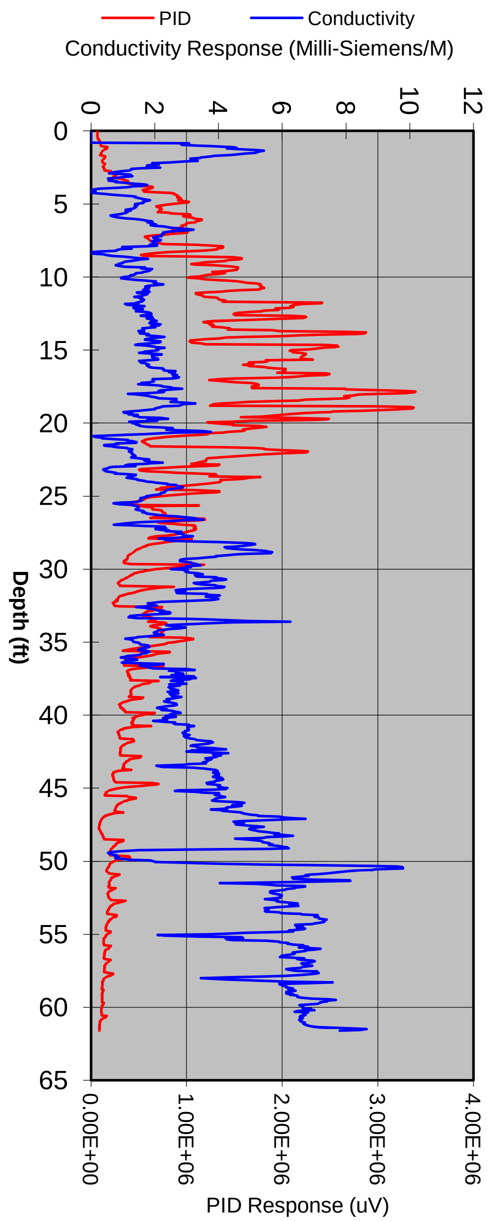
Notes:
Thermocouple failed at 25.50 feet bgs. Bypassed and completed boring.

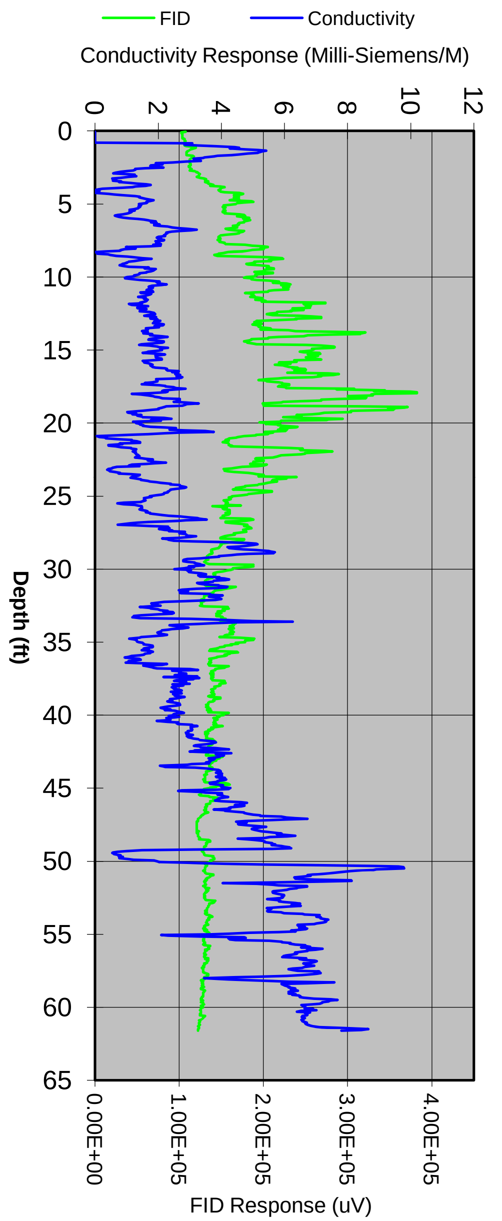
GW Depth (ft):
Depth of GW Provided by Client

Job Information		MIP Sampling Information			
Client Company:	URS	Trunkline Length:	150	Start Boring Time:	Tue Feb 21 2012 08:02:43
Project Name:	Itron Inc.	Probe Type:	6520	End Boring Time:	Tue Feb 21 2012 09:20:43
Site Address:	1310 Emerald Rd. Greenwood, SC	Rig Type:	Geoprobe 7822	MIP Specialist:	Chuck Terry









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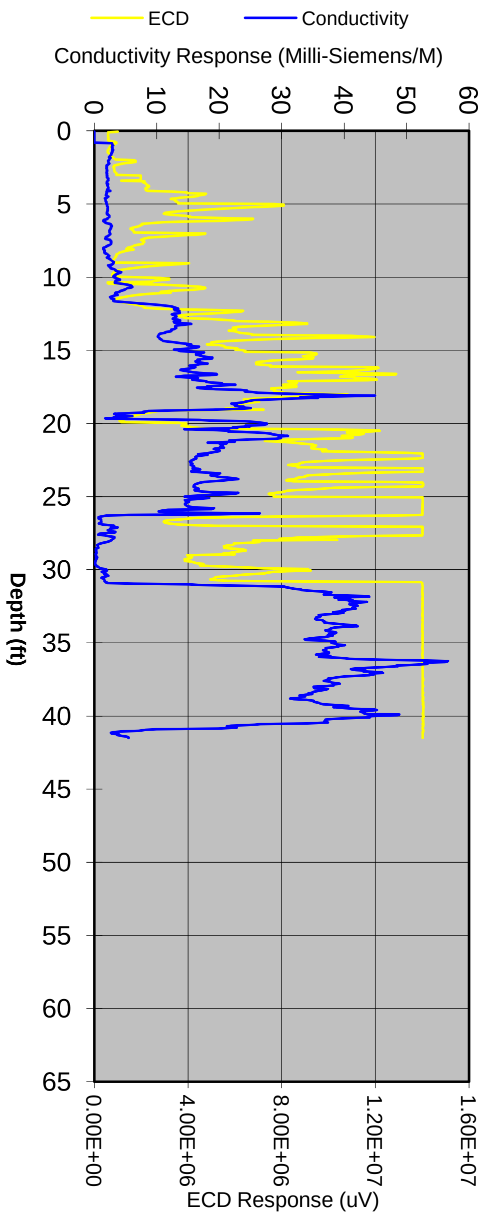
Boring Name: MIP03 **Total Depth (ft): 41.50**

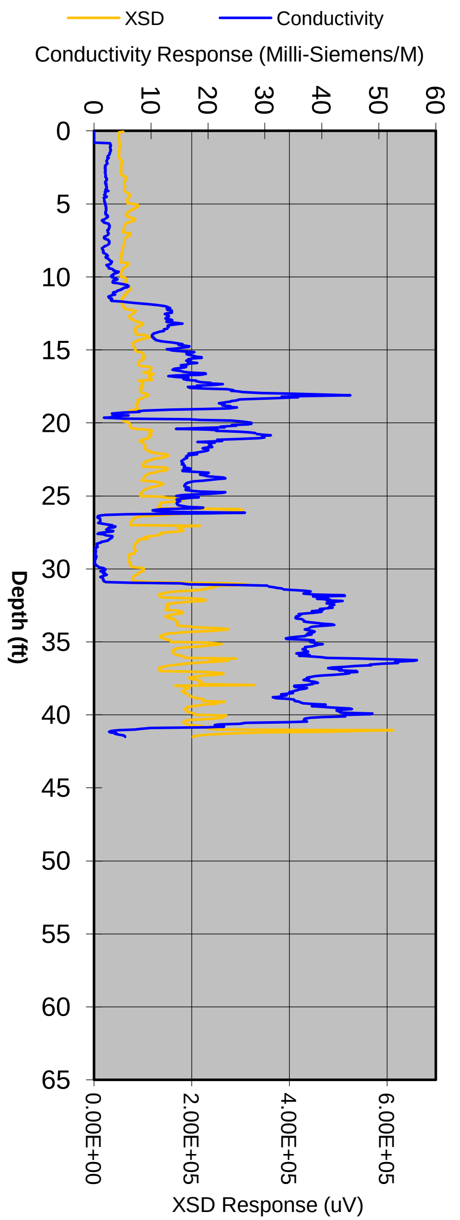
Notes:
None.

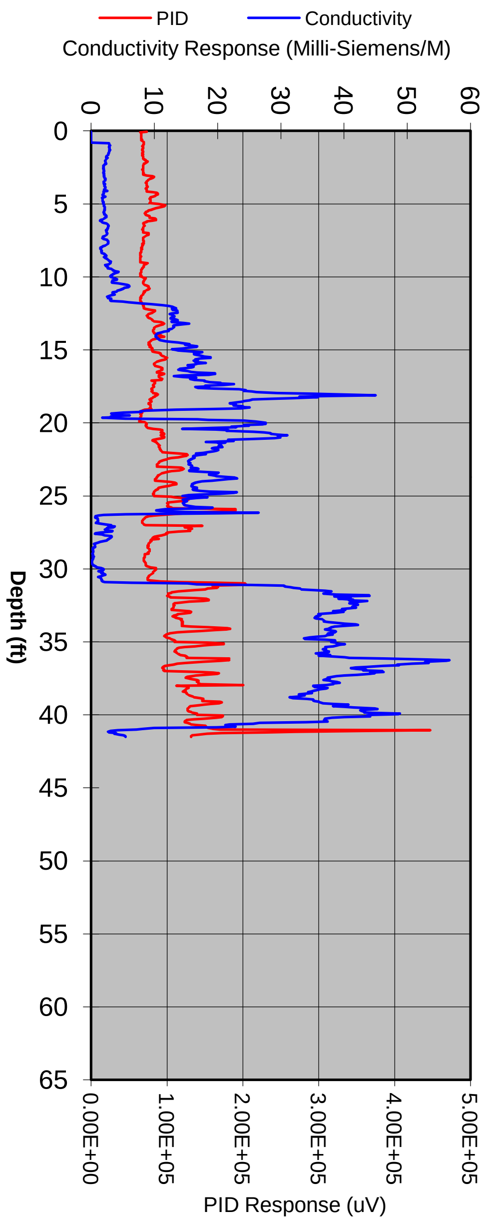
GW Depth (ft): 30
Depth of GW Provided by Client

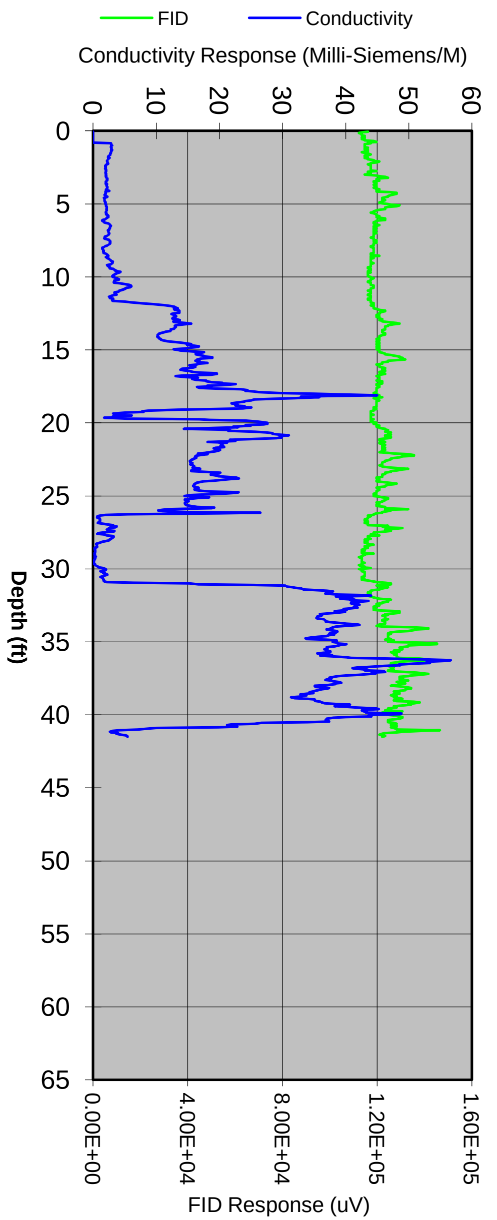
Job Information	
Client Company:	URS
Project Name:	Itron Inc.
Site Address:	1310 Emerald Rd. Greenwood, SC

MIP Sampling Information			
Trunkline Length:	150	Start Boring Time:	Tue Feb 21 2012 10:20:43
Probe Type:	6520	End Boring Time:	Tue Feb 21 2012 11:15:43
Rig Type:	Geoprobe 7822	MIP Specialist:	Chuck Terry









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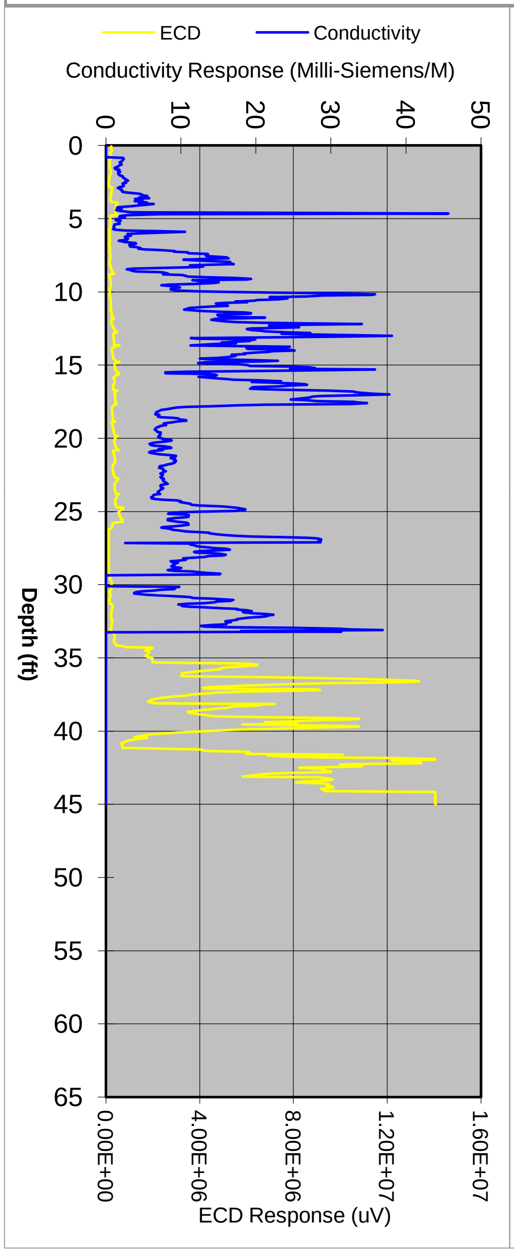
Boring Name: MIP04 Total Depth (ft): 45.00

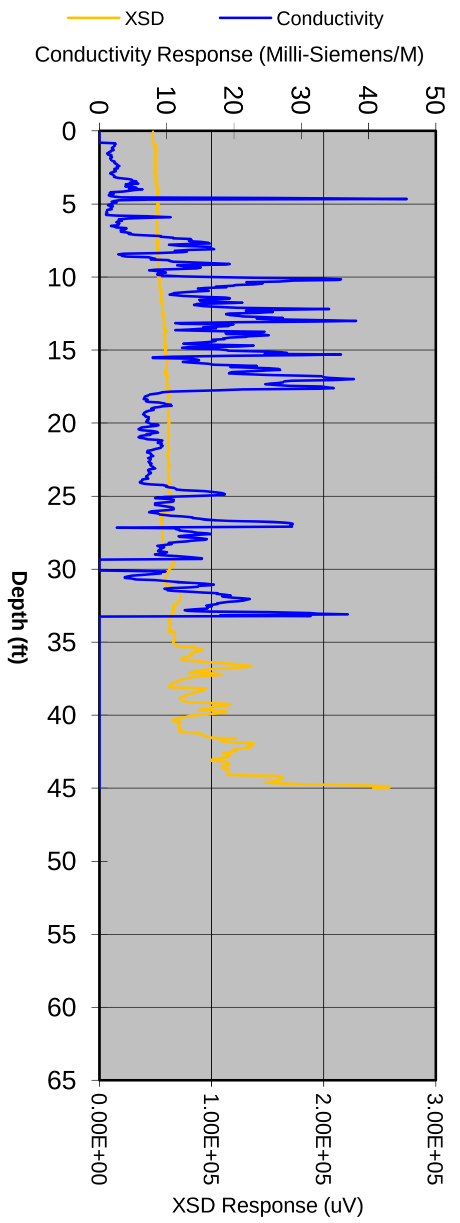
Notes:

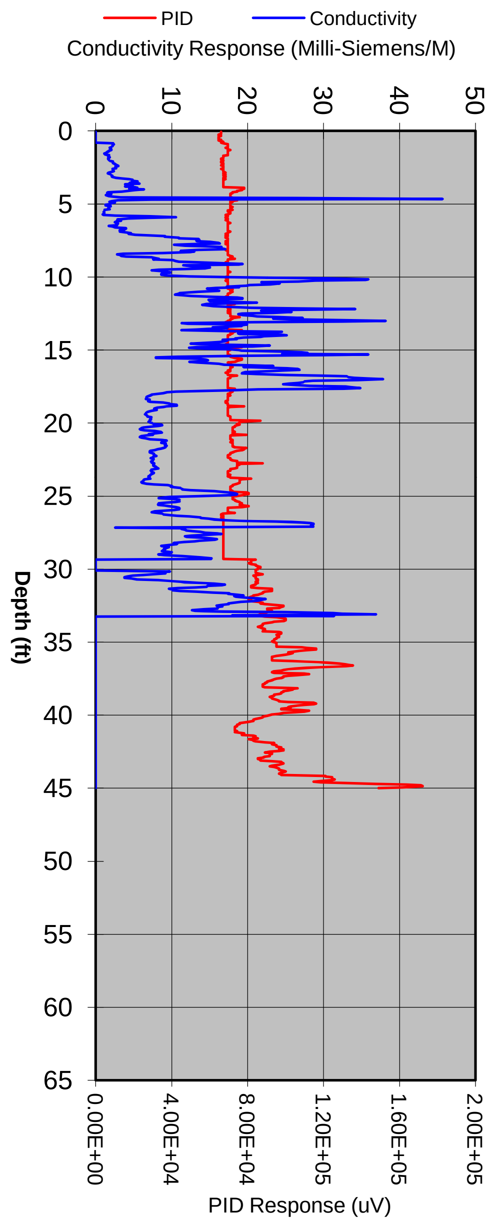
Heater failed at 27 feet bgs. Repaired and completed boring. Computer froze from 27 - 30 feet bgs, resulting in no detections for those depths. EC failed at 34 feet bgs.

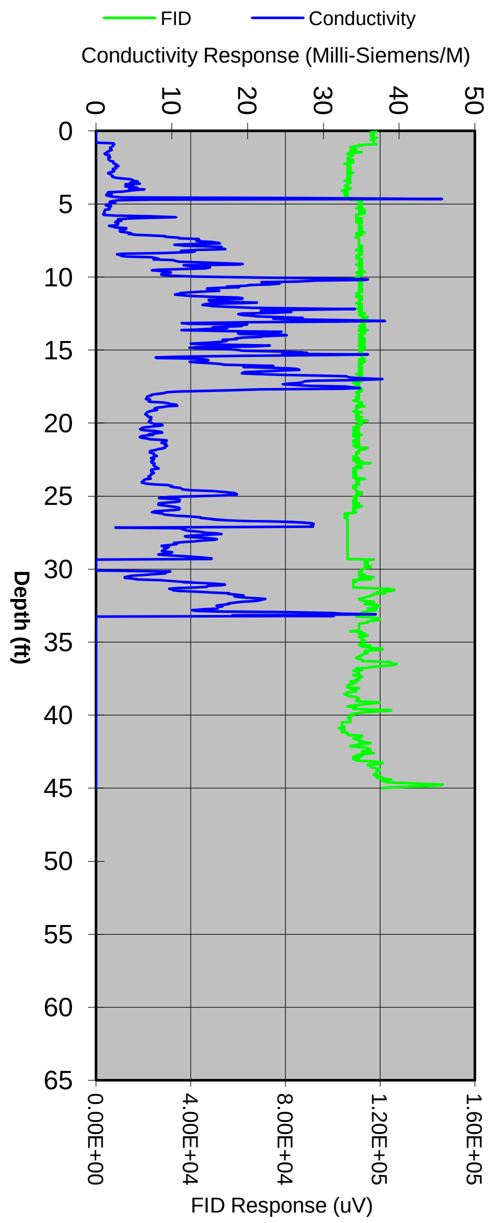
GW Depth (ft): 30
Depth of GW Provided by Client

Job Information		MIP Sampling Information			
Client Company:	URS	Trunkline Length:	150	Start Boring Time:	Tue Feb 21 2012 12:46:07
Project Name:	Itron Inc.	Probe Type:	6520	End Boring Time:	Tue Feb 21 2012 15:03:48
Site Address:	1310 Emerald Rd. Greenwood, SC	Rig Type:	Geoprobe 7822	MIP Specialist:	Chuck Terry









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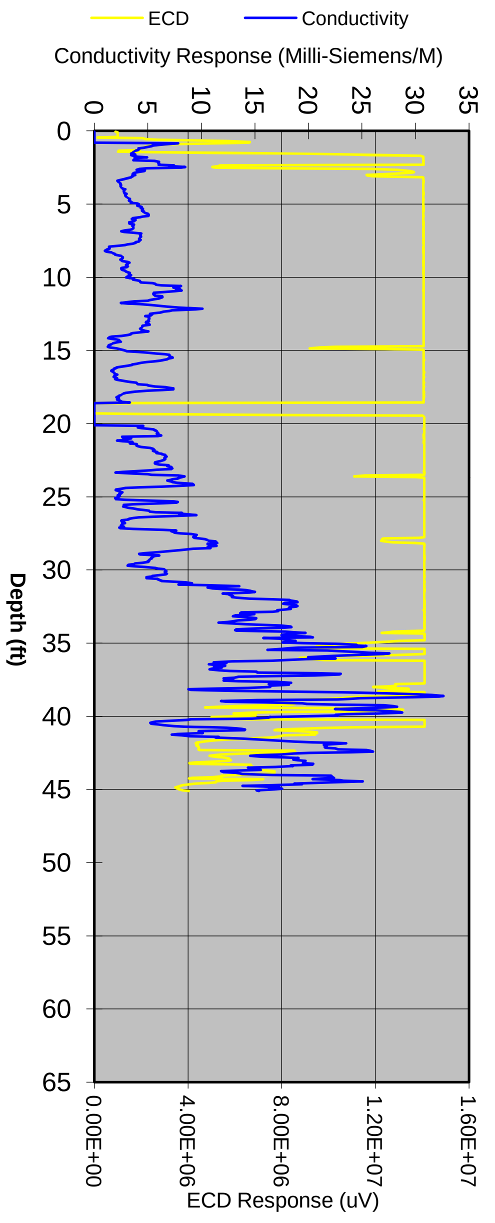
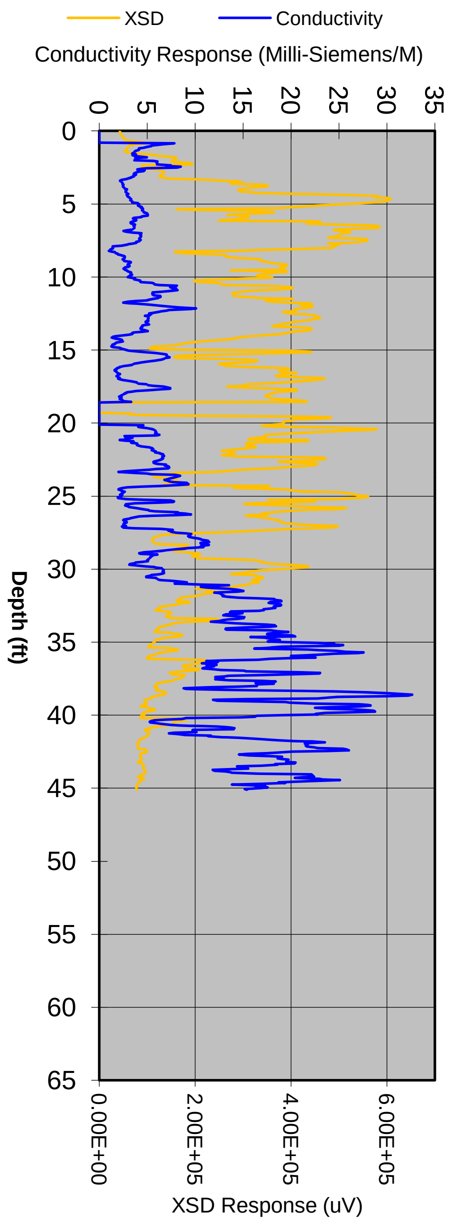
Boring Name: MIP05 **Total Depth (ft): 45.10**

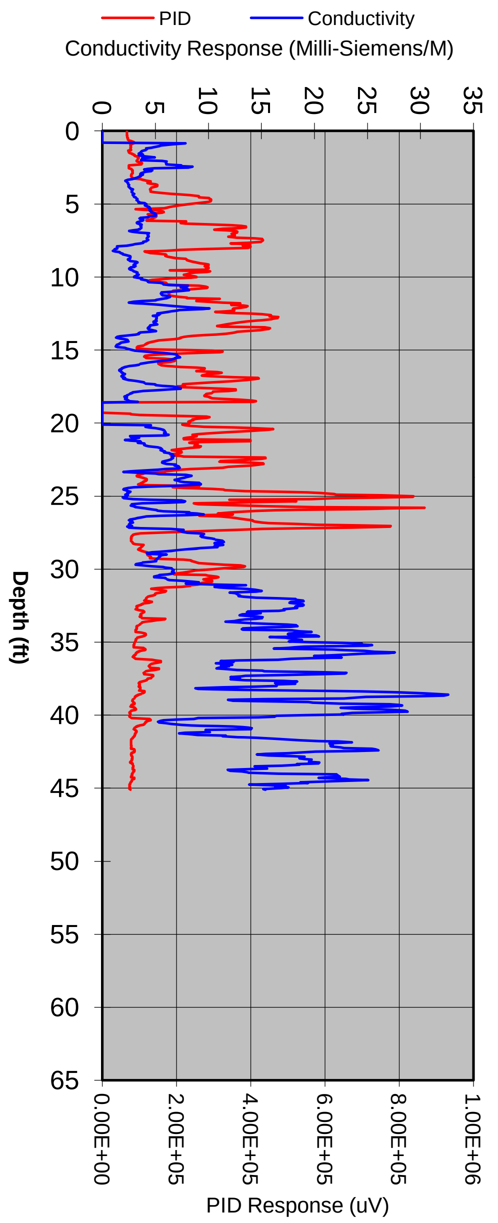
Notes:
Computer froze from 17.50 - 20 feet bgs, resulting in no detections at those depths.

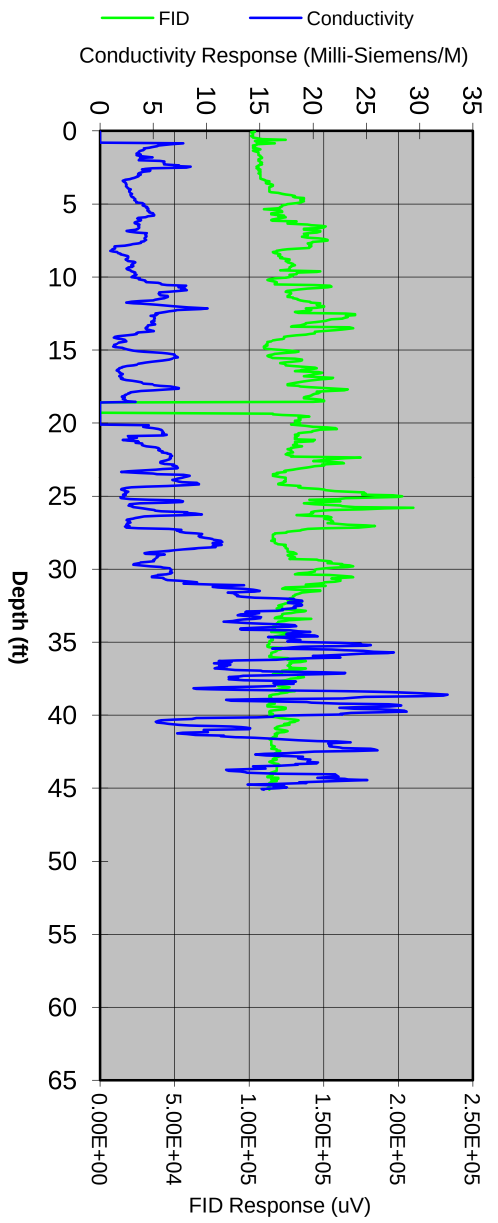
GW Depth (ft): 30
Depth of GW Provided by Client

Job Information		MIP Sampling Information			
Client Company:	URS	Trunkline Length:	150	Start Boring Time:	ue Feb 21 2012 16:09:29
Project Name:	Itron Inc.	Probe Type:	6520	End Boring Time:	Tue Feb 21 2012 17:10:51
Site Address:	1310 Emerald Rd. Greenwood, SC	Rig Type:	Geoprobe 7822	MIP Specialist:	Chuck Terry









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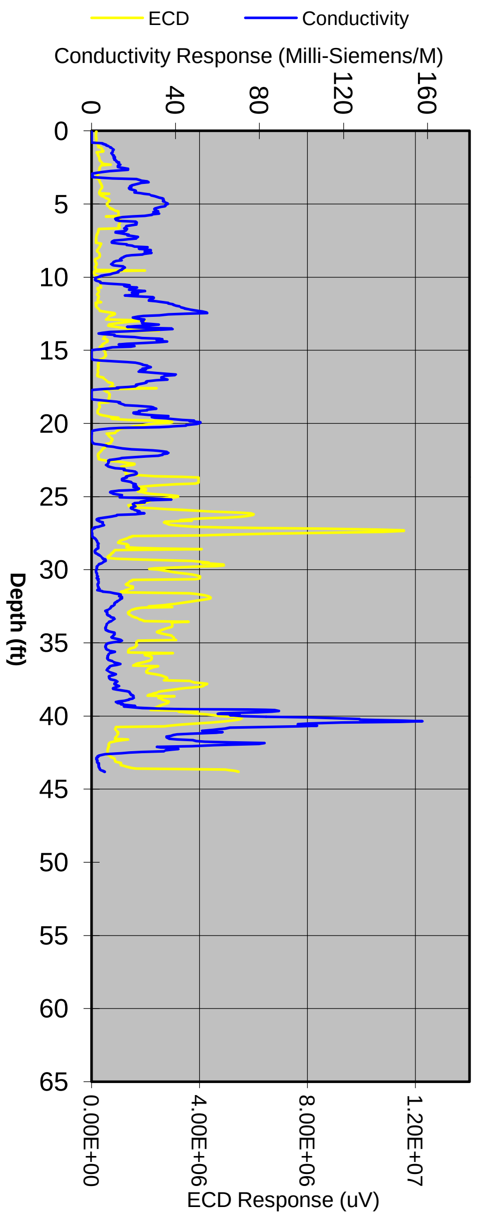
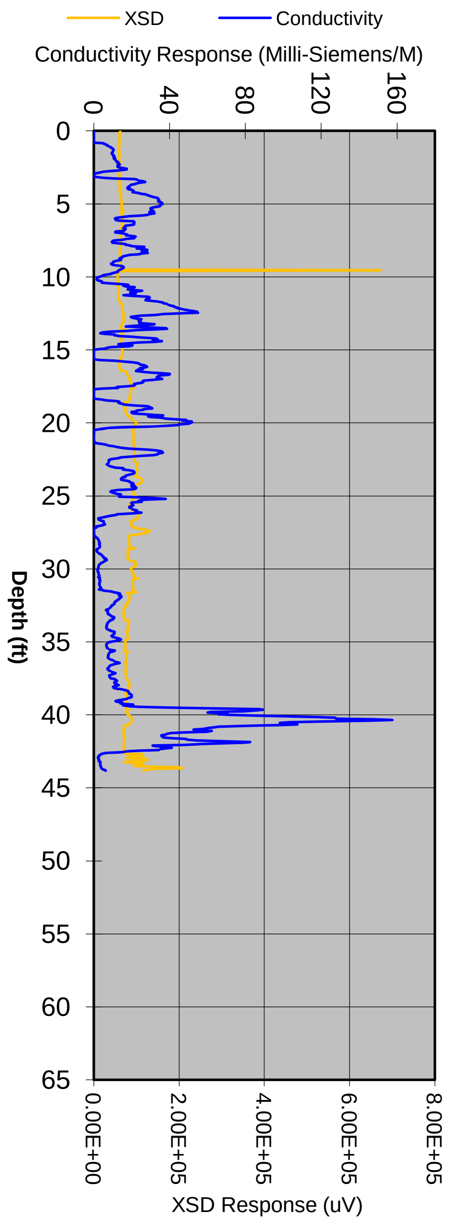
Boring Name: **MIP06** **Total Depth (ft):** **43.80**

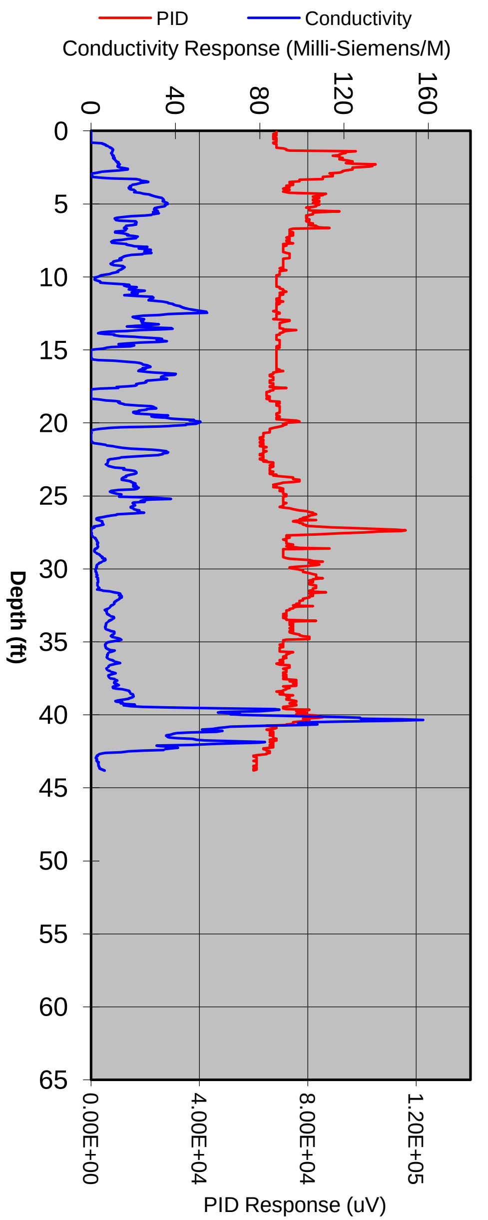
Notes:
Nitrogen line severed from 43.80 feet bgs. Terminated boring at approximately 43.80 feet bgs.

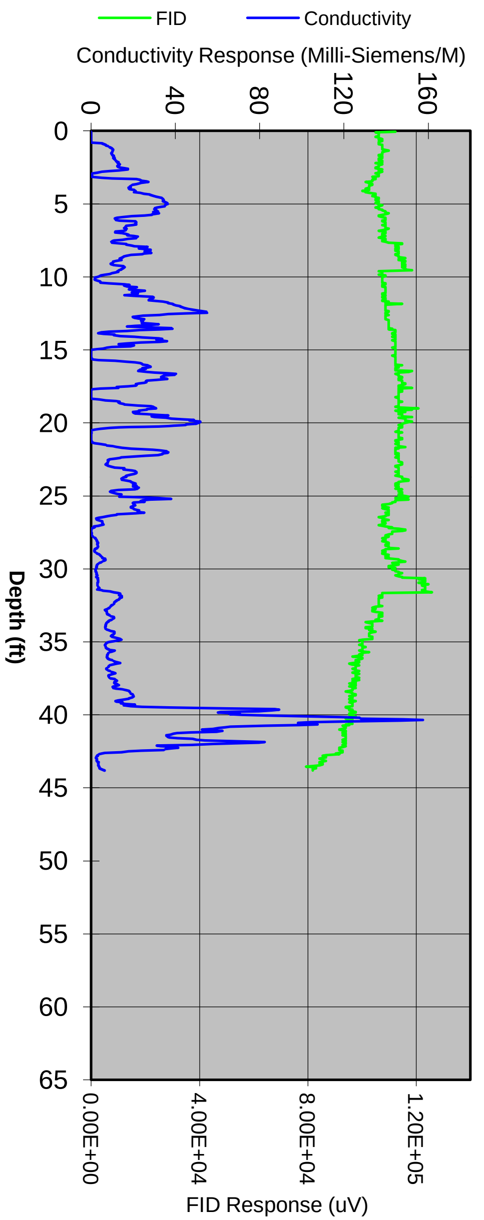
GW Depth (ft): 30
Depth of GW Provided by Client

Job Information		MIP Sampling Information			
Client Company:	URS	Trunkline Length:	150	Start Boring Time:	Wed Feb 22 2012 08:18:47
Project Name:	Itron Inc.	Probe Type:	6520	End Boring Time:	Wed Feb 22 2012 09:28:53
Site Address:	1310 Emerald Rd. Greenwood, SC	Rig Type:	Geoprobe 7822	MIP Specialist:	Chuck Terry









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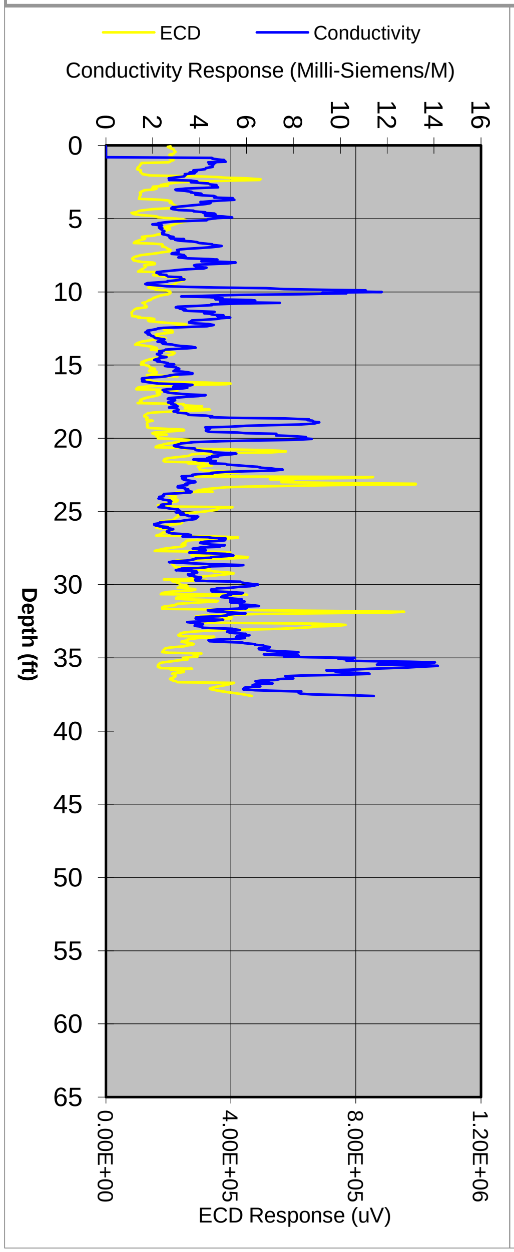
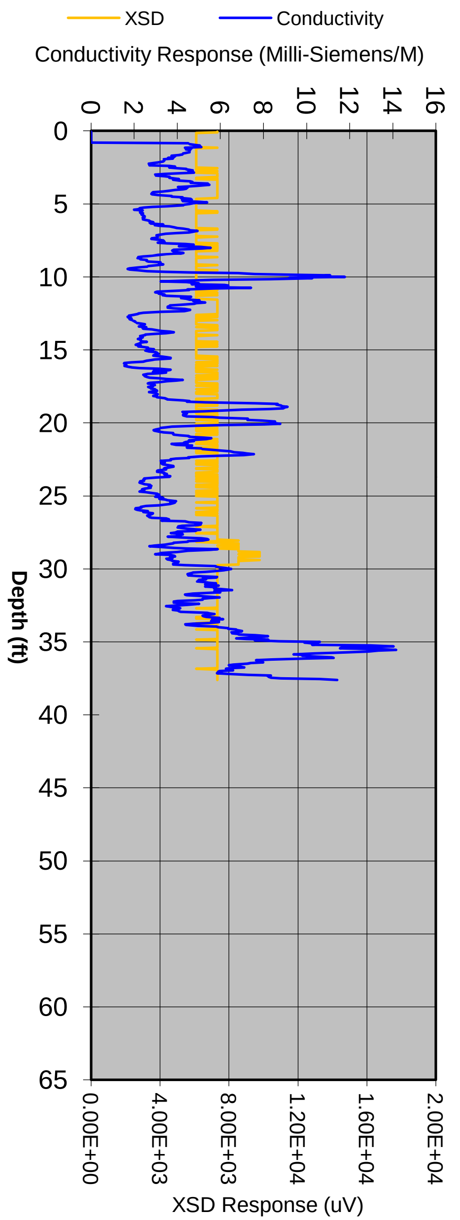
Boring Name: MIP07 **Total Depth (ft):** 37.60

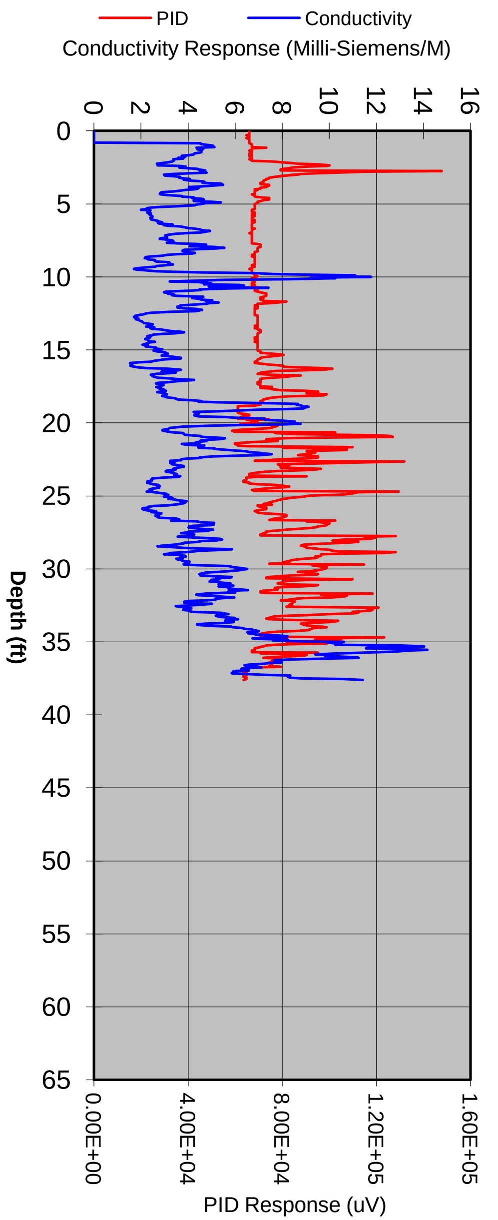
Notes:
Nitrogen line severed at 37.60 feet bgs. Terminated boring at 37.60 feet bgs.

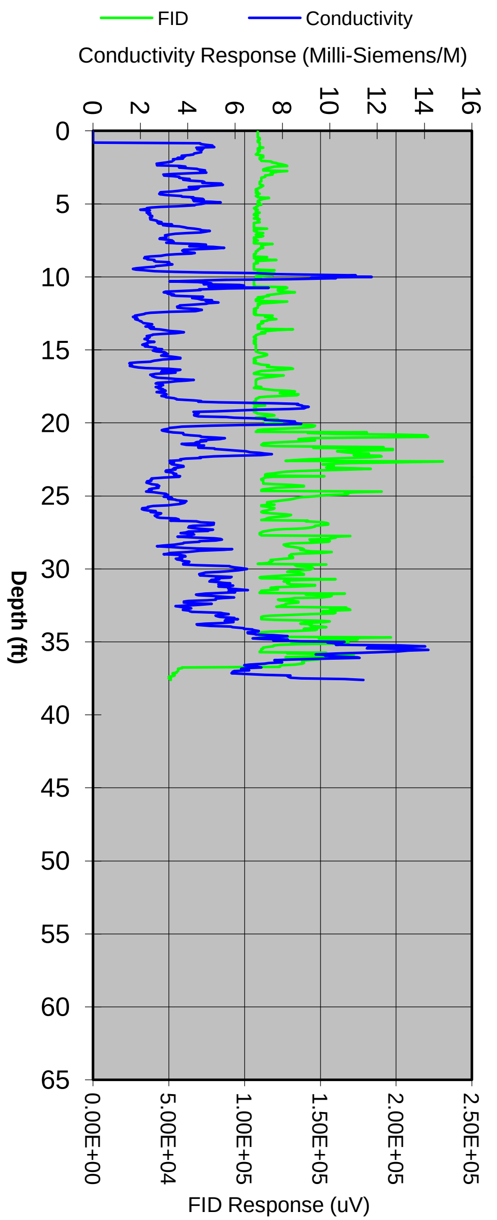
GW Depth (ft): 30
Depth of GW Provided by Client

Job Information		MIP Sampling Information			
Client Company:	URS	Trunkline Length:	150	Start Boring Time:	Wed Feb 22 2012 10:15:35
Project Name:	Itron Inc.	Probe Type:	6520	End Boring Time:	Wed Feb 22 2012 10:55:40
Site Address:	1310 Emerald Rd. Greenwood, SC	Rig Type:	Geoprobe 7822	MIP Specialist:	Chuck Terry









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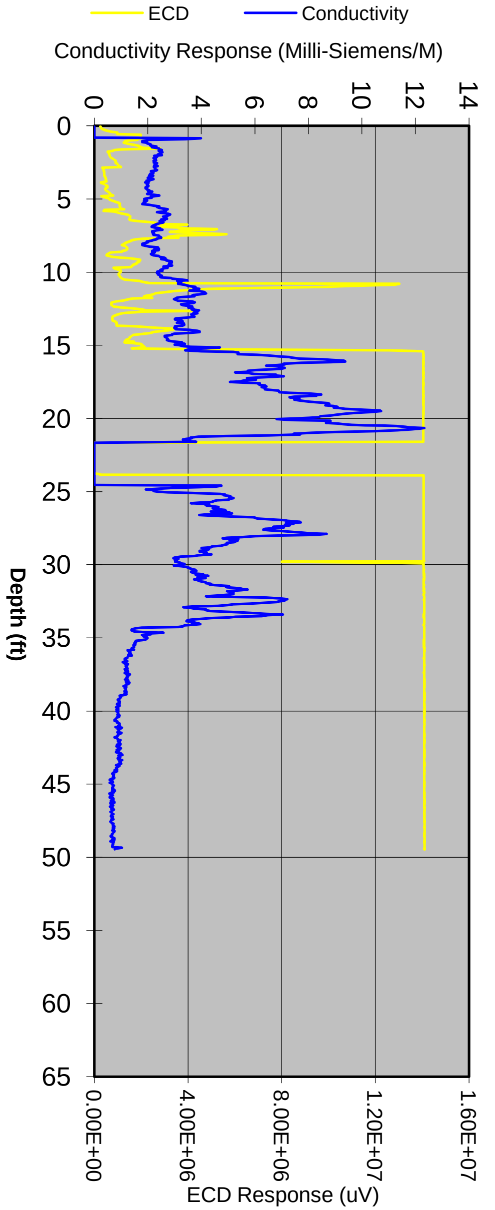
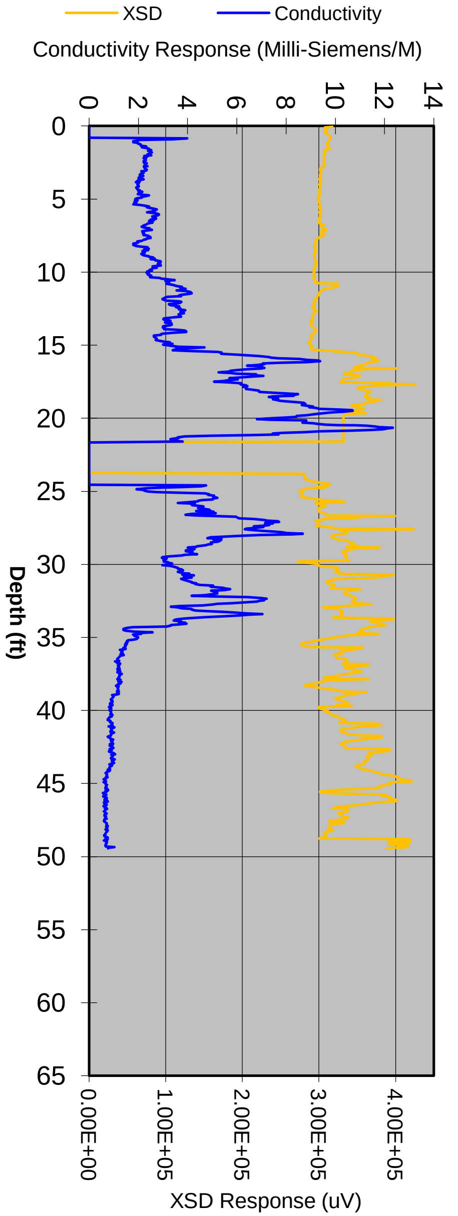
Boring Name: MIP08 **Total Depth (ft): 49.45**

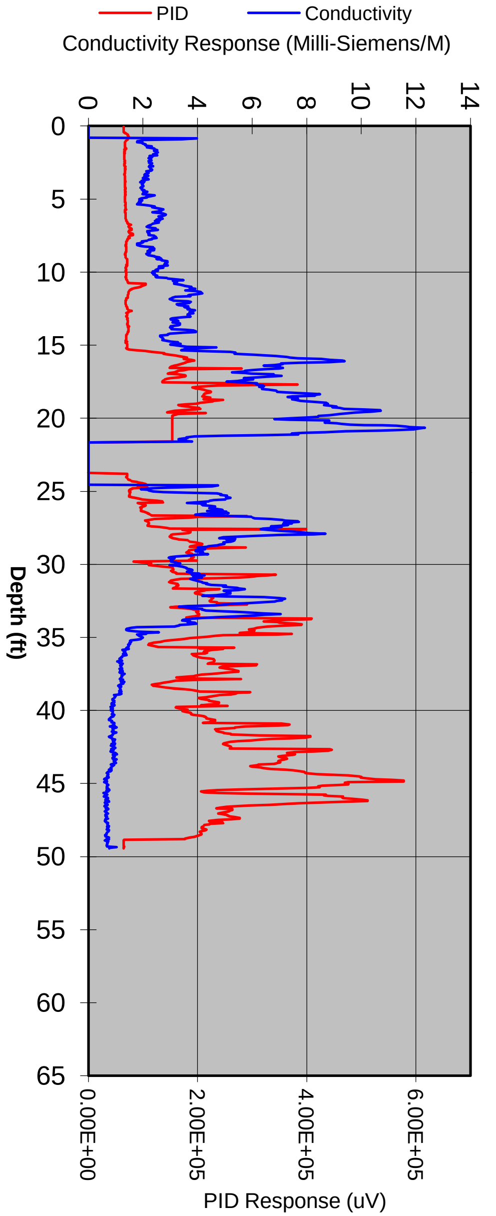
Notes:
No data collected from 22 to 24 feet bgs due to temporary power loss.

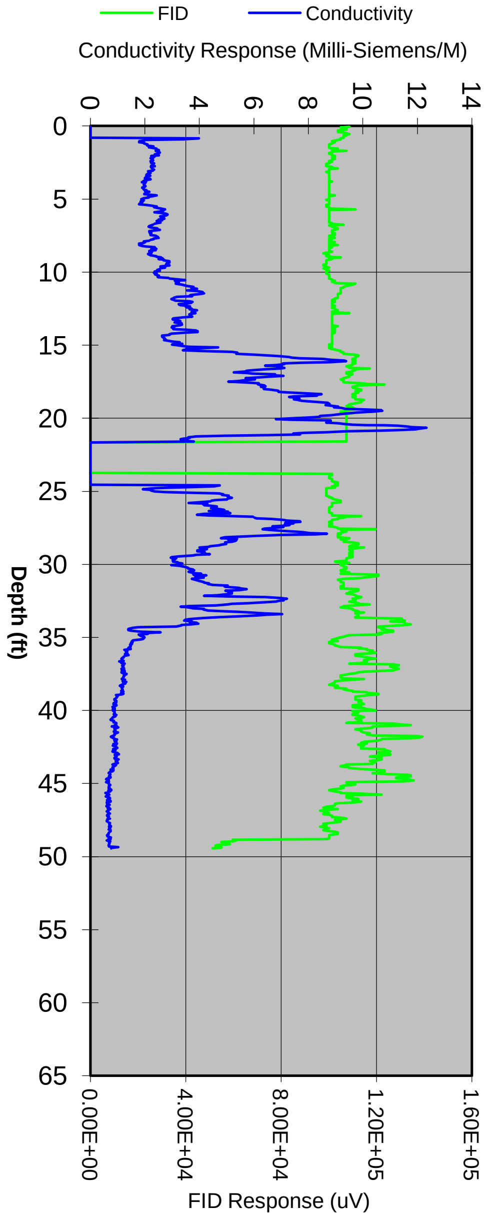
GW Depth (ft):
Depth of GW Provided by Client

Job Information		MIP Sampling Information			
Client Company:	URS	Trunkline Length:	150	Start Boring Time:	Wed Feb 22 2012 12:27:48
Project Name:	Itron Inc.	Probe Type:	6520	End Boring Time:	Wed Feb 22 2012 13:25:16
Site Address:	1310 Emerald Rd. Greenwood, SC	Rig Type:	Geoprobe 7822	MIP Specialist:	Chuck Terry









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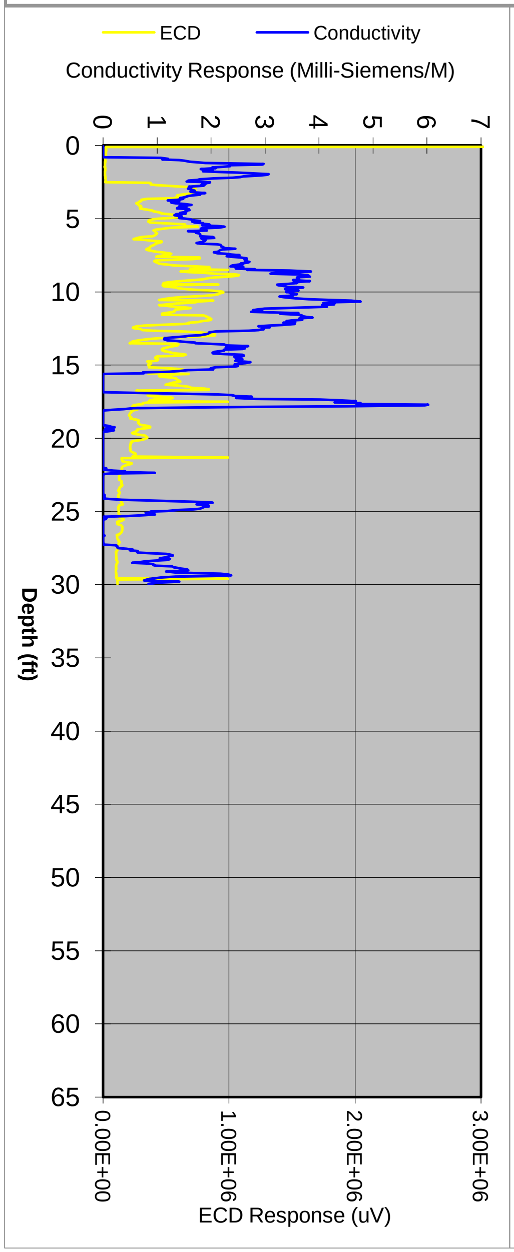
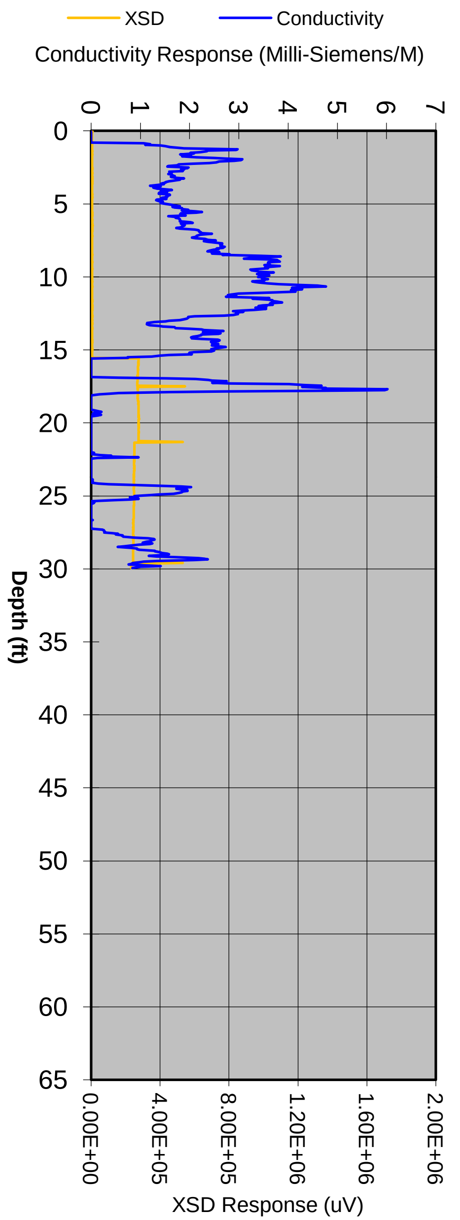
Boring Name: **MIP09**

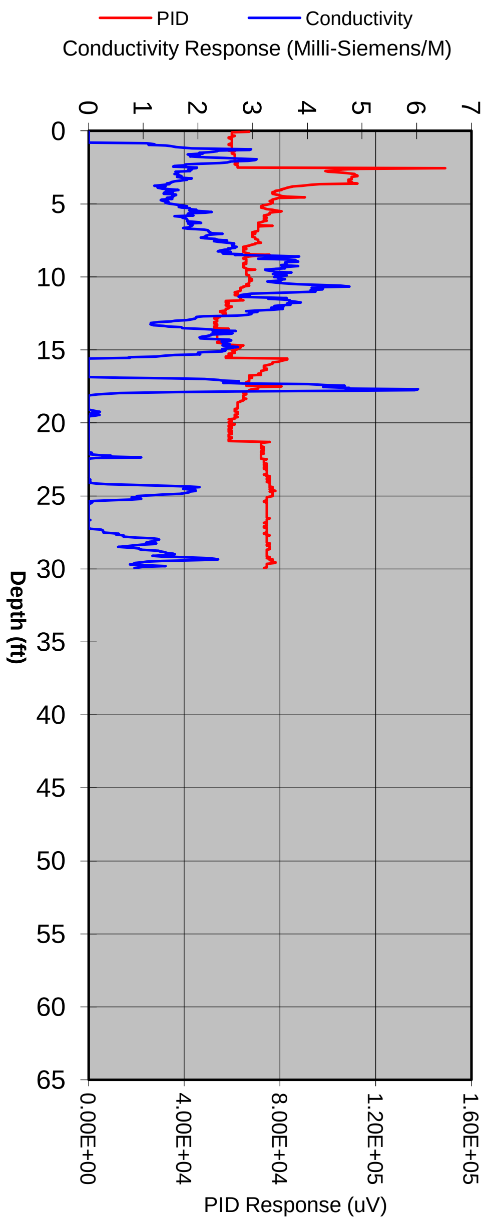
Total Depth (ft): **29.95**

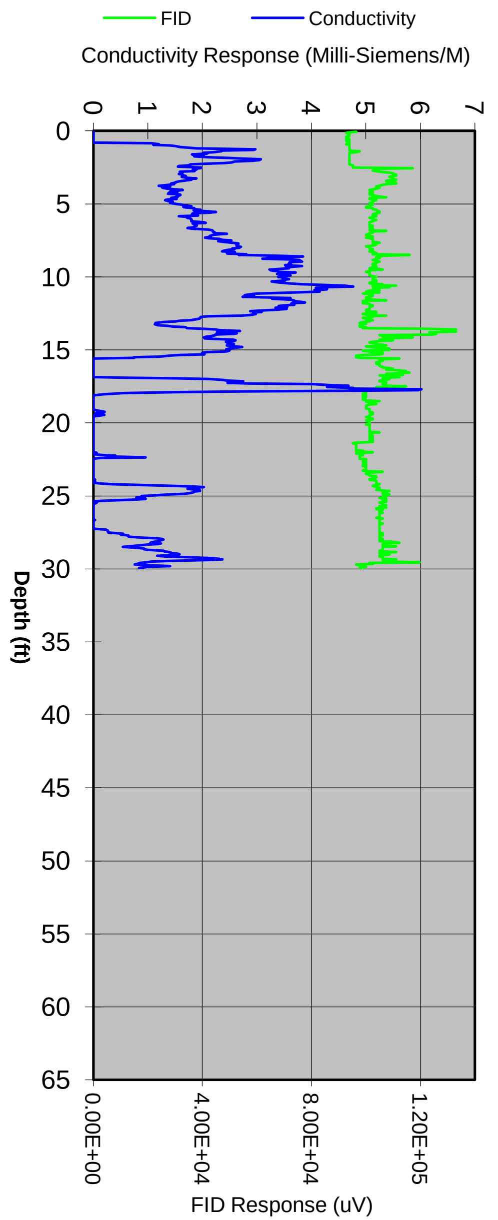
Notes:	GW Depth (ft): 30 Depth of GW Provided by Client
Stopped boring at 15 feet bgs due to high pressure. XSD error caused poor detections from 0 - 15 feet bgs. Refusal at 29.95 feet bgs.	

Job Information		MIP Sampling Information			
Client Company:	URS	Trunkline Length:	150	Start Boring Time:	Wed Feb 22 2012 16:37:39
Project Name:	Itron Inc.	Probe Type:	6520	End Boring Time:	Thu Feb 23 2012 07:50:48
Site Address:	1310 Emerald Rd. Greenwood, SC	Rig Type:	Geoprobe 7822	MIP Specialist:	Chuck Terry









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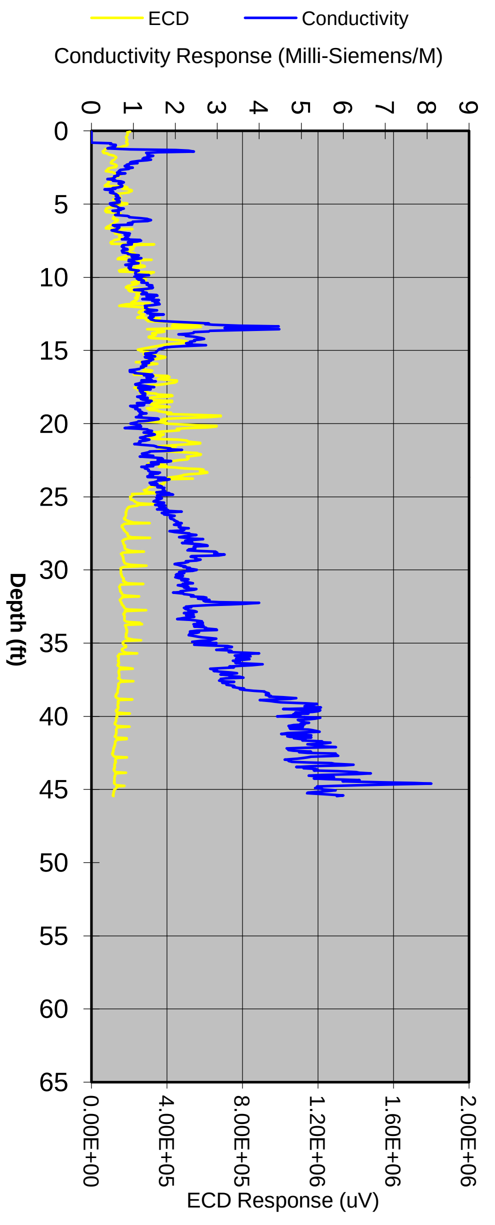
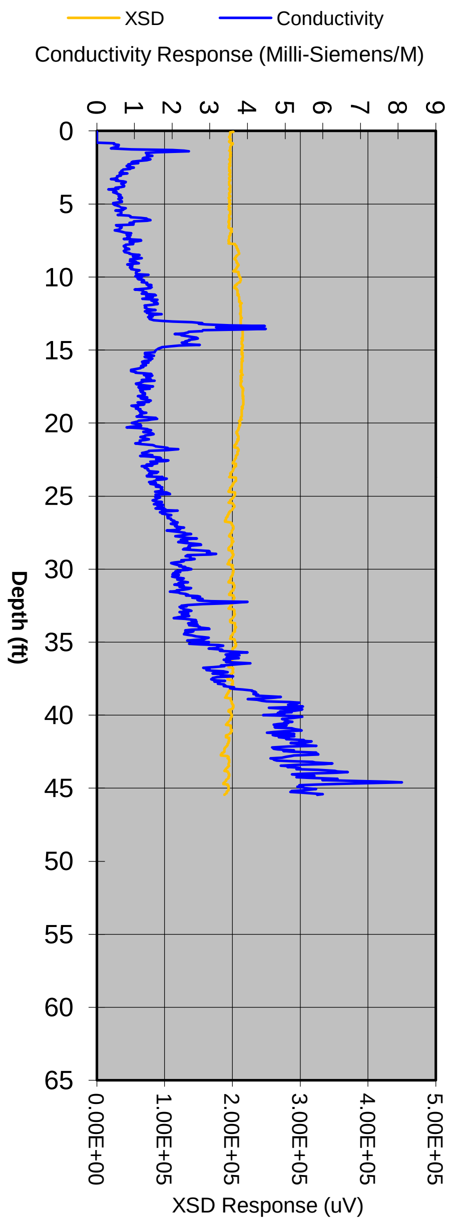
Boring Name: MIP10 **Total Depth (ft): 45.45**

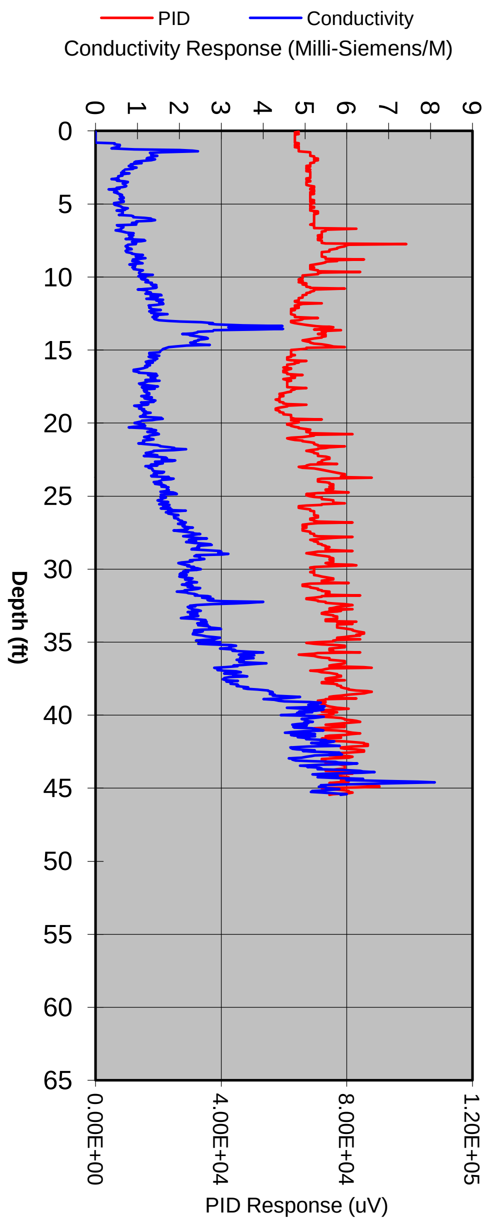
Notes:
None.

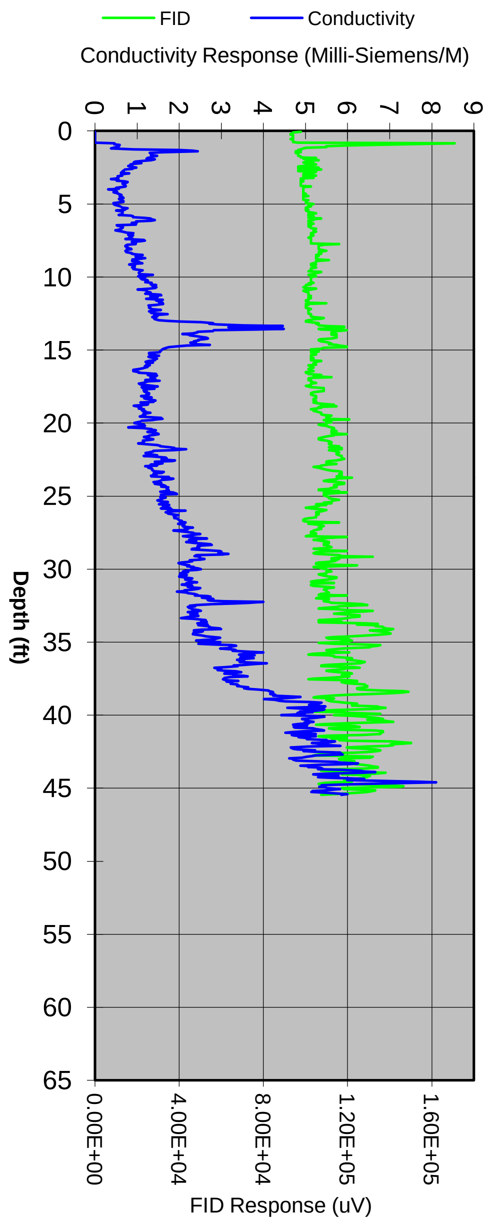
GW Depth (ft): 30
Depth of GW Provided by Client

Job Information		MIP Sampling Information			
Client Company:	URS	Trunkline Length:	150	Start Boring Time:	Thu Feb 23 2012 08:33:35
Project Name:	Itron Inc.	Probe Type:	6520	End Boring Time:	Thu Feb 23 2012 09:25:49
Site Address:	1310 Emerald Rd. Greenwood, SC	Rig Type:	Geoprobe 7822	MIP Specialist:	Chuck Terry









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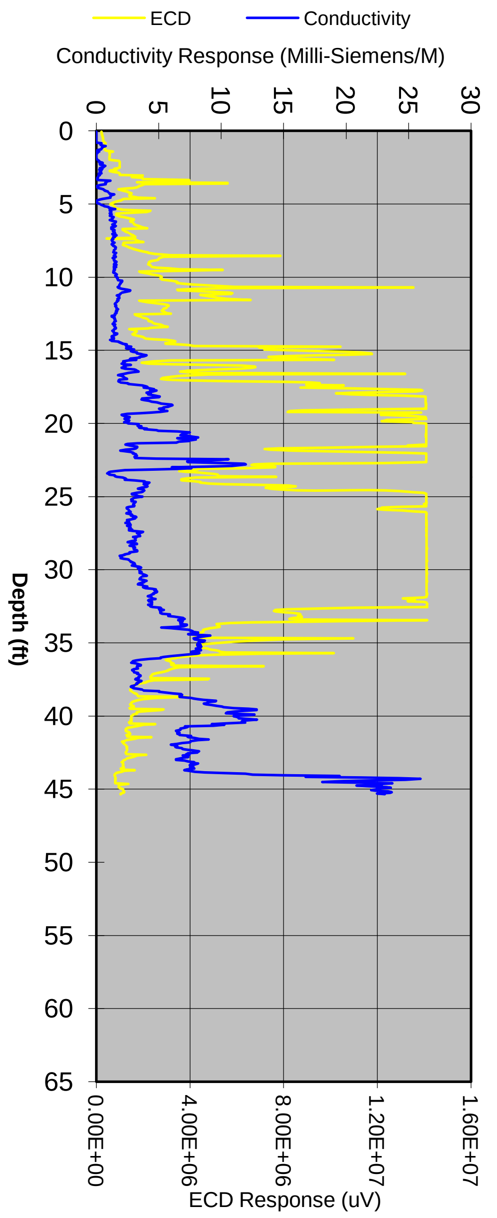
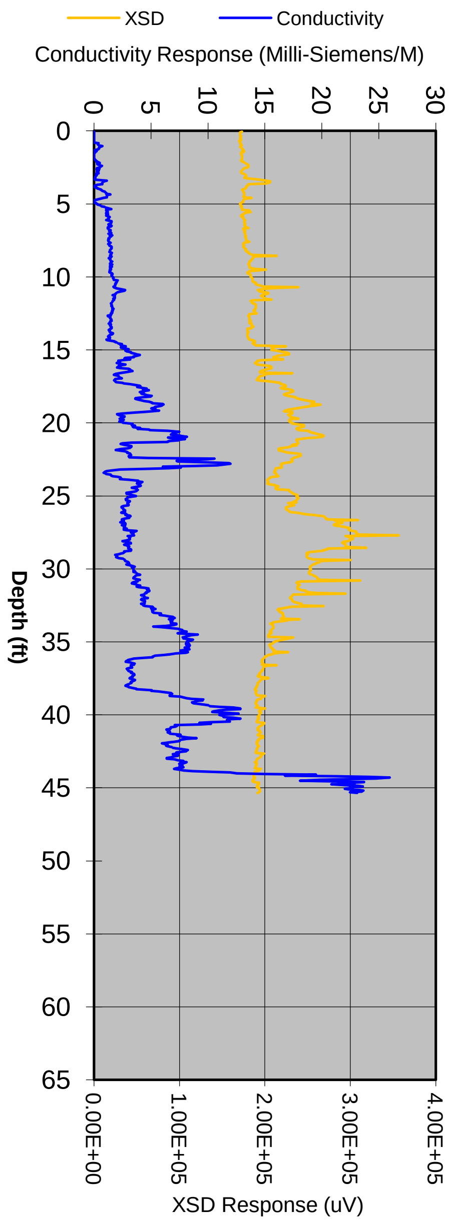
Boring Name: MIP11 **Total Depth (ft): 45.35**

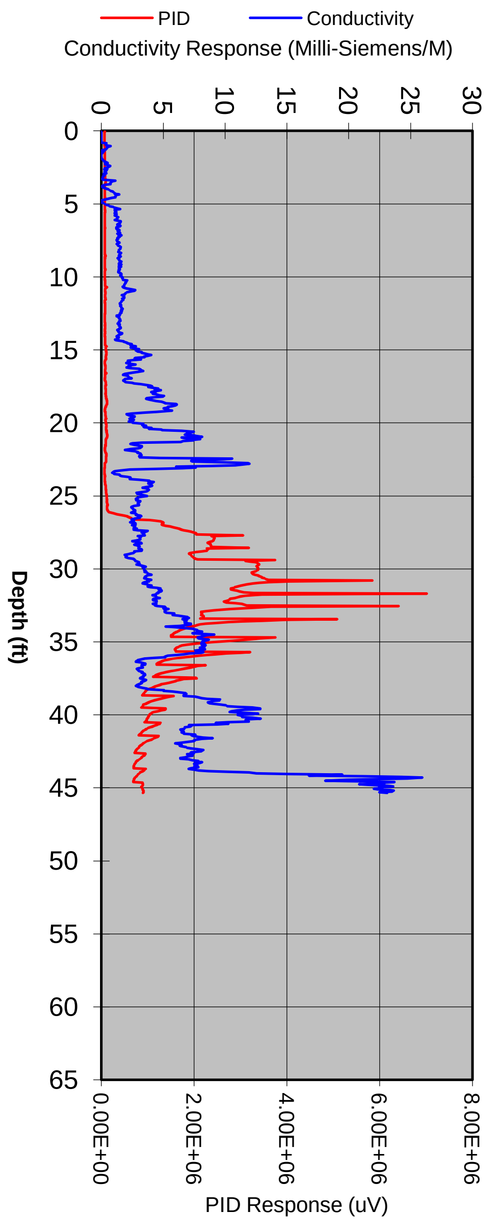
Notes:
None.

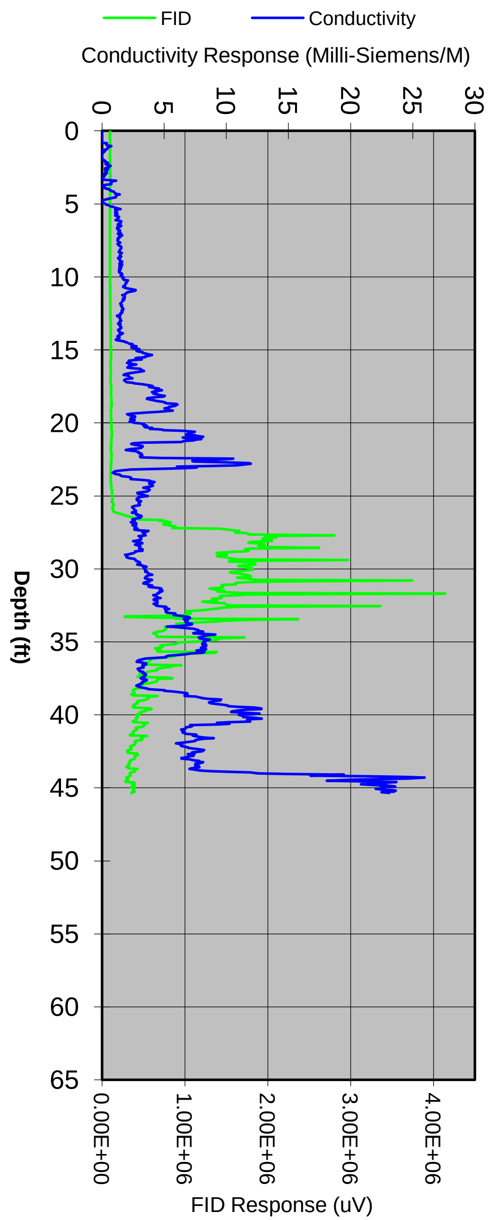
GW Depth (ft): 30
Depth of GW Provided by Client

Job Information		MIP Sampling Information			
Client Company:	URS	Trunkline Length:	150	Start Boring Time:	Thu Feb 23 2012 09:56:05
Project Name:	Itron Inc.	Probe Type:	6520	End Boring Time:	Thu Feb 23 2012 10:49:40
Site Address:	1310 Emerald Rd. Greenwood, SC	Rig Type:	Geoprobe 7822	MIP Specialist:	Chuck Terry









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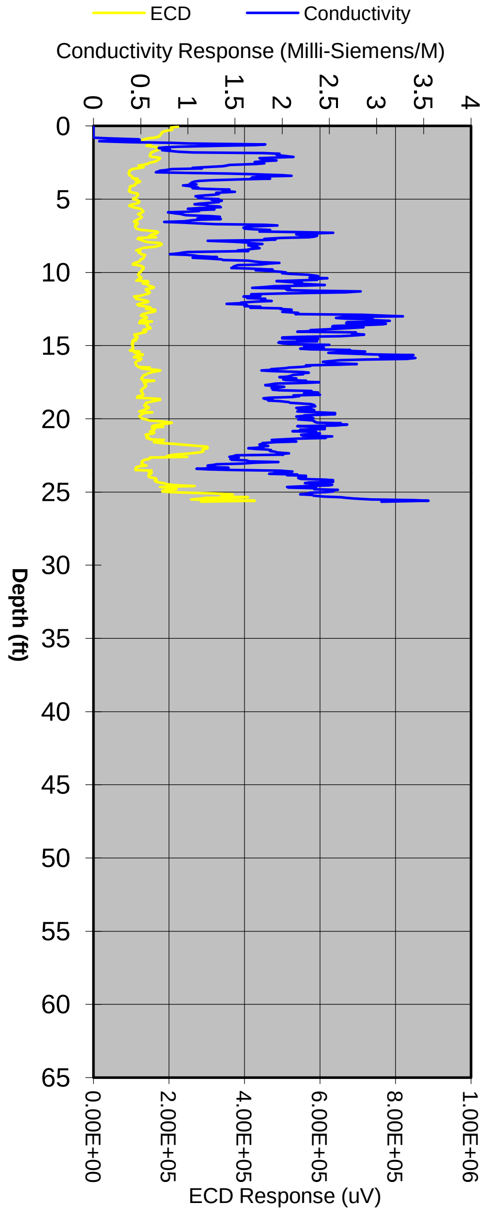
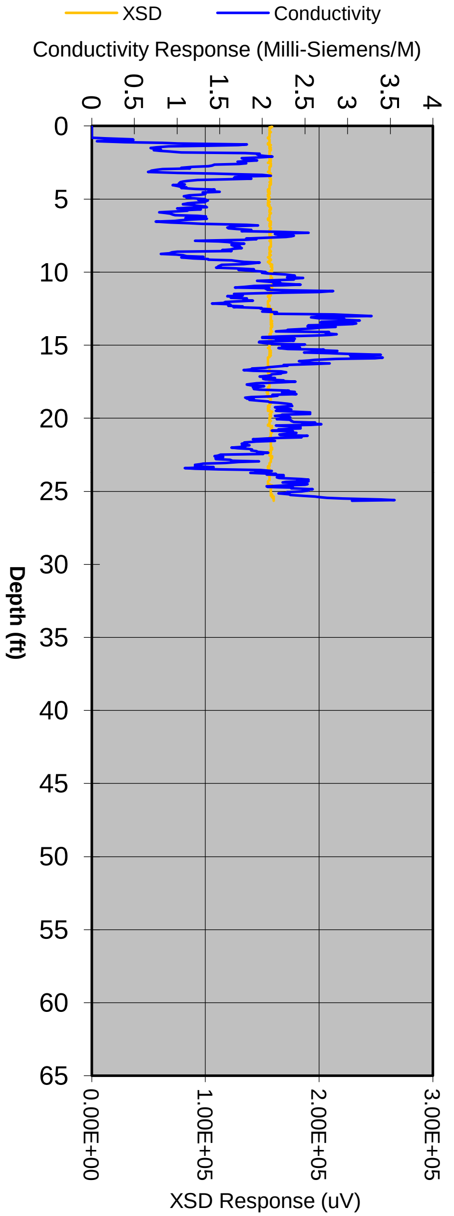
Boring Name: MIP12 **Total Depth (ft): 25.65**

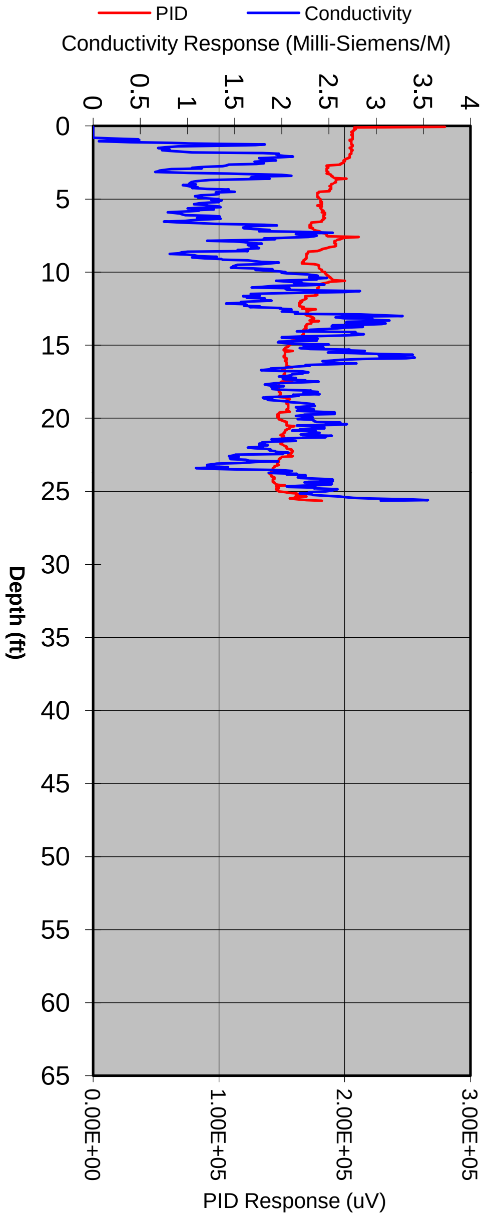
Notes:
Refusal at 25.65 feet bgs.

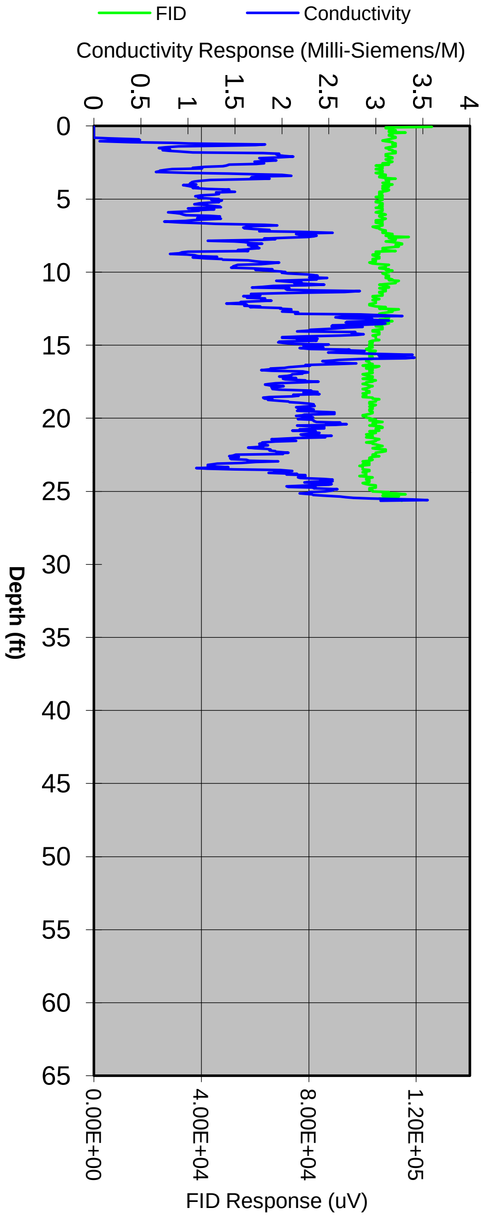
GW Depth (ft): 30
Depth of GW Provided by Client

Job Information		MIP Sampling Information			
Client Company:	URS	Trunkline Length:	150	Start Boring Time:	Thu Feb 23 2012 11:13:40
Project Name:	Itron Inc.	Probe Type:	6520	End Boring Time:	Thu Feb 23 2012 11:42:26
Site Address:	1310 Emerald Rd. Greenwood, SC	Rig Type:	Geoprobe 7822	MIP Specialist:	Chuck Terry









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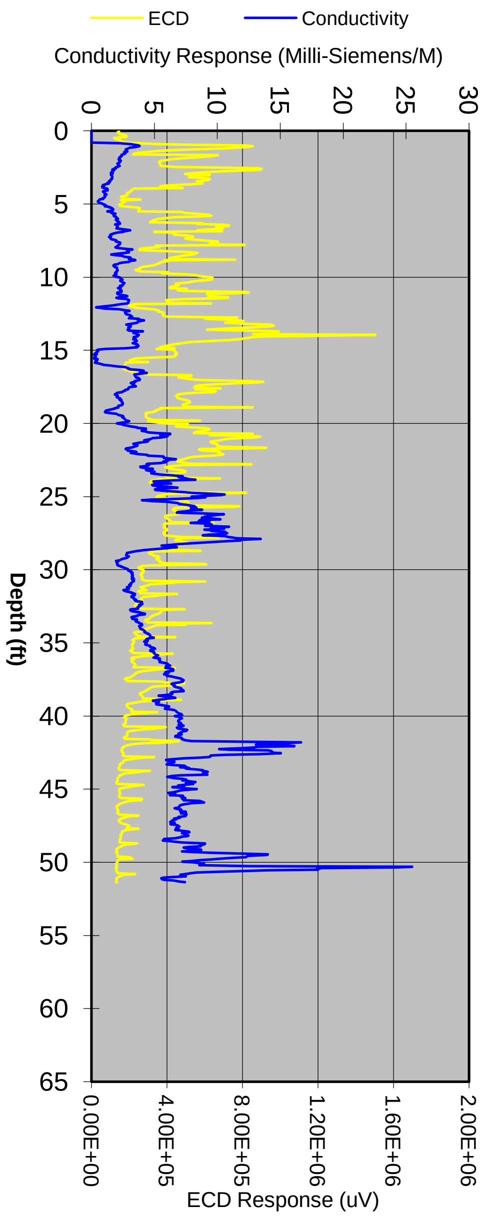
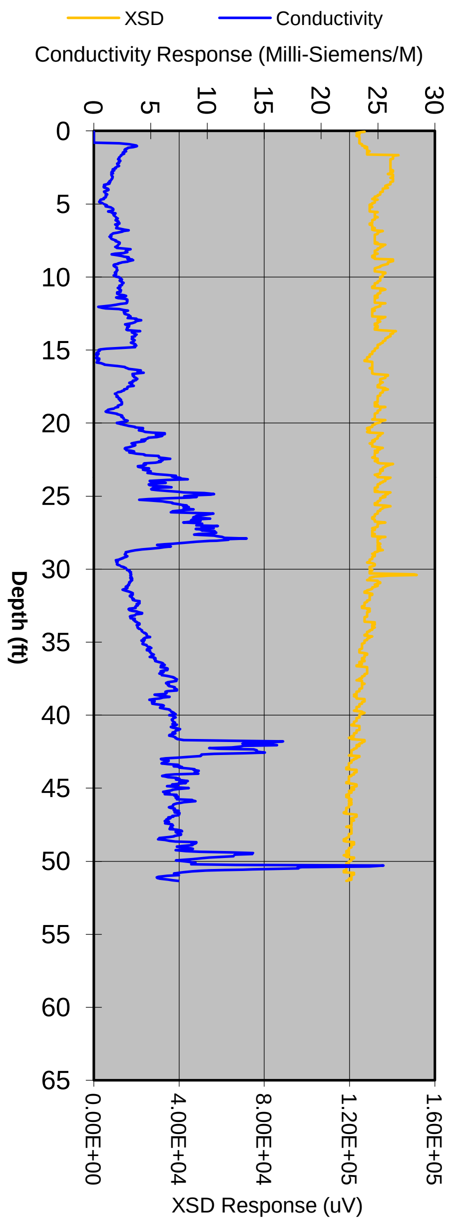
Boring Name: MIP13 **Total Depth (ft): 51.35**

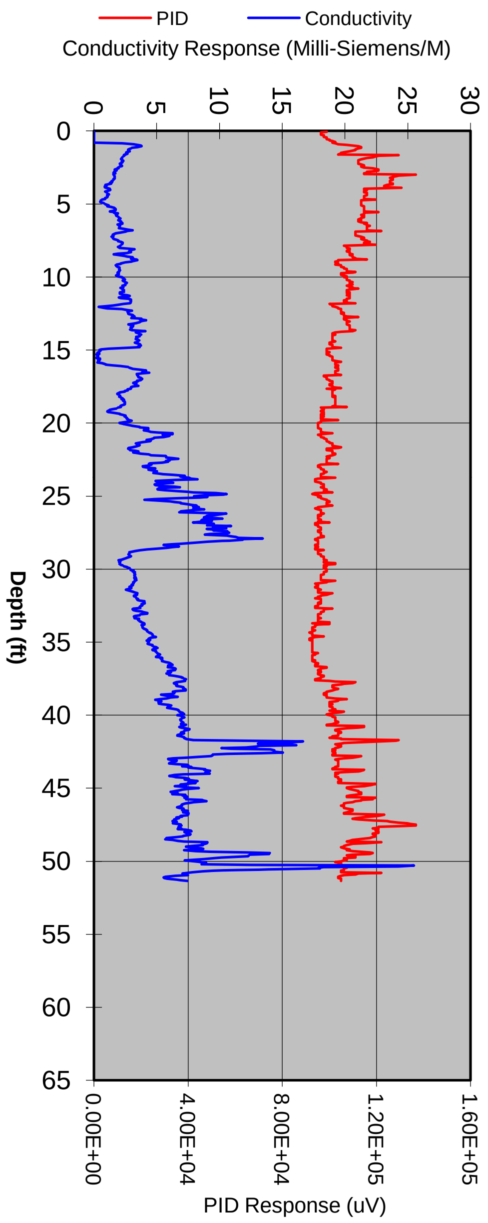
Notes:
None.

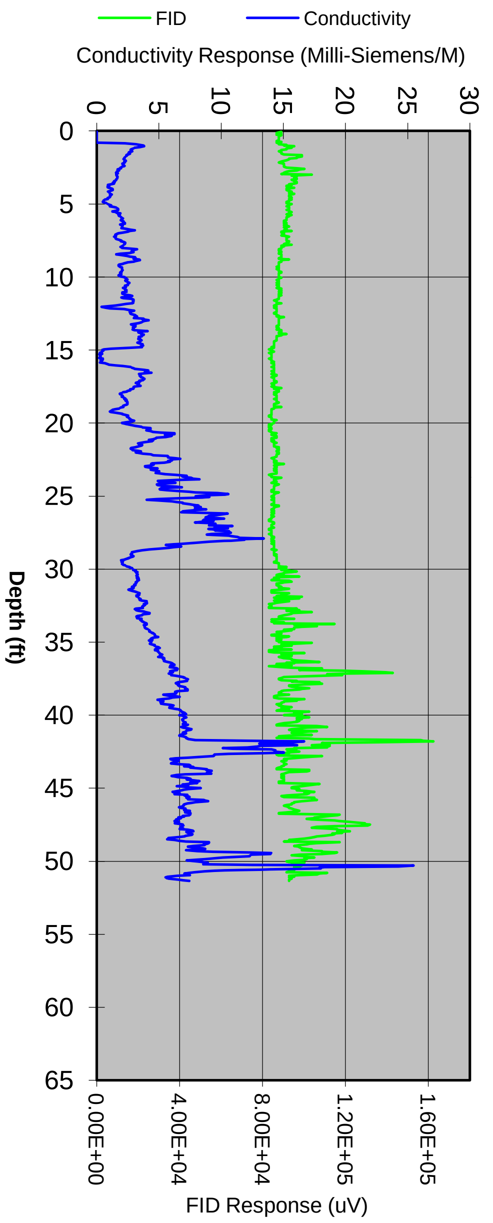
GW Depth (ft): 30
Depth of GW Provided by Client

Job Information		MIP Sampling Information			
Client Company:	URS	Trunkline Length:	150	Start Boring Time:	Thu Feb 23 2012 13:05:00
Project Name:	Itron Inc.	Probe Type:	6520	End Boring Time:	Thu Feb 23 2012 14:05:00
Site Address:	1310 Emerald Rd. Greenwood, SC	Rig Type:	Geoprobe 7822	MIP Specialist:	Chuck Terry









Appendix B – MIP Boring Logs (Common-Scale)

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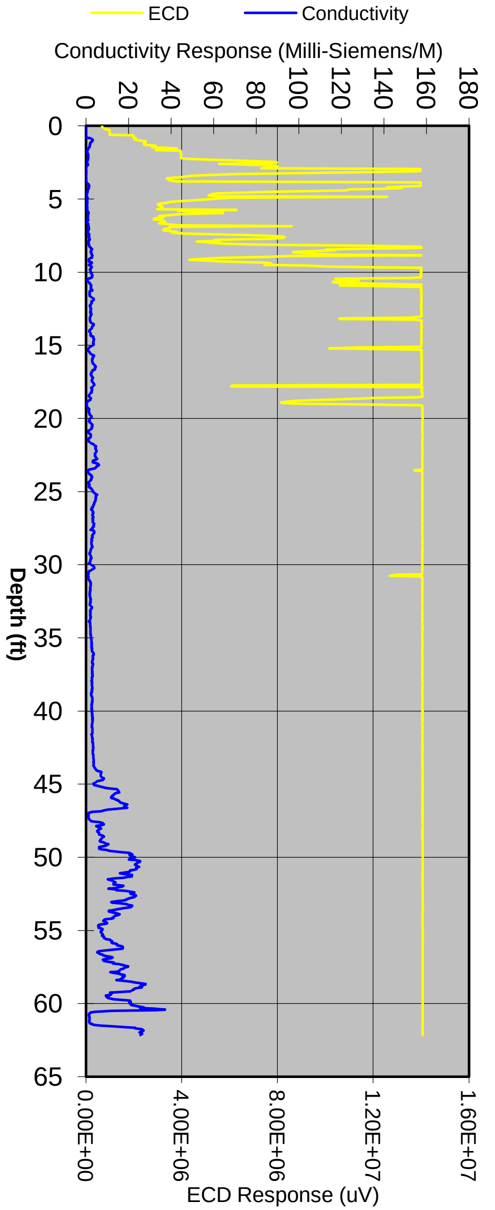
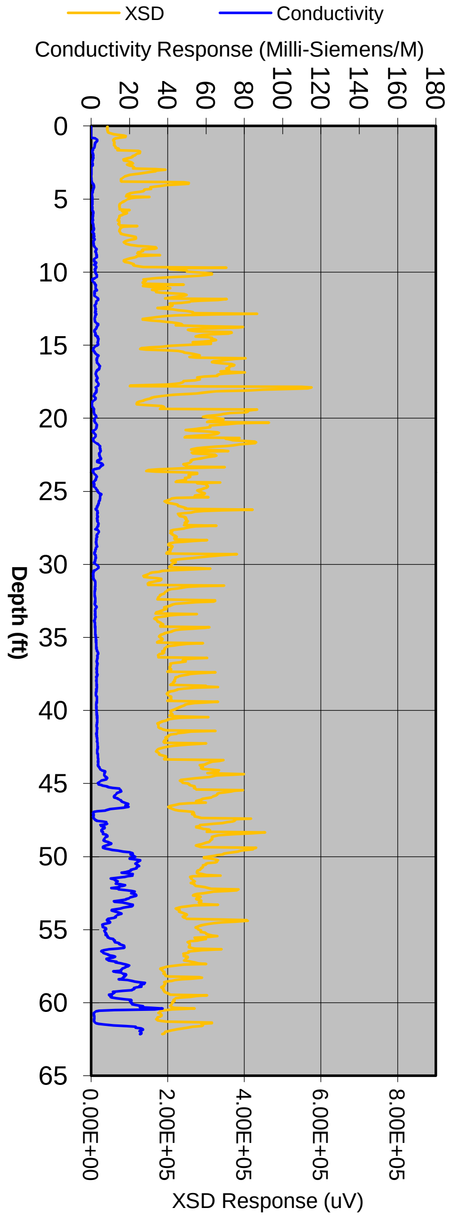
Boring Name: MIP01 **Total Depth (ft): 62.15**

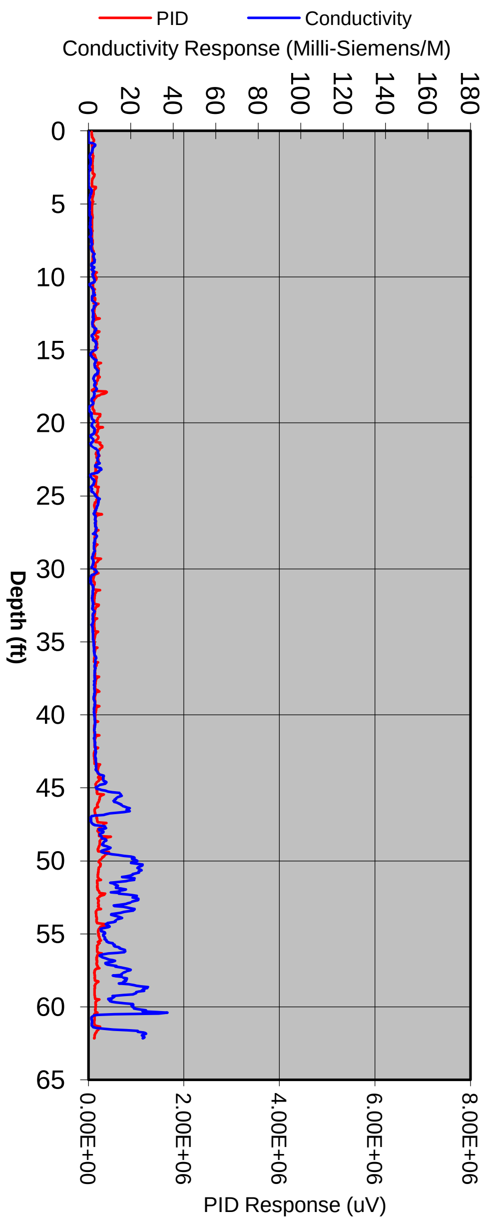
Notes:
New membrane. Heater failed at 18.80 feet bgs. Retracted tooling, repaired, and continued boring.

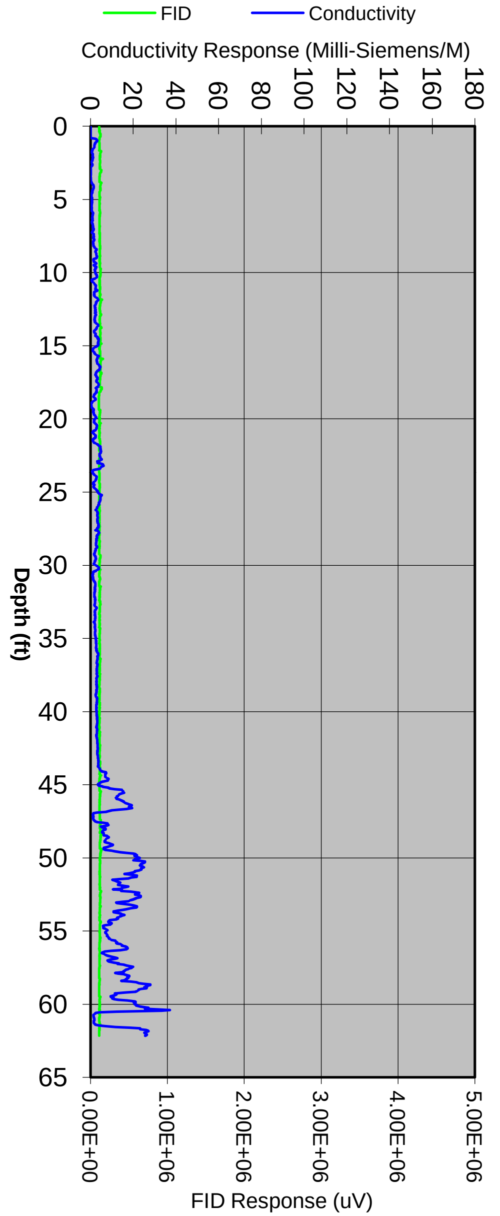
GW Depth (ft):
Depth of GW Provided by Client

Job Information		MIP Sampling Information			
Client Company:	URS	Trunkline Length:	150	Start Boring Time:	Mon Feb 20 2012 14:30:55
Project Name:	Itron Inc.	Probe Type:	6520	End Boring Time:	Mon Feb 20 2012 16:55:43
Site Address:	1310 Emerald Rd. Greenwood, SC	Rig Type:	Geoprobe 7822	MIP Specialist:	Chuck Terry









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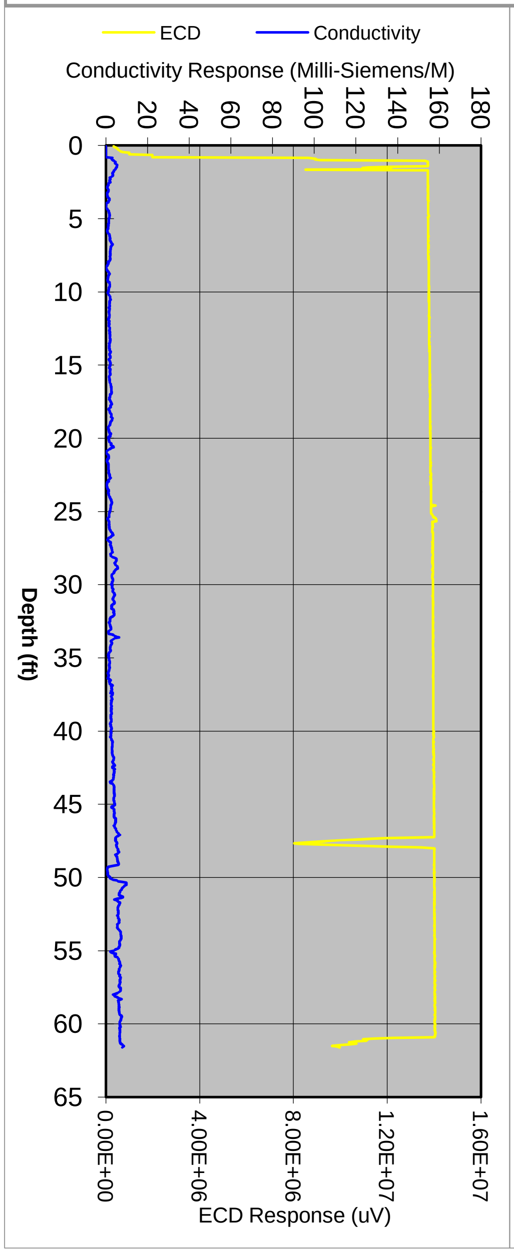
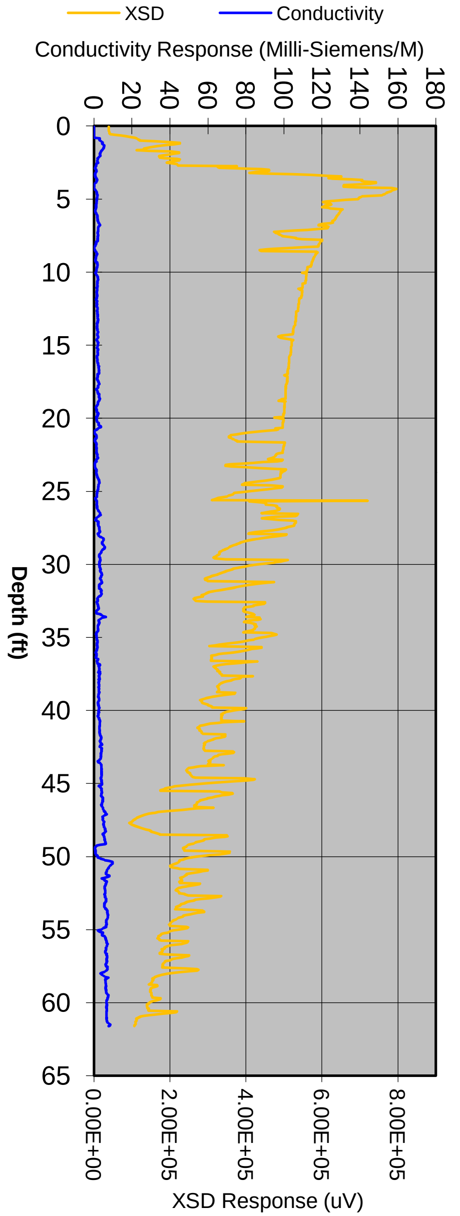
Boring Name: **MIP02** **Total Depth (ft):** **61.60**

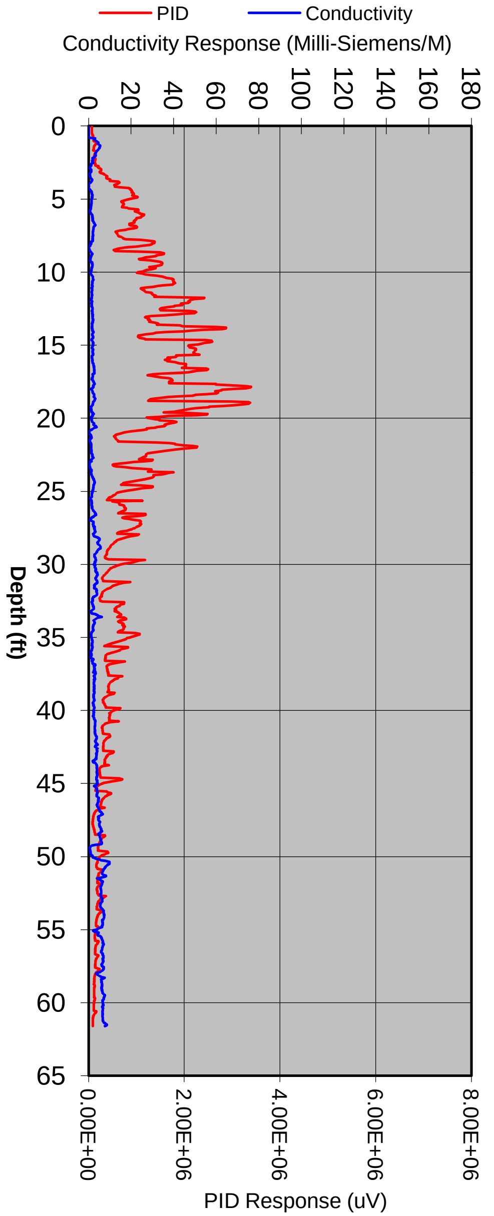
Notes:
Thermocouple failed at 25.50 feet bgs. Bypassed and completed boring.

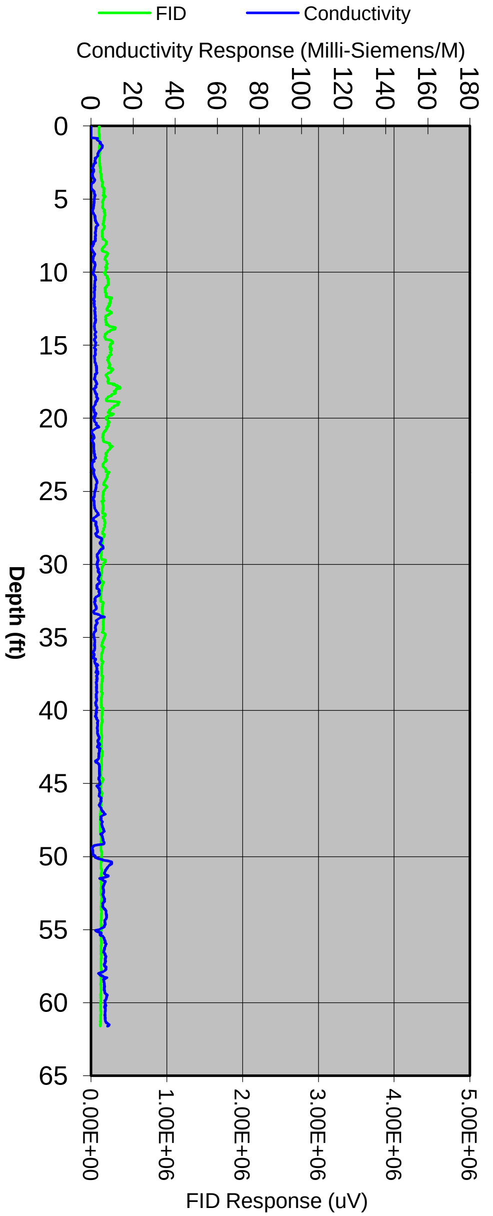
GW Depth
(ft):
Depth of GW Provided by Client

Job Information		MIP Sampling Information			
Client Company:	URS	Trunkline Length:	150	Start Boring Time:	Tue Feb 21 2012 08:02:43
Project Name:	Itron Inc.	Probe Type:	6520	End Boring Time:	Tue Feb 21 2012 09:20:43
Site Address:	1310 Emerald Rd. Greenwood, SC	Rig Type:	Geoprobe 7822	MIP Specialist:	Chuck Terry









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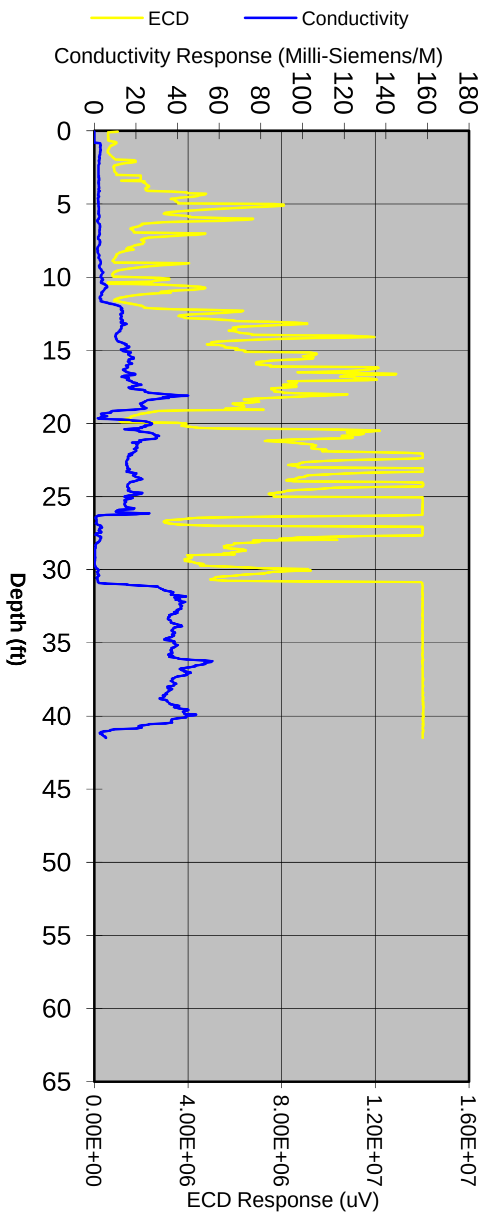
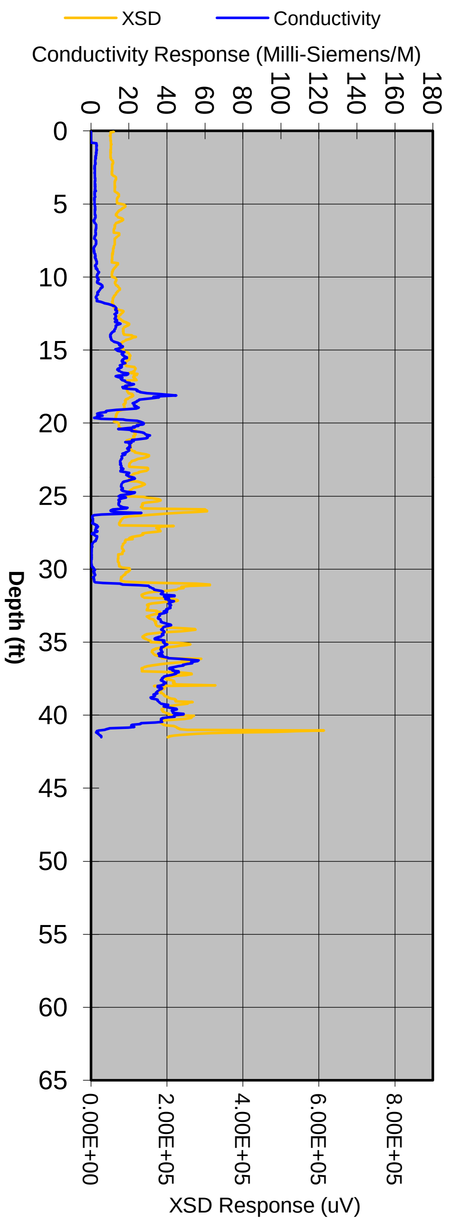
Boring Name: MIP03 **Total Depth (ft): 41.50**

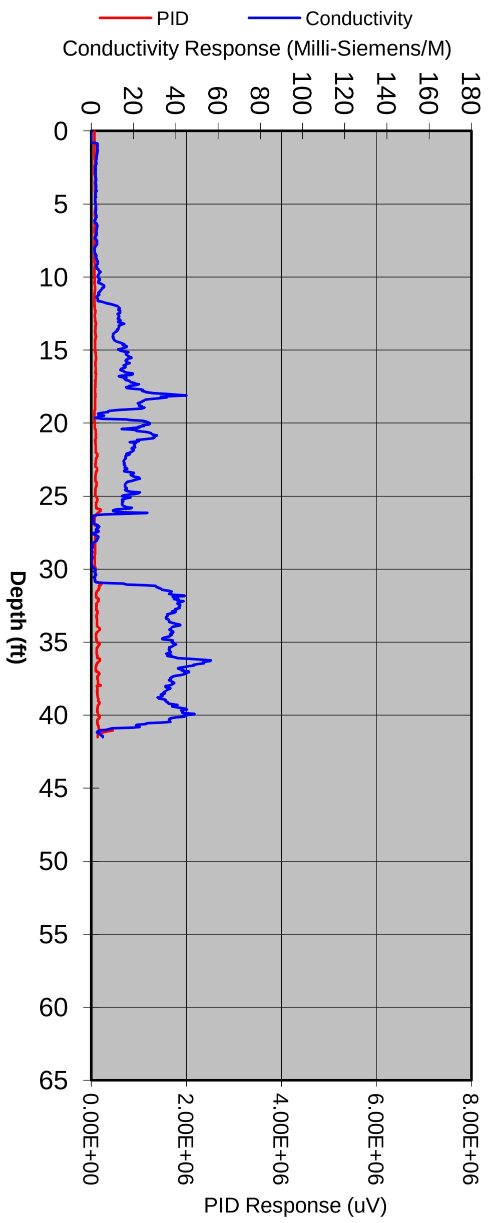
Notes:
None.

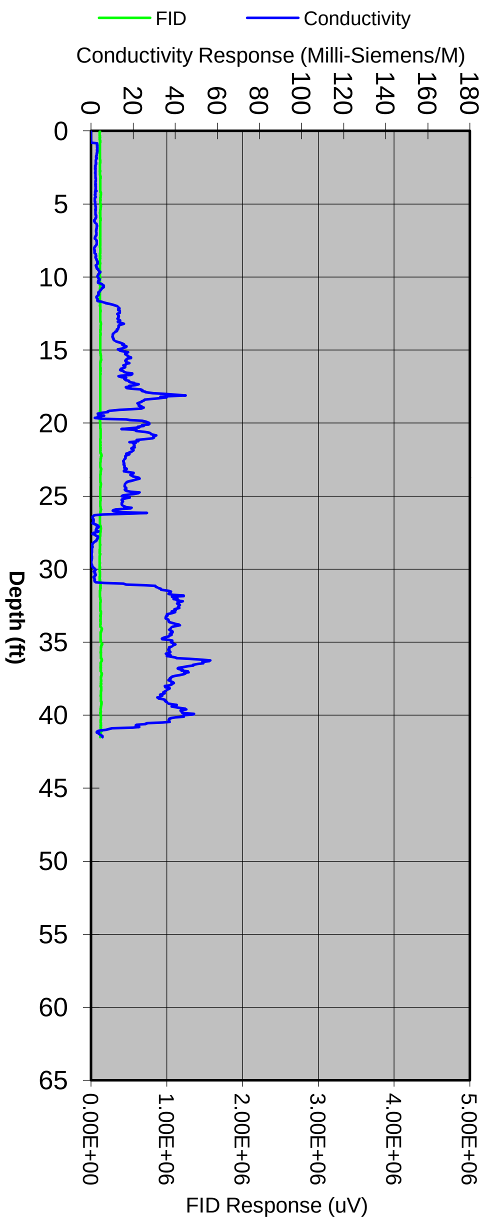
GW Depth (ft): 30
Depth of GW Provided by Client

Job Information		MIP Sampling Information			
Client Company: URS		Trunkline Length:	150	Start Boring Time:	Tue Feb 21 2012 10:20:43
Project Name:	Itron Inc.	Probe Type:	6520	End Boring Time:	Tue Feb 21 2012 11:15:43
Site Address:	1310 Emerald Rd. Greenwood, SC	Rig Type:	Geoprobe 7822	MIP Specialist:	Chuck Terry









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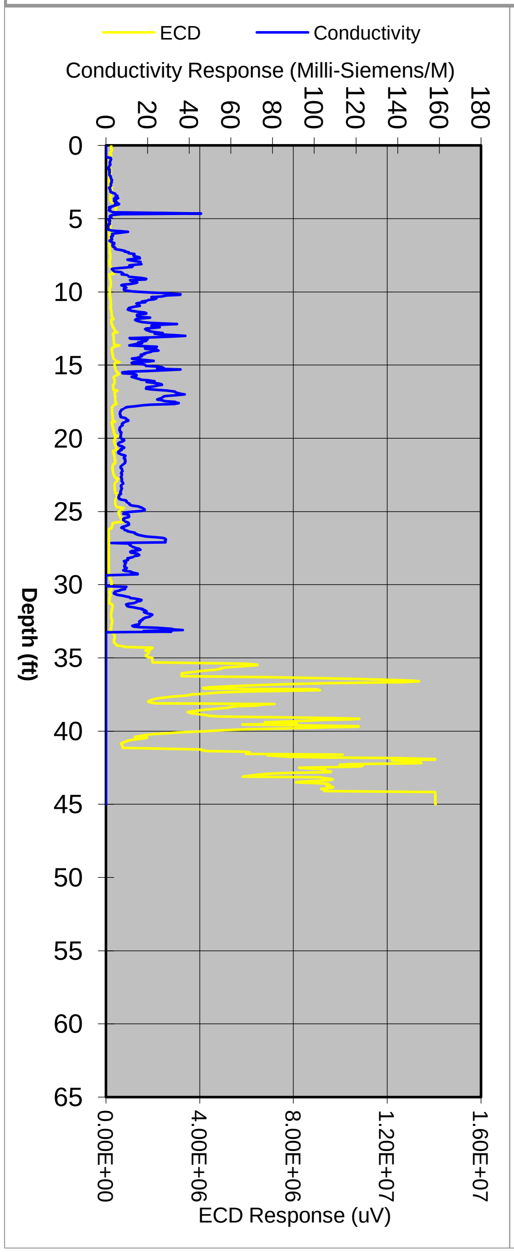
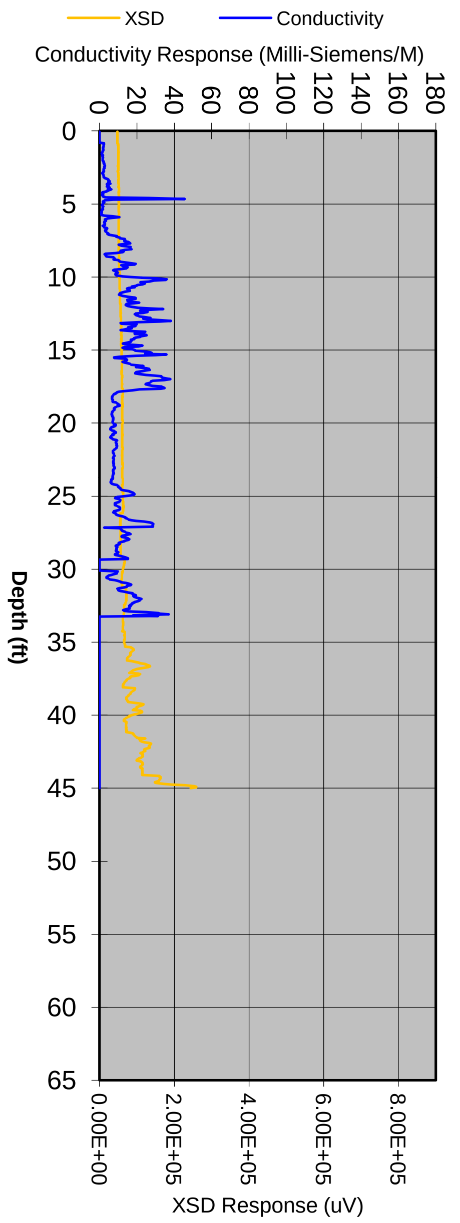
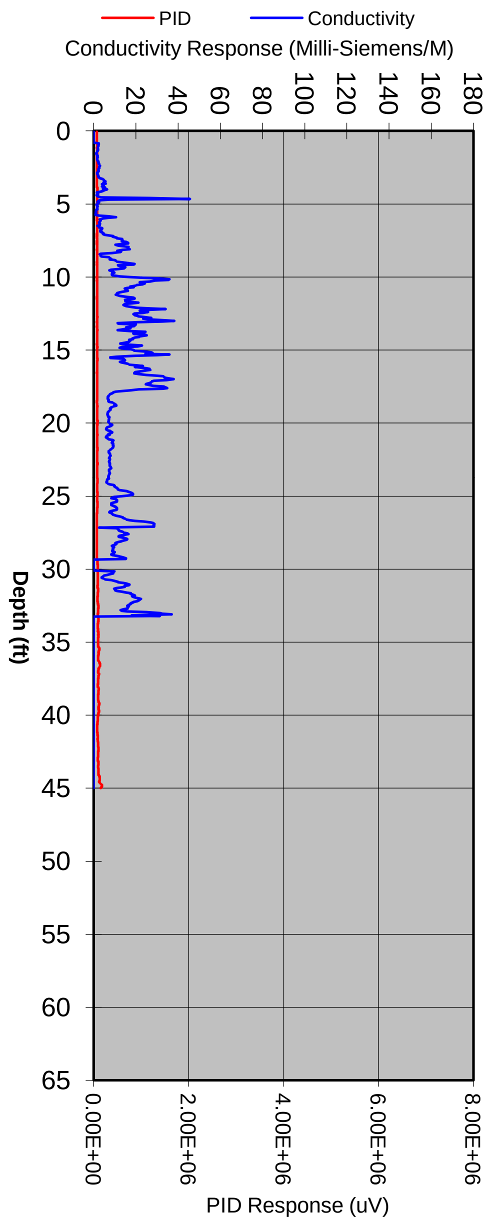
Boring Name: MIP04 Total Depth (ft): 45.00

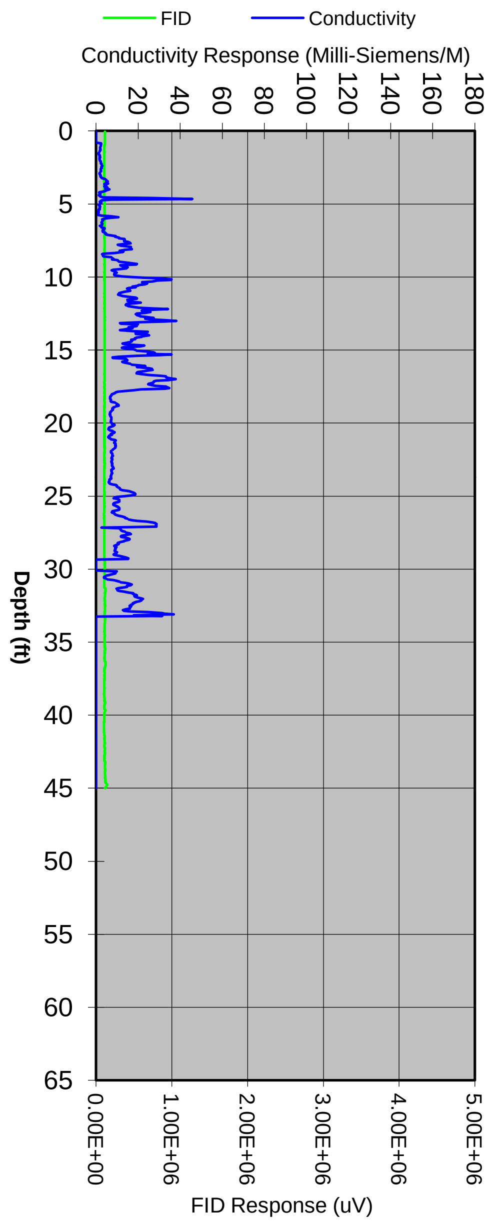
Notes: Heater failed at 27 feet bgs. Repaired and completed boring. Computer froze from 27 - 30 feet bgs, resulting in no detections for those depths. EC failed at 34 feet bgs.	GW Depth (ft): Depth of GW Provided by Client	30

Job Information		MIP Sampling Information			
Client Company:	URS	Trunkline Length:	150	Start Boring Time:	Tue Feb 21 2012 12:46:07
Project Name:	Itron Inc.	Probe Type:	6520	End Boring Time:	Tue Feb 21 2012 15:03:48
Site Address:	1310 Emerald Rd. Greenwood, SC	Rig Type:	Geoprobe 7822	MIP Specialist:	Chuck Terry









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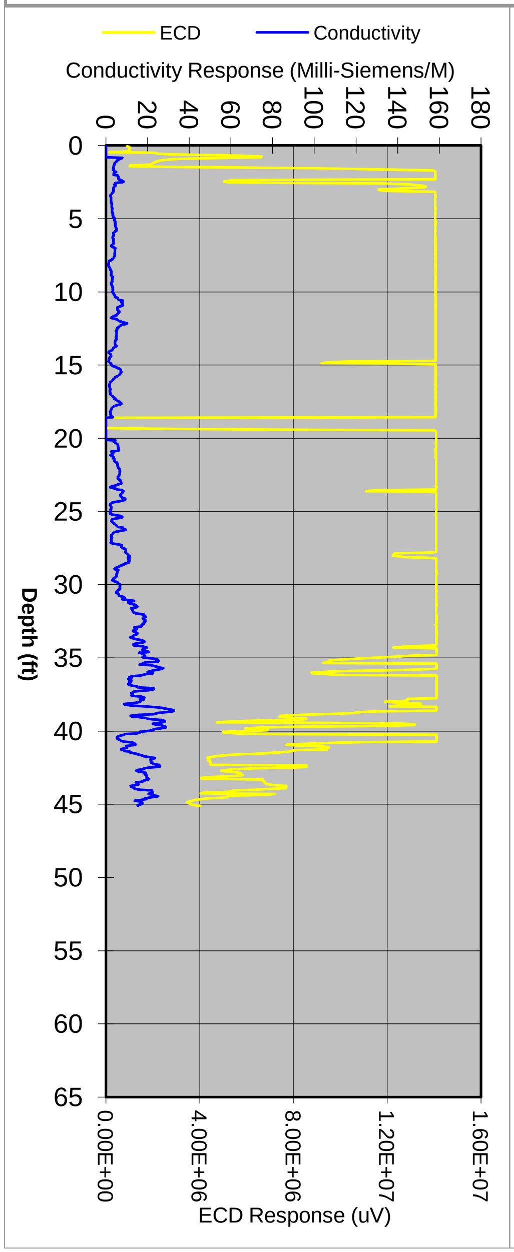
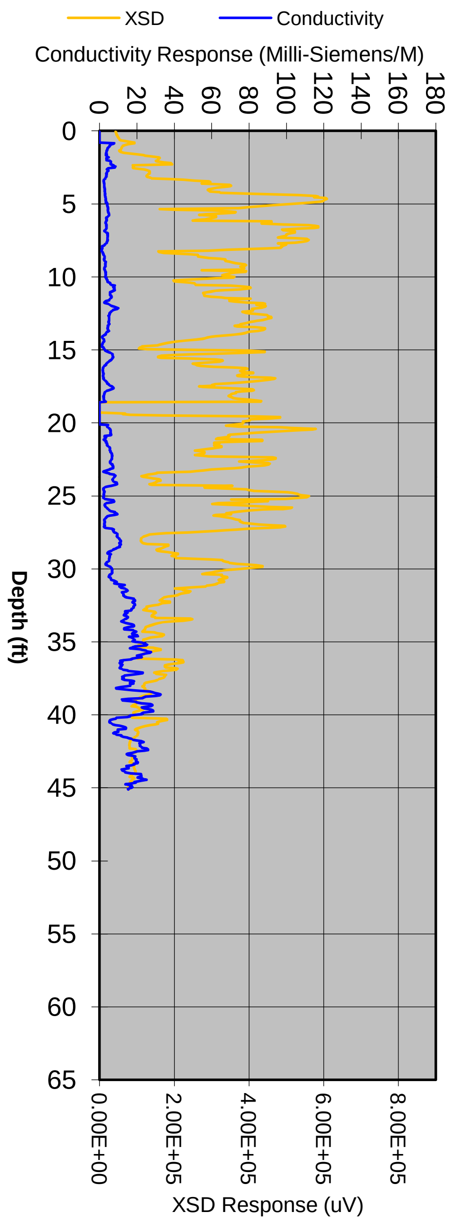
Boring Name: **MIP05** **Total Depth (ft):** **45.10**

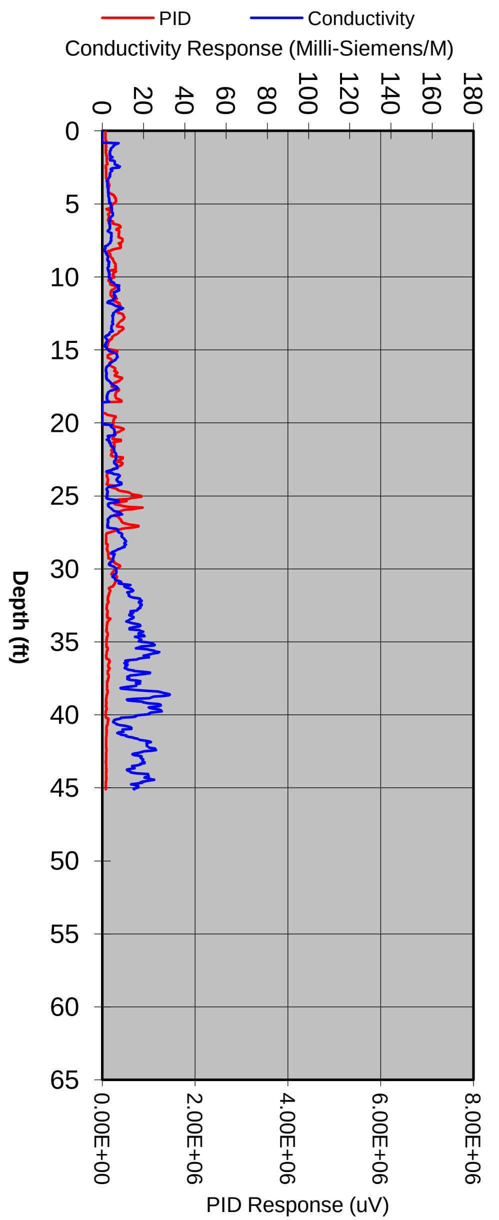
Notes:
Computer froze from 17.50 - 20 feet bgs, resulting in no detections at those depths.

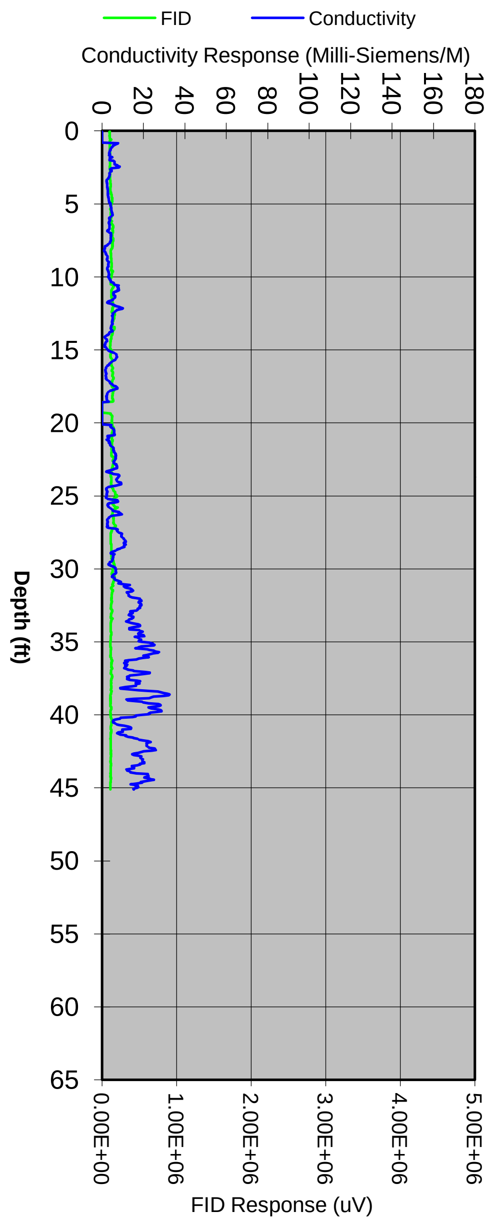
GW Depth (ft): 30
Depth of GW Provided by Client

Job Information		MIP Sampling Information			
Client Company:	URS	Trunkline Length:	150	Start Boring Time:	ue Feb 21 2012 16:09:29
Project Name:	Itron Inc.	Probe Type:	6520	End Boring Time:	Tue Feb 21 2012 17:10:51
Site Address:	1310 Emerald Rd. Greenwood, SC	Rig Type:	Geoprobe 7822	MIP Specialist:	Chuck Terry









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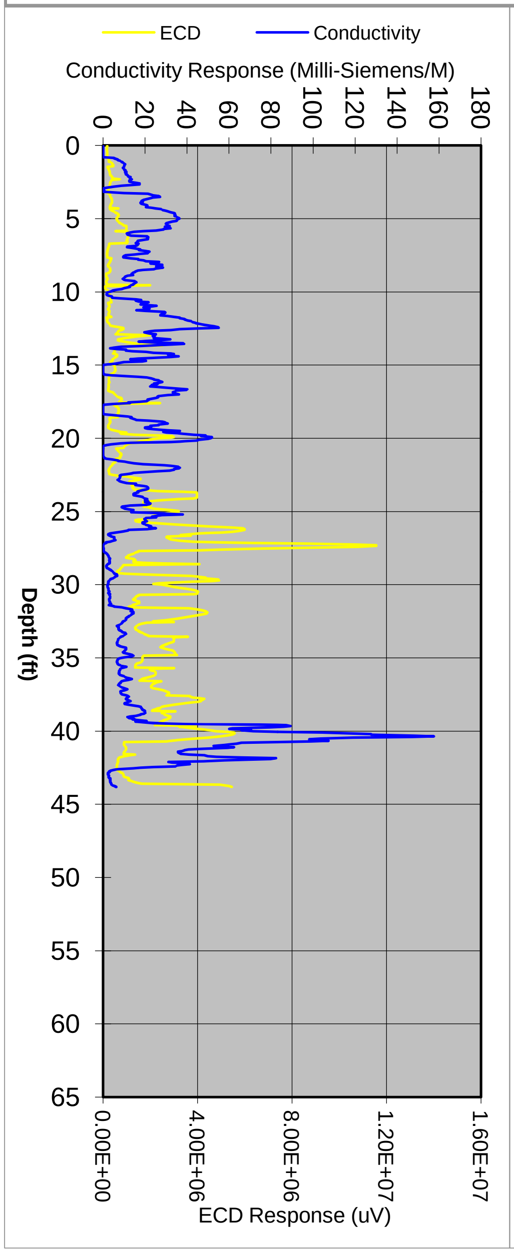
Boring Name: MIP06

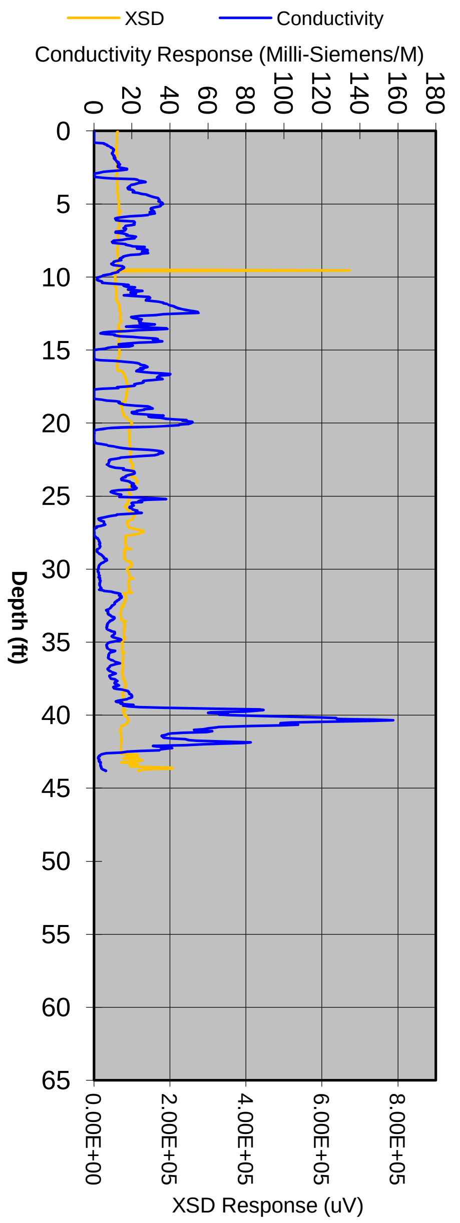
Total Depth (ft): 43.80

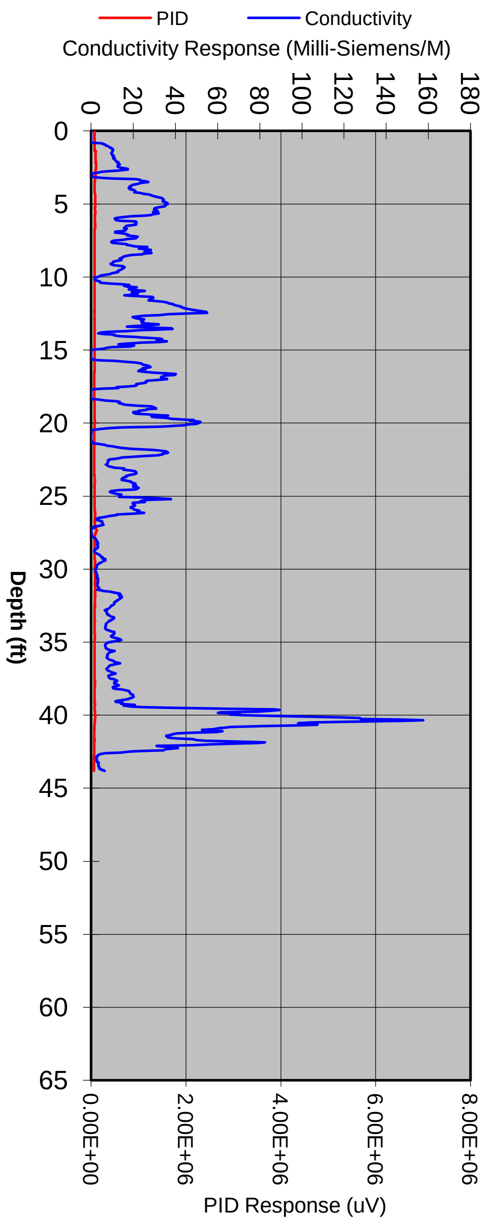
Notes:
Nitrogen line severed from 43.80 feet bgs. Terminated boring at approximately 43.80 feet bgs.

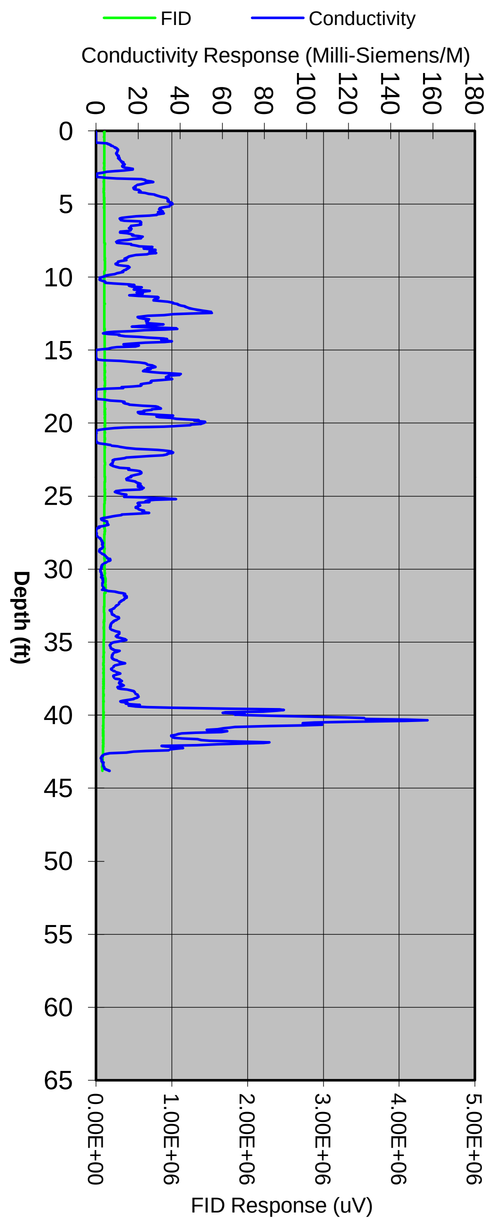
GW Depth (ft): 30
Depth of GW Provided by Client

Job Information		MIP Sampling Information			
Client Company:	URS	Trunkline Length:	150	Start Boring Time:	Wed Feb 22 2012 08:18:47
Project Name:	Itron Inc.	Probe Type:	6520	End Boring Time:	Wed Feb 22 2012 09:28:53
Site Address:	1310 Emerald Rd. Greenwood, SC	Rig Type:	Geoprobe 7822	MIP Specialist:	Chuck Terry









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Boring Name: **MIP07**

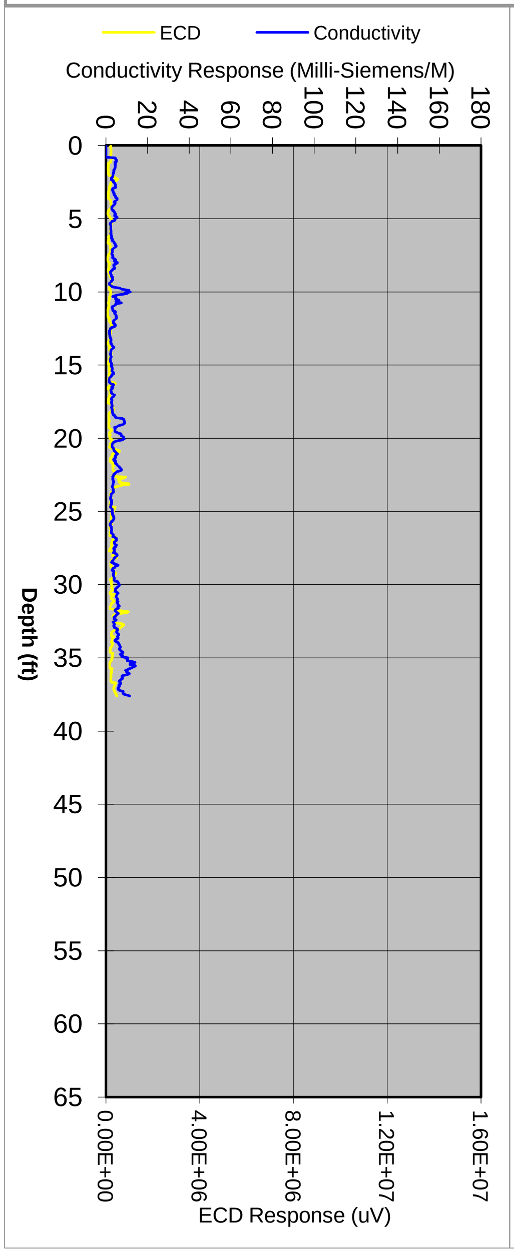
Total Depth (ft): **37.60**

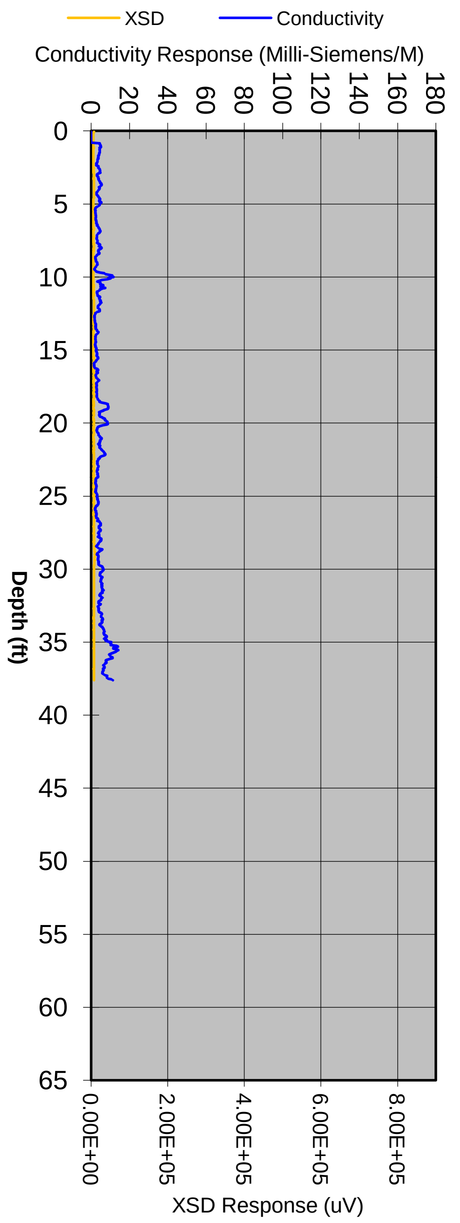
Notes:
Nitrogen line severed at 37.60 feet bgs. Terminated boring at 37.60 feet bgs.

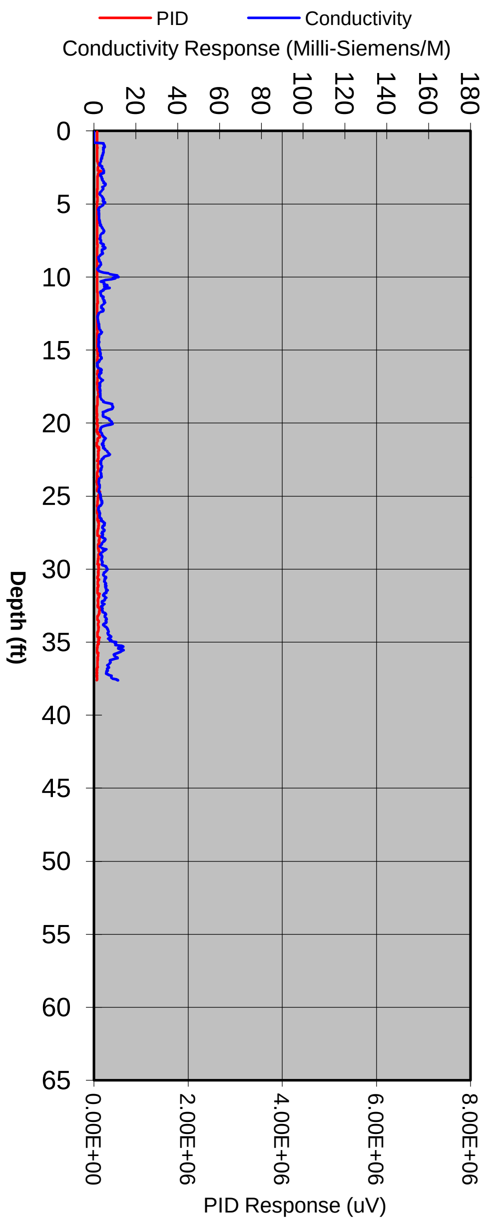
GW Depth (ft): 30
Depth of GW Provided by Client

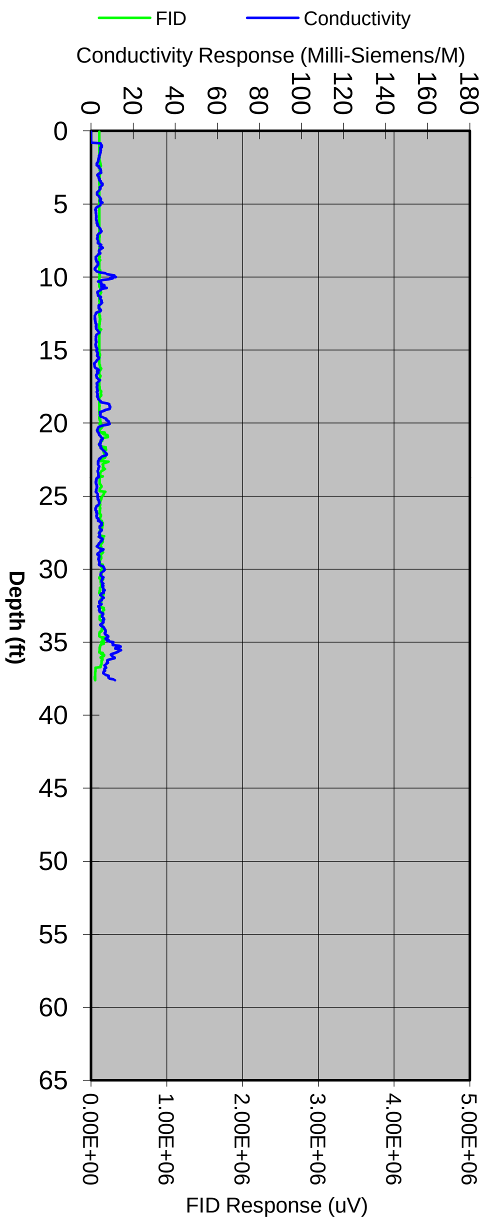
Job Information	
Client Company:	URS
Project Name:	Itron Inc.
Site Address:	1310 Emerald Rd. Greenwood, SC

MIP Sampling Information			
Trunkline Length:	150	Start Boring Time:	Wed Feb 22 2012 10:15:35
Probe Type:	6520	End Boring Time:	Wed Feb 22 2012 10:55:40
Rig Type:	Geoprobe 7822	MIP Specialist:	Chuck Terry









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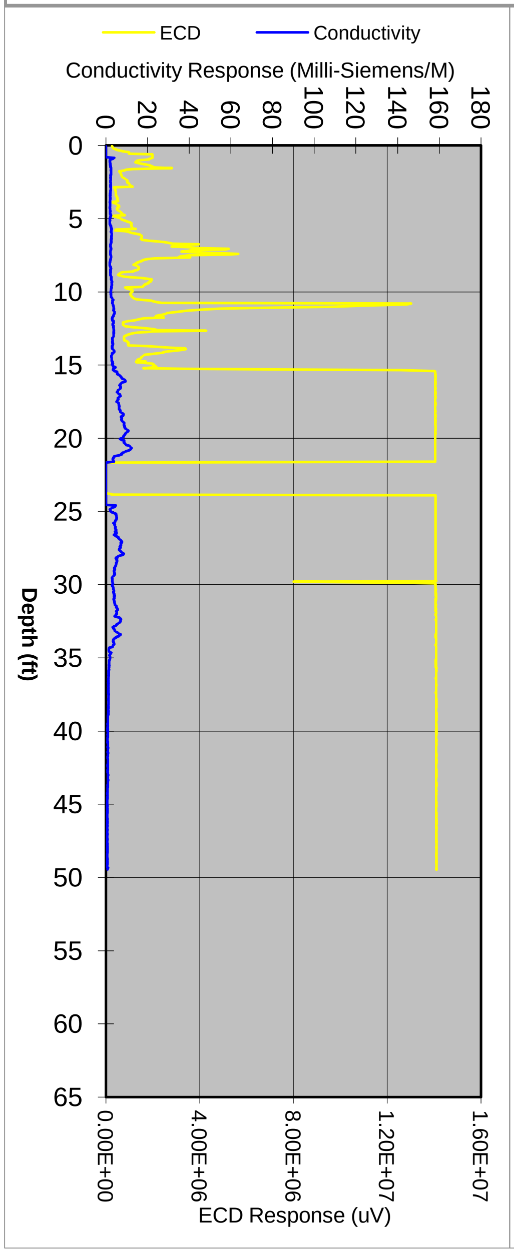
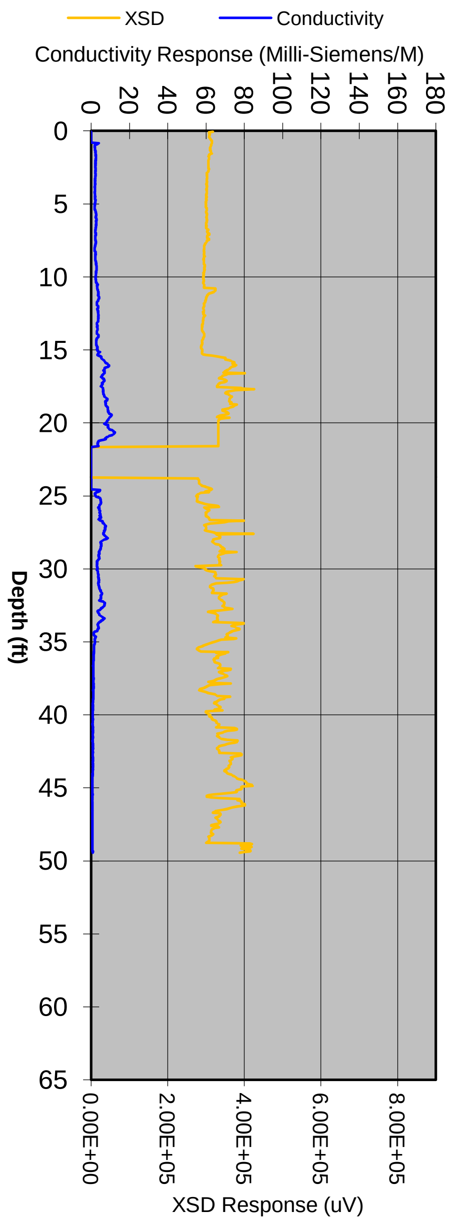
Boring Name: **MIP08** **Total Depth (ft):** **49.45**

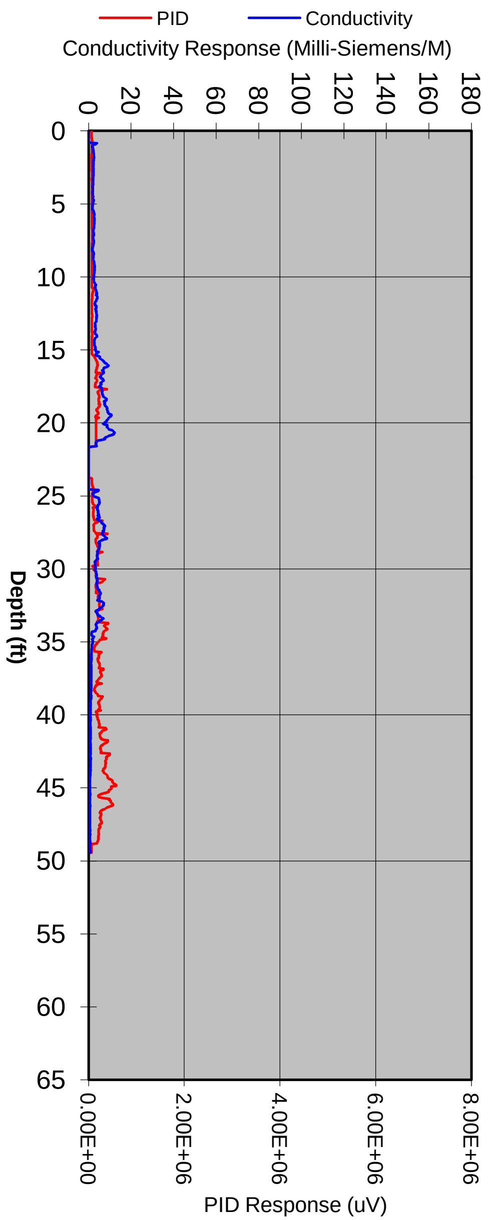
Notes:
No data collected from 22 to 24 feet bgs due to temporary power loss.

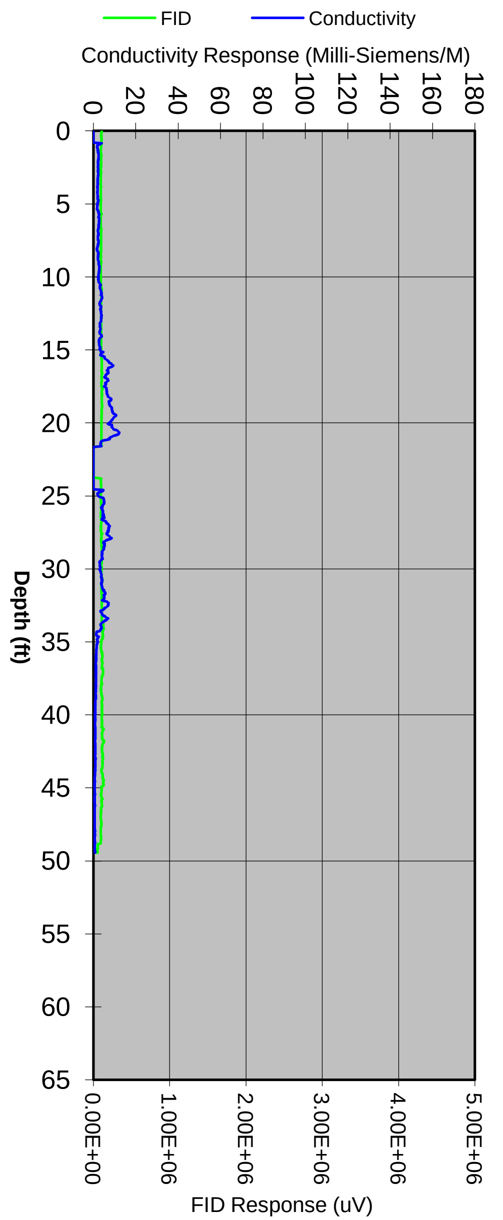
GW Depth (ft):
Depth of GW Provided by Client

Job Information		MIP Sampling Information			
Client Company:	URS	Trunkline Length:	150	Start Boring Time:	Wed Feb 22 2012 12:27:48
Project Name:	Itron Inc.	Probe Type:	6520	End Boring Time:	Wed Feb 22 2012 13:25:16
Site Address:	1310 Emerald Rd. Greenwood, SC	Rig Type:	Geoprobe 7822	MIP Specialist:	Chuck Terry









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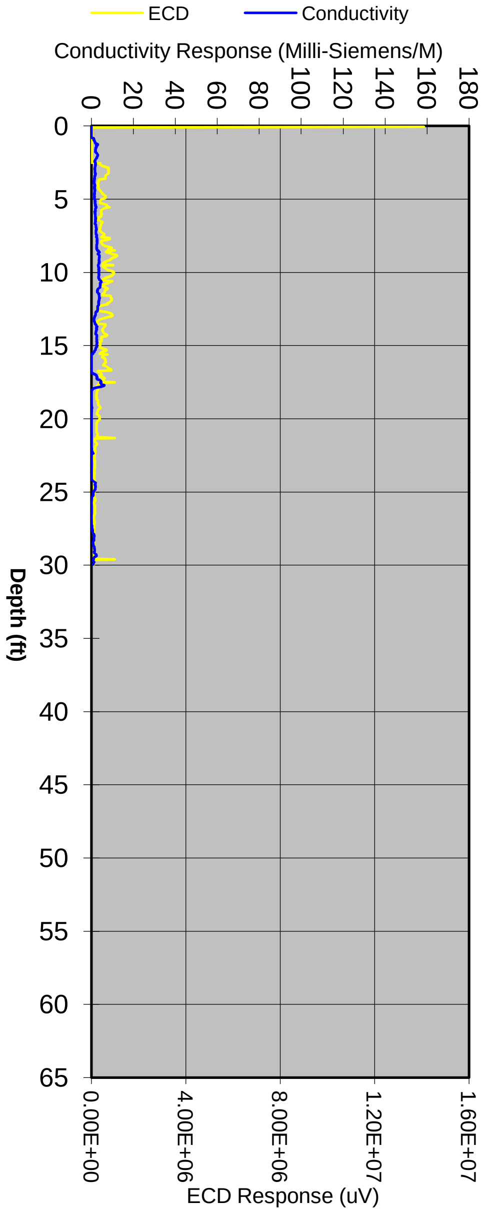
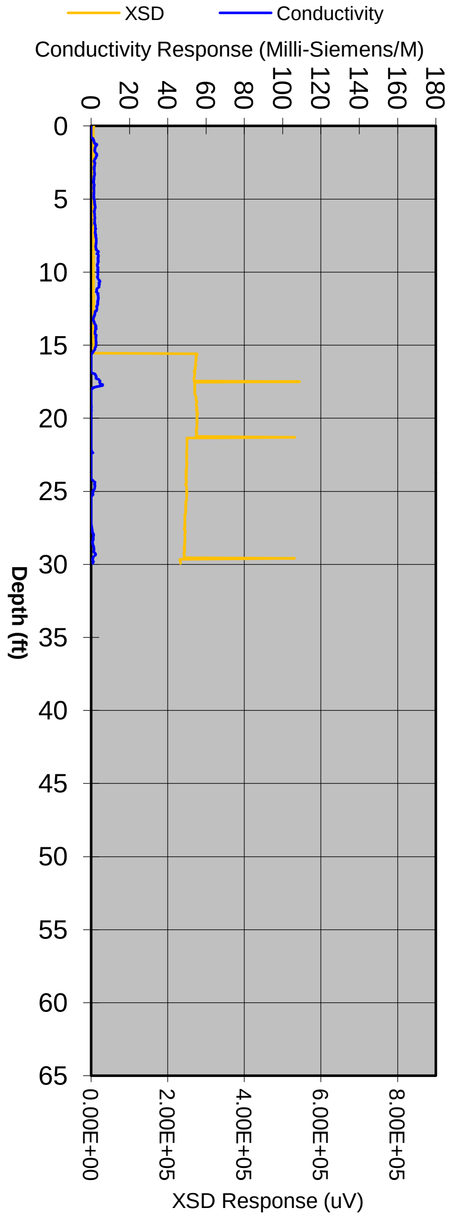
Boring Name: MIP09 **Total Depth (ft):** 29.95

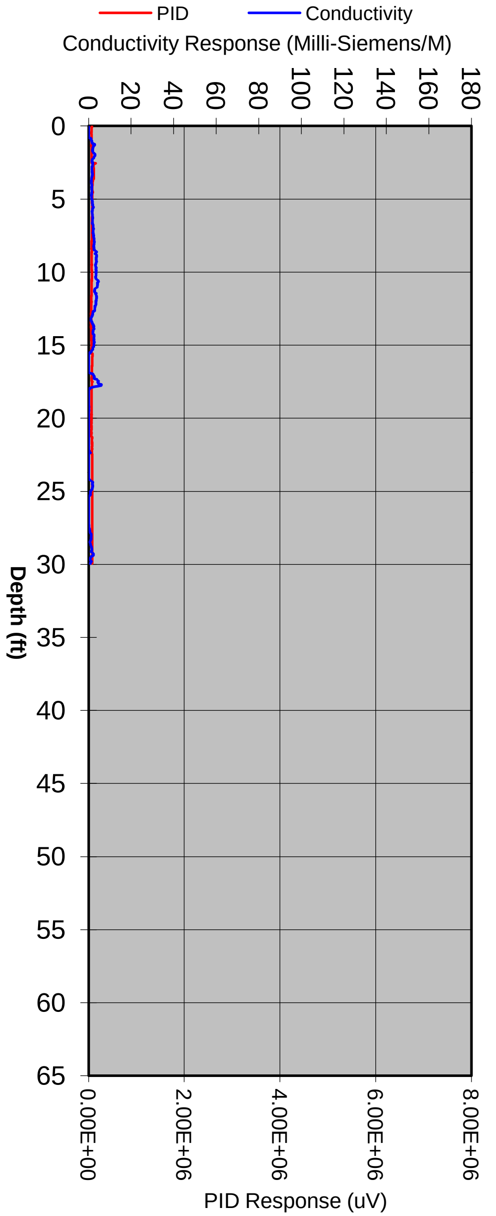
Notes:
Stopped boring at 15 feet bgs due to high pressure. XSD error caused poor detections from 0 - 15 feet bgs. Refusal at 29.95 feet bgs.

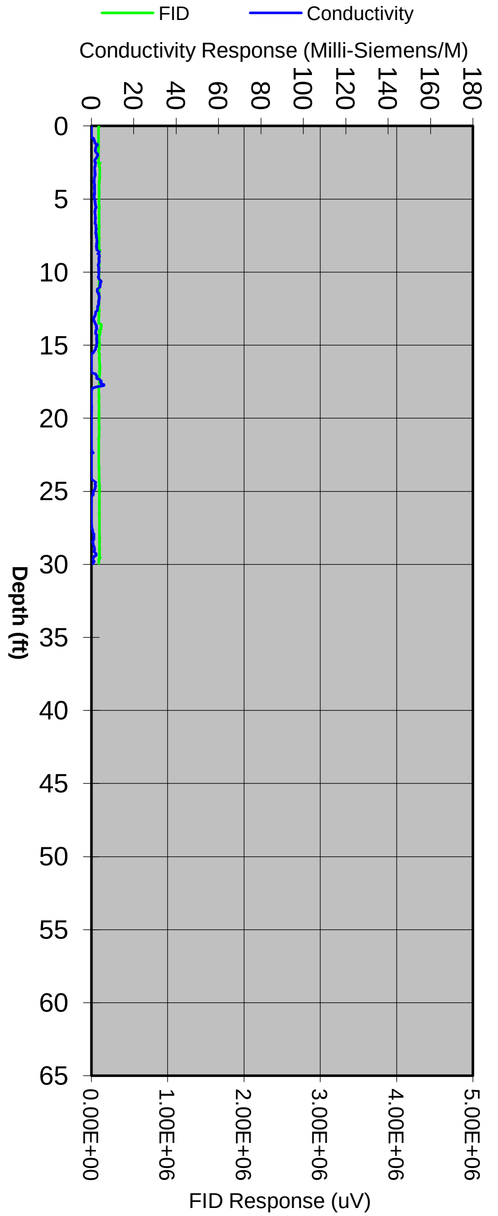
GW Depth (ft): 30
Depth of GW Provided by Client

Job Information		MIP Sampling Information			
Client Company:	URS	Trunkline Length:	150	Start Boring Time:	Wed Feb 22 2012 16:37:39
Project Name:	Itron Inc.	Probe Type:	6520	End Boring Time:	Thu Feb 23 2012 07:50:48
Site Address:	1310 Emerald Rd. Greenwood, SC	Rig Type:	Geoprobe 7822	MIP Specialist:	Chuck Terry









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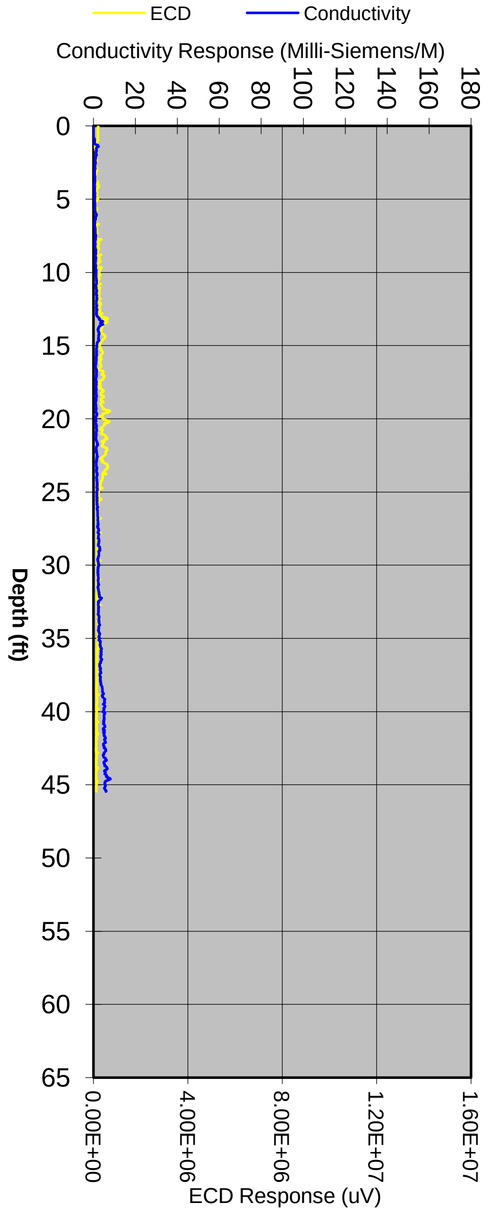
Boring Name: MIP10 **Total Depth (ft): 45.45**

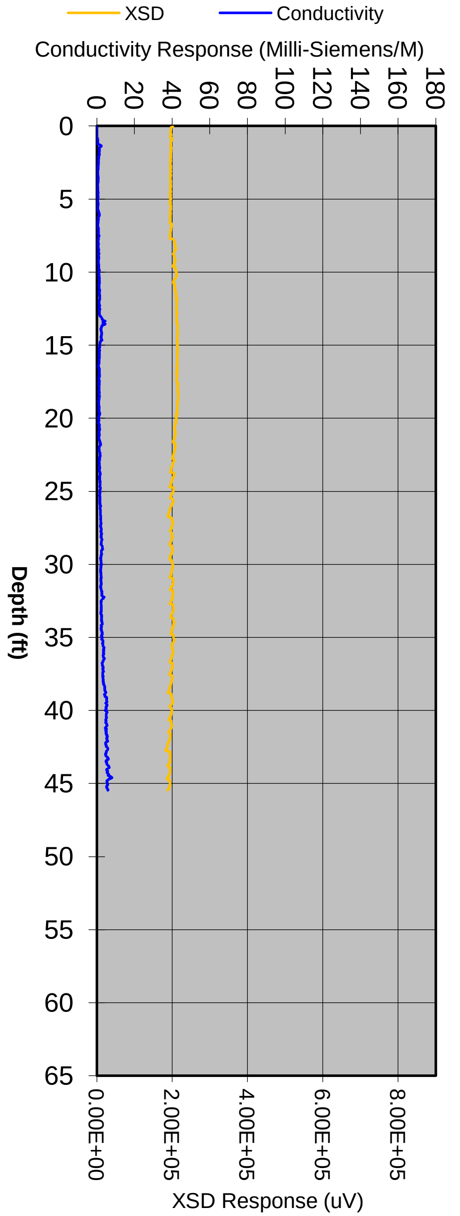
Notes:
None.

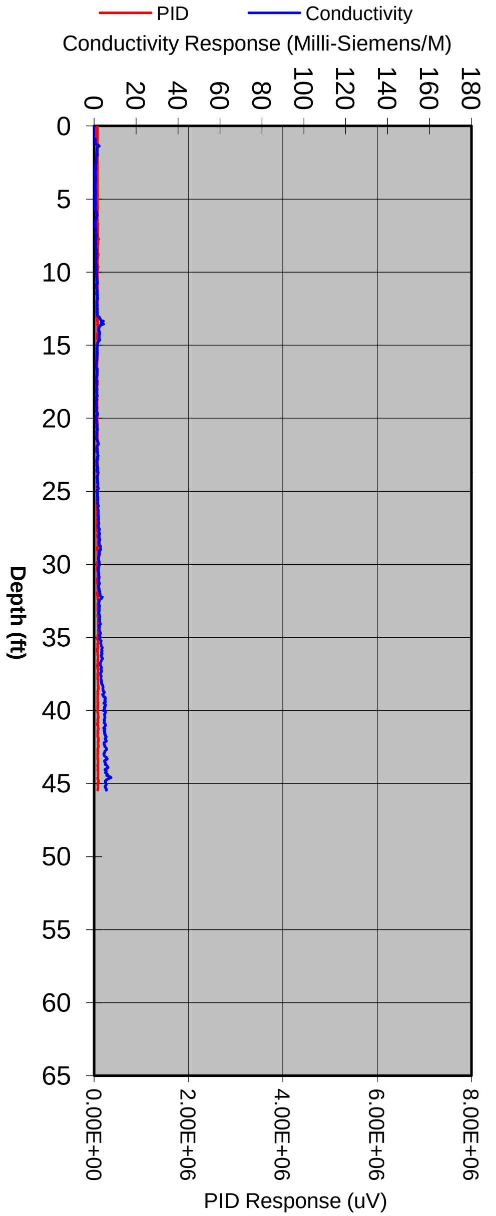
GW Depth (ft): 30
Depth of GW Provided by Client

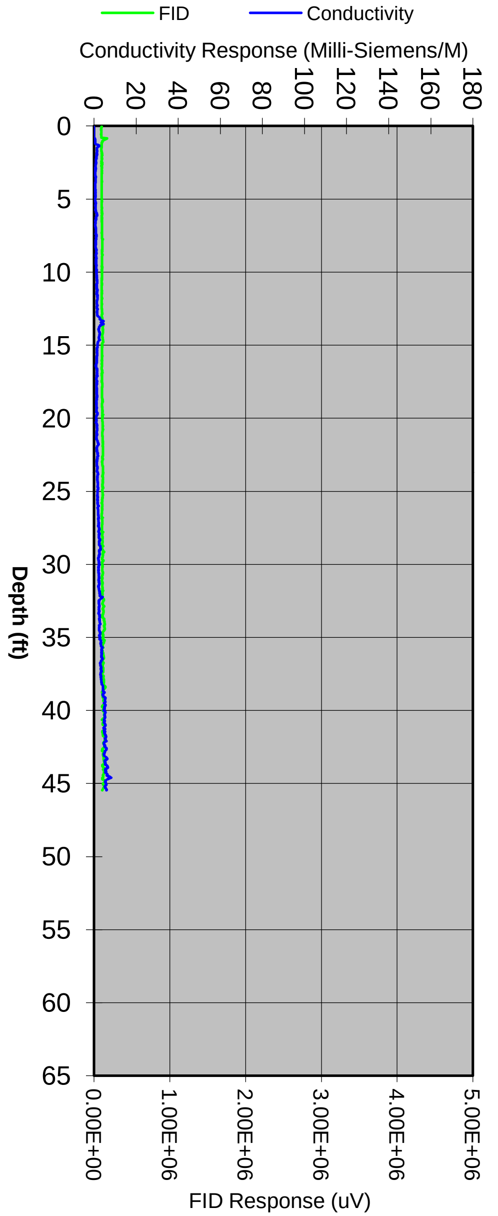
Job Information	
Client Company:	URS
Project Name:	Itron Inc.
Site Address:	1310 Emerald Rd. Greenwood, SC

MIP Sampling Information			
Trunkline Length:	150	Start Boring Time:	Thu Feb 23 2012 08:33:35
Probe Type:	6520	End Boring Time:	Thu Feb 23 2012 09:25:49
Rig Type:	Geoprobe 7822	MIP Specialist:	Chuck Terry









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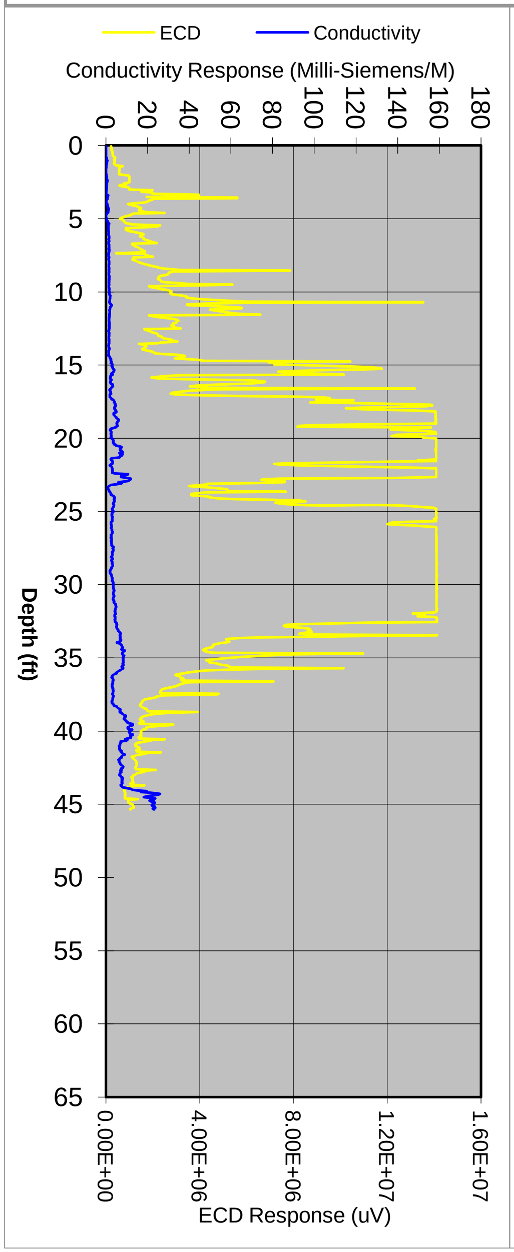
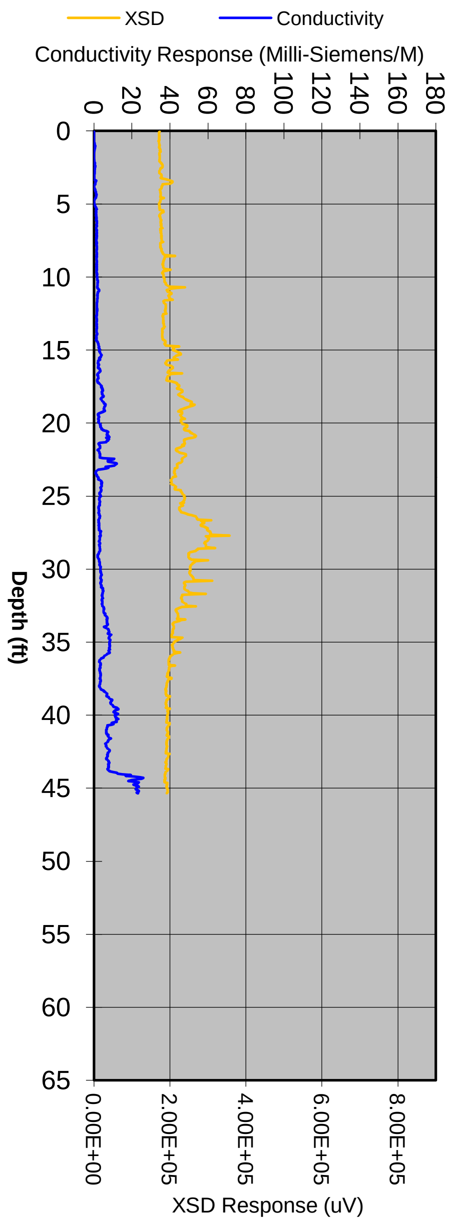
Boring Name: MIP11 **Total Depth (ft): 45.35**

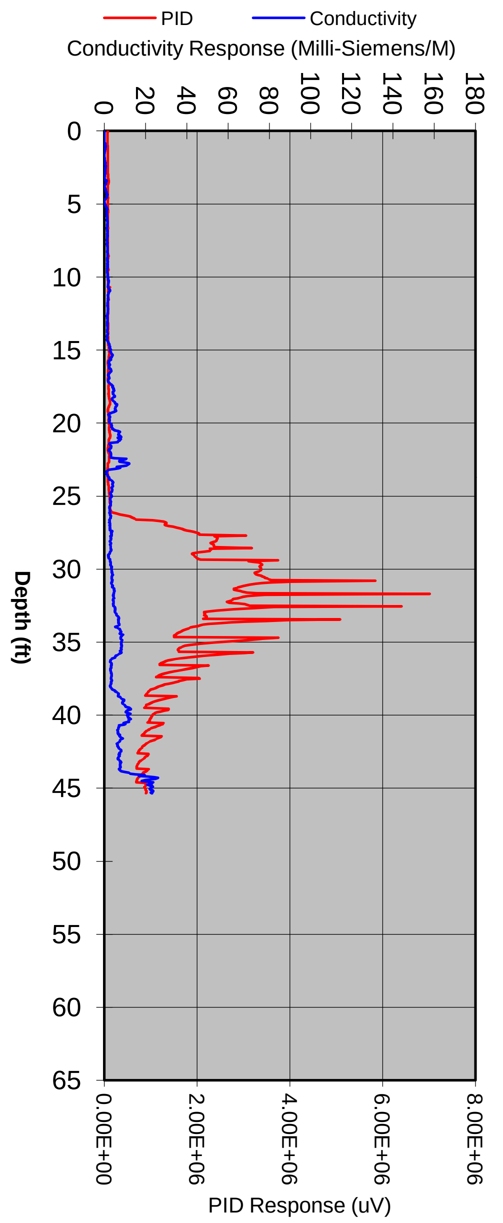
Notes:
None.

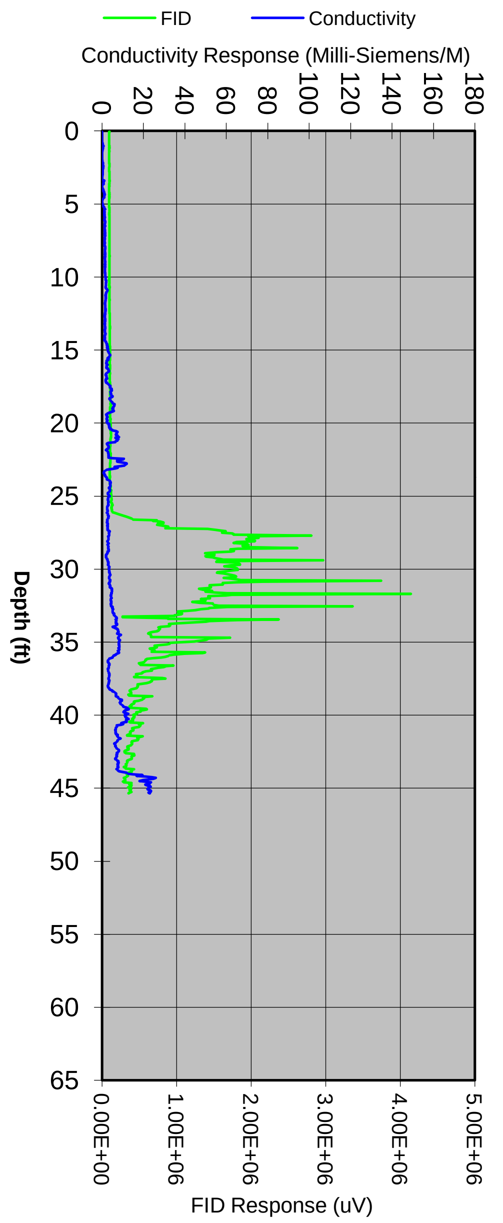
GW Depth (ft): 30
Depth of GW Provided by Client

Job Information		MIP Sampling Information			
Client Company:	URS	Trunkline Length:	150	Start Boring Time:	Thu Feb 23 2012 09:56:05
Project Name:	Itron Inc.	Probe Type:	6520	End Boring Time:	Thu Feb 23 2012 10:49:40
Site Address:	1310 Emerald Rd. Greenwood, SC	Rig Type:	Geoprobe 7822	MIP Specialist:	Chuck Terry









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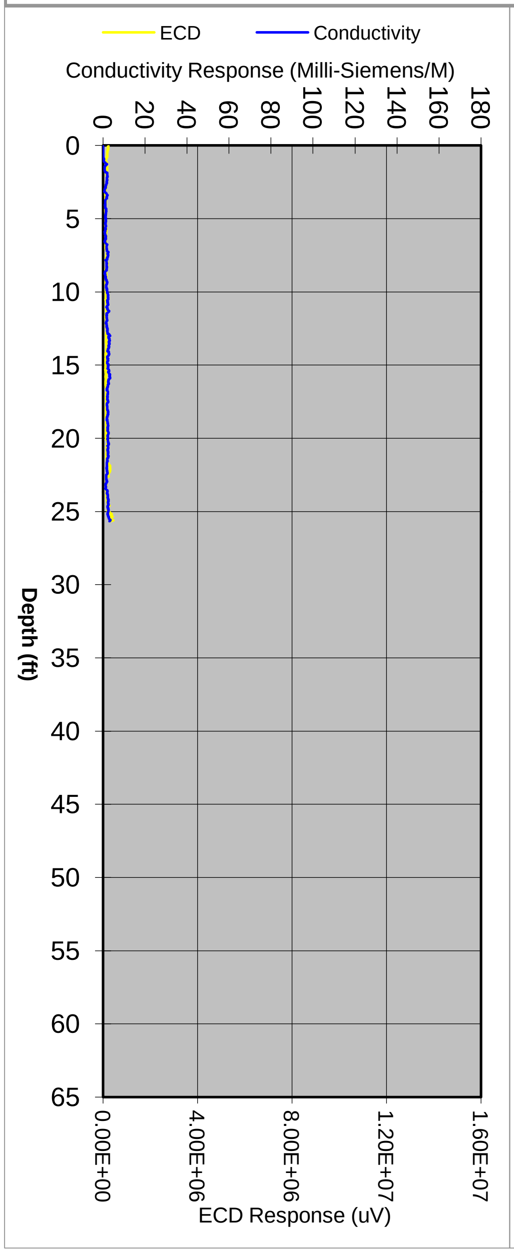
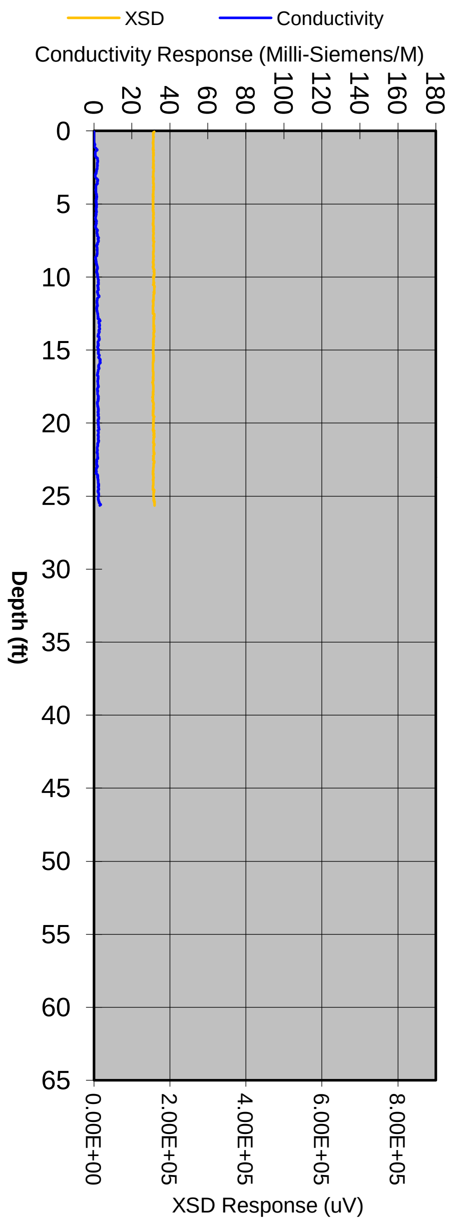
Boring Name: MIP12 **Total Depth (ft): 25.65**

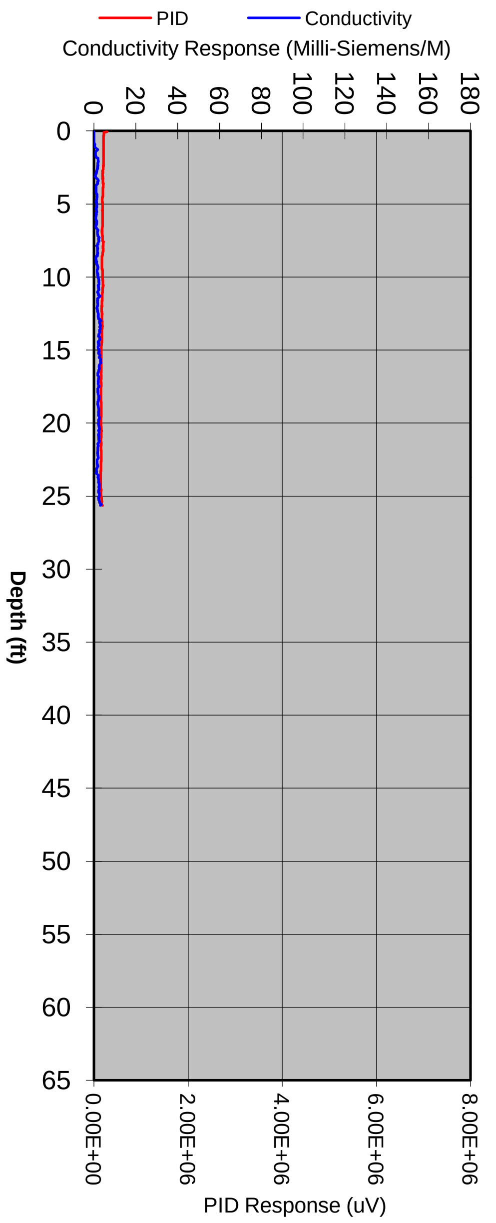
Notes:
Refusal at 25.65 feet bgs.

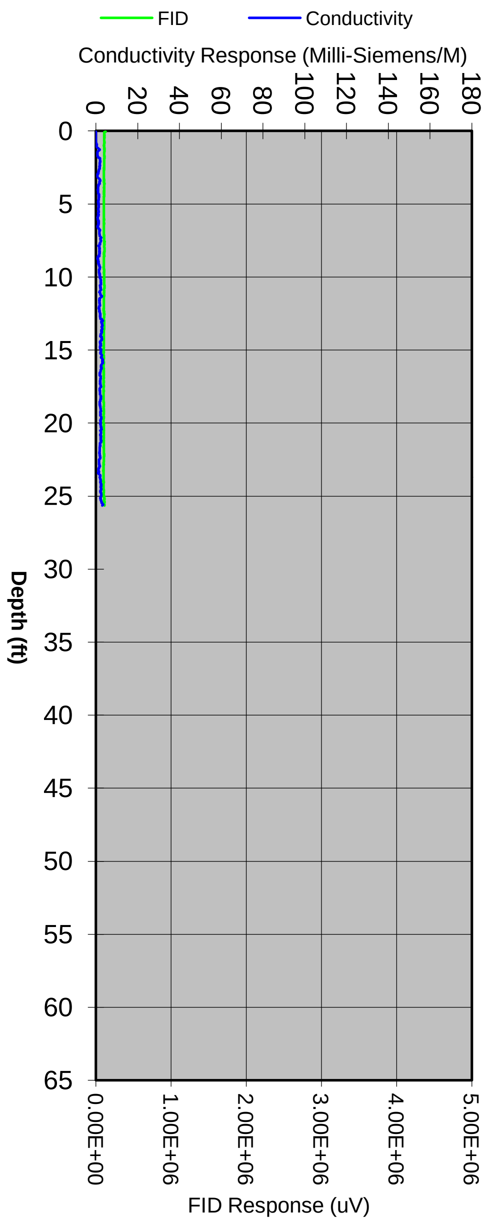
GW Depth (ft): 30
Depth of GW Provided by Client

Job Information		MIP Sampling Information			
Client Company:	URS	Trunkline Length:	150	Start Boring Time:	Thu Feb 23 2012 11:13:40
Project Name:	Itron Inc.	Probe Type:	6520	End Boring Time:	Thu Feb 23 2012 11:42:26
Site Address:	1310 Emerald Rd. Greenwood, SC	Rig Type:	Geoprobe 7822	MIP Specialist:	Chuck Terry









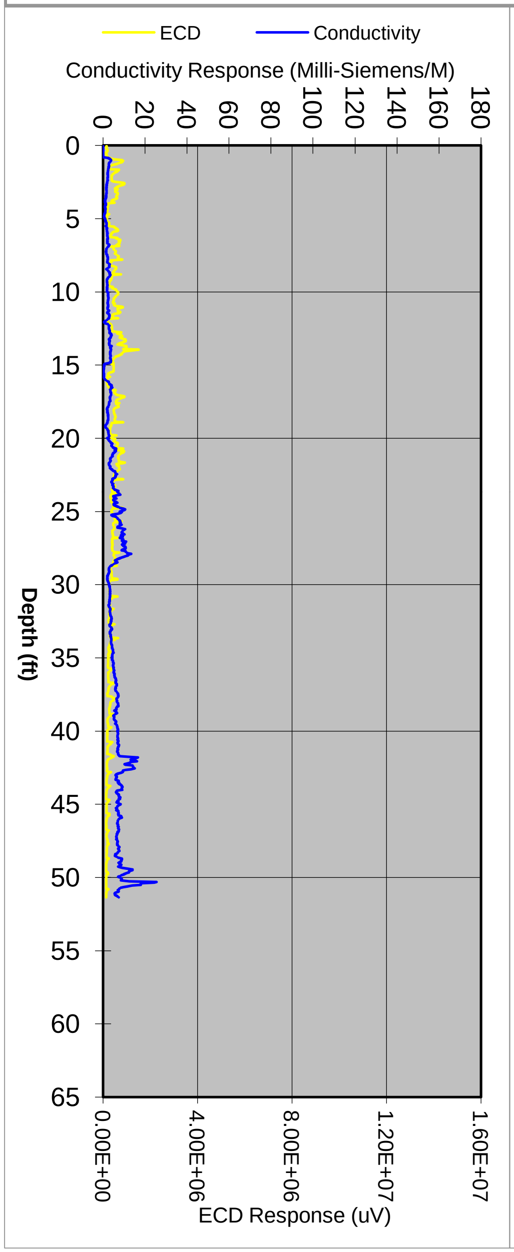
4961 Telsa Drive
Suite E
Bowie, MD 20715
P:301-352-6642
F:301-352-6643
www.vironex.com

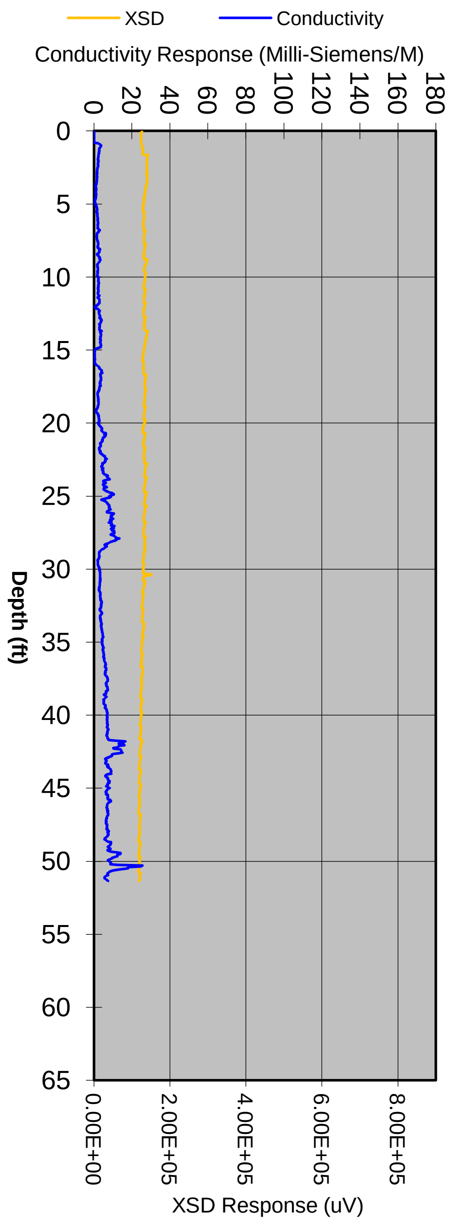
Boring Name: **MIP13** **Total Depth (ft):** **51.35**

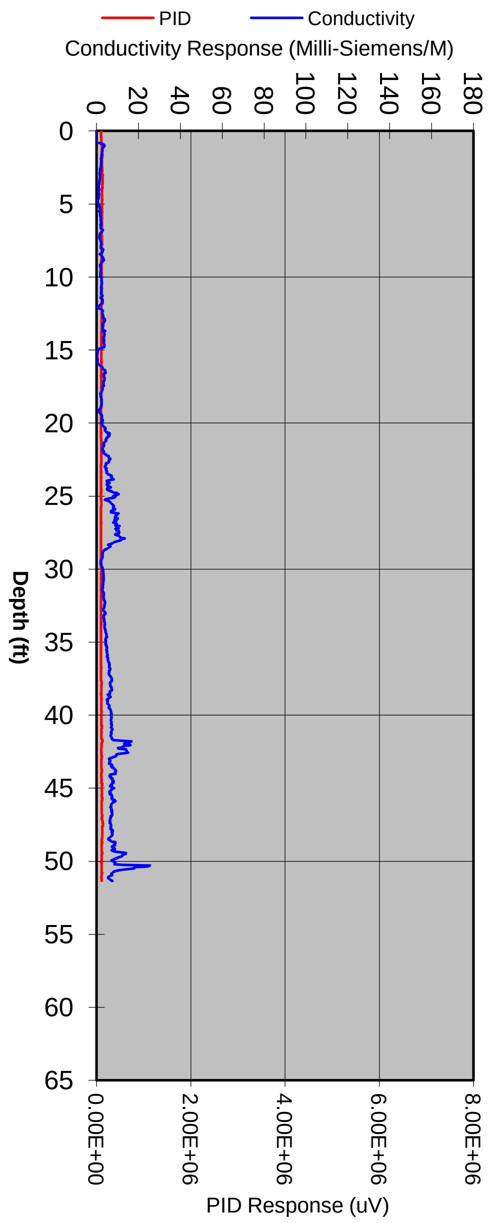
Notes:
None.

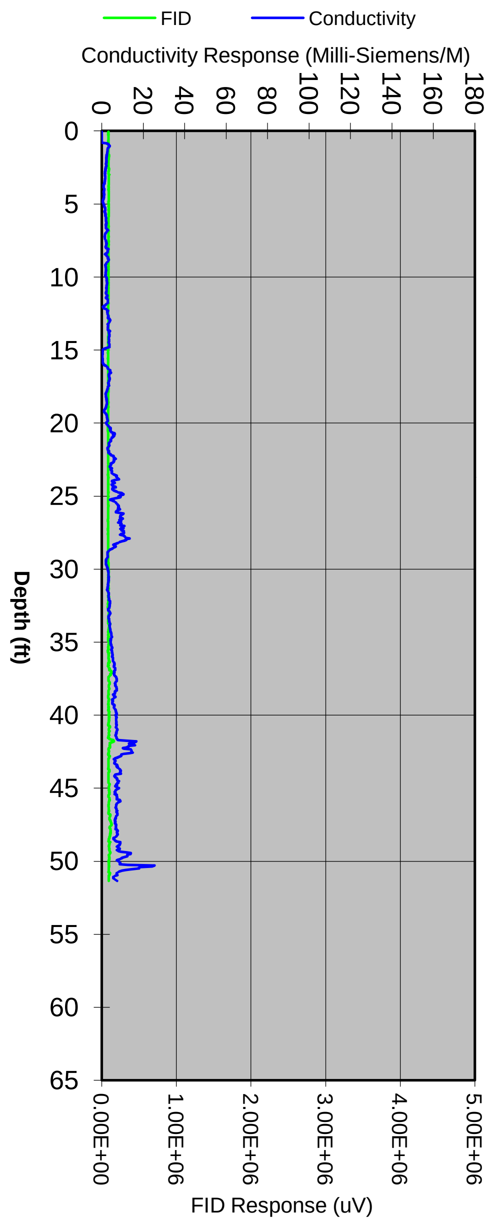
GW Depth (ft): 30
Depth of GW Provided by Client

Job Information		MIP Sampling Information			
Client Company:	URS	Trunkline Length:	150	Start Boring Time:	Thu Feb 23 2012 13:05:00
Project Name:	Itron Inc.	Probe Type:	6520	End Boring Time:	Thu Feb 23 2012 14:05:00
Site Address:	1310 Emerald Rd. Greenwood, SC	Rig Type:	Geoprobe 7822	MIP Specialist:	Chuck Terry









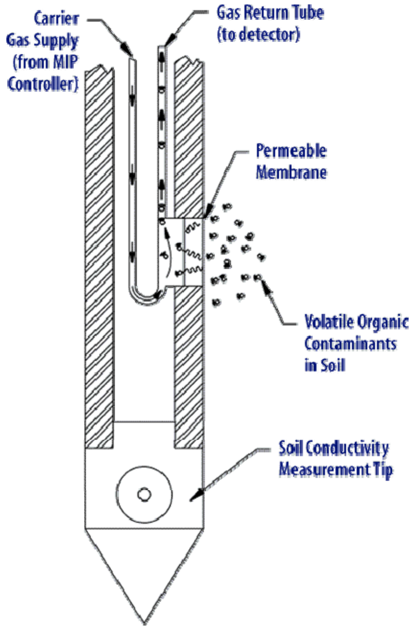
Appendix C – MIP Location Notes

MIP Boring	Date	Total Depth	Notes
MIP01	2.20.12	62.15	New membrane. Heater failed at 18.80 feet bgs. Retracted tooling, repaired, and continued boring.
MIP02	2.21.12	61.60	Thermocouple failed at 25.50 feet bgs. Bypassed and completed boring.
MIP03	2.21.12	41.50	None.
MIP04	2.21.12	45.00	Heater failed at 27 feet bgs. Repaired and completed boring. Computer froze from 27 - 30 feet bgs, resulting in no detections for those depths. EC failed at 34 feet bgs.
MIP05	2.21.12	45.10	Computer froze from 17.50 - 20 feet bgs, resulting in no detections at those depths.
MIP06	2.22.12	43.80	Nitrogen line severed from 43.80 feet bgs. Terminated boring at approximately 43.80 feet bgs.
MIP07	2.22.12	37.60	Nitrogen line severed at 37.60 feet bgs. Terminated boring at 37.60 feet bgs.
MIP08	2.22.12	49.45	No data collected from 22 to 24 feet bgs due to temporary power loss.
MIP09	2.22.12	29.95	Stopped boring at 15 feet bgs due to high pressure. XSD error caused poor detections from 0 - 15 feet bgs. Refusal at 29.95 feet bgs.
MIP10	2.23.12	45.45	None.
MIP11	2.23.12	45.35	None.
MIP12	2.23.12	25.65	Refusal at 25.65 feet bgs.
MIP13	2.23.12	51.35	None.

Appendix D – MIP System Overview

The MIP is a direct push tool that produces continuous chemical and physical logs of the vadose and saturated zones. It locates VOCs in-situ and shows you where they occur relative to the geologic and hydrologic units. Vertical profiles, transects, 3D pictures and maps can all be produced from the electronic data generated by the MIP logs. Its unique capability of providing reliable, real-time information allows you to make better and timely decisions while your team is still in the field.

The MIP is a downhole tool that heats the soils and groundwater adjacent to the probe to 120 degrees C. This increases volatility and the vapor phase diffuses across a membrane into a closed, inert gas loop that carries these vapors to a series of detectors housed at the surface. Continuous chemical logs or profiles are generated from each hole. Soil conductivity is also measured and these logs can be compared to the chemical logs to better understand where the VOCs occur. The MIP technology is only appropriate for volatile organic compounds (VOCs). The gas stream can be analyzed with multiple detectors, for example an electron capture detector is used to detect chlorinated solvents, a photo-ionization detector is used to detect petroleum hydrocarbons, and a flame ionization detector is used to detect methane.



Equipment:

- Geoprobe 66DT or equivalent
- MIP Controller (Nitrogen Flow and Heater)
- Geoprobe FC 5000 Computer
- HP 5890 Gas Chromatograph
- ECD (Electron Capture Detector)
- XSD (Halogen Specific Detector)
- PID (Photo Ionization Detector) 10.2 eV Lamp
- FID (Flame Ionization Detector)
- 150' Heated Trunkline
- 1.75" O.D. 6520 MIP Probe
- 1.5" O.D. Drive Rods

Detector Overview

- ECD – Electron Capture Detector uses a radioactive Beta emitter (electrons) to ionize some of the carrier gas and produce a current between a biased pair of electrodes. When organic molecules contain electronegative functional groups, such as halogens, phosphorous, and nitro groups pass by the detector, they capture some of the electrons and reduce the current measured between the electrodes.
- XSD – The Halogen Specific Detector converts compounds containing halogens to their oxidation products and fee halogen atoms by oxidative pyrolysis. These halogen atoms are adsorbed onto the activated platinum surface of the detector probe assembly resulting in an increase thermionic emission. This emission current provides a corresponding voltage that is measured via an electrometer circuit in the detector controller.

- PID – Photo Ionization Detector sample stream flows through the detector's reaction chamber where it is continuously irradiated with high energy ultraviolet light. When compounds are present that have a lower ionization potential than that of the irradiation energy (10.2 electron volts with standard lamp) they are ionized. The ions formed are collected in an electrical field, producing an ion current that is proportional to compound concentration. The ion current is amplified and output by the gas chromatograph's electrometer.
- FID – Flame Ionization Detector consists of a hydrogen / air flame and a collector plate. The effluent from the GC (trunkline) passes through the flame, which breaks down organic molecules and produces ions. The ions are collected on a biased electrode and produce an electric signal.

MIP Data Collected

- Depth - Data is collected from twenty data points per foot. 0.05', 0.10', 0.15', etc…
- Electrical Conductivity - Electrical Conductivity data is measured/collected in milli-siemens per Meter (ms/M). The conductivity of soils is different for each type of media. Finer grained sediments, such as silts or clays, will have a higher EC signal. While coarser grained sediments, sands and gravel, will have a lower EC signal. The coarser grained sediments will allow the migration of contaminants and the finer grained sediments will trap the contaminant.
- Speed / Advancement Rate - Speed data is measured/collected in feet per minute (ft/min). Speed is an indication of the physical advancement rate of the MIP probe. Speed of the MIP probe can vary due to operator advancement and dense soil types. Speed log can provide soil type information which can be correlated with electrical conductivity. Lower advancement speed, correlated with lower conductivity or larger grained soils would more than likely be associated with dense or compacted sands.
- Temperature - Temperature data is measured/collected in Degrees Celsius. Temperature is an indication of the physical temperature of the MIP block. Minimum and Maximum temperature is collected at each vertical interval. Vironex's temperature protocol indicates that the MIP probe temperature shall maintain a minimum temperature of 75 Degrees Celsius.
- Pressure - Pressure data is measured/collected in PSI. Pressure is an indication of the internal pressure of the nitrogen lines located within the trunkline and the pressure behind the membrane. Minimum and Maximum temperature is collected at each vertical interval. Geoprobes temperature protocol indicates that the MIP probe pressure shall not exceed 1.5 PSI difference from baseline.
- Detector (XSD, ECD, PID, FID) - Detector responses are measured/collected in micro Volts (uV). Detector responses are an indication of relative contaminant responses. Minimum and Maximum detector responses are collected at each vertical interval.

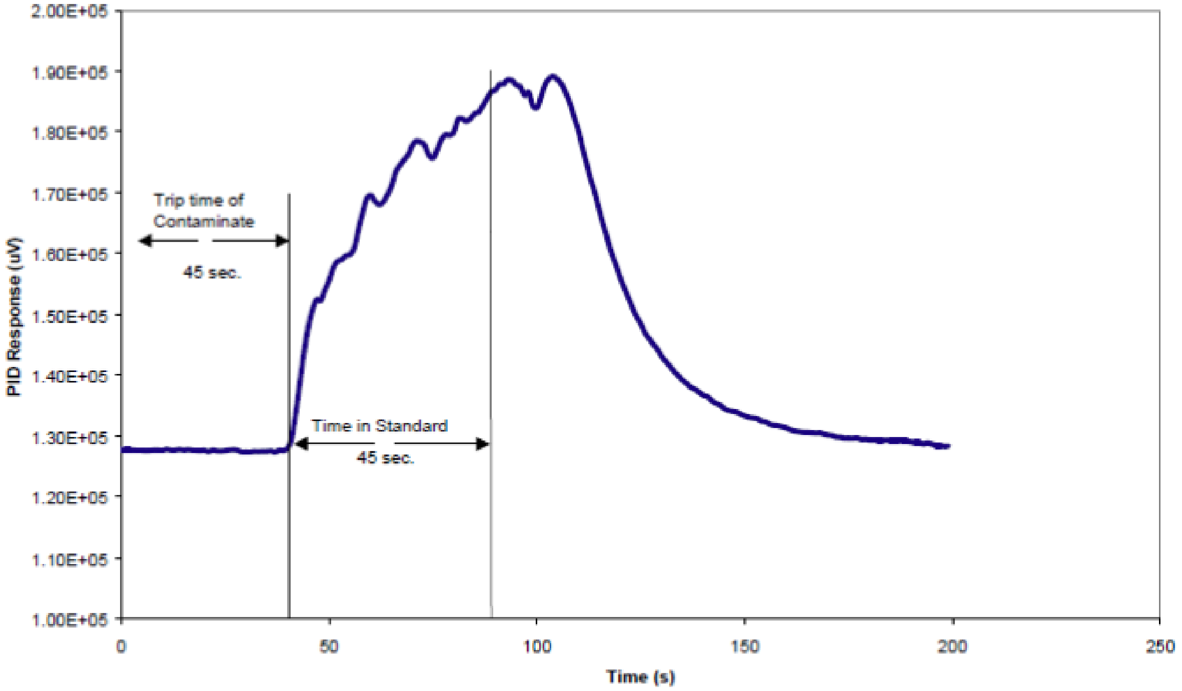
Response Testing

Response testing is an integral part of ensuring the quality of data from the MIP system. Response testing must be conducted before and after each log. This will ensure the validity of the data and the integrity of the system. Response testing also provides for comparison of data for later MIP logs at the same site. However, results of the response test may change due to membrane wear from soil contact and abrasion.

Prior to conducting a response test, a response test standard solution is prepared by adding an appropriate volume of stock standard solution to 0.5 liters of clean water in a suitable measuring container (beaker or graduated cylinder) to produce a working standard, for example, 10 µL of 50 mg/mL concentration stock standard is added to 0.5 liters of water to yield a 1mg/L working standard. Generally, response test standard solutions are prepared using trichloroethene and toluene. However, response test standard solutions may be prepared based on the specific contaminants of concern at a site of necessary. Also prior to conducting the response test, the MIP is placed in clean water until detector response stabilization has occurred.

The working standard is poured into a 2-inch diameter by 30-inch long PVC or stainless steel pipe that is capped at one end. A stabilized MIP is inserted in the working standard for a duration of 30 seconds (Note: in the response test shown below, the MIP was inserted into the working standard for a duration of 45 seconds). At the end of 30 seconds the MIP is removed from the working standard, and placed into clean water. The working standard cannot be reused after a response test.

The results of the response test are shown on the MIP data acquisition unit (shown below). The trip time is measured by recording the time between the moment when the MIP is placed in the working standard solution and the response of the detectors, as viewed on the MIP data acquisition unit. The baseline and peak response value are also recorded for comparison with other MIP response tests. The trip time is entered manually into the data acquisition system account for the time it takes for compounds in the subsurface to travel the length of the trunkline during the MIP boring.



PID Response Test – 10 ppm Benzene

APPENDIX B

Field Sampling and Analysis Plan

TABLE OF CONTENTS

TABLES

STANDARD OPERATING PROCEDURE ATTACHMENTS

1.0 INTRODUCTION

Itron, Inc. currently owns a 130,000 square-foot building on a 24.04-acre parcel of property located at 1310 Emerald Road in Greenwood, South Carolina, hereafter known as the "Site" (Figure 1in the Remedial Investigation Work Plan) . The site is located approximately 3 miles northeast of the town of Greenwood in a mixed light industrial, warehouse/distribution and residential area and manufactures flow meters for industrial and municipal uses. As part of the manufacturing process, the facility stores pre-formed brass, stainless steel, steel and aluminum parts on site. Additional materials manufactured at the facility include electronic circuit boards, wiring, casings and smaller components.

Prior to 1972, the site was reportedly used for agricultural purposes. The current building was constructed in 1972 for flow meter manufacturing by Neptune Carolina, Inc. In April 1972, Neptune Carolina transferred ownership of the property to Greenwood County. While the property was owned by Greenwood County for nearly 30 years, flow meter manufacturing continued under the operation of Allied Signal, Wheelabrator Frye and Schlumberger Industries. In September 2001, the ownership of the property reverted from Greenwood County to Schlumberger Industries. Schlumberger transferred ownership of the site to Actaris U.S. Liquid Measurement on October 26, 2001. Itron, Inc. acquired Actaris in 2008. In 2012, Itron sold the operations at the facility (i.e. Itron's Liquid Measurement Business) to Measurement Technology Group, Inc. which is doing business at the facility as Red Seal Measurement. Itron is now leasing the facility to Red Seal Measurement.

URS Corporation (URS) was retained by Itron Inc. (Itron) to conduct environmental due diligence at the Itron facility. A Phase I Environmental Site Assessment (ESA) was performed in December 2011 which identified three (3) Recognized Environmental Conditions (RECs). Based on the findings of the Phase I ESA, soil, groundwater, and indoor air quality at the Site were assessed during a Phase II ESA conducted in January 2012 and during a subsequent Site Assessment conducted in March 2012. The investigations detected tetrachloroethene (PCE) and other hazardous substances in soil and groundwater at concentrations exceeding applicable screening levels.

Due to the nature and extent of the contamination encountered, Itron and the South Carolina Department of Health and Environmental Control (SCDHEC) entered into a Voluntary Cleanup Contract (VCC) to conduct a Remedial Investigation (RI) to address the soil and groundwater contamination at the Site. This Field Sampling and Analysis Plan (FSAP) has been prepared to guide the investigation which will be performed on the Site to collect the data necessary to support selection of a cleanup action. This FSAP is a component of the RI Work Plan.

1.1 RATIONALE AND OBJECTIVES

The objective of this FSAP is to provide protocols for field sampling and analytical testing to further characterize and delineate the limits of impacts to soil and groundwater quality on the site. As described in the RI Work Plan, the available data for the potential constituents of concern (PCOCs) are not sufficient to accurately estimate the lateral and vertical limits of the soil and groundwater that exceed the applicable screening levels or to develop a specific cleanup plan.

The FSAP and associated Health and Safety Plan (HASP) (HASP to be submitted under separate cover) are intended to meet specific requirements. Field methods to be implemented are consistent with standard, generally accepted methods and, where appropriate, U.S. Environmental Protection Agency (EPA) (1993a, b) guidance documents and standard methods of the American Society for Testing and Materials (ASTM) (1996a, b, c). Quality assurance (QA) and quality control (QC) procedures are described in a separate Quality Assurance Project Plan (QAPP) (see Appendix C of the RI Work Plan) which will be implemented to ensure that data obtained from the chemical analyses are representative of the field conditions, valid, and accurately reported.

Included as attachments are Standard Operating Procedures (SOPs) provided for easy reference by field personnel. The SOPs are intended to promote the following:

- Consistent field procedures

- Accurate documentation of field observations, sampling procedures, and decontamination procedures
- Collection of representative samples from the site
- Proper calibration of field equipment to obtain accurate field measurements
- Minimization of cross-contamination and the introduction of artificial contaminants
- Information that is accurate and defensible and is of adequate technical quality to meet the objectives of the project.

1.2 ORGANIZATION AND RESPONSIBILITY

Qualified URS field personnel will perform the remedial investigations in accordance with the RI Work Plan including this FSAP, and associated HASP. The principal field duties of these personnel will include: (a) monitoring the utility locating, concrete coring, and drilling subcontractors and ensuring that any requirements for working within the Site are being followed, (b) making field observations and field parameter measurements, (c) field screening and describing soil samples, (d) selecting soil sampling intervals based on field screening and the criteria in this SAP, (e) groundwater sampling, (f) labeling and submitting samples to the analytical laboratory under chain-of-custody protocols, (g) communicating with the URS Project Manager if any issues arise or significant deviations from the Work Plan are needed, (h) interacting with the Site Field Coordinator, or other personnel at the site, as appropriate, and (i) ensuring compliance with the provisions of the HASP. All field personnel will have the required health and safety training as outlined in the HASP. Samples collected during the investigation for chemical analysis will be analyzed for the analytical parameters specified in this plan by Shealy Environmental Services, Inc. in West Columbia, South Carolina.

2.0 SCOPE OF WORK

Proposed soil boring, monitoring well installation, and sampling activities are discussed below. Table B-1 lists the proposed samples and their locations and identifies the proposed analyses. Table B-2 summarizes the proposed samples by collection area, type, and analyses.

2.1 SOIL

2.1.1 Sample Locations

Proposed soil sampling locations at the Site are shown on Figures 10-1, 10-2 and 10-3 of the RI Work Plan. The locations should be considered approximate. Actual locations will be confirmed in the field based on site conditions including access and locations of underground and overhead utilities.

The objectives of the soil investigation are to better define the nature and extent of the soil contamination previously detected in three potential source areas on the Site. The first suspected source area is located in the vicinity of the steel sump near the southeast corner of the building. The second source area is located near the cardboard storage room and the surrounding area near the east-northeast side of the building near the LPG test area. And finally, the third suspected source area is located on the northeast corner of the building where a gasoline UST and dispenser were formerly located. Soil sampling locations and analytical results collected to date at the Site are summarized on Figures 5, 10-1, 10-2 and 10-3 and Tables 4 and 5 in the RI Work Plan.

Soil samples will be collected at varying depths in a grid-style pattern beginning near the soil source areas described above. Soil samples will be collected to 30 feet below ground surface (bgs) or the water table, whichever is encountered first. Soil sample designations will include the letters "SB", indicating a soil sample followed by a number representing the sequence of sample. The next sample in the sequence for the site will be SB-19. Each soil sample will be followed by a depth range indicated in parentheses. For example, "SB-19 (6-

7)" indicates a soil sample collected from a depth range of six (6) to seven (7) feet bgs from the nineteenth soil boring. Information concerning the soil samples that have been field-screened and selected for analysis will be recorded and maintained in the field log book or on alternative log sheets. As discussed in the RI Work Plan, analytical results from the soil borings will be compared to applicable screening levels.

Soil samples will also be collected at varying depths from all proposed monitoring well locations to assess if the soils have been impacted by VOCs. Additionally, soil samples (anticipated to be "clean") will be collected from different stratigraphic units from proposed well locations, MW-13, MW-14, MW-15, MW-18 and MW-9D. These samples will be analyzed for Total Organic Carbon (TOC) using the Walkley-Black method. TOC samples will be collected from the saturated zone as well as the unsaturated zone. The proposed monitoring well locations are shown on Figure 11 of the RI Work Plan.

The sampling program is summarized in Table B-1.

Direct Push Borings

- **Steel Sump -** Eighteen borings have been proposed in the vicinity of the steel sump near the southeast corner of the building to further delineate PCE impacts in the soil in this area to assist with the planning for potential interim remedial action (i.e., soil removal) in this area.
- **Cardboard Storage Room and Vicinity -** Seventeen borings have been proposed in the vicinity of the cardboard storage room on the east-northeast side of the building to further delineate PCE impacts in the soil in this area.
- **Former UST and Gasoline Dispenser Area -** Five borings have been proposed in the vicinity of the former gasoline UST and dispenser located near the northeast corner of the building to assess impacts of naphthalene in the soil.

Sample Depth Intervals

As described above, the soil borings will be advanced to 30 feet bgs or to the water table, whichever is encountered first. The soil will be field-screened in 1-foot intervals to the termination depth. Samples selected for laboratory analysis will be the two samples exhibiting the highest PID readings from each boring if DNAPL is not detected. If DNAPL is detected, those samples will be submitted for laboratory analysis. A minimum of two samples per boring will be submitted to the laboratory. However, additional samples will be submitted if justified by field-screening results. In the event all PID readings at a particular location are "0", one soil sample will be selected from the 1-2 foot interval and the other will be selected from just above the water table.

In addition, soil samples from 0 to 1 foot bgs will be collected at 12 soil boring locationsidentified in Table B-1 and analyzed to fulfill the surface soil requirements of the Baseline

Risk Assessment (BRA), discussed in the RI work plan.

2.1.2 Analyses

The proposed soil sampling analyses are presented in Table B-1.

Soil samples collected from borings advanced in the steel sump area, shown on Figure 10-1, will be analyzed for VOCs per EPA Method 5035A/8260B. Results from this method will be reported on a dry-weight basis. Soil samples collected from the cardboard storage area and vicinity, shown on Figure 10-2, will be analyzed for VOCs, and polynuclear aromatic hydrocarbons (PAHs) per EPA Method 8270D. And finally, the soil samples from the former UST and gasoline and dispenser area, shown on Figure 10-3, will be analyzed for VOCs and PAHs.

Specific analytes, analytical methods and detection limits are outlined in the QAPP (see Appendix C of the RI Work Plan).

2.2 GROUNDWATER

2.2.1 Sample Locations

The objectives of the groundwater investigation are to further delineate the horizontal and vertical extent of PCE and other hazardous constituents in the groundwater at the Site. The groundwater sampling program is summarized in Table B-1. To accomplish these objectives, new groundwater monitoring wells will be installed, groundwater sampling will be conducted and water level elevations will be measured. The following scope of work is proposed:

- Installation of seven wells, MW-12 through MW-18, at various upgradient, sidegradient and downgradient locations (Figure 11 of the RI Work Plan) across the site to further delineate the horizontal impacts of PCE and other hazardous constituents in the shallow groundwater at the Site. In addition, the new wells will provide more information for confirming groundwater flow direction.
- Installation of four deep wells; MW-5D, MW-9D, MW-10D and MW-16D (Figure 11 of the RI Work Plan), to be paired with wells MW-5, MW-9, MW-10 and MW-16, respectively. These wells will help determine the water quality in the deeper geologic strata at the Site as well as determine groundwater flow direction.
- Sampling newly installed and existing wells MW-1 through MW-11 shown on Figure 11 of the RI Work Plan.

2.2.2 Analyses

Samples from all monitoring wells will be analyzed for VOCs per EPA Method 8260B. Monitoring wells MW-1 through MW-6, MW-12, MW-17, MW-18 and MW-5D will also be analyzed for PAHs. Specific analytes, analytical methods and detection limits are outlined in the QAPP (see Appendix C of the RI Work Plan).

2.3 SCHEDULE AND REPORTING

The results of field measurements and laboratory analyses will be documented in the RI Report as described in the RI Work Plan. The report will include maps showing the locations of soil borings and monitoring wells, a tabular summary of analytical results and pertinent field measurements, geologic logs of soil borings, COC forms, and laboratory analytical reports including appropriate quality assurance reports. The report will be submitted to SCDHEC in accordance with the schedule in the RI Work Plan.

3.0 STANDARD OPERATING PROCEDURES

3.1 SOIL INVESTIGATION PROCEDURES

Presented in the following sections are the methods that will be used to collect soil samples. Multiple methods may be used based on field conditions, location, density of the soils, desired sampling depth, and access.

Prior to the investigation utility drawings will be reviewed as available. Palmetto Utility Protection Service (PUPS) will be notified to identify utilities coming onto and within the property. A private utility locating contractor will be contracted to clear the proposed sampling locations.

All non-dedicated sampling equipment will be decontaminated between samples using the SOP for decontamination (Attachment B-1).

3.1.1 Direct Push

This method will be used for collecting all surface and subsurface soil samples from borings on-site. The method can collect a nearly continuous core of soil from the land surface to the bottom of the boring. A steel sampling rod is driven into the soil with a vehicle-mounted hydraulic ram and/or percussion hammer attached to a vehicle. The hammer and static weight of the vehicle are used to drive a small-diameter rod with a 2.25-inch outer diameter macrocore, containing an acrylic sample sleeve into the soil. Upon collecting the sample from the desired depth, the macrocore is withdrawn and the sample sleeve is removed. The sleeve is then cut open allowing immediate access to the sampled soil material. To continue the boring, the sample rod and macrocore are decontaminated, a new acrylic sample sleeve is inserted, and the macrocore is returned to the hole and driven down an additional five feet. Soil samples from a minimum two depth intervals will be collected for laboratory analysis in accordance with the SOP described in Attachment B-4.

3.1.2 Roto Sonic Drilling

This method will be used for collecting all surface and subsurface soil samples at all shallow and deep monitoring well locations. The roto-sonic drill rig advances a 4-inch diameter stainless steel core barrel in 10-foot increments; the 4-inch diameter stainless steel core barrel is threaded to 4-inch diameter carbon steel casing. After the 4-inch diameter core barrel and casing are advanced, a 6.25-inch carbon steel casing is then advanced to the bottom of the borehole and the process is repeated. This method can collect a nearly continuous core of soil form the surface to the bottom of the boring. Soil samples from a minimum of two depth intervals will be collected for laboratory analysis in accordance with the SOP described in Attachment B-4.

3.1.3 Borehole Abandonment

All DPT borings will require proper abandonment per South Carolina Well Standards R.61-71. Therefore, the borings will be filled with a neat cement-grout, bentonite mixture. The sealing material shall be placed in the boreholes using a tremie pipe.

Boreholes drilled through concrete slabs shall be filled with the sealing material to the level of the base of the slab. The final seal of concrete of the appropriate strength for the current operations in the area will be poured to the level of the top of the slab. The borehole abandonment method and approximate amount of grout material used will be recorded on the boring log. Since all DPT borings are being advanced in suspected source areas, each boring will be abandoned immediately following its completion to eliminate any conduits for potential DNAPL movement.

3.1.4 Soil Sample Collection

All soil sampling procedures and observations will be recorded in the field log notebook or the Field Report Form including sampling techniques employed, sampling equipment used, decontamination procedures utilized, calibration of measuring and test equipment, preservatives added, and methods utilized. The Chain of Custody (COC) forms will have the unique identification numbers, dates and times of collection, and sample depths.

Appropriate soil sampling procedures will be followed at all times to ensure that representative soil samples are provided for analysis, and that the act of sampling does not contribute to potential contaminant migration or cross-contamination at the site. All techniques employed will be thoroughly documented to ensure the defensibility of the data.

Outlined below are the SOPs (attached) applicable to soil sampling:

Decontamination. To reduce the potential for introduction of artificial contamination and/or cross-contamination between discrete samples within a boring or between borings, field equipment used during sampling will be decontaminated prior to use at each sampling location and during sampling. Drilling and sampling equipment will be decontaminated by the procedure for decontamination (Attachment B-1).

Equipment calibration. To obtain reliable and accurate data from the use of field screening instruments, these instruments will be calibrated as described by the procedures for equipment calibration (Attachment B-3). The types of field instruments that will be used include an organic vapor monitor (OVM) equipped with a photoionization detector (PID).

Field documentation. Accurate documentation of field procedures will be guided by the procedure for field documentation (Attachment B-6). A detailed log of the soil materials encountered, field screening data, and pertinent sampling and drilling details will be prepared in the field by the field personnel. A daily field report will also be prepared which summarizes the daily activities. Sample collection data and requested analyses will be recorded on COC forms.

Sample collection and field screening. Soil samples for chemical analysis will be collected, field screened, and handled per the procedures for soil sampling (Attachment B-4). Soils retrieved as cuttings and discrete samples will be visually examined for evidence of PCOCs and classified in accordance with the Unified Soil Classification System (ASTM D 2487-93). All soil samples will be visually assessed and field screened for organic vapors with a PID.

3.1.5 Selection Of Soil Sampling Depths

In order to assess the vertical extent of soil, visual and field-screening techniques will be utilized to determine the presence of PCOCs. Visual techniques will include evidence of staining and field screening will consist of collecting headspace readings for elevated organic vapors using a PID. Soils will be screened in 1-foot increments and any soils with PID readings of >100 ppm will also be screened for the presence of DNAPL. The following techniques will be used for screening for DNAPL.

- Fluorescence test – Examine sample for fluorescence using a broad spectrum (long- and short-wave) UV lamp in a dark room. Fluorescence indicates DNAPL. Examine known "clean" samples to check for natural fluorescence.
- Hydrophobic dye shake test – Add distilled water and 2 mg of Sudan IV dye to a sealable plastic bag containing the sample. Agitate by hand for about 30 seconds. Examine for red globules indicating DNAPL.

Once these tests are performed, the samples from the appropriate sampling depths will be selected. Samples selected for laboratory analysis will be the two samples exhibiting the highest PID readings from each boring if DNAPL is not detected. If DNAPL is detected, those samples will be submitted for laboratory analysis. A minimum of two samples per boring will be submitted to the laboratory. However, additional samples will be submitted if justified by field-screening results. In the event all PID readings at a particular location are "0", one soil sample will be selected from the 1-2 foot interval and the other will be selected from just above the water table.

Field personnel may determine that other sampling requirements are necessary based upon encountering unexpected conditions. Such conditions will be discussed with the Project Manager.

3.1.6 Selection Of Soil Samples For Laboratory Analysis

The depth ranges and number of samples for chemical analysis are outlined in Table B-1. Prior to specifying which samples will be analyzed, field personnel will discuss the field observations in each of the borings in the area with the URS Project Manager who will confirm the appropriate sample selection.

QA/QC samples will include trip blanks and duplicates. Where dedicated sampling equipment is not used, equipment rinsate blanks will also be collected. Frequency and method for QA/QC sample collection is discussed in QAPP (see Appendix C of the RI Work Plan).

3.1.7 Chemical Analytical Methods For Soil Samples

Chemical testing will be performed by Shealy Environmental Services, Inc. in West Columbia, South Carolina. The soil samples will be analyzed for one or more of the chemical analyses presented in Table B-1. Analytical methods used to analyze soil samples are identified in Table B-3 and in the QAPP (see Appendix C of the RI Work Plan). QA/QC samples will include trip blanks and duplicates. Where dedicated sampling equipment is not used, equipment rinsate blanks will also be collected. Frequency and method for QA/QC sample collection is discussed in QAPP.

3.2 GROUNDWATER INVESTIGATION PROCEDURES

3.2.1 Groundwater Monitoring, Well Construction and Development

Groundwater monitoring wells will be constructed within boreholes advanced by a sonic drill rig in accordance with applicable regulations and guidelines. Wells will be constructed of 2-inch Schedule 40-PVC casing with threaded couplings with an end plug placed at the bottom of the casing. Groundwater has been encountered at approximately 26 to 39 feet bgs at the Site in shallow monitoring wells. As proposed in the RI Work Plan, the shallow monitoring wells will be advanced into the first water-bearing zone. It is anticipated that all shallow monitoring wells will be screened with 10-foot of 0.010-inch mill-slotted PVC well screen.

The deep monitoring wells will be advanced into a deeper water-bearing zone (permeable layer), potentially including bedrock. The deep wells will also be installed using roto-sonic drilling techniques. In the past for Type III well installation, a permanent surface casing grouted in-place was installed and served the purpose to separate the overlying water-bearing surficial geological strata from hydraulically communicating with the underlying geologic formations. With sonic drilling, installation of a permanent surface casing is no longer necessary. Instead, with sonic drilling, an 8-inch or 10-inch diameter carbon steel casing will be installed to the required depth to serve as a temporary surface casing during the installation of four (4) 2-inch diameter deep wells. The borehole will then be advanced further after the temporary casing is installed and the wells will then be constructed within the temporary casing with 5 or 10 feet of 0.010-inch slot screen above the terminal depth of the boring. The screened-interval will be based on the lithology encountered in the boring. Generally, the large-diameter outer casing will be set approximately 4 to 5 feet into a low permeability layer and then the boring will be advanced with the small-diameter casing into the next water bearing zone. If a low permeability layer is not encountered, it is anticipated that the large-diameter casing will be advanced to bedrock. At this point, the intent of the deep well installation will be to extend the boring 15 feet deeper and then construct the well with 5 to 10-foot of screen above the termination depth.

In accordance with South Carolina Well Standards for constructing monitoring wells, the annular space of each well will be backfilled with a filter pack composed of uniformly sized, quartz sand or gravel being free from clay, silt, or other deleterious material to approximately one foot above the top of the well screen. A bentonite seal of about 2-feet will be placed on top of the sand pack and then, after hydration of the bentonite seal, the remainder of the annular space will be filled with a cement-grout mixture up to the ground surface. The well will then be completed with a steel, flush-mount, traffic grade, watertight monument or steel stick-up that will be anchored within a concrete seal.

Each groundwater well will be developed to remove fine-grained materials from within and around the sand pack by pumping, bailing and surging. Each well will be alternately surged and overpumped until the turbidity of the discharge water is < 10 NTUs or no further improvement is possible. Development water will be managed as Investigation Derived Waste (Section 4).

3.2.2 Groundwater Sampling Methods

Following the installation of the new groundwater monitoring wells, groundwater will be monitored by URS field personnel in all new and existing onsite monitoring wells in accordance with the procedure for groundwater sampling (Attachment B-5). All newly installed monitoring wells will not be sampled until at least 24 hours after development. The depth to water in each well will be gauged before groundwater samples are collected. The wells will be purged and sampled using low-flow sampling techniques. As wells are purged, groundwater will be monitored for temperature, pH, conductivity, dissolved oxygen, oxidation reduction potential (ORP) and turbidity using an electric water quality monitor (or equivalent). Groundwater samples will be collected once pH and specific conductance have stabilized and turbidity has either stabilized or is below 10 NTUs (Attachment B-5). Groundwater will then be collected into appropriate containers, labeled, and placed in a cooler on ice at 4ºC for transport to Shealy Environmental Services, Inc. in West Columbia, South Carolina, under a COC form.

3.2.3 Chemical Analytical Methods For Groundwater Samples

Chemical testing will be performed by Shealy, for one or more of the chemical analyses presented in Table B-2. Analytical methods used to analyze groundwater samples are identified in Table B-4 and in the QAPP (see Appendix C of the RI Work Plan). QA/QC samples will include trip blanks and duplicates. Where dedicated sampling equipment is not used, equipment rinsate blanks will also be collected. Frequency and methods for QA/QC sample collection are discussed in the QAPP.

3.3 SAMPLE LABEL DESIGNATIONS

3.3.1 Soil Samples

Each soil sample will be labeled with the sample type (SB- for direct-push soil borings) and depth below the ground surface (bgs). For example, SB-19 (6 -7’) would be a sample collected at a depth of 6 to 7 feet bgs from boring SB-19. Soil samples collected from monitoring well locations will be designated in a similar manner. For example, soil sample MW-5D (4-5’) would be a sample collected at a depth of 4 to 5 feet bgs from monitoring well boring MW-5D.

3.3.2 Groundwater Samples

Each groundwater sample will be labeled with the monitoring well (MW-) number and the date. For example, sample MW-4-031913 would be a sample from well MW-4 collected on March 19, 2013.

3.3.3 QA/QC Sample Numbers

Field duplicate samples will be designated with a unique sample identification (i.e. MW-103) to ensure unbiased analysis by the laboratory. The duplicate and the well it is associated with will be clearly identified in the field log.

Trip blank samples will be designated with "TB" followed by the day of sample shipment. For example, a trip blank accompanying samples shipped on March 19, 2013 would be labeled: TB-031913. If more than one trip blank is submitted on the same day then these samples will be labeled in sequences as follows: TB1-031913, TB2-031913, etc.

3.4 SAMPLE CONTAINERS, PRESERVATION, STORAGE, AND HOLDING TIMES

The types of sample containers that will be used to store and ship samples are based on the analytical plan requirements. Tables B-3 and B-4 list the type of analysis, sample preservation, storage, and holding time requirements that will govern the handling of each sample. Shealy will provide clean sample bottles for all samples.

3.5 SAMPLE HANDLING, SHIPPING, AND LABORATORY RECEIPT

3.5.1 Chain Of Custody

COC forms identifying analytical requests will be maintained separately from all other documentation. This form will be completed by the sample collector before releasing the cooler containing the samples for transportation. The COC form will be routed with the samples through transportation and analysis requests. A copy of the COC form completed by the field team will be submitted to the QA/QC Manager, and COC forms will be retained in the master job file.

3.5.2 Transportation

Shipping dates and method of shipment will be recorded on the field report form and on the COC forms. Transport containers will be coolers chilled with ice, sealed with signed custody seals. COC forms will be placed in a plastic bag and taped to the inside of the cooler lid. If shipped by courier (e.g., FedEx or UPS), a copy of the shipping receipt and COC will be submitted to the URS Project Manager and will be retained in the master job file.

3.5.3 Laboratory Receipt And Analytical Requests

When a batch of samples arrives at the laboratory, the personnel receiving the sample cooler will sign the COC form and enter a laboratory number for the sample batch on the form. In addition, laboratory identification numbers are assigned to each sample and used by the laboratory for internal tracking of the samples. Samples will be assigned to particular analytical procedures either on the COC or on a sample analysis request form which may be submitted to the laboratory separate from the samples following review of the field data. The analytical methods which will be used are listed in Tables B-3 and B-4. Both the laboratory batch number and sample numbers assigned in the field will be cited when analyses are requested. The laboratory will sign the COC and laboratory request forms and send a copy to the URS Project Manager for placement in the master job file.

Damaged sample containers, sample labeling discrepancies between sample container labels and COC forms, and analytical request discrepancies will be noted on the COC form, and the QA/QC Manager will be notified for problem identification and resolution.

4.0 INVESTIGATIVE DERIVED WASTES (IDW)

The environmental investigative work will generate soil cuttings, decontamination fluids, and monitoring well development and purge waters. Management of the Investigative Derived Waste (IDW) has been outlined in the RI Work Plan. The IDW will be stored in 55-gallon drums and staged at a designated location on the Site until analytical results have been received allowing the waste to be profiled for disposal. The following measures will be taken to most efficiently characterize the waste for disposal purposes.

- All 55-gallon drums will be labeled with a "pending analysis" label to include date of generation, generator name, well and/or soil boring numbers, type of media and contact information for URS and the client.
- All waste drums containing soil and water will be segregated and consolidated into groups based on their source and/or the likelihood to be classified as characteristically hazardous or non-hazardous.
- A composite sample will be collected from each group, using a sampling trier or auger for soil and a coliwasa sampler or bottom-loading bailer for water.
- Toxicity Characteristic Leaching Procedure (TCLP) VOCs will be analyzed for each group of drums. Composite soil samples will be analyzed by TCLP and the Paint Filter Test. Composite water samples will be analyzed by TCLP and for corrosivity.
- Based on the analytical results, each group of drums will be classified as hazardous or non-hazardous waste.
- Storage time limits (generally 90 days) and other RCRA requirements will be taken into account when managing the IDW.

It is anticipated that all IDW will be disposed of offsite at a permitted disposal facility following waste profiling. Additionally, all waste manifests will be signed by Itron personnel.

Uncontaminated disposable personal protective equipment (PPE) will consist primarily of nitrile gloves. Miscellaneous solid wastes consist of paper, plastic wrappers, aluminum cans, and other miscellaneous types of debris. Total volume is expected to be one large plastic bag per day, which will be disposed of in municipal waste containers at the facility.

5.0 REFERENCES

American Society for Testing and Materials, 1996a, Annual Book of Standards, Section 4, Volume 4.08 Soil and Rock., ASTM West Conshohocken, PA.

American Society for Testing and Materials, 1996b, ASTM Standards on Design and Planning for Ground Water and Vadose Zone Investigations, Publication Code Number: 03-418296-38, ASTM West Conshohocken, PA.

American Society for Testing and Materials, 1996c, ASTM Standards on Ground Water and Vadose Zone Investigations: Drilling, Sampling, Well Installation and Abandonment Procedures, Publication Code Number: 03-418196-38, ASTM West Conshohocken, PA.

South Carolina Department of Health and Environmental Control (SCDHEC), 2002, R.61-71 South Carolina Well Standards, April 26.

U.S. Environmental Protection Agency, 1999-2007, National Functional Guidelines, various.

U.S. Environmental Protection Agency, 1993a, Subsurface Characterization and Monitoring Techniques. A Desk Reference Guide, Volume 1, Solids and Groundwater Appendices A and B, EPA625/R-93/003a.

U.S. Environmental Protection Agency, 1993b, Subsurface Characterization and Monitoring Techniques. A Desk Reference Guide, Volume 11: The Vadose Zone, Field Screening and Analytical Methods Appendices C and D, EPA625/R-93/003b.

TABLES

STANDARD OPERATING PROCEDURES

(SOPs)

ATTACHMENT B-1

PROCEDURE FOR DECONTAMINATION

OVERVIEW

The purpose of this procedure is to ensure that all non-dedicated sampling and field screening equipment that contacts the sample material is clean and does not cause cross contamination between samples.

MOBILIZATION

- Assemble the appropriate equipment.
- Alconox detergent (or equivalent)
- Potable water
- De-ionized water
- Three 5-gallon or larger buckets
- Two brushes
- 5-gallon garden sprayer
- Plastic sheeting
- Sealing plastic bags

Drilling contractor provided equipment

- Steam cleaner
- Visqueen plastic
- Containment for steam cleaning water and removed soil

DECONTAMINATION

1) Drilling and well installation equipment:

- Set up a decontamination station at the location(s) designated by client.
- Verify that the drilling contractor has required equipment at the designated decontamination area and *thoroughly* cleans the equipment (inside and outside) with

a high-pressure steam cleaning unit (water at 200 °F and 1500 psi) prior to use at each boring/well location and between samples. All augers, drill steel, and drill casing should be decontaminated prior to use in each boring. Cleaned equipment should be placed on a visqueen covered surface following decontamination. Samplers can also be steamed cleaned in lieu of the decontamination procedure outlined below.

- Verify proper containment of water and soils generated by steam cleaning.
- Document decontamination procedures in the daily field report.

2) Sampling equipment during sampling:

- Rinse thoroughly with potable water.
- Scrub with Alconox/water wash to remove any visible dirt.
- Rinse with potable water.
- Double-rinse with deionized water.
- Replace wash and rinse water prior to sampling near each sampling location, or more often if warranted.
- Store in a clean area on visqueen plastic sheeting during sampling.
- Wrap in plastic for storage unless equipment will be used immediately.
- Document decontamination procedures in the daily field report.

ATTACHMENT B-2

PROCEDURE FOR FIELD INSTRUMENT OPERATION

OVERVIEW

The purpose of instrument operational procedures is to ensure that the instruments are operated properly to ensure accurate recording of parameters in the field. Verify that the instrument case contains the operations manuals supplied by the manufacturer. The manufacturer's specific procedures should be followed if these differ from the general procedures outlined below.

Note: Verify that the instrument is charged and running correctly before going out in the field. Recharge instruments with rechargeable batteries every night. Check instruments with replaceable batteries and replace batteries if necessary. **Make sure there is an extra charged battery and set of replaceable batteries each day the equipment is used.**

OPERATING PROCEDURES

1) pH Meter

- Turn on the instrument and allow to warm up.
- Immerse the probe in the sample keeping it away from the sides and bottom of the sample container. Allow ample time for the probe to equilibrate with the sample.
- While suspending the probe away from the sides and bottom of the sample container, record the pH.
- Rinse the probe with de-ionized water and store it in the manufacturer's recommended storage solution until the next sample is ready.

2) Conductivity Meter

- Turn on the instrument and allow to warm up.
- Collect the sample, check and record its temperature
- Correct the instrument's temperature adjustment to the temperature of the sample (if required)

- Immerse the probe in the sample keeping it away from the sides and bottom of the container. It is important that the center portion of the probe be wetted by the sample.
- Allow the meter to stabilize. Record the results in a logbook or appropriate field data sheet.
- Rinse the probe with de-ionized water.

3) Water-Level Indicator and Immiscible Product Interface Probes

- Turn the switch to "on".
- Fluid level measurements from the top of the casing should always be taken from the same side of the casing (usually the North side) in all wells so that groundwater elevations are consistently calculated each time. A small notch will be made in the PVC at the top of casing to denote where to measure the groundwater level.
- Lower the probe to the liquid surface in the well and monitor the audible output to determine if the probe detects water. Record the depth to the nearest 0.01 foot below the top of the well casing.
- To detect DNAPL, lower the probe to the bottom of the well, through the water column, and listen for a variation in audible output. If DNAPL is detected, raise the probe until the audible output changes and measure the thickness to the nearest 0.01 foot. Repeat procedure until measurements agree within 0.02 feet.
- Record final measurements on the groundwater sampling form, well construction detail form, or daily field report, as appropriate. Calculate the water elevation by subtracting the measured depth in feet from the reference elevation of the well.
- Decontaminate the probe and portion of the cable which was in contact with the fluids prior to use in each well using the procedure for decontamination

4) Photoionization Detector (PID)

ATTACHMENT B-2

PROCEDURE FOR FIELD INSTRUMENT OPERATION

- Turn on the instrument and allow to warm up.
- Insert the probe of the instrument inside the plastic freezer bag, taking care not to insert the probe into the sample medium (i.e. soil) to take a headspace reading. Allow the meter to stabilize. Record the results in a logbook or appropriate field data sheet.
- Allow the meter to return to "0" before taking a reading from the next sample.
- When taking readings in the worker's breathing zone, set the PID to alarm at a target concentration (i.e. >10 ppm). Before taking the reading, allow the PID to return to "0" and then place the meter in the breathing zone to determine the concentration. Allow the meter to stabilize. Record the results in a logbook or appropriate field data sheet.

5) Dissolved Oxygen Meter

- Turn the meter on and allow to warm up.
- Dissolved oxygen should be measured by using a flow-through cell.
- Record the results in a logbook or appropriate field data sheet.
- Rinse the probe with de-ionized water.

6) Oxidation-Reduction Potential Meter

- Turn the meter on and allow to warm up.
- ORP should be measured by using a flow-through cell.
- Record the results in a logbook or appropriate field data sheet.
- ORP is a temperature sensitive measurement. Consequently, the sample temperature should always be recorded at the same time as the ORP is recorded.
- Rinse the probe with de-ionized water.

7) Turbidity Meter

ATTACHMENT B-2

PROCEDURE FOR FIELD INSTRUMENT OPERATION

- Collect a representative sample and pour off enough to fill the cell to the fill line (about 15 mL) and replace the cap on the cell.
- Wipe off excess water and any streaks with a soft, lint-free cloth (lens paper).
- Turn instrument on. Place the meter on a flat, sturdy surface. Do not hold the instrument while making measurements.
- Insert the sample cell in the instrument so the diamond or orientation mark aligns with the raised orientation mark in the front of the cell compartment. Close the lid.
- If appropriate, select manual or automatic range selection by pressing the Signal Average key. Use signal average mode if the sample causes a noisy signal (display changes constantly).
- Press Read. The display will show --- NTU. Then the turbidity is displayed in NTU. Record the result after the lamp symbol turns off.
- Rinse the cell with de-ionized water or rinse out with sample water prior to the next reading.

ATTACHMENT B-3

PROCEDURE FOR FIELD INSTRUMENT CALIBRATION

OVERVIEW

The purpose of instrument calibration is to ensure that the instruments used for field screening and field measurements are functioning correctly and accurately. Verify that the instrument case contains the operations manuals supplied by the manufacturer and see the calibration procedures in the operations manuals for calibration and for troubleshooting procedures. A summary of the general calibration procedures for various instruments is provided below. Manufacturer's specific procedures should be followed if these differ from the general procedure outlined below.

Note: Verify that the instrument is charged and running correctly before going out in the field. Recharge instruments with rechargeable batteries every night. Check instruments with replaceable batteries and replace batteries if necessary. **Make sure there is an extra charged battery and set of replaceable batteries each day the equipment is used.**

CALIBRATION PROCEDURES

1) pH Meter

- Turn on the instrument and allow to warm up.
- Determine and record the temperature of each buffered solution.
- Place the probe in the pH 7.0 buffer solution and set the temperature-adjust knob to the temperature of the buffer solution.
- Adjust the unit output to 7.0 using the zero control.
- Rinse the probe with deionized water and place the probe in the pH 4.0 buffer solution.
- Adjust the unit output using the slope control.
- Verify the slope is adjusted correctly by rinsing the probe with deionized water and placing the probe in the pH 10.0 buffer solution.

- Store the probe in pH 4.0 solution when not in use.
- Record all readings in the daily field report.

Frequency: Conduct pH meter calibration at the beginning of each day. Periodically throughout the day, make one-point calibration checks using the pH 7.0 buffer solution. If the check indicates that the calibration has changed, repeat the two-point calibration and record results in the daily field report.

2) Conductivity Meter

- Turn on the instrument and allow to warm up.
- Set the adjust knob to zero.
- Place the probe in the calibration solution.
- Adjust the unit output to the conductivity of the calibration solution using the calibration control knob.
- Record all readings on the field report form.

Frequency: Conduct conductivity meter calibration at the beginning of each day and record all readings on the field report form. Make calibration checks periodically throughout each day and record all readings in daily field report.

3) Water-Level Indicator and Immiscible Product Interface Probes

- Turn on the switch to “on”.
- Lower the probe into a bucket of water and verify the audible indicator for water goes on when the probe enters the water.
- In order to check whether an interface probe is detecting non-aqueous phase fluids (e.g., LNAPL or DNAPL), lower the probe into a bucket of water with a thin layer of oil added to it to verify the audible indicator for LNAPL goes on when the probe enters the oil. An alternative method is to test the probe in an oil/water separator with

visible oil or another container containing hydrocarbons, if available.

Frequency: Check water level indicator/interface probe at the beginning of each day and document this in daily field report.

4) Photoionization Detector (PID)

The PID will be calibrated according to the manufacturer's procedures. "Zero air" and "span gases" are used to calibrate the instruments. The zero air is introduced to the PID in order to determine the "background" signal. The concentration of the span gas is then selected and introduced to the instruments. The instrument makes all of the necessary calculations to arrive at a "calibration constant". The manufacturer's manual will be located in the instrument carrying case for reference for calibration and troubleshooting procedures.

Frequency: Conduct meter calibration at the beginning of each day and periodically throughout each day or more frequently when apparent anomalous readings are obtained. Record all readings in the daily field report and on the calibration form in the project health and safety plan.

5) Dissolved Oxygen Meter

- Turn the meter on and wait at least 20 minutes before calibrating the DO meter.
- Remove the sensor guard and wash the sensor 2 or 3 times with deionized water.
- Place the probe in the calibration solution.
- Do not hold the probe while performing the auto calibration. Body temperature may elevate the internal temperature sensor measurement creating a DO calibration error.
- Record the calibration readings in the daily field report.

Frequency: Calibrate at the beginning of each day and during the day as appropriate if potentially anomalous readings are obtained. Record all readings in the daily field report form.

6) Oxidation-Reduction Potential Meter

- Turn the meter on, place the probe in the calibration fluid, and check the reading to confirm it is within the calibration range.

Frequency: Calibrate at the beginning of each day and during the day as appropriate if potentially anomalous readings are obtained. Record all readings in the daily field report form.

7) Turbidity Meter

- Turn the meter “ON” and allow it to stabilize.
- Immerse the probe in the first standard solution and calibrate the probe against the solution.
- Rinse the probe with de-ionized water, remove excess rinse water and calibrate the probe using additional standards as appropriate.
- Record the standard values used to calibrate the meter.

Frequency: Calibrate at the beginning of each day and during the day as appropriate if potentially anomalous readings are obtained. Record all readings in the daily field report form.

ATTACHMENT B-4

PROCEDURE FOR SOIL SAMPLING AND FIELD SCREENING

OVERVIEW

The purpose of the procedures for collecting soil samples is to ensure that the samples are representative of the physical and chemical conditions encountered in each boring. Selected samples will be tested and analyzed to: (1) evaluate the presence and, if present, nature and extent of PCOC in soil and (2) determine the hydrologic and other physical properties of soils encountered. Therefore, it is important to obtain representative samples, if feasible. In addition, the samples shall be collected in a manner that does not cause cross-contamination of samples.

MOBILIZATION

Review the FSAP, QAPP, and HASP and work plan. Coordinate each sampling event with the Site contact. Perform utility drawings review and arrange underground utility survey. Notify the laboratory of sample collection and delivery dates. Verify containers received from laboratory and preservations are appropriate relative to analytical methods as outlined in Tables B-3 and B-4 in the project FSAP. Arrange for concrete coring, if needed, and drilling/hydraulic probing contractor. Assemble appropriate equipment as follows:

- Decontamination Equipment per Attachment B-1
- Field copies of the work plan, including the FSAP, QAPP, and HASP
- Hand auger and core sampler, and associated equipment
- Laboratory provided, glass sample jars
- Photoionization detector (PID) or organic vapor analyzer (OVA) and calibration gases
- pH meter and calibration fluids (if applicable)
- Tape measure and water level indicator
- Sample labels and field forms (geologic boring logs, daily field report, chain of custody, etc. as outlined in Attachment B-4)
- Insulated cooler, ice, packing material, duct tape, sealing plastic bags, sample custody

seals

- Personal protection equipment per the HASP

Decontamination and Field Instrument Calibration

See procedures for decontamination (Attachment B-1) and field equipment calibration (Attachment B-3). Calibrate field equipment prior to initiating drilling and sampling and decontaminate sampling equipment as required. Record calibration data in the daily field report.

SAMPLE COLLECTION

- Check the Work Plan to determine the sampling interval and methodology to be used at each area.
- Prior to collecting each soil sample, screen for the presence of organic vapors at the top of the open borehole, auger flight, or drill/probe casing using the PID/OVA and record the highest and sustained measurements on a geologic log. The cuttings and worker's breathing zone will also be screened for organic vapors a minimum of once for every 5 feet drilled.
- Open the soil sampler/macrocore and place the soil core into plastic freezer bags in 1-foot increments in order to conduct headspace readings with a PID. Soil will be screened from 0-1', 1-2', 2-3', etc. and the readings will be recorded on the geologic log.
- All potential samples will then be reserved on wet ice while the rest of the boring is completed.
- If the PID reading is >100 ppm, the sample will also be checked for DNAPL by subjecting a portion of the sample to Fluorescence and Hydrophobic dye tests. These tests are explained in more detail below.
- Once the boring is complete and all potential samples have been screened, the PID

and DNAPL screening results will be evaluated and samples will be selected for laboratory analysis. Samples selected for laboratory analysis will be the two samples exhibiting the highest PID readings from each boring if DNAPL is not detected. If DNAPL is detected, those samples will be submitted for laboratory analysis. A minimum of two samples per boring will be submitted to the laboratory. However, additional samples will be submitted if justified by field-screening results.

- Retrieve selected samples from those reserved on ice and transfer from the freezer bag to the appropriate containers for submittal to the laboratory.

The following techniques mentioned above will be used for screening for DNAPL.

- Fluorescence test – Examine sample for fluorescence using a broad spectrum (long- and short-wave) UV lamp in a dark room. Fluorescence indicates DNAPL. Examine known "clean" samples to check for natural fluorescence.
- Hydrophobic dye shake test – Add distilled water and 2 mg of Sudan IV dye to a sealable plastic bag containing the sample. Agitate by hand for about 30 seconds. Examine for red globules indicating DNAPL.

Soil samples will be collected as outlined below:

Samples for Volatile Organic Compounds (VOCs) – Place sample material for analysis of VOCs into laboratory provided glassware as soon as possible and before otherwise disturbing the sample material.

Samples for Polynuclear Aromatic Hydrocarbons (PAHs) –Soils analyzed for PAHs will be selected from the same sampling depths as the VOCs samples.Samples to be analyzed for PAHs will be selected from the source areas identified in the RI Work Plan.

Samples for Total Organic Carbon (TOC) – Soils selected for TOC analysis will target "clean" soil from different stratigraphic units from select upgradient and downgradient monitoring well locations identified in the RI Work Plan. These samples will be selected from various shallow and deep monitoring well locations as described in the RI Work Plan. Therefore, samples selected for TOC analysis will be screened with a PID and the samples selected for analysis, will ideally have no detection of organic vapors. The sample will then be placed in the appropriate sample jar with a clean tool and the jar will be filled to minimize headspace in the jar. Each sample will be labeled and placed in a cooler containing ice.

Field Screening Sample – Place soil in a sealed plastic freezer bag labeled with the borehole number and depth of sample. After allowing the sample to volatilize for at least 5 minutes, insert the PID probe into the bag, obtain a headspace reading for volatile organics, and record the reading on the geologic log. Retain samples until the completion of the borehole drilling for geologic logging.

QA/QC Sample Collection – Duplicate and other quality control samples will be collected at the following frequencies:

- One equipment blank will be collected for every twenty (20) samples collected using non-dedicated sampling equipment (5% frequency per matrix and method).
- A trip blank will be included in each shipment of samples submitted to the laboratory for a VOA.
- One duplicate or replicate will be collected for every twenty (20) field samples per matrix and method (5% frequency per matrix and method).
- Additional sample volume will be submitted to the laboratory for the matrix spike and matrix spike duplicate analyses, which are to be conducted at a frequency of 5% per matrix and method, as applicable.

GEOLOGIC LOGGING

ATTACHMENT B-4

PROCEDURE FOR SOIL SAMPLING AND FIELD SCREENING

Describe the following soil characteristics of each sample using the Unified Soil Classification System (USCS, ASTM D 2488-84) on geologic log. **Note**: Use of the following order facilitates preparation of the final computer generated log:

- Soil group symbol (e.g., SM, SP, etc.)
- Color (per Munsell color chart)
- Group name (e.g., silty sands, poorly-graded sand, etc.)
- Particle size range (e.g., fine to medium)
- Moisture content (dry, moist, wet)
- Density (based on blows required to drive sampler) of granular soils or stiffness of clays
- Plasticity of fines
- Texture or structure (e.g., laminated)
- Geologic name (e.g., fill, glacial till, etc.).
- Staining, odor, or other evidence of dangerous constituents (if appropriate).
- Additional pertinent comments.

For example: SM, Dark Gray, Silty Fine Sand with trace of fine gravel (moist) (very dense) (glacial till) (discontinuous orange staining and strong odor)

DECONTAMINATION

Decontaminate the sampler and other sampling equipment prior to collection of each sample in accordance with the procedure outlined in Attachment B-1.

BOREHOLE ABANDONMENT

After borehole completion, verify that the drilling contractor seals the borehole per the FSAP. Record the borehole abandonment method and approximate amount of grout material on the geologic log.

SAMPLE HANDLING

- **Sample packing** - Place the sample containers in an ice chest cooled with sufficient ice to maintain the samples at or below 4ºC. Wet ice shall be placed within sealed plastic bags and placed below, within and on top of the samples. The ice chest shall remain closed except when placing samples in or removing samples. There should be foam or other appropriate packing material on the base of the ice chest, between sample containers, and on top of the sample containers to prevent breakage of glass sample jars. The packing shall be sufficient to prevent excessive movement of the containers which could affect sample integrity. The ice chest shall remain in the sampler's possession at all times until delivery to the lab or secure temporary storage.
- **Use of chain of custody form** - Be sure to complete *all* areas of the COC form (which is printed in triplicate) consistent with the documentation procedure described in Attachment C-6. Place the COC form in a sealed plastic bag and place it in the ice chest with the samples listed on the form for transport to the laboratory.
- **Sample custody** - Keep samples in your possession. If the samples are left unattended (i.e., in a locked vehicle), place chain-of-custody seals on the cooler to ensure the cooler has not been opened.
- **Sample shipping** - Each day, or as necessary, hand deliver or arrange for transport of the soil samples to the contract laboratory.
- **Disposal of investigative waste materials** - handle the drill cuttings and decontamination water in accordance with the FSAP.

ATTACHMENT B-5

PROCEDURE FOR GROUNDWATER SAMPLING AND WATER LEVEL MEASUREMENT

OVERVIEW

The purpose of the groundwater sampling procedures is to ensure that representative samples of groundwater are provided for analysis and that the act of sampling does *not* contribute to further contamination at the site or cross-contamination of samples. The purpose of collecting groundwater levels is to calculate groundwater elevations and estimate flow direction. Groundwater elevations will be used to evaluate groundwater flow direction for an area of the site if at least three wells are present

CAUTION

Take care opening sample bottles. Some of the sample bottles may contain concentrated acid preservatives which will burn your skin and damage your clothing. The bottle labels should identify the preservative or they may have a red or yellow sticker on them which indicates "preservative". *If you do spill the preservative, immediately flush with water for at least five minutes and implement other appropriate actions per the project Health and Safety Plan.*

MOBILIZATION

Review the work plan, FSAP, QAPP, and HASP. Coordinate the sampling event with the appropriate client contact and arrange for containers for purge water. Notify the laboratory of sample collection and delivery dates and request sample bottles. Verify containers received from laboratory and preservations are appropriate relative to analytical methods as outlined in Tables B-3 and B-4 in the project FSAP. Assemble appropriate equipment as follows:

- Decontamination equipment per Attachment B-1
- Field copies of the work plan, FSAP, QAPP, and HASP
- Electronic water level indicator and/or Interface probe (for measuring potential immiscible product layers)
- Folding ruler or measuring tape (marked in 0.01 foot increments)
- Sampling and purging equipment (e.g., peristaltic pump, disposable tubing, and

filters)

- Sample containers (with preservatives added as appropriate)
- Indelible marker
- Field screening equipment: PID, specific conductivity meter, pH meter, calibration solutions and gases, thermometer, extra batteries
- Tool kit
- Appropriate disposable gloves and other personal protective equipment per the HASP
- Keys to well locks and wrench for surface monuments
- Calculator
- Sample labels and field forms: well construction forms, COC forms, daily field report, water sampling forms
- Packaging material: insulated coolers, ice, packing material, duct tape, sealing plastic bags, sample custody seals

CALIBRATING THE FIELD SCREENING INSTRUMENTS

Prior to initiating purging and sampling, calibrate the field instruments per the procedures for field instrument calibration (Attachment B-3).

INSPECTING THE WELL

On the field report, record the well identification number, condition of the surface monument and surface seal, and any conditions of surrounding ground surface which could impact well integrity (e.g., ponded water, stained ground surface, cracked asphalt, etc.). Also record the nature of any observed problems on the daily field report form and report them to the project manager.

OPENING THE WELL

Remove the locking and protective caps. Sample the air in the well head for organic vapors using a PID. Record measurements on the daily field report and groundwater collection form. For unvented wells, allow sufficient time for the water level to equilibrate with the atmosphere before measuring.

MEASURING FLUID LEVELS IN A WELL

Note: measure fluid levels for all wells in an area within a 24-hour period. Measure levels in a well prior to purging. Standard operating procedures for measuring fluid levels in a well are described in detail in Attachment B-2.

COLLECTING SAMPLES

Groundwater samples will be collected from all monitoring wells using low-flow techniques using a submersible pump. As groundwater is purged from the well it will be monitored for temperature, pH, specific conductance, dissolved oxygen (DO), oxidation reduction potential (ORP) and turbidity using an electric water quality monitor (or equivalent). The water level will also be monitored and the pumping rate adjusted to limit drawndown to 4-inches or less, if possible.

With respect to the groundwater chemistry, an adequate purge is achieved when the pH and specific conductance of the groundwater have stabilized and the turbidity has either stabilized (plus or minus 10%) or is below 10 Nephelometric Turbidity Units (NTUs). Although 10 NTUs is normally considered the minimum goal for most groundwater sampling objectives, lower turbidity has been shown to be achievable in most situations and reasonable attempts should be made to achieve these lower levels. Due to fluctuations in temperature for various reasons, temperature is not used for stability determination.

Stabilization occurs when, for at least three consecutive measurements, the pH remains constant within 0.1 Standard Unit (SU) and specific conductance varies no more than approximately 5 percent. Other parameters, such as DO, may also be used as a purge adequacy parameter. Normal goals for DO are 0.2 mg/L or 10 percent saturation, whichever is greater. DO measurements must be conducted using either a flow-through cell or an over-topping cell to minimize or reduce any oxygenation of the sample during the measurement process. ORP should not be used as a purge stabilization parameter, but may be measured during purging to obtain the measurement of record for ORP for the sampling event.

There are no set criteria for establishing how many total sets of measurements are adequate to document stability of parameters. If calculated purge volume is small, the measurements should be taken frequently enough to provide a sufficient number of measurements to evaluate stability. If the purge volume is large, measurements taken every 15 minutes, for example, may be sufficient.

If, after three well volumes have been removed, the chemical parameters have not stabilized according to the above criteria, additional well volumes (up to five well volumes), should be removed. If the parameters have not stabilized within five volumes, it is at the discretion of the project leader whether or not to collect a sample or continue purging. If, after five well volumes, pH and conductivity have stabilized and the turbidity is still decreasing and approaching an acceptable level, additional purging should be considered to obtain the best sample possible, with respect to turbidity. The conditions of sampling should be noted in the field log.

In some situations, even with slow purge rates, a well may be pumped or bailed dry (evacuated). In these situations, this generally constitutes an adequate purge and the well can be sampled following sufficient recovery (enough volume to allow filling of all sample containers). It is not necessary that the well be evacuated three times before it is sampled. The pH, specific conductance, temperature and turbidity should be measured and recorded, during collection of the sample from the recovered volume, as the measurements of record for the sampling event.

For wells with slow recovery, attempts should be made to avoid purging them to dryness. This can be accomplished, for example, by slowing the purge rate. As water enters a well that has been purged to dryness, it may cascade down the sand pack and/or the well screen, stripping VOCs that may be present and/or introducing soil fines into the water column.

It is particularly important that wells be sampled as soon as possible after purging. If adequate volume is available immediately upon completion of purging, the well must be sampled immediately. If not, sampling should occur as soon as adequate volume has recovered. If possible, sampling of wells which have a slow recovery should be scheduled so that they can be purged and sampled in the same day, after adequate volume has recovered. Wells of this type should, unless it is unavoidable, not be purged at the end of one day and sampled the following day.

QA/QC Sample Collection – Duplicate and other quality control samples will be collected at the following frequencies:

- One equipment blank will be collected for every twenty (20) samples collected using non-dedicated sampling equipment (5% frequency per matrix and method).
- A trip blank will be included in each shipment of samples submitted to the laboratory for a VOA.
- One duplicate or replicate will be collected for every twenty (20) field samples per matrix and method (5% frequency per matrix and method).
- Additional sample volume will be submitted to the laboratory for the matrix spike and matrix spike duplicate analyses, which are to be conducted at a frequency of 5% per matrix and method, as applicable.

LABELING OF SAMPLES

Label each sample container according to the sample number, date, and time of collection in accordance with the project sampling scheme. Upon completion of labeling, place the sample in a cooled ice chest for storage and transport to the laboratory. Record date, time, and sample appearance on the daily field report and water collection form. Record all other required sampling information on the water sampling form.

ATTACHMENT B-5

PROCEDURE FOR GROUNDWATER SAMPLING AND WATER LEVEL MEASUREMENT

SAMPLE HANDLING

- **Sample packing** - Place the sample containers in an ice chest cooled with sufficient ice to maintain the samples at or below 4 degrees Centigrade. The frozen ice packs shall be placed within sealed plastic bags and placed below, within and on top of the samples. The ice chest shall remain closed except when placing samples in or removing sample. There should be foam or other appropriate packing material on the base of the ice chest, between sample containers, and on top of the sample containers to prevent breakage of glass sample jars. The ice chest shall remain in the sampler's possession at all times until delivery to the laboratory or secure temporary storage.
- **Use of chain of custody form** - Be sure to complete *all* areas of the COC form (which is printed in triplicate) consistent with the documentation procedure described in Attachment B-6. Place the COC form in a sealed plastic bag and place it in the ice chest with the samples listed on the form for transport to the laboratory.
- **Sample custody** - Keep samples in your possession. If the samples are left unattended (i.e., in a locked vehicle), place chain-of-custody seals on the cooler to ensure the cooler has not been opened.
- **Sample shipping** - Each day, or as necessary, hand deliver or arrange for transport of the water samples to the contract laboratory.
- **Disposal of investigative waste materials** - handle the purge and decontamination water in accordance with the FSAP.

ATTACHMENT B-6

PROCEDURE FOR FIELD DOCUMENTATION

OVERVIEW

Each field team will maintain a daily field report and complete other logs and sampling forms to provide a daily record of events and document data and sample collection. All notes in the daily field report and other logs and forms should be clear, concise, and legally defensible. The use of each type of data record is described below.

DAILY FIELD LOG

All documentation in daily field reports will be in ink. If an error is made, make corrections by crossing a line through the error and entering the correct information. Date and initial corrections. No entries will be obliterated or rendered unreadable. Sign and date each page.

Daily entries

- Job name and number
- Date
- Time
- Meteorological conditions
- Field personnel present
- Documentation of site safety meeting
- Level of personnel protection
- List of on-site visitors and the level of personal protection
- Field observations and conditions
- Building or general location being investigated
- Identification of sampling points consistent with project labeling scheme on area plan
- Description of reason for modifying sample locations on plan
- References to photographs (if applicable)
- Number of samples taken and general time of sample collection at each location
- Number of QA/QC samples taken
- Telephone contacts made regarding project and general purpose of discussion

- Visitor's names, affiliation, time of visit and purpose
- Unique field observations, difficulties, or modifications to specified scope or methods
- Documentation of decontamination
- All calibration measurements made (e.g., pH, temperature, specific conductance, etc.)
- Sample distribution (i.e., storage at site, direct delivery to contract analytical laboratory)
- Shipping date, method of shipment, destination, and the shipment identification number (if samples shipped)
- Summary of daily activities
- Other pertinent information.

GEOLOGIC LOG

Record the boring/monitoring well identification number, drilling contractor and method, field geologist/engineer's observations, description of soils encountered, USCS classification of soils, field screening measurements for soils, sample collection depths, and sample identification numbers on this log. In addition, notes regarding the drilling operation including site conditions, drilling rate, blow counts required to drive sampler, observation of drilling cuttings, depth to groundwater if encountered, borehole sealing material, and other pertinent subsurface conditions shall be recorded on the geologic log. All project information on the log shall also be completed and the preparer shall initial and date the log. Furthermore, if a well is constructed within the boring, this form will include the details of the materials used to construct that well and depth of placement of those materials.

GROUNDWATER SAMPLING DATA SHEET

Document groundwater water sampling procedures and data collected during well purging on the Groundwater Sampling Data Sheet. Be sure to complete all areas of the form and properly label the samples in accordance with the project sample labeling scheme. The sampler shall date and sign the form.

ATTACHMENT B-6

PROCEDURE FOR FIELD DOCUMENTATION

SAMPLE LABEL

A laboratory provided sample label will be placed on all samples collected. The label will be completed with the following information:

- Project number and name
- Date and time of sample collection
- Boring or monitoring well number
- Sample identification number and depth (soils only)
- Sample type (soil, groundwater, etc.)
- Sampler's initials

CUSTODY SEALS

When securing a cooler for sample shipment to the laboratory, seal the cooler with a laboratory provided signed custody seal to document that the cooler has not been tampered with during shipping.

CHAIN OF CUSTODY FORM

Use a standard URS COC or one provided by the laboratory. Complete *all* areas of the COC form in triplicate. Retain one copy of the COC and provide it to the project manager for the master job file. Send two copies of the COC with samples shipped to the laboratory. If samples are hand delivered, obtain the signature of the receiving personnel and leave the second copy with the laboratory. The third copy is placed in the job file. The laboratory will provide a copy of the final COC with the analytical reports.

Table B-1
Sample Nomenclature Summary

Area	Location Number	Sample Identification	Estimated Sampling Depth	Sample Media	VOCs (5035A/8260B)	PAHs (8270D)	TOC Walkley-Black
Proposed Surface Soil Sample Locations							
Steel Sump	SB-20	SB-20 (0-1')	0-1 ft bgs	Surface Soil	X		
	SB-21	SB-21 (0-1')	0-1 ft bgs	Surface Soil	X		
	SB-22	SB-22 (0-1')	0-1 ft bgs	Surface Soil	X		
	SB-25	SB-25 (0-1')	0-1 ft bgs	Surface Soil	X		
	SB-26	SB-26 (0-1')	0-1 ft bgs	Surface Soil	X		
Cardboard Storage Room/Vicinity	SB-42	SB-42 (0-1')	0-1 ft bgs	Surface Soil	X	X	
	SB-45	SB-45 (0-1')	0-1 ft bgs	Surface Soil	X	X	
	SB-46	SB-46 (0-1')	0-1 ft bgs	Surface Soil	X	X	
	SB-47	SB-47 (0-1')	0-1 ft bgs	Surface Soil	X	X	
	SB-50	SB-50 (0-1')	0-1 ft bgs	Surface Soil	X	X	
UST/Gasoline Dispenser	SB-56	SB-56 (0-1')	0-1 ft bgs	Surface Soil	X	X	
	SB-57	SB-57 (0-1')	0-1 ft bgs	Surface Soil	X	X	
Proposed Subsurface Soil Sample Locations							
Steel Sump	SB-19	SB-19 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X		
	SB-19	SB-19 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X		
	SB-20	SB-20 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X		
	SB-20	SB-20 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X		
	SB-21	SB-21 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X		
	SB-21	SB-21 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X		
	SB-22	SB-22 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X		
	SB-22	SB-22 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X		
	SB-23	SB-23 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X		
	SB-23	SB-23 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X		
	SB-24	SB-24 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X		
	SB-24	SB-24 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X		
	SB-25	SB-25 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X		
	SB-25	SB-25 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X		
	SB-26	SB-26 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X		
	SB-26	SB-26 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X		
	SB-27	SB-27 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X		
	SB-27	SB-27 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X		
	SB-28	SB-28 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X		
	SB-28	SB-28 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X		
	SB-29	SB-29 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X		
	SB-29	SB-29 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X		
	SB-30	SB-30 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X		
	SB-30	SB-30 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X		
	SB-31	SB-31 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X		
	SB-31	SB-31 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X		
	SB-32	SB-32 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X		
	SB-32	SB-32 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X		
	SB-33	SB-33 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X		
	SB-33	SB-33 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X		
	SB-34	SB-34 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X		
	SB-34	SB-34 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X		
	SB-35	SB-35 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X		
	SB-35	SB-35 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X		
	SB-36	SB-36 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X		
	SB-36	SB-36 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X		

Table B-1
Sample Nomenclature Summary

Area	Location Number	Sample Identification	Estimated Sampling Depth	Sample Media	VOCs (5035A/8260B)	PAHs (8270D)	TOC Walkley-Black
Proposed Subsurface Soil Sample Locations - Continued							
Cardboard Storage Room/Vicinity	SB-37	SB-37 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X	X	
	SB-37	SB-37 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X	X	
	SB-38	SB-38 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X	X	
	SB-38	SB-38 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X	X	
	SB-39	SB-39 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X	X	
	SB-39	SB-39 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X	X	
	SB-40	SB-40 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X	X	
	SB-40	SB-40 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X	X	
	SB-41	SB-41 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X	X	
	SB-41	SB-41 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X	X	
	SB-42	SB-42 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X	X	
	SB-42	SB-42 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X	X	
	SB-43	SB-43 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X	X	
	SB-43	SB-43 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X	X	
	SB-44	SB-44 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X	X	
	SB-44	SB-44 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X	X	
	SB-45	SB-45 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X	X	
	SB-45	SB-45 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X	X	
	SB-46	SB-46 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X	X	
	SB-46	SB-46 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X	X	
	SB-47	SB-47 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X	X	
	SB-47	SB-47 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X	X	
	SB-48	SB-48 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X	X	
	SB-48	SB-48 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X	X	
	SB-49	SB-49 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X	X	
	SB-49	SB-49 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X	X	
	SB-50	SB-50 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X	X	
	SB-50	SB-50 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X	X	
	SB-51	SB-51 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X	X	
	SB-51	SB-51 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X	X	
	SB-52	SB-52 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X	X	
	SB-52	SB-52 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X	X	
	SB-53	SB-53 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X	X	
	SB-53	SB-53 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X	X	
Proposed Subsurface Soil Sample Locations - Continued							
UST/Gasoline Dispenser	SB-54	SB-54 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X	X	
	SB-54	SB-54 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X	X	
	SB-55	SB-55 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X	X	
	SB-55	SB-55 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X	X	
	SB-56	SB-56 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X	X	
	SB-56	SB-56 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X	X	
	SB-57	SB-57 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X	X	
	SB-57	SB-57 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X	X	
	SB-58	SB-58 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X	X	
	SB-58	SB-58 (Sample Depth)	Up to 30 feet bgs	Subsurface Soil	X	X	

Table B-1
Sample Nomenclature Summary

Area	Location Number	Sample Identification	Estimated Sampling Depth	Sample Media	VOCs (5035A/8260B)	PAHs (8270D)	TOC Walkley-Black
Proposed Soil Samples at Monitoring Well Locations							
Entire Site	MW-12	MW-12 (Sample Depth)	Above Water Table	Subsurface Soil	X		
	MW-12	MW-12 (Sample Depth)	Above Water Table	Subsurface Soil	X		
	MW-13	MW-13 (Sample Depth)	Above Water Table	Subsurface Soil	X		X
	MW-13	MW-13 (Sample Depth)	Above Water Table	Subsurface Soil	X		X
	MW-14	MW-14 (Sample Depth)	Above Water Table	Subsurface Soil	X		X
	MW-14	MW-14 (Sample Depth)	Above Water Table	Subsurface Soil	X		X
	MW-15	MW-15 (Sample Depth)	Above Water Table	Subsurface Soil	X		X
	MW-15	MW-15 (Sample Depth)	Above Water Table	Subsurface Soil	X		X
	MW-16	MW-16 (Sample Depth)	Above Water Table	Subsurface Soil	X		
	MW-16	MW-16 (Sample Depth)	Above Water Table	Subsurface Soil	X		
	MW-17	MW-17 (Sample Depth)	Above Water Table	Subsurface Soil	X		
	MW-17	MW-17 (Sample Depth)	Above Water Table	Subsurface Soil	X		
	MW-18	MW-18 (Sample Depth)	Above Water Table	Subsurface Soil	X		X
	MW-18	MW-18 (Sample Depth)	Above Water Table	Subsurface Soil	X		X
	MW-5D	MW-5D (Sample Depth)	Above Water Table	Subsurface Soil	X		
	MW-5D	MW-5D (Sample Depth)	Above Water Table	Subsurface Soil	X		
	MW-9D	MW-9D (Sample Depth)	Above Water Table	Subsurface Soil	X		X
	MW-9D	MW-9D (Sample Depth)	Above Water Table	Subsurface Soil	X		X
	MW-10D	MW-10D (Sample Depth)	Above Water Table	Subsurface Soil	X		
	MW-10D	MW-10D (Sample Depth)	Above Water Table	Subsurface Soil	X		
	MW-16D	MW-16D (Sample Depth)	Above Water Table	Subsurface Soil	X		
	MW-16D	MW-16D (Sample Depth)	Above Water Table	Subsurface Soil	X		
Proposed Groundwater Samples							
Entire Site	MW-1	MW-1	Screened Interval	Groundwater	X	X	
	MW-2	MW-2	Screened Interval	Groundwater	X	X	
	MW-3	MW-3	Screened Interval	Groundwater	X	X	
	MW-4	MW-4	Screened Interval	Groundwater	X	X	
	MW-5	MW-5	Screened Interval	Groundwater	X	X	
	MW-6	MW-6	Screened Interval	Groundwater	X	X	
	MW-7	MW-7	Screened Interval	Groundwater	X		
	MW-8	MW-8	Screened Interval	Groundwater	X		
	MW-9	MW-9	Screened Interval	Groundwater	X		
	MW-10	MW-10	Screened Interval	Groundwater	X		
	MW-11	MW-11	Screened Interval	Groundwater	X		
	MW-12	MW-12	Screened Interval	Groundwater	X	X	
	MW-13	MW-13	Screened Interval	Groundwater	X		
	MW-14	MW-14	Screened Interval	Groundwater	X		
	MW-15	MW-15	Screened Interval	Groundwater	X		
	MW-16	MW-16	Screened Interval	Groundwater	X		
	MW-17	MW-17	Screened Interval	Groundwater	X	X	
	MW-18	MW-18	Screened Interval	Groundwater	X	X	
	MW-5D	MW-5D	Screened Interval	Groundwater	X	X	
	MW-9D	MW-9D	Screened Interval	Groundwater	X		
	MW-10D	MW-10D	Screened Interval	Groundwater	X		
	MW-16D	MW-16D	Screened Interval	Groundwater	X		

Notes:

ft bgs - Feet below ground surface
PAH- Polynuclear aromatic hydrocarbons
TPH - Total petroleum hydrocarbons
VOC - Volatile organic compounds

Table B-2
Sample Analysis Summary

		Number of										
Analyte	Method	Steel Sump	Cardboard Storage	UST/Gas	Entire Site	**Subtotal**	No. of Equipment Blanks see Note (1)	No. of Trip Blanks see Note (2)	No. of Field Duplicates see Note (1)	No. of MS see Note (1)	No. of MSD	Total No. of Samples
Surface soil												
VOCs	SW 5035A 8260B	5	5	2	0	12	1	1	1	1	1	17
PAHs	SW 8270D-SIM	0	5	2	0	7	1	0	1	1	1	11
	Subtotal:	5	10	4	0	19	2	1	2	2	2	28
Subsurface soil												
VOCs	SW 5035A/8260B	36	34	10	22	102	6	6	6	6	6	132
PAHs	SW 8270D-SIM	0	34	10	0	44	3	0	3	3	3	56
TOC	Walkley-Black	0	0	0	10	10	1	0	1	1	1	14
	Subtotal:	36	68	20	32	156	10	6	10	10	10	202
Groundwater												
VOCs	SW 8260B	0	0	0	22	22	2	2	2	2	2	32
PAHs	SW 8270D-SIM	0	0	0	10	10	1	0	1	1	1	14
	Subtotal:	0	0	0	32	32	3	2	3	3	3	46

In addition, six (6) composite soil samples and six (6) water samples will be analyzed for TCLP VOCs by SW-846 1311/8260B.

Notes:

MS/MSD - Matrix Spike/Matrix Spike Duplicate
PAHs - Polynuclear Aromatic Hydrocarbons
TCLP - Toxicity Characteristic Leaching Procedure
TOC - Total Organic Carbon
VOCs - Volatile organic compounds

(1) Equipment blanks, field duplicates, and MS and MSD - 5% of total number of samples collected per method and matrix. Note: Equipment blanks will b
collected only when using non-dedicated sampling equipment

(2) Trip blanks will be included in each shipment of soil and GW samples submitted to the laboratory for a VOA analysis.

Table B-3
Soil Sample Collection, Preservation, And Holding Time Criteria
Itron, Inc.
Greenwood, South Carolina

Parameter	Analytical Method	Container Type	Preservation	Extraction Holding Time	Analysis Holding Time
Volatile Organic Compounds (VOCs)	EPA SW-846 5035A/8260B Mod.	2-40 mL VOA vials with DI Water, 1-40 mL VOA vial with MeOH 1-40 mL VOA No Preservative, and 2-oz glass jar with teflon-lined lid (minimize headspace)	DI Water (for VOA vial) Methanol (for VOA vial) No headspace (for 2-oz glass jar) [5 gms of sample for 5 mls of preservative] Freeze within 48 Hours of Collection	NA	14 days
Polynuclear Aromatic Hydrocarbons (PAHs)	EPA SW-846 8270 and 8270-SIM	4-oz glass jar with teflon-lined lid	Cool to 4ºC	NA	14 days
Total Organic Carbon (TOC)	Walkley-Black	4-oz glass jar with teflon-lined lid	Cool to 4ºC	NA	28 days
TCLP VOCs	EPA SW-846 5035A/8260B Mod.	4-oz glass jar with teflon-lined lid	Cool to 4ºC	NA	14 days

* - Days from extraction date

Note:

Other allowable containers for soil samples include stainless steel rings with teflon-lined plastic caps for analyses other than volatile parameters.

Table B-4
Groundwater Sample Collection, Preservation, And Holding Time Criteria
Itron, Inc.
Greenwood, South Carolina

Parameter	Analytical Method	Container Type	Preservation	Extraction Holding Time	Analysis Holding Time
Volatile Organic Compounds (VOCs)	EPA SW-846 8260B	3-40 ml VOA glass vials with teflon septum (No Headspace)	HCI pH<2, cool to 4ºC	NA	14 days
Polynuclear Aromatic Hydrocarbons (PAHs)	EPA SW-846 8270-SIM (Low-Level)	2-1 L amber glass, Teflon lined cap	Cool to 4ºC	7 days	40 days*
TCLP VOCs	EPA SW-846 8260B	1-1 L. wide-mouth glass jars	Cool to 4ºC	NA	14 days

* - Days from extraction date

APPENDIX C

Quality Assurance Project Plan

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TABLES

ABBREVIATIONS AND ACRONYMS LIST

CFR	code of federal regulations
COC	chain-of-custody
DO	dissolved oxygen
DQO	data quality objective
FSAP	field sampling and analysis plan
HASP	health and safety plan
LCS	laboratory control sample
MCL	maximum contaminant level
MDL	method detection limit
MS/MSD	matrix spike / matrix spike duplicate
ORP	oxidation reduction potential
PE	performance evaluation
QA/QC	quality assurance / quality control
QAPP	quality assurance project plan
RI	Remedial Investigation
RL	reporting limit
RPD	relative percent difference
SARA	Superfund Amendments and Reauthorization Act
SCDHEC	South Carolina Department of Health and Environmental Control
URS	URS Corporation
USEPA	United States Environmental Protection Agency
VCC	Voluntary Clean-up Contract

1.0 PROJECT DESCRIPTION

This document presents the Quality Assurance Project Plan (QAPP) for the Remedial Investigation (RI) to be conducted at the Itron, Inc. facility in Greenwood, South Carolina. The RI is being conducted under Responsible Party Voluntary Cleanup Contract (RPVCC) 13-6078-RP, effective October 2, 2013 between the South Carolina Department of Health and Environmental Control (SCDHEC) and Itron, Inc. The activities conducted in association with this investigation will be consistent with the National Contingency Plan contained in Title 40 Code of Federal Regulations (CFR) Part 300.68(a-j). This QAPP has been developed according to the following guidance documents:

- USEPA Guidance for Preparing Quality Assurance Project Plans (USEPA, 1998),
- USEPA Requirements for Quality Assurance Project Plans (USEPA, 1999a),
- Region IV Field Branches Quality Management Plan (USEPA, 2012), and
- Section 121 of the Superfund Amendments and Reauthorization Act (SARA) of 1986.

The procedures outlined in this QAPP govern all aspects of chemical data collection activities associated with the RI field sampling and analysis plan (FSAP). The purpose of the QAPP and FSAP is to ensure that the data are representative of the conditions in the field and that analytical data are valid and accurately reported.

2.0 PROJECT ORGANIZATION AND RESPONSIBILITY

The project team will consist of personnel from Itron, Inc., and URS Corporation (URS) and their subcontractors including Shealy Environmental Services, Inc. The following paragraphs describe the major positions and responsibilities of the team along with the approach to quality assurance (QA) management. Key project personnel and regulatory personnel and their responsibilities for QA activities are described below.

2.1 Project Managers

- Carol Minsk
  South Carolina Department of Health and Environmental Control (SCDHEC)
  Bureau of Land and Waste Management
  2600 Bull Street
  Columbia, South Carolina 29201
  (803) 898-3432
  minskcc@dhec.sc.gov

- Jeff Stewart
  Itron, Inc.
  2111 North Molter Road
  Liberty Lake, Washington 99019
  (509) 891-3699
  jeff.stewart@itron.com

- James Flynn
  URS Corporation
  1501 4th Avenue, Suite 1400
  Seattle, Washington 98101
  (206) 438-2113
  james.flynn@urs.com

The Project Managers are responsible for implementation of all aspects of the work plans, FSAP, HASP and QAPP (project plans) for which their respective companies are responsible. Specific responsibilities include review and approval of revisions to project plans, ensuring that all technical procedures are followed, reporting of deviations from the SCDHEC approved project plans to the Itron and SCDHEC Project Managers, and ensuring that the data collected will satisfy the Data Quality Objectives (DQOs) discussed in Section 3 of this document. In addition, they provide technical review of reports.

2.2 QA/QC Manager

- Jennifer B. Garner
  URS Corporation
  1501 4th Avenue, Suite 1400
  Seattle, Washington 98101
  (206) 438-2063
  jen.garner@urs.com

The QA/QC Manager is responsible for developing and managing procedures described in the QAPP, interfacing with the project laboratory and data quality assessment personnel, reviewing QA/QC audit reports, coordinating audit procedures, implementing necessary corrective action procedures, reviewing and evaluating analytical laboratory results, reviewing data quality assessment reports, and reporting to the URS Project Manager.

2.3 Analytical Laboratory Project Manager

- Lucas Odom
  Shealy Environmental Services, Inc.
  106 Vantage Point Drive
  West Columbia, South Carolina 29172
  (803) 206-9537
  lodom@shealylab.com

The analytical laboratory project manager is responsible for reviewing and reporting all analytical data generated during the project, responding to questions or concerns regarding the quality of the data that the project managers, QA/QC manager, or data quality assessment personnel may have, and implementing any corrective actions deemed necessary by these individuals with regards to laboratory operations.

2.4 Environmental Media Sampling Personnel

- Various URS and Other Contract Personnel

The field sampling personnel are responsible for implementing the sampling and handling procedures as specified in the project plans, ensuring all field procedures follow the appropriate project plan, notifying the Project Manager and QA/QC Manager of any difficulties encountered during the field program, and implementing corrective actions to the field procedures as approved by the Project Manager.

3.0 DATA QUALITY OBJECTIVES

DQOs are qualitative and/or quantitative statements of the precision (a measure of the random error), bias (a measure of systematic error), representativeness, completeness, and comparability necessary for the data to serve the objectives of the RI. The objectives of the RI are discussed in detail in the work plan. During plan implementation, field as well as laboratory data will be generated. The quality of the field data (e.g. water quality parameters) will be evaluated based on successful calibration of each instrument supplying the data and the stated accuracy and precision by the manufacturer. The quality of laboratory data will be evaluated based on the relative precision, bias, representativeness, completeness, and comparability of the data generated by each type of analysis. These terms are defined below:

Precision	Precision is a measure of the scatter in the data due to random error. For most environmental measurements, the major sources of random error are sampling and analytical procedures. Sampling and analytical precision is expressed as the relative percent difference (RPD). The RPD for laboratory duplicates, matrix spike and matrix spike duplicates (MS/MSD), and field duplicates will be used to assess sampling and analytical precision.

Bias	Bias is a measure of the difference between the analytical result for a parameter and the true value due to systematic errors. Potential sources of systematic errors include sample collection, physical/chemical instability of samples, interference effects, calibration of the measurement system, and artificial contamination. Bias will be assessed based on laboratory control sample (LCS) results, MS/MSD recoveries, surrogate recoveries (organic analyses), and method blanks.
Representativeness	Representativeness of the environmental conditions at the time of sampling is achieved by selecting sampling locations and methods so that the data describe the site conditions that the project seeks to evaluate.
Completeness	Completeness refers to the amount of usable data produced in the project.
Comparability	Comparability refers to the ability to compare the data from the project to other data collected at this site.

Project DQOs for method detection limits (MDLs) and laboratory reporting limits (RLs) are summarized in Tables 1 and 2. The methods were selected to achieve reporting limits that are equal to or below regulatory screening levels also shown in the tables.

The DQOs for precision and bias are assessed based on the laboratory control limits provided in Tables 1 and 2. Representativeness of the data collected will be ensured by collecting samples in the locations and with the methods described in the FSAP. In addition, representative samples will also be ensured through following proper protocols for sample handling (storage, preservation, packaging, custody, and transportation), sample documentation, and laboratory sample handling and documentation procedures.

Comparability of the data will be ensured by selecting standard USEPA and/or state analytical methodologies for sample analysis. Data will be reported from the laboratory to the Project Manager in electronic format. The laboratory-provided data will be converted by the selected laboratory into a suitable database format specified by URS. The electronic analytical reports will be checked by URS to ensure reporting accuracy. Data quality will be assessed in terms of precision, bias, representativeness, completeness and comparability using specific data quality assessment procedures outlined in Section 10. Results of these assessments, along with any data that is qualified, will be submitted to the QA/QC manager in a data review memorandum for review and, if necessary, additional assessment.

4.0 SAMPLING PROCEDURES

Specific sampling procedures are discussed in the FSAP. Pertinent information obtained during sampling - including field measurements, physical description of the sample, time and date collected and person collecting the sample - will be recorded on a sample form or in a field logbook as described in the FSAP. The FSAP describes the format for field data entry and field procedures for assuring accuracy. Specific sampling procedures for collecting groundwater and soil as part of the RI are described in the FSAP.

Containers, sample size, preservation, and holding times are provided in Tables 3 and 4 for groundwater and soil for each analytical methodology that may be used to analyze these media. Samples will be identified according to the sample designation system described in the applicable FSAP on waterproof labels with indelible markers. Sample custody will be tracked with a chain-of-custody (COC) form in accordance with the procedures outlined in the applicable project plan. Samples will remain in the custody of the sample collector until transport to the laboratory, unless a secure storage area is available.

5.0 ANALYTICAL PROCEDURES

The analytical methods that may be used by the contract laboratory are outlined in Tables 1 and 2 and discussed in Section 5.2 below.

5.1 Field Analytical Procedures

Groundwater will be analyzed for dissolved oxygen (DO) (low flow purging only), pH, conductivity, oxidation reduction potential (ORP), turbidity and temperature in the field using portable testing equipment as described in the FSAP. Soil samples may be field screened for organic vapor emissions using a portable organic vapor monitor as indicated in the specific project plan. The portable instruments used for field measurements will be operated, maintained, and calibrated in accordance with the manufacturer's operations manual specific for the instrument.

5.2 Laboratory Analytical Procedures

The analytical methodologies, including MDLs and laboratory RLs, that will be used to analyze water and soil samples are derived from *SW-846, EPA Test Methods for Evaluating Solid Waste Update IIIB* (USEPA, 2005). The selected analytical laboratory will perform all organic analyses of groundwater and soil samples collected during the RI in general accordance with the appropriate specific methodology. All method-required QC will be completed by the laboratory conducting the analyses/tests and reported along with the analytical and testing results. Analytical methods and reporting limits will be reviewed prior to plan implementation.

6.0 DATA REDUCTION, REVIEW AND REPORTING

Data reduction is the process of converting raw data to final results. Data from direct-reading field instruments will be obtained from the instrument and recorded onto a sample collection form, or other appropriate field form as described in the applicable project plan. Laboratory analytical data reduction, review and reporting will be conducted by the laboratory in accordance with their standard operating procedures discussed in their Quality Assurance Manual and requirements of the appropriate project plan. Data deliverables will include the project sample results and QC results in electronic format. The data will be submitted to URS electronically for data quality assessment and formatting as directed by the project plan or project managers. The data assessment will consist of ensuring that the laboratory has met the QC control limits established for surrogate recovery, LCS recovery, MS/MSD recovery and RPD, sample duplicate RPD, and that the samples were properly preserved and analyzed within the recommended holding times for each analysis. Once the data have been assessed, electronic versions of the data, including qualifications, if any, will be submitted to the URS Project Manager along with the data quality assessment reports. If any errors are discovered by URS, the laboratory will be notified and the discrepancy corrected.

Data will be summarized in Excel tables. Under certain circumstances, more than one result for the same analyte may be reported by the laboratory. For samples that are extracted and/or analyzed multiple times due to laboratory QC procedures, the most appropriate data to report will be evaluated individually during data assessment. When evaluating the appropriate data to report, factors such as hold time, QC parameters, and agreement between analyses will be reviewed and the rationale for the decision will be documented in the data assessment report.

Results will be compared to the applicable screening levels identified in the RI Work Plan. Data assessment procedures are outlined in Section 10.

7.0 QUALITY CONTROL PROCEDURES

Quality control procedures provide the means of evaluating and controlling the precision and bias of the analytical results. Careful adherence to established procedures for sample collection, preservation, and storage will minimize errors due to sampling and sample instability.

7.1 Field QC Procedures

The types of field QC samples that will be collected during the remedial investigation and their purpose in relation to the DQOs discussed in Section 3 are listed below.

7.1.1 Field Blanks

Field blanks can indicate bias in analytical results caused by artificially introduced contamination from sample containers, sampling equipment, filtration equipment, preservation reagents, transportation and storage practices, and other samples. Two kinds of field blanks may be used: trip blanks and rinsate (decontamination or equipment) blanks.

Trip blanks will accompany all volatile samples as they are transported to and from the sampling site and then to the laboratory. They will consist of 40-ml glass vials filled with distilled/carbon-free water provided by the laboratory. One trip blank will be included with each cooler of sample containers destined for volatiles analysis. Trip blanks will be prepared by the laboratory at the time sample containers are prepared for the site sampling.

If non-dedicated sampling equipment is used during sample collection of any media, one rinsate blank per sample media collected should be prepared each day sampling is conducted with non-dedicated equipment or at the frequency described in the applicable project plan. This sample will consist of deionized water provided by the laboratory poured over the non-dedicated sampling equipment after the equipment has been cleaned in accordance with the procedures specified in the applicable project plan. The rinsate water will be collected in the appropriate sample jar provided by the laboratory for the type of analysis to be conducted.

7.1.2 Field Duplicates

Field duplicates are samples that are collected at the same time and location, and are preserved, stored, and analyzed under identical conditions as the parent sample. Generally, the most significant source of random error is the sampling procedures. The sampling error cannot be measured directly, although it may be the largest source of error in the results. Evaluation of the difference between the analytical results of field duplicates can provide an estimate of the sampling error for project samples. A good estimate of the random error due to sampling can only be made if the results of the field duplicates are significantly above the RL for a particular analysis. Hence, samples selected for duplication should be those expected to produce positive results, if possible. In addition, to provide a better estimate of the standard deviation of field duplicate results, it is important to collect several pairs of duplicates. Collection of at least one duplicate per 20 samples of a specific media (i.e., groundwater and soil) collected should provide a sufficient number of duplicates. Field duplicates will not be identified to the laboratory but will be recorded on the sample collection forms or other appropriate field forms for identification after analysis has been conducted. A list of field duplicates will be provided to the data quality assessment personnel.

7.2 Laboratory QC Procedures

Laboratory QC samples are used to assess if analytical results are within quality control limits and documented. The types of QC samples the laboratory will employ depend on the particular analytical methodology that will be used to analyze the samples. Each analytical method has required QC that must meet laboratory developed acceptance limits in order for the data to be considered valid. In addition, as part of the laboratory's annual accreditation program, performance evaluation samples and MDL studies are conducted to evaluate the laboratory's capability of performing the method accurately and precisely.

MS/MSDs shall be performed on project samples at a rate of one per 20 samples collected for each matrix and analysis. In some cases, this will require the collection of additional sample volume in the field. If so, the FSAP will specify the sample volume required.

The control limits provided in Tables 1 and 2 were obtained from Shealy Environmental Services, Inc. during formulation of this QAPP. In general, these control limits were statistically calculated for each analytical method and matrix in accordance with SW-846 guidance based on actual sample results from a sample population which includes samples from multiple projects from many sites. In some cases, the control limits are defined by the analytical method. The control limits therefore represent the normal laboratory variability associated with analysis of samples from many sites. Matrix spike, laboratory control sample, and surrogate recoveries are reviewed by the laboratory to assess whether the recoveries indicate an out-of-control situation and to determine if corrective action is necessary. The laboratory will document the findings of their QC review and the corrective actions performed in the case narrative for the analytical reports.

8.0 PERFORMANCE AND SYSTEM AUDITS

Two types of audits may be conducted to determine whether procedures outlined in the project plans and laboratory QA program are being followed, or to detect problems so that corrective action can be initiated. The two different types of audits are described below.

8.1 Performance Audits

In a performance audit, performance evaluation (PE) samples are submitted to the laboratory and analyzed for the purpose of evaluating the performance of the measurement or analytical procedures used by the laboratory. The PE sample consists of some type of environmental matrix (e.g., soil, water) which contains a known amount of a particular analyte(s). The laboratory analyzes the sample using routine procedures and then reports their results. Shealy Environmental Services, Inc. is a South Carolina certified laboratory, and routinely participate in performance audits of their routine procedures. Results of these audits are available from the laboratory. Review of the audit results that are part of South Carolina's certification program may be conducted if there are questions concerning the capability of the laboratory in performing any of the series of analytical measurements of this RI.

Field measurement systems such as pH meters, etc. are assumed to be performing adequately if they can be successfully calibrated in accordance with the manufacturer's operating instructions and the calibration is documented in the field notes.

8.2 System Audits

System audits are conducted in order to determine if the requirements described in the applicable project plan are being properly carried out. A system audit may cover the field and laboratory portions of the project. The project manager, upon recommendation by the QA/QC manager, may request that a system audit of the field or laboratory operations be performed. Results of system audits will be reported to the project managers and project coordinators. Any corrective actions required should be implemented as discussed in Section 11.

9.0 PREVENTATIVE MAINTENANCE

Preventative maintenance procedures and schedule for field sampling equipment and measurement equipment will be conducted in accordance with the manufacturer's operations manual for each piece of equipment. Any critical spare parts or sampling equipment disposables such as small tools, disposable bailers, sample containers and other small items should be inventoried by field personnel in order to prevent and/or minimize equipment downtime. The laboratory will be responsible for preventative maintenance of its measurement equipment.

10.0 DATA ASSESSMENT PROCEDURES

When the results of the measurements have been obtained, the URS Project Manager and QA/QC manager will determine whether the project DQOs have been achieved. Whether the overall project DQOs have been met will be assessed by review of the analytical data quality assessment reports generated by the data quality assessment personnel. The responsibility of these personnel will be to ensure that the analytical DQOs have been met through review of the QC results associated with the project analytical data. Data quality assessment reports will discuss the completeness of the data and will document the reasons for any data qualifiers that are assigned. Specific procedures to be used in the data quality assessment of project data precision, bias, and completion are discussed in this section.

In order to ensure that data is of a known and acceptable quality, all analytical data generated for the RI will undergo a data quality review. This data review is an assessment of data precision and accuracy using quality control summary sheet results provided by the laboratory for each data package. If outliers occur during calibration or calibration verification or other analytical problems are identified, the laboratory will contact the URS QA/QC manager to discuss the problems/outliers. Professional judgment will be used to determine necessary actions, if any. The problems/outliers will be identified and the remedial measures implemented will be noted in the case narrative from the laboratory. Data will be evaluated and data qualifiers assigned based on the method requirements and guidance for qualification outlined in the USEPA documents *USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Organic Data Review* (USEPA, 2008) and *USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Inorganic Data Review* (USEPA, 2010). If several problems or deficiencies are encountered or specific data appear to be problematic based on the initial data review, more extensive data review will be implemented such as review of raw data. The data review consists of the following elements:

- Verification that sample numbers and analyses match the chain-of-custody request.
- Verification that sample preservation and holding times are met.
- Verification that field and laboratory blanks were performed at the proper frequency and that no analytes were present in the blanks.
- Verification that field and laboratory duplicates, MS/MSDs, laboratory duplicates, and control samples were run at the proper frequency and that control limits were met.
- Verification that surrogate compound analyses have been performed and that results met the QC criteria.
- Verification that established reporting limits have been achieved.

Data quality assessment will also include a review of the precision, bias, and completeness of analytical data. Precision will be assessed based on the RPD of MS/MSD or laboratory duplicate pairs. Calculated RPDs will be compared to the control limits and if the RPD is within these limits, then the precision of the analysis will be assumed to meet the DQOs of the project. Bias will be reviewed by comparing the percent recoveries of surrogates, matrix spikes, and laboratory control samples to the appropriate control limits. The control limits provided in Tables 1 and 2 were provided by the laboratory during development of this QAPP.

Completeness will be expressed as the percentage of the total tests (including sample and field QC results) conducted that are valid and considered usable for project objectives. Analytical results qualified as estimated based on data quality assessment are considered usable but the reason for qualification should be considered when using the data for site assessment or remedial evaluation. Rejected data are not usable.

11.0 CORRECTIVE ACTION

Evaluation of field and laboratory QC data and/or audits conducted for field operations and/or laboratory operations may indicate the need for a corrective action. Problems with analytical QC data will be addressed by the laboratory QC officer. Problems arising during field operations, however, will be addressed by the QA/QC manager through communication of the identified problem and a potential corrective action to the URS Project Manager. The Project Manager will then relay this information to the field personnel for implementation. The field personnel will then report back to the Project Manager upon successful implementation of the corrective action. Itron and SCDHEC will be notified of variances to the QAPP or applicable project plans through status reports, data review reports, quarterly reports, or other written correspondence as deemed appropriate.

12.0 QUALITY ASSURANCE REPORTS

A data assessment report will be prepared for the analytical data generated for each sampling event. The data assessment reports will indicate if DQOs were met and identify QA problems, if any, and the recommended and/or implemented corrective actions. Data assessment reports will also include summaries and reasons for data qualifiers assigned during the QA review. Data assessment reports will be submitted to the QA/QC manager and the URS Project Manager for review prior to the final reporting of analytical data. Data assessment reports, including analytical laboratory reports, will be included as an appendix to the RI report required by the VCC.

13.0 REFERENCES

U.S. Environmental Protection Agency (USEPA), 2008, USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, EPA 540/R-99/008, June 2008.

U.S. Environmental Protection Agency (USEPA), 2002, *National Primary Drinking Water Standards*, EPA publication amended June 2003.

U.S. Environmental Protection Agency (USEPA), 2010, USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, EPA 540-R-04-004, January 2010.

U.S. Environmental Protection Agency (USEPA), 2006, *National Recommended Water Quality Criteria*, http://www.epa.gov/waterscience/criteria/wqctable/nrwqc-2006.pdf.U.S. Environmental Protection Agency. 2008. Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW-846), 3rd Ed., September 1986; Final Update I, July 1992; Final Update IIA, August 1993; Final Update II, September 1994; Final Update IIB, January 1995, Final Update IIIA, 1997, Update IIIB, April 1998, Final February 2007.

Table 1
Data Quality Objectives for Groundwater
Itron, Inc. - Greenwood, South Carolina
2013 Remedial Investigation

	Screening Criteria		**Laboratory Reporting and Control Limit Criteria** [a]						
	USEPA MCLs (Drinking Water)	**SCDHEC RBSLs**	MDL	PQL	Surrogate (%)	LCS/LCSD (%)	LCS/LCSD RPD (%)	MS/MSD (%)	MS/MSD RPD (%)
VOCs (ug/L) [Method 8260B]									
Acetone	NSL	NSL	6.7	20	--	70-130	20	60-140	20
Benzene	5	5	0.2	5	--	70-130	20	70-130	20
Bromodichloromethane	80	NSL	1.7	5	--	70-130	20	71-143	20
Bromoform	80	80	0.4	5	--	70-130	20	65-131	20
Bromomethane (Methyl bromide)	NSL	NSL	0.8	5	--	60-140	20	36-168	20
Carbon disulfide	NSL	NSL	0.3	5	--	60-140	20	60-140	20
1,1,2-Trichloro-1,2,2-trifluoroethane	NSL	NSL	0.3	5	--	70-130	20	70-130	20
Isopropylbenzene	NSL	NSL	1	5	--	70-130	20	70-130	20
1,2,4-Trichlorobenzene	70	70	1.7	5	--	70-130	20	70-130	20
Methyl acetate	NSL	NSL	0.72	5	--	70-130	20	15-128	20
Cyclohexane	NSL	NSL	0.977	5	--	70-130	20	70-130	20
Methylcyclohexane	NSL	NSL	0.95	5	--	70-130	20	70-130	20
Xylenes (total)	10,000	10,000	1.7	5	--	70-130	20	70-130	20
Methyl tert-butyl ether (MTBE)	NSL	40	0.4	5	--	70-130	20	70-130	20
cis-1,2-Dichloroethene	70	NSL	0.2	5	--	70-130	20	70-130	20
1,2-Dichlorobenzene	600	NSL	1.7	5	--	70-130	20	70-130	20
1,3-Dichlorobenzene	NSL	NSL	1.7	5	--	70-130	20	79-120	20
1,4-Dichlorobenzene	75	NSL	1.7	5	--	70-130	20	80-120	20
Toluene	1,000	1,000	1.7	5	--	70-130	20	70-130	20
1,1,1-Trichloroethane	200	NSL	0.2	5	--	70-130	20	77-132	20
1,1,2-Trichloroethane	5	NSL	0.3	5	--	70-130	20	77-132	20
Trichloroethene	5	NSL	0.3	5	--	70-130	20	73-124	20
Trichlorofluoromethane	NSL	NSL	0.3	5	--	70-130	20	60-140	20
Vinyl chloride	2	NSL	0.1	2	--	70-130	20	29-159	20
2-Butanone (MEK)	NSL	NSL	1.8	10	--	60-140	20	60-140	20
Methylene chloride	5	NSL	1.7	5	--	70-130	20	69-129	20
4-Methyl-2-pentanone	NSL	NSL	0.8	10	--	60-140	20	60-140	20
Styrene	100	NSL	0.1	5	--	70-130	20	70-130	20
1,1,2,2-Tetrachloroethane	NSL	NSL	0.4	5	--	70-130	20	60-155	20
Tetrachloroethene	5	NSL	0.4	5	--	70-130	20	70-130	20
trans-1,2-Dichloroethene	100	NSL	0.4	5	--	70-130	20	70-130	20
1,2-Dichloropropane	5	NSL	0.3	5	--	70-130	20	71-126	20
cis-1,3-Dichloropropene	NSL	NSL	0.3	5	--	70-130	20	69-130	20
trans-1,3-Dichloropropene	NSL	NSL	0.3	5	--	70-130	20	73-131	20
Ethylbenzene	700	700	1.7	5	--	70-130	20	70-130	20
2-Hexanone	NSL	NSL	1	10	--	60-140	20	60-140	20
1,2-Dibromo-3-chloropropane (DBCP)	0.2	NSL	0.6	5	--	70-130	20	70-130	20
1,2-Dibromoethane (EDB)	0.05	0.05	0.3	5	--	70-130	20	70-130	20
Dichlorodifluoromethane	NSL	NSL	0.2	5	--	60-140	20	10-158	20
1,1-Dichloroethane	NSL	NSL	0.3	5	--	70-130	20	69-132	20
1,2-Dichloroethane	5	NSL	0.3	5	--	70-130	20	70-130	20
1,1-Dichloroethene	7	NSL	0.5	5	--	70-130	20	50-132	20
Carbon tetrachloride	5	NSL	0.4	5	--	70-130	20	37-166	20
Chlorobenzene	100	NSL	1.7	5	--	70-130	20	78-129	20
Chloroethane	NSL	NSL	0.5	5	--	42-163	20	60-140	20
Chloroform	80	NSL	1.7	5	--	70-130	20	63-123	20
Chloromethane (Methyl chloride)	NSL	NSL	0.3	5	--	70-130	20	20-158	20
Dibromochloromethane	80	NSL	1.7	5	--	70-130	20	74-134	20
d4-1,2-Dichloroethane	--	--	--	--	70-130	--	--	--	--
d8-Toluene	--	--	--	--	70-130	--	--	--	--
Bromofluorobenzene	--	--	--	--	70-130	--	--	--	--
PAHs (ug/L) [Method 8270D]									
Acenaphthene	NSL	NSL	1.2	5	--	30-130	40	30-130	40
Acenaphthylene	NSL	NSL	1.2	5	--	30-130	40	30-130	40
Anthracene	NSL	NSL	1.1	5	--	30-130	40	30-130	40
Benzo(a)anthracene	NSL	NSL	0.6	5	--	30-130	40	30-130	40
Benzo(a)pyrene	0.2	NSL	0.5	5	--	30-130	40	30-130	40
Benzo(b)fluoranthene	NSL	NSL	0.6	5	--	30-130	40	30-130	40
Benzo(g,h,i)perylene	NSL	NSL	0.8	5	--	30-130	40	30-130	40
Benzo(k)fluoranthene	NSL	NSL	1	5	--	30-130	40	30-130	40
Chrysene	NSL	NSL	0.7	5	--	30-130	40	30-130	40
Dibenzo(a,h)anthracene	NSL	NSL	1.3	5	--	30-130	40	30-130	40
Fluoranthene	NSL	NSL	1.4	5	--	30-130	40	30-130	40
Fluorene	NSL	NSL	1.4	5	--	30-130	40	30-130	40
Indeno(1,2,3-c,d)pyrene	NSL	NSL	2.3	5	--	30-130	40	30-130	40
Naphthalene	NSL	25	1.3	5	--	30-130	40	30-130	40
Phenanthrene	NSL	NSL	1.2	5	--	30-130	40	30-130	40
Pyrene	NSL	NSL	3.1	5	--	30-130	40	30-130	40
2-Fluorobiphenyl	--	--	--	--	37-129	--	--	--	--
Nitrobenzene-d5	--	--	--	--	38-127	--	--	--	--
Terphenyl-d14	--	--	--	--	10-148	--	--	--	--

Notes:

VOCs - Volatile Organic Compounds

PAHs - Polynuclear Aromatic Hydrocarbons

MCLs - Maximum contaminant levels based on National Primary Drinking Water Standards as established by the United States Environmental Protection Agency (USEPA)

RBSLs - Risk-Based Screening Levels based on South Carolina Department of Health and Environmental Control (SCDHEC) Risk Based Corrective Action (RBCA)

MDL - Minimum Detection Limit

PQL - Practical Quantitation Limit

LCS/LCSD - Laboratory control sample/laboratory control sample duplicate

MS/MSD - Matrix spike/matrix spike duplicate

NSL - No Screening Level listed

[a] Laboratory control limits provided by Shealy Environmental Services, Inc.

Table 2
Data Quality Objectives for Soil
Itron, Inc. - Greenwood, South Carolina
2013 Remedial Investigation

	Screening Criteria				**Laboratory Reporting and Control Limit Criteria [a]**						
	EPA SSL for Protection of Groundwater	**Resident Soil RSL**	**Industrial Soil RSL**	**SCDHEC RBSLs**	MDL	PQL	Surrogate (%)	LCS/LCSD (%)	LCS/LCSD RPD (%)	MS/MSD (%)	MS/MSD RPD (%)
VOCs (ug/kg) [Method 5035A/8260B]											
Acetone	NSL	61,000,000	630,000,000	NSL	6.7	20	--	42-149	20	42-149	20
Benzene	2.6	1,100	5,400	7	1.1	5	--	69-123	20	69-123	20
Bromodichloromethane	22	270	1,400	NSL	1.7	5	--	69-121	20	69-121	20
Bromoform	21	62,000	220,000	NSL	0.7	5	--	61-119	20	61-119	20
Bromomethane (Methyl bromide)	NSL	7,300	32,000	NSL	1.8	5	--	10-168	20	35-144	20
Carbon disulfide	1.9	820,000	3,700,000	NSL	1.3	5	--	58-122	20	58-122	20
1,1,2-Trichloro-1,2,2-trifluoroethane	NSL	43,000,000	180,000,000	NSL	0.63	5	--	49-136	20	49-136	20
Isopropylbenzene	NSL	NSL	NSL	NSL	0.23	5	--	50-136	20	50-136	20
1,2,4-Trichlorobenzene	70	22,000	99,000	NSL	1.7	5	--	34-145	20	34-145	20
Methyl acetate	NSL	78,000,000	1,000,000,000	NSL	0.98	5	--	59-137	20	59-137	20
Cyclohexane	NSL	7,000,000	29,000,000	NSL	0.674	5	--	53-139	20	53-139	20
Methylcyclohexane	NSL	NSL	NSL	NSL	0.41	5	--	41-144	20	41-144	20
Xylenes (total)	9,800	630,000	2,700,000	14,500	2.9	5	--	58-128	20	58-128	20
Methyl tert-butyl ether (MTBE)	NSL	43,000	220,000	NSL	0.4	5	--	70-130	20	70-130	20
cis-1,2-Dichloroethene	21	160,000	2,000,000	NSL	0.76	5	--	70-122	20	70-122	20
1,2-Dichlorobenzene	580	1,900,000	9,800,000	NSL	1.7	5	--	57-131	20	57-131	20
1,3-Dichlorobenzene	NSL	NSL	NSL	NSL	1.7	5	--	51-134	20	51-134	20
1,4-Dichlorobenzene	72	2,400	12,000	NSL	1.7	5	--	52-133	20	52-133	20
Toluene	690	5,000,000	45,000,000	1,450	1.7	5	--	61-129	20	61-129	20
1,1,1-Trichloroethane	70	8,700,000	38,000,000	NSL	0.85	5	--	63-128	20	63-128	20
1,1,2-Trichloroethane	1.1	1,100	5,300	NSL	0.79	5	--	55-128	20	55-128	20
Trichloroethene	1.8	910	6,400	NSL	1.9	5	--	62-126	20	62-126	20
Trichlorofluoromethane	NSL	790,000	3,400,000	NSL	1.5	5	--	45-138	20	45-138	20
Vinyl chloride	0.69	60	1,700	NSL	0.86	5	--	42-132	20	42-132	20
2-Butanone (MEK)	NSL	28,000,000	200,000,000	NSL	2.4	10	--	57-148	20	57-148	20
Methylene chloride	1.3	56,000	960,000	NSL	2.6	5	--	70-130	20	77-129	20
4-Methyl-2-pentanone	NSL	5,300,000	53,000,000	NSL	1.5	10	--	60-134	20	60-134	20
Styrene	110	6,300,000	36,000,000	NSL	1.1	5	--	54-136	20	54-136	20
1,1,2,2-Tetrachloroethane	NSL	560	2,800	NSL	0.47	5	--	69-132	20	69-132	20
Tetrachloroethene	2.3	22,000	110,000	NSL	0.5	5	--	45-150	20	70-130	20
trans-1,2-Dichloroethene	29	150,000	690,000	NSL	1.5	5	--	68-131	20	68-131	20
1,2-Dichloropropane	1.7	940	4,700	NSL	0.91	5	--	72-124	20	72-124	20
cis-1,3-Dichloropropene	NSL	NSL	NSL	NSL	0.68	5	--	70-126	20	70-126	20
trans-1,3-Dichloropropene	NSL	NSL	NSL	NSL	0.82	5	--	70-124	20	70-124	20
Ethylbenzene	780	5,400	27,000	1,150	1.7	5	--	59-128	20	59-128	20
2-Hexanone	NSL	210,000	1,400,000	NSL	1.3	10	--	54-137	20	54-137	20
1,2-Dibromo-3-chloropropane (DBCP)	0.86	5.4	69	NSL	1.5	5	--	55-125	20	55-125	20
1,2-Dibromoethane (EDB)	0.14	34	170	NSL	0.85	5	--	74-124	20	74-124	20
Dichlorodifluoromethane	21	680	3,300	NSL	1.6	5	--	10-157	20	10-157	20
1,1-Dichloroethane	NSL	3,300	17,000	NSL	0.73	5	--	71-127	20	71-127	20
1,2-Dichloroethane	1.4	430	2,200	NSL	1	5	--	67-129	20	67-129	20
1,1-Dichloroethene	2.5	240,000	1,100,000	NSL	1.7	5	--	69-138	20	69-138	20
Carbon tetrachloride	1.9	610	3,000	NSL	1.8	5	--	58-136	20	58-136	20
Chlorobenzene	68	290,000	1,400,000	NSL	1.7	5	--	59-129	20	59-129	20
Chloroethane	NSL	NSL	NSL	NSL	1.3	5	--	42-163	20	50-132	20
Chloroform	22	290	1,500	NSL	0.83	5	--	71-125	20	71-125	20
Chloromethane (Methyl chloride)	NSL	120,000	500,000	NSL	1	5	--	34-134	20	34-134	20
Dibromochloromethane	21	680	3,300	NSL	1.7	5	--	66-119	20	66-119	20
d4-1,2-Dichloroethane	--	--	--	--	--	--	53-142	--	--	--	--
d8-Toluene	--	--	--	--	--	--	68-124	--	--	--	--
Bromofluorobenzene	--	--	--	--	--	--	47-138	--	--	--	--
PAHs (ug/kg) [Method 8270D]											
Acenaphthene	NSL	3,400,000	33,000,000	NSL	10.1	330	--	46-114	40	30-130	40
Acenaphthylene	NSL	NSL	NSL	NSL	13.1	330	--	44-122	40	30-130	40
Anthracene	NSL	17,000,000	170,000,000	NSL	14.6	330	--	50-119	40	30-130	40
Benzo(a)anthracene	NSL	150	2,100	66	10.9	330	--	47-121	40	30-130	40
Benzo(a)pyrene	240	15	210	NSL	24.1	330	--	55-134	40	30-130	40
Benzo(b)fluoranthene	NSL	150	2,100	66	22.3	330	--	28-139	40	30-130	40
Benzo(g,h,i)perylene	NSL	NSL	NSL	NSL	22.5	330	--	36-125	40	30-130	40
Benzo(k)fluoranthene	NSL	1,500	21,000	66	27.2	330	--	47-130	40	30-130	40
Chrysene	NSL	15,000	210,000	66	10.3	330	--	45-126	40	30-130	40
Dibenzo(a,h)anthracene	NSL	15	210	66	21.9	330	--	45-122	40	30-130	40
Fluoranthene	NSL	2,300,000	22,000,000	NSL	10.4	330	--	50-123	40	30-130	40
Fluorene	NSL	2,300,000	22,000,000	NSL	12.7	330	--	48-117	40	30-130	40
Indeno(1,2,3-c,d)pyrene	NSL	150	2,100	NSL	29.8	330	--	45-123	40	30-130	40
Naphthalene	NSL	3,600	18,000	36	13.9	330	--	36-110	40	30-130	40
Phenanthrene	NSL	NSL	NSL	NSL	13.4	330	--	49-117	40	30-130	40
Pyrene	NSL	1,700,000	17,000,000	NSL	14.3	330	--	47-119	40	30-130	40
2-Fluorobiphenyl	--	--	--	--	--	--	33-102	--	--	--	--
Nitrobenzene-d5	--	--	--	--	--	--	22-109	--	--	--	--
Terphenyl-d14	--	--	--	--	--	--	41-120	--	--	--	--

Notes:

VOCs - Volatile Organic Compounds

PAHs - Polynuclear Aromatic Hydrocarbons

MCLs - Maximum contaminant levels based on National Primary Drinking Water Standards as established by the United States Environmental Protection Agency (USEPA)

RBSLs - Risk-Based Screening Levels based on South Carolina Department of Health and Environmental Control (SCDHEC) Risk Based Corrective Action (RBCA)

RSL - Regional Screening Level

SSL - Soil Screening Level - MCL -based for Protection of Groundwater

RSLs and SSLs are established by the USEPA.

MDL - Minimum Detection Limit

PQL - Practical Quantitation Limit

LCS/LCSD - Laboratory control sample/laboratory control sample duplicate

MS/MSD - Matrix spike/matrix spike duplicate

NSL - No Screening Level listed

[a] Laboratory control limits provided by Shealy Environmental Services, Inc.

Table 3
Water Sample Collection, Preservation, And Holding Time Criteria
Itron, Inc. - Greenwood, South Carolina
2013 Remedial Investigation

Parameter	Analytical Method	Container Type	Preservation	Extraction Holding Time	Analysis Holding Time
Volatile Organic Compounds (VOCs)	EPA SW-846 8260B	3-40 ml VOA glass vials with teflon septum (No Headspace)	HCI pH<2, cool to 4ºC	NA	14 days
Polynuclear Aromatic Hydrocarbons (PAHs)	EPA SW-846 8270-SIM (Low-Level)	2-1 amber glass Teflon lined cap	Cool to 4ºC	7 days	40 days*
Toxicity Characteristic Leaching Procedure (TCLP) VOCs	EPA SW-846 8260B	1-1 L wide-mouth glass jar	cool to 4ºC	NA	14 days

* - Days from extraction date

NA= Not Applicable

Table 4
Soil Sample Collection, Preservation, And Holding Time Criteria
Itron, Inc. - Greenwood, South Carolina
2013 Remedial Investigation

Parameter	Analytical Method	Container Type	Preservation	Extraction Holding Time	Analysis Holding Time
Volatile Organic Compounds (VOCs)	EPA SW-846 5035A/8260B Mod.	2-40 mL VOA vials with sodium bisulfate (from Easy-Draw Syringe), 1-40 mL VOA vial with MeOH (from Easy-Draw Syringe), and 2-oz glass jar with teflon-lined lid (minimize headspace)	DI Water (for VOA vial) Methanol (for VOA vial) No headspace (for 2-oz glass jar) Cool to 4ºC [5 gms of sample for 5 mls of preservative]	NA	14 days
Polynuclear Aromatic Hydrocarbons (PAHs)	EPA SW-846 8270 and 8270-SIM	4-oz glass jar with teflon-lined lid	Cool to 4ºC	NA	14 days
Total Organic Carbon (TOC)	Walkley-Black	4-oz glass jar with teflon-lined lid	Cool to 4ºC	NA	28 days
Toxicity Characteristic Leaching Procedure (TCLP) VOCs	EPA SW-846 5035A/8260B	4-oz glass jar with teflon-lined lid	Cool to 4ºC	NA	14 days