



**DRAFT FINAL AREA C GROUNDWATER
LONG-TERM MONITORING REPORT
ROUND I
STATISTICAL EVALUATION**

**PICATINNY ARSENAL
NEW JERSEY**

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**Prepared for:
USACE – Baltimore District**



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of Engineers.**

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Acronyms and Abbreviations

ARAR	applicable or relevant and appropriate requirements
bgs	below ground surface
COC	contaminant of concern
DO	dissolved oxygen
DTB	depth to bottom
ft/ft	foot per foot
H	hypotheses
J	estimated
LOC	Level of Concern
LTM	Long-term groundwater monitoring
LTM Plan	<i>Long Term Monitoring Plan and Land Use Control Remedial Design for Area C Groundwater, Picatinny Arsenal, New Jersey</i> (Shaw 2009)
MCL	maximum contaminant level
MDL	method detection limit
mg/L	milligrams per liter
ms/cm	milliSiemens per centimeter
msl	mean sea level
mV	millivolt
NA	not applicable
ND	non-detect
NJDEP	New Jersey Department of Environmental Protection
NP	not performed
NR	not reported
NTU	nephelometric turbidity units
ORP	oxidation reduction potential
PTA	Picatinny Arsenal
QAPP	Quality Assurance Project Plan
R&D	research and development
RDX	hexahydro-1,3,5-trinitro-1,3,5-triazine
redox	reduction-oxidation
ROD	Record of Decision
Rt.	route
SB	southern boundary
Shaw	Shaw Environmental, Inc.
s.u.	standard unit
UCL	upper confidence limit
UG	upgradient
U.S.	United States
USACE	U.S. Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
VOC	volatile organic compound
WESTON	Weston Solutions, Inc.
µg/L	micrograms per liter
µm	micron

%

percent

1 INTRODUCTION

1.1 Purpose

The United States (U.S.) Army Corps of Engineers, Baltimore District (USACE) tasked Weston Solutions, Inc. (WESTON) under Contract W912DR-09-D-0006 with implementing the *Long Term Monitoring Plan and Land Use Control Remedial Design for Area C Groundwater, Picatinny Arsenal, New Jersey*, November 2009 (Shaw Environmental, Inc. [Shaw] 2009) (LTM Plan). ARCADIS/Malcolm Pirnie is performing the long-term groundwater monitoring (LTM) on behalf of WESTON.

Area C groundwater is designated as Army Environmental Database Restoration Site PICA-206. Note that all Installation Restoration Program sites are given a PICA-XX designation. The LTM actions are being performed in accordance with a Record of Decision (ROD) signed by the United States Environmental Protection Agency (USEPA) on September 1, 2009 (USEPA 2009a). The selected remedies for Area C include:

- Establish land use controls
- Use the existing Classification Exception Area/Well Restriction Area that is in place throughout Picatinny Arsenal (PTA)
- Establish and implement a LTM program
- Develop an exit strategy to define triggers for reevaluating, reducing, or eliminating groundwater monitoring
- Perform Comprehensive Environmental Response, Compensation, and Liability Act five-year reviews

The objective of the groundwater remedy is to ensure protectiveness of human health and the environment through monitoring a network of wells in Area C, including wells along the downgradient southern boundary of PTA. In accordance with the approved LTM Plan, groundwater samples were collected semi-annually for chemical analysis, for a minimum of 2 years. To evaluate temporal changes or seasonal fluctuations, the first four semi-annual sampling events were conducted seasonally. During Year One, 2010, the sampling events were conducted in winter (January/February) and in summer (July/August). Refer to the *Area C Groundwater Long Term Monitoring Report, Round A*, May 2010 and the *Area C Groundwater Long Term Monitoring Report, Round B*, October 2010, prepared by Shaw (2010a and 2010b, respectively), which are in the administrative record for PTA, for additional information.

During Year Two, 2011, the sampling events were conducted in spring (April) and fall (October/November). Refer to the *Area C Groundwater Long-Term Monitoring Report, Round C*, December 2011, and the *Area C Groundwater Long-Term Monitoring Report, Round D*, May 2012, prepared by WESTON/ARCADIS/Malcolm Pirnie (WESTON 2011b and 2012), in the administrative record for PTA for additional information regarding these monitoring events. Note that in accordance with the approved LTM Plan, the first statistical evaluation was conducted after the fourth monitoring event.

The fifth round of sampling was completed in Year 3 in July (summer) 2012, the sixth round of sampling was completed in March (winter) 2013, the seventh round of sampling was completed in October (fall) 2013, and the eighth round of sampling was completed in April (spring) 2014). Refer to the *Area C Groundwater Long-Term Monitoring Report, Round E*, January 2013, the *Area C Groundwater Long-Term Monitoring Report, Round F*, August 2013, the *Area C Groundwater Long-Term Monitoring Report, Round G*, March 2014, and the *Area C Groundwater Long-Term Monitoring Report, Round H*, May 2014 prepared by WESTON/ARCADIS/Malcolm Pirnie (WESTON 2013a, WESTON 2013b, WESTON 2014a, and WESTON 2014b, respectively), in the administrative record for PTA for additional information. These reports include the second through fifth statistical evaluations, respectively.

This document presents a summary and interpretation of groundwater data collected during the ninth round of monitoring conducted in August and September (summer) 2014. The sixth statistical evaluation for the LTM is also included in this report.

1.2 Installation Setting

PTA, which covers approximately 5,801 acres, is located in Morris County, New Jersey, approximately 45 miles west of New York City, in the Highlands Region. The installation is bordered by numerous major highways including State Route (Rt.) 15, Interstate 80, and U.S. Rt. 46.

PTA was initially established in the late 1800s as a storage and powder depot. Production activities began in the 1890s, and by the beginning of World War I, PTA was manufacturing smokeless powder and munitions of various sizes. By the end of the war, PTA had begun new operations, including the melt-loading of projectiles; the manufacture of pyrotechnic signals and flares; the experimental manufacture of modern propellants, high explosives, fuses, and metal components; and the loading of trinitrotoluene and amatol into bombs and projectiles.

During World War II, PTA produced artillery ammunition, bombs, high explosives, pyrotechnics, and other ordnance. After World War II, PTA's primary role was the research and engineering of new ordnance; however, PTA resumed the production and development of explosives, ammunition, and mine systems during the Korean and Vietnam conflicts. In recent years, PTA's mission has shifted to conducting and managing research and development (R&D), lifecycle engineering, and support of other military weapons and weapon systems.

It was determined under the Base Realignment and Closure process in 2005 that PTA will remain open and will be realigned, gaining new missions. PTA's primary mission is to become an integrated weapons and armaments specialty site for guns and ammunition. To help support this mission, PTA is the site of the Armaments Research, Development and Engineering Center, the mission of which is to conduct and manage R&D for all assigned weapons systems. PTA has also established several partnerships with academia and industry and has involved them in the R&D process.

1.3 Area C Setting and History

Area C is approximately 126 acres and is located in the southwestern corner of PTA, near the ridge that forms the eastern boundary of the arsenal. Figure 1 depicts the location of Area C (PICA-206)

groundwater. Note that figures too large to be imbedded in the report can be found immediately following the report text and are numbered sequentially (*e.g.*, Figure 1). Figures imbedded in the report are numbered with the section number and a sequential number (*e.g.*, Figure 1-X). Area C is bounded by Green Pond Brook to the northwest, Rt. 15 to the southwest, and a steep hillside running adjacent to Parker Road to the east. There are five PICA sites located within Area C: Site 19 (Pyrotechnic Demonstration Area); Site 25/26 (Former Sanitary Landfill/Dredge Pile); Site 163 (Baseball Fields); and Site 180 (Waste Burial Area). Groundwater at these sites is included in the Area C LTM.

Two additional sites, Site 34 (Burning Ground) and a Former Skeet Range, have also been identified in this area, but are being investigated or monitored separately and are not considered part of Area C. Site 34 (Burning Ground) has its own groundwater monitoring plan and investigations are currently ongoing at the Former Skeet Range. Figure 2 shows the locations of the seven sites within Area C. Note that the Former Skeet Range does not have a PICA-XX number.

Numerous environmental investigations, including groundwater monitoring, have been conducted within Area C and along the southern boundary of PTA to evaluate the nature and extent of groundwater contamination throughout this area. These investigations revealed sporadic, low-concentration detections of volatile organic compounds (VOCs), dioxins/furans, explosives, and naturally occurring metals such as iron and manganese. Two metals, arsenic and lead, were found to be more widespread within Area C; however, their source was not identified. Results of the prior investigations were used during the feasibility study phase to develop remedial action objectives, identify contaminants of concern (COCs), and evaluate remedial alternatives. The COCs identified within Area C groundwater are arsenic and lead. COCs were identified by comparing groundwater concentrations to the Levels of Concern (LOCs) selected for PTA. The LOCs for Area C are the more stringent of the following:

- Federal Maximum Contaminant Levels (MCLs)
- New Jersey Department of Environmental Protection (NJDEP) MCLs
- NJDEP Groundwater Quality Criteria
- Any non-zero federal MCL goal

If a chemical is not listed under the above-referenced promulgated standards, the LOC is taken from the lowest of the USEPA Regional Screening Levels for Tapwater Risk-Based Concentrations (USEPA 2009c) and the USEPA Federal Drinking Water Health Advisories (USEPA 2009b).

1.4 Scope of Long-Term Groundwater Monitoring

The scope of work for the LTM, as described in the LTM Plan, includes the sampling and monitoring of 16 monitoring wells within Area C, along with 16 monitoring wells at the southern boundary of PTA (referred to as sentinel or southern boundary wells). Note that the number of wells being sampled could change after each statistical evaluation is conducted. Refer to Figure 1-1 for additional information. The LTM Plan specified the monitoring of Area C wells for those constituents that historically exceeded the groundwater LOCs. The 16 southern boundary wells are

monitored for a larger set of parameters because these wells provide early warning if contaminated groundwater appears to be migrating off-post.

The monitoring activities summarized in this semi-annual report were performed from August 18 to August 21 and September 19, 2014. Groundwater samples were collected from a total of 26 monitoring wells, including eight monitoring wells in Area C (MW-17, MW25-8, DM19-1, DM19-2, DM25-2, 1181-3, MW180-1 and C1-B), two upgradient (UG) wells (MW25-6A and MW25-6B), and 16 southern boundary wells (SB1-1, SB1-2, SB1-3, SB1-5, SB1-6, SB1-7, SB2-1A, SB2-2, SB2-3, SB3-1B, SB3-2, SB3-3, SB4-1, SB4-2, SB4-3, and SB4-4). To date five Area C monitoring wells, MW-16, MW25-7, C1-A DM25-3, and LF-2, have been decommissioned and one well, MW 3548-3, has been removed from the sampling program as it cannot be located and is assumed to have been destroyed. The details of the sampling program are discussed in Section 3 of this report.

1.5 Long-Term Monitoring Statistical Analyses

1.5.1 General

The purpose of the statistical evaluation is to determine how the exit strategy outlined in the LTM Plan should be implemented. The exit strategy, which is shown on Figure 1-1, is used to determine whether the frequency of groundwater monitoring for a well should be altered or discontinued. For several parameters the statistical analyses also depend on trigger levels. With the exception of lead, the trigger levels, which are shown in Table 1-1, were based on the maximum concentration of the analyte detected during previous sampling events. Note that tables too large to be imbedded in the report can be found immediately following the report text, and are numbered sequentially (*e.g.*, Table 1). Tables imbedded in the report are numbered with the section number and a sequential number (*e.g.*, Table 1-X).

1.5.2 Previous Statistical Evaluations

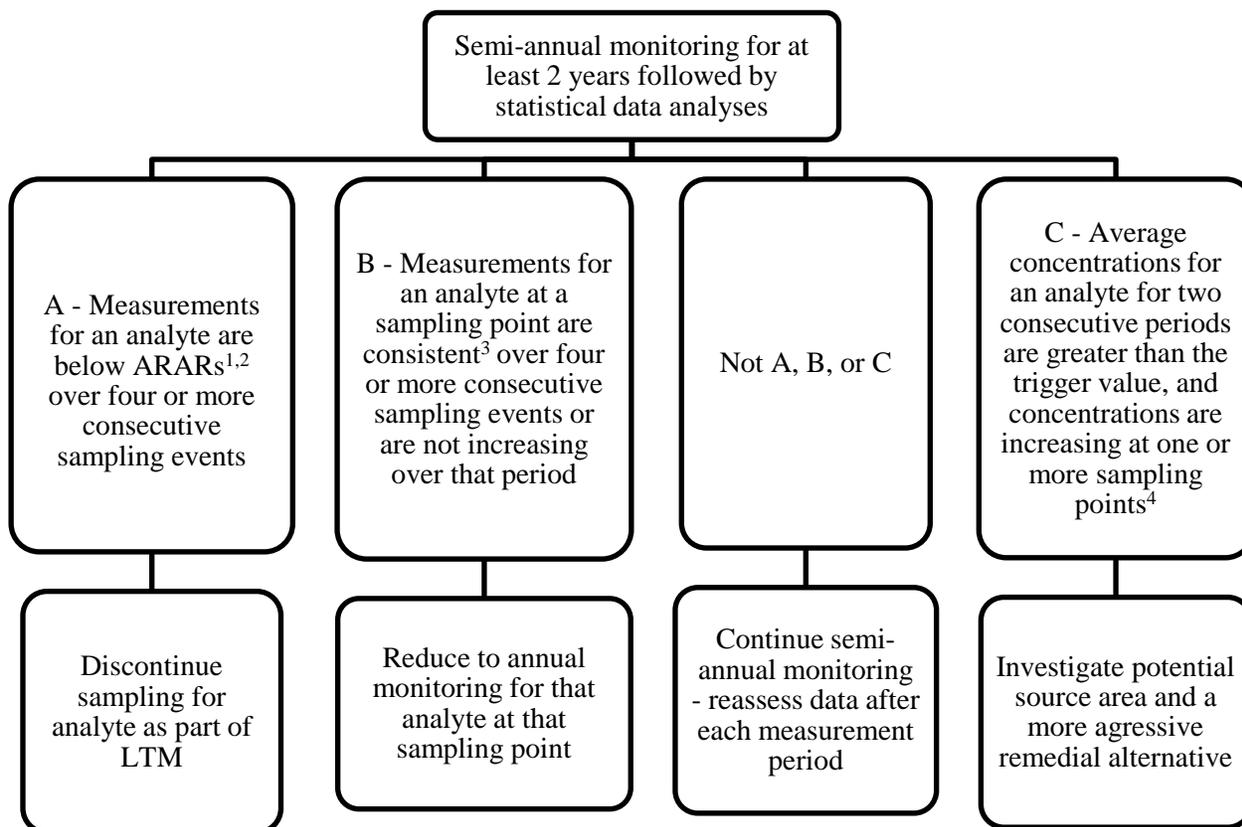
To date, five statistical evaluations have been conducted; these evaluations are summarized below. This report contains the results of the sixth statistical evaluation.

1. First Statistical Evaluation – In accordance with the LTM Plan, the first statistical evaluation was conducted after the first 2 years of sampling were completed, which was after the fall 2011 sampling event. The complete statistical evaluation is contained in the *Area C Groundwater Long-Term Monitoring Report, Round D*, May 2012 (WESTON 2012). Several modifications were made to the LTM program based on the results of the first statistical evaluation; these modifications are summarized in the *Area C Groundwater Long-Term Monitoring Report, Round E*, January 2013 (WESTON 2013a).
2. Second Statistical Evaluation – The results of the second statistical evaluation are included in the January 2013 monitoring report (WESTON 2013a). As with the first statistical evaluation, a series of modifications were made to the LTM program based on the results of the second statistical evaluation. Specifically, while all analytes from the summer 2012 program were retained in the sampling program, several wells passed Step A of the LTM statistical evaluation for specific analytes; therefore, sampling for certain analytes in

specific wells was no longer required. In addition, sampling for some analytes in certain wells was reduced from annual to semi-annual.

3. Third Statistical Evaluation – In the third statistical evaluation (WESTON 2013b), three analytes passed Step A for all monitoring wells and, therefore, were removed from the LTM program. These analytes included cis-1,2-dichloroethene, chromium, and hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX). All of the modifications made are summarized in the *Area C Groundwater Long-Term Monitoring Report, Round F*, August 2013 (WESTON 2013b).
4. Fourth Statistical Evaluation – The results of the fourth statistical evaluation are included in the March 2014 monitoring report (WESTON 2014a). As a result of this evaluation, nickel was removed from the LTM program. Therefore, the only analytes remaining include vinyl chloride, arsenic, lead, and thallium.
5. Fifth Statistical Evaluation – The results of the fifth statistical evaluation are included in the May 2014 monitoring report (WESTON 2014b). As a result of this evaluation, thallium was removed from the LTM program. Therefore the only analytes remaining include vinyl chloride, arsenic, and lead. The analytes sampled for in each well are listed in Table 1-2.

**Figure 1-1
LTM Exit Strategy**



Notes:

1. The applicable or relevant and appropriate requirements (ARAR) are the LOCs listed in Section 1.3.
2. For arsenic and lead, the exit strategy will also include an evaluation of groundwater quality parameters (e.g., pH and turbidity).
3. Measurements are considered consistent if they fall within the 95 percent (%) confidence window.
4. A more aggressive remedial action would be required when the average (i.e., arithmetic mean) concentration for that analyte, for all sampling points for that sampling period, exceed the upper 95% confidence interval for two consecutive sampling events, and the concentrations at a sampling point (or points) has shown a statistically significant increase over the span of the LTM program. A statistically significant increase will be determined using the Mann-Whitney test.

**Table 1-1
Trigger Levels**

Chemical ^a	Trigger Level (in µg/L ^b)
VOCs	
Vinyl chloride	6.6
Inorganics	
Arsenic	49.6
Lead	50 ^c

Notes:

- Only analytes that remained in the LTM program after completion of the fourth statistical evaluation are shown in this table.
- µg/L = micrograms per liter.
- Because the maximum lead concentration detected, 320 µg/L, is more than 60 times the ARAR, the trigger value was established at 10 times the ARAR.

**Table 1-2
Summer 2014 LTM Sampling Schedule**

Well ID	Vinyl Chloride	Arsenic	Lead
SB1-1	Annual	Annual	Annual
SB1-2	Annual	Annual	Annual
SB1-3	Annual	Annual	Semi-annual
SB1-5	Annual	Annual	Annual
SB1-6	Annual	Annual	Annual
SB1-7	Annual	Annual	Annual
SB2-1A	Annual	Annual	Annual
SB2-2	Annual	Semi-annual	Annual
SB2-3	Annual	Annual	Annual
SB3-1B	Annual	Annual	Annual
SB3-2	Annual	Annual	Annual
SB3-3	Annual	Annual	Annual
SB4-1	Annual	Annual	Annual
SB4-2	Annual	Annual	Annual
SB4-3	Annual	Annual	Annual
SB4-4	Annual	Annual	Annual
MW-17 ^a			Annual
MW25-8		Annual	
DM19-1	Semi-annual	Semi-annual	
DM19-2		Annual	
DM25-2	Annual	Annual	
1181-3		Annual	
MW180-1		Annual	
C1-B		Annual	
MW25-6A ^b	Semi-annual	Semi-annual	Annual

Well ID	Vinyl Chloride	Arsenic	Lead
MW25-6B ^b	Semi-annual	Semi-annual	Annual

Notes:

- a. If a cell is blank, sampling for this analyte is not required for this well.
- b. The frequency of sample collection and analyses for the UG wells, MW25-6A and MW25-6B, was determined by the most conservative sampling frequency required for the site and sentinel wells.

2 AREA C CHARACTERISTICS

2.1 Geology and Hydrogeology

PTA lies within Green Pond Valley, a glaciated river valley bounded by Green Pond Mountain to the northwest and Copperas Mountain to the southeast. Elevations at PTA range from approximately 680 to 1,000 feet above mean sea level (msl). Green Pond Valley is filled with glacially derived sediments surrounded and underlain by bedrock. The basement rocks are faulted by a series of northeast/southwest trending faults. Bedrock of the eastern ridge adjacent to Area C consists of Precambrian gneiss and is overlain by approximately 5 to 130 feet of glacial deposits. The Leithsville Dolomite occurs beneath the valley region of Area C, where it is overlain by up to 210 feet of glacial deposits near the center of the valley (Shaw 2009).

Green Pond Brook, the main surface water drainage pathway within the valley, runs along the western boundary of Area C. The western half of Area C is flat and in the floodplain of Green Pond Brook. The topography in Area C does not vary considerably as the entire area is flat floodplain, approximately 685 to 695 feet above msl (Shaw 2009). The following four major aquifers have been identified beneath Area C:

- Unconfined Glacial Aquifer – This aquifer occurs within the valley floor and has a thickness of approximately 3 to 35 feet. The unconfined aquifer is continuous throughout the valley, with the exception of areas on ridges where bedrock is exposed at the surface. Groundwater within this hydrogeologic unit, which occurs from relatively near ground surface to approximately 30 feet below ground surface (bgs) in upland areas, generally flows toward Green Pond Brook. Groundwater flow velocities vary greatly based on varying permeability and gradient, and are estimated to range from 50 to more than 300 feet per year.
- Upper Semi-Confined Glacial Aquifer – This aquifer, which is generally encountered in the southern half of the valley, corresponds to the intermediate fine-grained unit of sediments and is encountered at depths ranging from 20 to 25 feet bgs. This aquifer is made up predominantly of silt and clay and is a low-permeability unit. Because the upper semi-confined aquifer is finer grained than the overlying and underlying aquifers, it retards downward groundwater flow to the semi-confined and bedrock aquifers (Shaw 2009).
- Lower Semi-Confined Glacial Aquifer – This aquifer occurs beneath the upper semi-confined aquifer only in the central valley portion of Area C. As the unconsolidated sediments become thinner on the sides of the valley, this lower aquifer pinches out against the bedrock. The top of the lower semi-confined aquifer is encountered at depths ranging from 35 bgs in the northern portion of Area C to 150 feet bgs near the southern portion. The thickness of this aquifer ranges from 0 feet on the southeastern ridge to 163 feet in the valley center (Shaw 2009). The groundwater flow direction in the semi-confined aquifers is generally down valley to the southwest and toward surface water discharge areas. Vertical flow is typically upward toward discharge areas, except where affected by groundwater withdrawal wells. Groundwater flow velocities are generally similar to the unconfined aquifer, although in some areas, the lower semi-confined aquifer consists of a coarser deposit with generally low hydraulic gradients.

- Bedrock Aquifer – This aquifer exhibits faults, fold axes, bedding planes, and foliation trends that affect contaminant transport. Groundwater flow in the bedrock is generally toward the central valley and surface water features; however, locally the foliation and fracturing can alter and control flow directions along fractures and fault planes.

2.2 Groundwater Elevation and Flow Direction

Groundwater movement is generally from the topographically high areas toward areas of discharge (surface water bodies) in the center of the valley. However, groundwater flow within the unconfined (water table) aquifer at the southern boundary of PTA may at certain times be locally affected by seepage (recharge) from Green Pond Brook (United States Geological Survey [USGS] 1996). A round of synoptic groundwater level measurements was collected from 24 monitoring wells on August 18, 2014. Water levels were not collected from wells MW180-1 and 1181-3 since they had recently been abandoned due to work in the lower burning grounds and had not yet been re-installed in August 2014. Table 2-1 presents depth-to-groundwater measurements and groundwater elevations for the summer 2014 sampling event. These values were compared to data collected during the spring 2014 sampling event.

Groundwater elevations were generally lower than the elevations measured at the same wells in spring 2014. Overall, however, flow directions and groundwater gradients remain similar to those described in the Round H (spring 2014) LTM report (WESTON 2014b). Updated groundwater contour maps or elevation maps, which were generated based on the summer 2014 water levels, are included as Figures 3 through 6. Descriptions of groundwater elevations and flow directions for each aquifer, based on the summer 2014 sampling event, are provided below:

- Unconfined Glacial Aquifer – Groundwater in the unconfined water table aquifer was identified between elevations of 688.58 (MW25-6A) and 682.22 (SB2-2) feet above msl. Groundwater elevation contours indicate groundwater flows similar to spring 2014; locally, groundwater flows toward Green Pond Brook and its unnamed tributaries, and then heads south following the brook. The groundwater elevation contours are presented on Figure 3.
- Upper Semi-Confined Glacial Aquifer – Groundwater in the upper semi-confined aquifer was identified from two wells and was found at elevations at 684.26 (SB1-3) and 684.70 (SB4-3) feet above msl. Vertical components of the hydraulic gradient are present between the unconfined and upper semi-confined glacial aquifers. The following vertical gradients were estimated by using the potentiometric elevations and distances between center points of the well screens, in well pairs: SB1-2/SB1-3 (0.003 foot per foot [ft/ft] – downwards); SB1-6/SB1-3 (0.032 ft/ft – upwards); SB1-7/SB1-3 (0.044 ft/ft – downwards); and SB4-2/SB4-3 (0.021 ft/ft – downwards). Potentiometric elevations are shown on Figure 4; contours of the potentiometric surface are not shown for the following reasons:
 - Contours cannot be drawn with data from only two wells.
 - SB4-3 is located west of Green Pond Brook and SB1-3 is located to the east of Green Pond Brook.
 - Potentiometric elevation in SB1-3 (684.26 msl) was similar to that in SB1-2 (684.31 msl); SB1-2 is screened in the confined glacial aquifer.

- These observations suggest that groundwater flow in the upper semi-confined aquifer is likely to be similar to that within the unconfined glacial aquifer, toward Green Pond Brook.
- Lower Semi-Confined Glacial Aquifer – Groundwater in the lower semi-confined aquifer was identified between elevations of 682.15 and 673.60 feet above msl. Groundwater elevation contours were developed from water level measurements collected from four wells screened in the lower semi-confined aquifer; these are presented on Figure 5. As indicated by the elevation contours, groundwater flow is down the valley toward the southwest. From a single well pair (SB4-3/SB4-4), a vertical component of the hydraulic gradient between the upper and lower semi-confined aquifers was estimated at 0.134 ft/ft – downwards.
- Bedrock Aquifer – The bedrock aquifer is subdivided into two hydrostratigraphic units: the Precambrian Gneiss, located beneath the eastern side of Area C, and the Leithsville Dolomite, located in the central valley of Area C. Groundwater in these aquifers is expected to flow away from the valley walls toward the central part of Area C, with a slight southwest component. As shown in two nearly adjacent wells, groundwater occurs between 684.83 (SB1-1) and 685.81 (SB1-5) feet above msl in the Precambrian Gneiss. Groundwater in the Leithsville Dolomite was identified from three wells, between elevations of 675.56 and 672.11 feet above msl.

As indicated by the potentiometric elevations on Figure 6, groundwater flow is away from the valley walls toward the central part of Area C. Vertical components of the hydraulic gradient are present between the lower semi-confined glacial aquifer and bedrock. These were estimated using the potentiometric elevations and distances between center points of the well screens, in well pairs: SB2-1A/SB2-3 (0.018 ft/ft – downwards); SB3-2/SB3-1B (<0.001 ft/ft – downwards); and SB4-4/SB4-1 (0.007 ft/ft – downwards).

While potentiometric elevations from all bedrock wells are shown on Figure 6; contours are not shown for the following reasons:

- Three wells in the dolomite are too few to be representative.
- All five dolomite and gneiss bedrock wells are essentially aligned in a northwest to southeast corridor such that there is insufficient areal coverage within Area C.

**Table 2-1
Groundwater Elevations**

Well	Location	Aquifer	Top of Inner Casing Elevation (msl)	Depth to Water, Summer 2014 (feet below inner casing)	Groundwater Elevation, Summer 2014 (msl)	Groundwater Elevation, Spring 2014 (msl) ^a
SB1-1	SB ^b	Bedrock – Gneiss	691.88	7.05	684.83	691.14
SB1-2	SB	Unconfined	691.74	7.43	684.31	688.58
SB1-3	SB	Upper Semi-Confined	692.17	7.91	684.26	688.86
SB1-5	SB	Bedrock – Gneiss	708.87	23.06	685.81	691.86
SB1-6	SB	Unconfined	690.75	7.01	683.74	687.51
SB1-7	SB	Unconfined	691.66	6.76	684.9	689.34
SB2-1A	SB	Lower Semi-Confined	691.77	18.17	673.6	676.46
SB2-2	SB	Unconfined	690.16	7.94	682.22	685.41
SB2-3	SB	Bedrock – Dolomite	691.07	18.96	672.11	674.88
SB3-1B	SB	Bedrock – Dolomite	701.55	25.99	675.56	678.6
SB3-2	SB	Lower Semi-Confined	701.56	25.93	675.63	678.8
SB3-3	SB	Unconfined	701.04	17.19	683.85	686.73
SB4-1	SB	Bedrock – Dolomite	707.17	32.33	674.84	677.86
SB4-2	SB	Unconfined	708.47	22.61	685.86	687.98
SB4-3	SB	Upper Semi-Confined	708.14	23.44	684.7	687.61
SB4-4	SB	Lower Semi-Confined	708.02	31.76	676.26	679.39
MW25-6A	UG ^c	Unconfined	699.33	10.75	688.58	692.48
MW25-6B	UG	Lower Semi-Confined	692.98	10.83	682.15	687.61
MW-17	Site	Unconfined	692.98	8.81	684.17	- ^d
MW25-8	Site	Unconfined	690.22	7.08	683.14	-
DM19-1	Site	Unconfined	692.18	8.03	684.15	685.83
DM19-2	Site	Unconfined	692.82	8.83	683.99	-
DM25-2	Site	Unconfined	694.99	11.87	683.12	-
1181-3 ^e	Site	Unconfined	-	-	-	-

Well	Location	Aquifer	Top of Inner Casing Elevation (msl)	Depth to Water, Summer 2014 (feet below inner casing)	Groundwater Elevation, Summer 2014 (msl)	Groundwater Elevation, Spring 2014 (msl) ^a
MW180-1 ^c	Site	Unconfined	-	-	-	-
C1-B	Site	Unconfined	690.6	2.86	687.74	-

Notes:

- a. Refer to the *Area C Groundwater Long-Term Monitoring Report, Round H*, May 2014 (WESTON 2014b) for details.
- b. SB = southern boundary
- c. UG = upgradient
- d. - indicates the well was not sampled during this event
- e. This well was abandoned and re-installed due to work in Lower Burning Grounds. The well has not yet been re-surveyed to determine current top of inner casing elevation.

2.3 Summary and Findings of Previous Site Investigations

Between 1998 and the present, numerous groundwater investigations have been performed within Area C. These investigations and the corresponding data are described in detail in the Final Feasibility Study (Shaw 2005), the *Area C Groundwater Long Term Monitoring Report, Round A*, May 2010 (Shaw 2010a), and the *Area C Groundwater Long Term Monitoring Report, Round B*, October 2010 (Shaw 2010b).

Overall, sampling has indicated limited exceedances of a few VOCs and explosives in groundwater in Area C; this contamination appears to be isolated and of limited extent. Lead and arsenic are more widespread throughout the area with no specific identifiable source (Dames and Moore 1998). Other metals detected, such as iron, manganese, aluminum, and sodium, either are naturally occurring and associated with the local geology, or are not known to be related to PTA activities.

3 SAMPLING AND ANALYTICAL PROCEDURES

3.1 General

The summer 2014 semi-annual groundwater event was conducted from August 18 through August 21 and September 19, 2014. Groundwater samples were collected from 26 wells, including eight Area C wells, two UG wells, and 16 southern boundary wells. Currently, 26 monitoring wells remain in the LTM program. Two wells, C1-A and MW 3548-3, were decommissioned/removed from the LTM program as a result of the first statistical evaluation; two wells, MW-16 and MW25-7, were decommissioned/removed from the LTM program as a result of the second statistical evaluation; and two wells, DM25-3 and LF-2, were decommissioned/removed from the LTM as a result of the fourth statistical evaluation.

Figure 7 illustrates the 26 monitoring wells that remain in the LTM program and the 26 that were sampled during the summer 2014 sampling event. Table 3-1 summarizes the well designation, hydrogeologic unit, and analytical program implemented for each well. Sixteen of the wells sampled are southern boundary wells and are designated with an “SB”; the other ten wells sampled are associated with specific sites within Area C. Details of the sampling program are discussed in Section 4 of this report.

All field activities and chemical analyses were conducted in accordance with the *Final Facility-Wide Field Sampling Plan*, May 2007 (ARCADIS 2007a), the *Final Quality Assurance Project Plan* (QAPP), August 2007 (ARCADIS 2007b), and the *Abbreviated Accident Prevention Plan, Long Term Groundwater Monitoring in Area C*, Picatinny Arsenal, March 2011 (WESTON 2011a). In addition, field activities and chemical analyses were performed in accordance with guidance from USACE, NJDEP, and USEPA Region 2, including the *NJDEP Field Sampling Procedures Manual* (NJDEP 2005) and the *Technical Requirements for Site Remediation* (NJDEP 2011).

3.2 Well Assessments

As part of the LTM, a well assessment was performed at each well prior to purging and sampling. The Well Assessment Checklists are provided in Appendix A and photographs of all wells are provided in Appendix B. A summary of the results of the well assessment is provided in Table 3-2.

**Table 3-1
Summary of Wells Included in the Long-Term Monitoring Program**

Well ID	Well Designation	Aquifer	Vinyl Chloride	Arsenic	Lead
SB1-1	SB	Bedrock - Gneiss	X	X	X
SB1-2	SB	Unconfined	X	X	X
SB1-3	SB	Upper Semi-Confined	X	X	X
SB1-5	SB	Bedrock - Gneiss	X	X	X

Well ID	Well Designation	Aquifer	Vinyl Chloride	Arsenic	Lead
SB1-6	SB	Unconfined	X	X	X
SB1-7	SB	Unconfined	X	X	X
SB2-1A	SB	Lower Semi-Confined	X	X	X
SB2-2	SB	Unconfined	X	X	X
SB2-3	SB	Bedrock - Dolomite	X	X	X
SB3-1B	SB	Bedrock - Dolomite	X	X	X
SB3-2	SB	Lower Semi-Confined	X	X	X
SB3-3	SB	Unconfined	X	X	X
SB4-1	SB	Bedrock - Dolomite	X	X	X
SB4-2	SB	Unconfined	X	X	X
SB4-3	SB	Upper Semi-Confined	X	X	X
SB4-4	SB	Lower Semi-Confined	X	X	X
MW25-6A	Upgradient	Unconfined	X	X	X
MW25-6B	Upgradient	Lower Semi-Confined	X	X	X
MW-17	Site	Unconfined			X
MW25-8	Site	Unconfined		X	
DM19-1	Site	Unconfined	X	X	
DM19-2	Site	Unconfined		X	
DM25-2	Site	Unconfined	X	X	
1181-3	Site	Unconfined		X	
MW180-1	Site	Unconfined		X	
C1-B	Site	Unconfined		X	

**Table 3-2
Monitoring Well Assessment**

Well ID	Screened Interval (feet bgs)	Completion Depth (feet bgs)	Well Assessment Spring 2014	Actions Taken During Summer 2014 Sampling	Well Assessment Summer 2014 ^a
SB1-1	83-93	93	No action necessary	No action necessary	No action necessary
SB1-2	8-18	18	No action necessary	No action necessary	No action necessary
SB1-3	24-34	34	No action necessary	No action necessary	No action necessary
SB1-5	90-110	110 ^b	No action necessary	No action necessary	No action necessary
SB1-6	8-18	18 ^b	No action necessary	No action necessary	No action necessary
SB1-7	9.5-19.5	19.5 ^b	No action necessary	No action necessary	No action necessary
SB2-1A	158-168	168	No action necessary	No action necessary	No action necessary

Well ID	Screened Interval (feet bgs)	Completion Depth (feet bgs)	Well Assessment Spring 2014	Actions Taken During Summer 2014 Sampling	Well Assessment Summer 2014 ^a
SB2-2	25-35	35	Cracked concrete pad needs repair	Cracked well pad repaired	No action necessary
SB2-3	243-253	253	No action necessary	No action necessary	No action necessary
SB3-1B	326-336	336	No action necessary	No action necessary	No action necessary
SB3-2	170-180	180	No action necessary	No action necessary	No action necessary
SB3-3	21-31	31	No action necessary	No action necessary	No action necessary
SB4-1	369-379	379	No action necessary	Cracked well pad repaired ^c	No action necessary
SB4-2	36-46	46	No action necessary	No action necessary	No action necessary
SB4-3	92-102	102	No action necessary	Cracked well pad repaired ^c	No action necessary
SB4-4	155-165	165	No action necessary	No action necessary	No action necessary
MW25-6A	10-20	20	No action necessary	No action necessary	No action necessary
MW25-6B	65-75	75	No action necessary	No action necessary	No action necessary
MW-17	7-19	19 ^b	Not assessed	No action necessary	No action necessary
MW25-8	20-30	30	Not assessed	No action necessary	No action necessary
DM19-1	9.5-19.5	19.5	No action necessary	No action necessary	No action necessary
DM19-2	9.5-19.5	19.5	Not assessed	No action necessary	No action necessary
DM25-2	9.9-20.1	20.1	Not assessed	No action necessary	No action necessary
1181-3	12.5-22.5	22.5 ^b	Not assessed	Well was abandoned and re-installed due to work in Lower Burning Grounds	Needs to be surveyed
MW180-1	5-15	15	Not assessed	Well was abandoned and re-installed due to work in Lower Burning Grounds	Needs to be surveyed
C1-B	12.3-22.3	22.3 ^b	Not assessed	No action necessary	No action necessary

Notes:

- a. All necessary actions identified during the summer 2014 assessment will be completed during the next round of sampling.
- b. Well logs are not available for these wells; therefore, the completion depths are based on information contained in previous reports.
- c. Although this item was not identified as needing repair during the spring 2014 sampling event, it was identified and repaired during this event.

3.3 Well Sounding

Depth to bottom (DTB) results for the summer 2014 event were compared to the spring 2014 DTB values, as shown in Table 3-3. The summer 2014 and spring 2014 DTB values are highly consistent (within +/- 0.5 foot of one another).

**Table 3-3
Monitoring Well Depth to Bottom Measurements**

Well No.	Depth to Bottom (DTB) ^a			Deviation Between Summer 2014 and Fall 2013 Measured DTB ^{b,c,d}	Deviation Between Summer 2014 and Spring 2014 Measured DTB ^{b,c,d,e}
	Measured Fall 2013	Measured Spring 2014	Measured Summer 2014		
SB1-1	94.4	94.4	94.50	0.10	0.10
SB1-2	19.9	20.97	20.99	1.09	0.02
SB1-3	36.75	36.8	36.85	0.10	0.05
SB1-5	109.58	109.65	109.65	0.07	0.00
SB1-6	19.95	20.05	20.04	0.09	-0.01
SB1-7	20.71	20.8	20.82	0.11	0.02
SB2-1A	167.63	167.6	167.65	0.02	0.05
SB2-2	37.15	37.15	37.33	0.00	0.18
SB2-3	252.08	252.1	252.10	0.02	0.00
SB3-1B	332.1	332.1	332.20	0.00	0.10
SB3-2	180.3	180.25	180.45	0.05	0.20
SB3-3	33.15	33.1	33.35	0.05	0.25
SB4-1	382.3	382.29	382.40	0.01	0.10
SB4-2	45.62	45.75	45.74	0.12	-0.01
SB4-3	100.2	100.25	100.25	0.05	0.00
SB4-4	168.8	166.86	166.88	0.08	0.02
MW25-6A	19.1	18.65	19.12	0.02	0.47
MW25-6B	76.02	75.6	75.96	-0.06	0.36
MW-17	20.9	-	21.00	0.01	0.10 ⁵
MW25-8	31.73	-	31.82	0.09	0.09 ⁵
DM19-1	21.92	21.7	21.90	-0.02	0.20
DM19-2	21.32	-	21.35	0.03	0.03 ⁵
DM25-2	21.85	-	21.85	0.00	0.00 ⁵
1181-3 ^f	Not applicable as this well was recently re-installed				
MW180-1 ^f	Not applicable as this well was recently re-installed				
C1-B	23.1	-	23.11	0.01	0.01 ⁵

Notes:

- a. DTB are provided as feet below the top of the inner riser.
- b. Positive value indicates that a shallower depth was measured.
- c. Values shown in **bold red font** indicate a deviation greater than +/- 0.5 foot.
- d. As discussed in the fall 2013 report (WESTON 2014a), it was determined that the as-built data for monitoring well SB3-1B does not accurately represent the DTB. Since it is unknown if the as-built data are accurate for the remaining monitoring wells, in lieu of comparing the measured DTB to the as-built DTB, the two most recent measured DTB's will be compared to determine if changes have occurred.
- e. Because depth to bottom was not measured in spring 2014, the summer 2014 value was compared to the fall 2013 value.
- f. These wells were decommissioned and re-installed; therefore, a deviation between previous measurements is not applicable.

3.4 Sampling Procedures and Field Measurements

The 26 monitoring wells were sampled using low-flow sampling procedures during which the groundwater was monitored for field indicator parameters including pH, dissolved oxygen (DO), reduction-oxidation (redox) potential, turbidity, conductivity, and temperature. As discussed in Section 2.2, water level measurements were also collected from each well. Table 3-4 summarizes the field parameter values at the time each well was sampled during all six monitoring events. The sampling data sheets are provided in Appendix C.

**Table 3-4
Field Parameter Values – Summer 2014**

Well No.	Date	Conductivity (ms/cm) ^a	DO (mg/L) ^b	pH (s.u.) ^c	Redox (mV) ^d	Turbidity (NTU) ^e
SB1-1	1/26/2010	0.872	8.65	6.09	178.4	8.4
	7/20/2010	0.581	10.1	6.24	156.8	6.4
	4/12/2011	0.849	10	6.15	200	72
	11/1/2011	0.794	7.58	6.05	243	6.2
	7/27/2012	0.874	7.83	6.17	210	8.9
	3/20/2013	0.877	9.65	6.17	210	5.4
	10/24/2013	0.732	9.80	6.32	204	3.7
	4/1/2014	0.632	7.76	6.18	242	13.3
	8/19/2014	0.811	6.31	5.66	234	25.4

Table 3-4
Field Parameter Values – Summer 2014

Well No.	Date	Conductivity (ms/cm) ^a	DO (mg/L) ^b	pH (s.u.) ^c	Redox (mV) ^d	Turbidity (NTU) ^e
SB1-2	1/26/2010	1.664	7.65	6.26	208.4	7.6
	7/20/2010	2.261	4.25	6.03	248.1	0
	4/12/2011	1.8	10.36	6.2	223	22.3
	11/3/2011	1.06	5.42	6.39	197	0
	7/27/2012	1.31	4.65	6.26	292	3
	3/20/2013	1.13	5.78	6.34	235	1.9
	10/24/2013	1.97	2.94	6.05	196	0
	4/1/2014	1.48	5.85	6.52	259	6.1
	8/15/2014	3.79	5.10	5.37	246	7.8
SB1-3	1/26/2010	0.889	9.08	6.31	193	2.3
	7/20/2010	1.563	9.17	6.13	190.3	1
	4/12/2011	0.884	9.19	6.17	250	12.4
	11/1/2011	1.07	7.06	6.14	240	6.9
	7/27/2012	1.25	6.78	6.33	292	5.4
	3/20/2013	0.881	6.95	6.41	232	2.7
	10/24/2013	1.43	7.00	6.24	210	0
	4/1/2014	0.887	8.08	6.61	272	7.2
	8/19/2014	1.59	5.80	6.16	214	0.0
SB1-5	1/26/2010	0.983	1.66	7.02	20.5	8.8
	7/20/2010	0.313	2.29	6.99	17.8	4.2
	4/13/2011	0.453	2.67	6.62	194	22.2
	11/1/2011	0.362	3.22	6.66	190	2.3
	7/27/2012	0.346	3.22	6.87	32	22.7
	3/18/2013	0.398	5.55	6.88	245	0.8
	10/24/2013	0.374	1.88	6.67	49	0
	4/1/2014	0.686	5.77	7.14	49	0
	8/19/2014	0.405	1.69	6.21	39	18.8

**Table 3-4
Field Parameter Values – Summer 2014**

Well No.	Date	Conductivity (ms/cm) ^a	DO (mg/L) ^b	pH (s.u.) ^c	Redox (mV) ^d	Turbidity (NTU) ^e
SB1-6	1/28/2010	1.311	8.62	6.24	152	9.8
	7/20/2010	1.204	8.39	6.34	120.4	8.6
	4/14/2011	0.91	8.7	6.12	405	150
	11/3/2011	1.2	5.68	6.43	191	7.8
	7/27/2012	1.12	9.53	6.34	192	27.4
	3/20/2013	1.08	5.63	6.38	197	9.4
	10/24/2013	.884	4.81	6.22	176	27.6
	4/1/2014	1.83	5.97	6.43	192	6.2
	8/19/2014	1.25	5.32	6.15	214	18.1
SB1-7	1/28/2010	0.826	11.11	6.35	154	6.6
	7/20/2010	0.736	15.61	6.01	227.7	9.8
	4/14/2011	0.686	9.13	6.47	245	51.6
	11/3/2011	0.818	9.71	6.21	219	14.4
	7/27/2012	0.828	7.6	6.39	288	25.5
	3/20/2013	0.343	7.93	5.91	256	0.0
	10/24/2013	0.753	1.04	4.87	334	8.3
	4/1/2014	0.843	7.83	6.36	228	2.6
	8/19/2014	0.844	7.14	6.26	214	0.1
SB2-1A	2/2/2010	1.882	0.67	11.89	-185	1.4
	8/4/2010	256.7	0.19	11.66	4.5	0
	4/15/2011	1.3	0.58	11.72	-39	21.9
	11/4/2011	0.409	0	10.37	-130	0
	7/26/2012	1.3	0	11.54	-101	1
	10/22/2013	1.46	8.27	11.88	-287	2.3
	4/2/2014	2.26	0.72	12.14	-66	0
	8/20/2014	2.14	0.57	10.88	-112	0.0

Table 3-4
Field Parameter Values – Summer 2014

Well No.	Date	Conductivity (ms/cm) ^a	DO (mg/L) ^b	pH (s.u.) ^c	Redox (mV) ^d	Turbidity (NTU) ^e
SB2-2	2/2/2010	3.91	0.74	6.69	-87	50
	8/4/2010	3.585	0.25	6.67	-107.9	8.9
	4/15/2011	3.22	0	6.66	-60	117
	11/4/2011	2.58	0	6.54	-86	18.7
	7/26/2012	3.33	0	6.71	-108	48.1
	3/21/2013	3.75	6.82	6.81	-103	6.6
	10/22/2013	4.47	0.58	6.73	-95	29.3
	4/2/2014	5.47	0.38	6.55	-104	45.0
	8/20/2014	5.95	1.84	5.41	73	8.2
SB2-3	2/2/2010	0.177	0.34	8.27	-145	1.6
	8/4/2010	43.94	0.49	8	122.8	0
	4/15/2011	0.189	0.23	8.3	99	3.3
	11/4/2011	0.174	0	8.05	133	0
	7/26/2012	0.193	1.38	8.17	51	0
	10/22/2013	0.198	0.59	7.68	-50	0.7
	4/2/2014	0.208	0.66	8.26	128	0
	8/20/2014	0.184	0.78	7.71	49	0.0
SB3-1B	1/27/2010	0.428	0.27	11.22	-255	6
	3/17/2010	0.276	0.49	11.24	-218	2.3
	7/21/2010	0.735	0.19	10.89	-254.2	7.9
	4/18/2011	0.358	0	10.29	-13	8
	11/4/2011	0.344	0	11.03	-294	0.2
	7/30/2012	0.335	0	10.47	-244	0.9
	3/20/2013	.201	1.07	9.90	23	44.3
	10/24/2013	0.302	2.90	10.68	-226	0
	4/2/2014	0.352	3.81	10.83	-192	0
	8/20/2014	0.338	0.76	9.96	-187	0.0

Table 3-4
Field Parameter Values – Summer 2014

Well No.	Date	Conductivity (ms/cm) ^a	DO (mg/L) ^b	pH (s.u.) ^c	Redox (mV) ^d	Turbidity (NTU) ^e
SB3-2	1/27/2010	0.174	0.39	8.29	-171	7.2
	7/20/2010	3.447	1.25	8.13	298.1	0
	4/18/2011	0.179	0	8.07	184	0.5
	11/4/2011	0.188	0	8.1	82	0
	7/30/2012	0.175	0	7.21	182	0
	3/21/2013	0.189	0	8.29	60	0
	10/22/2013	0.183	1.02	6.98	115	0.8
	4/2/2014	0.186	0.94	7.67	47	0
	8/20/2014	0.175	1.18	7.80	81	0.0
SB3-3	1/27/2010	0.303	11.08	6.07	103	5.5
	8/5/2010	1.481	1.24	6.61	118.2	9.5
	4/18/2011	0.271	9.8	6.21	312	4.2
	11/4/2011	0.246	6.86	5.7	255	1
	7/30/2012	0.439	4.12	5.81	246	48.4
	10/22/2013	0.778	0.93	6.57	188	1.2
	4/2/2014	0.546	8.29	6.19	174	18.1
	8/20/2014	1.26	0.32	6.55	127	10.4
SB4-1	1/11/2010	0.176	0.4	11.47	-412	4.8
	3/17/2010	0.193	0.26	11.21	-335	2.8
	8/3/2010	0.236	0.42	10.74	-254.2	0
	4/20/2011	0.271	0.17	9.36	-374	8
	11/1/2011	0.267	0	10.31	-278	3.2
	7/31/2012	0.229	0	10.47	-325	2.5
	10/25/2013	0.185	0.97	7.38	-56	2.3
	4/3/2014	0.159	0.42	8.89	-212	0
	8/21/2014	0.168	2.64	7.89	-181	0.0

Table 3-4
Field Parameter Values – Summer 2014

Well No.	Date	Conductivity (ms/cm) ^a	DO (mg/L) ^b	pH (s.u.) ^c	Redox (mV) ^d	Turbidity (NTU) ^e
SB4-2	1/12/2010	0.195	1.03	5.9	95.6	15.9
	8/3/2010	20.23	1.57	5.78	132.7	6.9
	4/20/2011	0.255	2.02	5.88	173	17.2
	11/1/2011	0.259	1.16	6	139	66.4
	7/31/2012	0.252	1.15	5.91	96	6.1
	10/25/2013	0.316	0.85	6.02	124	4.4
	4/3/2014	0.294	2.30	5.77	100	4.8
	8/21/2014	0.260	2.03	5.66	95	23.9
SB4-3	1/12/2010	0.465	0.66	7.33	-141.1	6.3
	8/3/2010	0.528	0.52	7.12	-122	5.2
	4/20/2011	0.676	0.14	7.18	-107	16.5
	11/1/2011	0.635	0	7.01	-94	120
	7/31/2012	0.687	3.39	7.12	-90	7
	10/25/2013	0.765	5.17	7.07	-121	7.7
	4/3/2014	0.605	3.14	7.28	81	0
	8/21/2014	0.757	2.48	6.91	-131	6.9
SB4-4	1/12/2010	0.145	0.36	8.45	92.9	9.7
	7/3/2010	16.38	0.23	8.43	-57.3	9.5
	4/20/2011	0.209	0.39	8.23	147	88.9
	11/1/2011	0.202	0	8.1	65	11.3
	7/31/2012	0.204	0.02	8.17	78	8.1
	10/25/2013	0.216	1.54	8.06	148	0
	4/3/2014	0.212	1.43	8.34	129	0
	8/21/2014	0.196	0.66	7.62	322	0.0

Table 3-4
Field Parameter Values – Summer 2014

Well No.	Date	Conductivity (ms/cm) ^a	DO (mg/L) ^b	pH (s.u.) ^c	Redox (mV) ^d	Turbidity (NTU) ^e
DM19-1	1/28/2010	0.61	0.18	6.47	-94	4.6
	7/15/2010	0.547	0.58	6.59	76.9	-4.9
	4/13/2011	0.741	0	6.47	-76	27.4
	11/2/2011	0.66	0	6.41	-93	1.9
	7/26/2012	0.289	0	6.66	-106	11.8
	3/19/2013	.607	5.35	6.67	-73	24.7
	10/21/2013	0.342	0.97	6.73	-110	0.8
	3/31/2014	0.455	0.70	6.73	-86	48.2
	8/18/2014	0.329	0.84	7.08	-149	0.0
DM19-2	1/19/2010	0.618	0.21	6.71	-52	38.5
	7/15/2010	20.78	0.62	6.48	-84.4	0
	4/13/2011	0.542	8.16	6.77	-72	57.3
	11/2/2011	0.565	0	6.36	-102	63.9
	7/26/2012	0.316	0	7.16	-166	32.9
	3/19/2013	0.621	5.12	6.75	-53	19.7
	10/21/2013	0.778	0.35	5.65	62	21.2
	8/18/2014	0.358	0.55	7.50	-155	6.2
DM25-2	1/18/2010	0.516	0.78	6.2	-65.3	9.3
	7/15/2010	0.79	0.23	5.99	-49.6	1.9
	4/18/2011	0.45	0.07	6.32	-55	39.8
	11/2/2011	0.382	0	6	-22	0
	7/25/2012	0.345	0	6.18	-42	23.5
	10/23/2013	0.372	1.19	6.25	-48	3.0
	8/21/2014	0.351	1.48	5.77	-78	9.7

Table 3-4
Field Parameter Values – Summer 2014

Well No.	Date	Conductivity (ms/cm) ^a	DO (mg/L) ^b	pH (s.u.) ^c	Redox (mV) ^d	Turbidity (NTU) ^e
MW25-6A	1/13/2010	0.13	9.4	6.8	157.7	1.2
	7/15/2010	5.71	9.31	6.33	191.2	0
	4/21/2011	0.364	7.81	7.1	283	0
	11/2/2011	0.449	2.57	5.19	258	0
	7/25/2012	0.58	1.47	5.6	221	5.5
	3/19/2013	0.365	6.84	7.00	212	0.5
	10/21/2013	0.295	4.78	6.40	226	3.5
	3/31/2014	0.183	7.85	6.74	209	0
	8/18/2014	0.689	0.90	7.75	79.0	0.0
MW25-6B	1/13/2010	0.369	1.25	8.68	147.9	10.4
	7/15/2010	1.053	0.67	8.01	-130.5	7.8
	4/21/2011	0.687	-26	7.73	330	25.7
	11/2/2011	0.686	0	7.7	27	0.8
	7/25/2012	0.702	0.25	8.12	20	11.6
	3/19/2013	0.751	0.57	7.95	-3.00	4.1
	10/21/2013	0.681	2.73	9.80	28	28
	3/31/2014	0.702	2.70	9.92	74	8.7
	8/18/2014	0.734	1.69	8.86	35	0.0
MW-17	1/19/2010	0.163	7.17	6.54	124.4	8.1
	7/22/2010	0.143	3.81	6.2	102.9	5.7
	4/20/2011	0.128	7.44	6.36	359	29.3
	11/3/2011	0.105	2.18	4.09	413	5.1
	7/26/2012	0.098	6.78	6.35	214	44.9
	10/23/2013	0.117	3.26	6.62	153	14.2
	8/19/2014	0.116	4.27	4.95	239	6.4

**Table 3-4
Field Parameter Values – Summer 2014**

Well No.	Date	Conductivity (ms/cm) ^a	DO (mg/L) ^b	pH (s.u.) ^c	Redox (mV) ^d	Turbidity (NTU) ^e
MW25-8	1/18/2010	0.479	2.21	6.18	-57.2	14.9
	7/22/2010	11.16	0.14	6.21	-38.1	8.1
	4/15/2011	0.27	0	6.35	-52	81.2
	11/3/2011	0.358	0	3.83	326	5.5
	7/25/2012	0.416	0	6.21	-17	38.4
	10/22/2013	0.458	0.42	6.26	-39	14.1
	8/21/2014	0.436	0.37	6.06	-61	13.2
C-1B	1/5/2010	0.214	0.17	6.95	93.4	2.9
	6/17/2010	0.173	0.25	7.35	8.2	6.6
	4/14/2011	0.245	0.15	7.37	325	12.8
	11/2/2011	0.36	0	6.74	125	0
	7/27/2012	0.172	0	6.07	215	19.4
	3/20/2013	.286	6.26	7.14	24	15.1
	10/23/2013	.0233	0.84	7.91	97	14.5
	8/18/2014	0.276	0.92	7.31	-63	21.8
MW180-1	2/3/2010	0.329	2.15	6.69	8.9	9.6
	7/19/2010	5.889	1.87	6.39	54.2	8.2
	4/13/2011	0.35	2.67	6.54	159	129
	11/2/2011	0.461	0	6.8	18	0
	7/31/2012	0.483	1.6	6.64	77	25.1
	10/23/2013	0.487	1.95	6.77	96	25.6
	9/19/2014	0.491	2.82	7.48	-76	0
1181-3	2/3/2010	0.318	0.51	6.71	-96	8.7
	7/22/2010	8.827	0.17	6.67	-92.1	5.8
	4/13/2011	0.259	0.19	6.45	-6	49.8
	11/2/2011	0.331	0	6.65	-76	0
	7/31/2012	0.319	3.26	6.69	-90	9.9
	10/23/2013	0.309	0.91	7.03	-24	21.3
	9/19/2014	0.347	1.97	6.95	-82	0.0

Notes:

- a. ms/cm – milliSiemens per centimeter
- b. mg/L - milligrams per liter
- c. s.u. - standard units

- d. mV - millivolts
- e. NTU - nephelometric turbidity units

3.5 Sample Analyses

TestAmerica, LLC, a National Environmental Laboratory Accreditation Program-certified laboratory, provided all analytical services for the summer 2014 monitoring event. Copies of the laboratory analytical data packages are provided in Appendix D. Analytical data were evaluated in accordance with installation-specific requirements defined in the August 2007 QAPP (ARCADIS 2007b). The data validation report is provided in Appendix E.

For previous monitoring events, TestAmerica, LLC provided analytical services for the winter 2010, spring 2011, fall 2011, summer 2012, winter 2013, fall 2013, and spring 2014 sampling events. Empirical Laboratory, LLC provided analytical services for the summer 2010 sampling event. Refer to Tables 1 through 26 for summaries of all of the LTM data.

3.6 Data Usability

All data collected for this project were validated in accordance with the August 2007 QAPP (ARCADIS 2007b). As discussed in this document, the validation criteria for LTM data include a review of the laboratory report narrative for noted deficiencies and the potential impact to data usability with the data primarily being evaluated based on the trend analysis. Therefore, a review of chains-of-custody, sample preservation and sample receipt logs, and electronic data validation of select quality control parameters were performed for all data packages using the Data Qualification Module. No major deficiencies were identified during the data validation; therefore, no additional review was performed.

3.7 Well-Specific Issues

No well-specific issues were identified during this sampling round. Refer to the *Area C Groundwater Long-Term Monitoring Report, Round H*, May 2014 (WESTON 2014b) and earlier reports for a discussion of well-specific issues that were previously identified.

4 FACTORS AFFECTING ANALYTICAL RESULTS

A number of field parameters can significantly impact the solubility of certain metals, and therefore, metals concentrations in groundwater. A brief summary of the potential effects of these parameters on the COCs, arsenic and lead, is provided below. This information was obtained from the following reports:

- USEPA Science Forum, C. Stein, W. Brandon, and D. McTiguel, *Arsenic Behavior Under Sulfate-Reducing Conditions: Beware of the “Danger Zone”*
- USEPA, Office of Research and Development, Office of Solid Waste and Emergency Response, *Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures*, EPA/540/S-95/504 (USEPA 1996)
- USEPA, Office of Research and Development, Office of Solid Waste and Emergency Response, *Behavior of Metals in Soils*, EPA/540/S-92/018 (USEPA 1992)
- USEPA, Office of Research and Development, National Risk Management Research Laboratory, *Monitored Natural Attenuation of Inorganic Contaminants in Groundwater*, EPA/600/R-07/140 (USEPA 2007)
- USGS, *Occurrence and distribution of iron, manganese, and selected trace elements in ground water in the glacial aquifer system of the Northern United States* (USGS 2009)

4.1 Arsenic Concentrations

The main factors affecting arsenic concentrations in groundwater include desorption and dissolution. Desorption and dissolution can be affected by an influx of competing ions, such as phosphate (PO_4^{3-}) or carbonate (CO_3^{2-}), or through changes in the groundwater chemistry, mainly pH and redox potential, that cause the sorbent material to no longer be stable. A strong correlation between pH and arsenic concentrations in groundwater has been identified, with concentrations typically increasing as the pH increases.

Arsenic mobility is strongly affected by redox environment. Arsenic itself is redox-sensitive¹ and adsorption dynamics are highly dependent on whether arsenic is present as As(V) (arsenate) or As(III) (arsenite). Specifically, although arsenate tends to adsorb more strongly than arsenite, the dynamics are highly pH dependent (Campbell and Hering, 2008). Arsenic release from soils occurs most readily and most commonly under iron reducing conditions, resulting from the reductive dissolution of iron and the subsequent release of adsorbed and co-precipitated arsenic. Under this circumstance, elevated arsenic in groundwater is typically correlated with low redox potential (below 100 to 200 mV), very low DO, and elevated dissolved iron and manganese (Smedley and Kinniburgh 2002). Accordingly, arsenic concentrations in groundwater are expected to be highest when DO and nitrate concentrations are less than 0.5 mg/L, dissolved iron is at least 100 $\mu\text{g/L}$, and the oxidation reduction potential (ORP) is around -50 mV or lower (accounting for a +200 mV calibration shift when using a silver chloride reference electrode), which is indicative of

¹ Redox-sensitive is defined as “an element that occurs dissolved in near neutral pH (between pH 5 and 9) ground water under more than one common oxidation state and where one or more oxidation states are more soluble than others.”

iron reducing conditions (Smedley and Kinniburgh, 2002; USGS 2009). This analysis must be made with caution; however, low DO and redox do not necessarily imply that arsenic concentrations will be high.

Due to adsorption to soil particles, concentrations of arsenic in groundwater typically increase with increased turbidity.

4.2 Lead Concentrations

The main factors affecting lead concentrations in groundwater are adsorption at the solid-water interface, precipitation, and complexation with organic matter. Under alkaline conditions, aqueous concentrations are limited by the precipitation of hydroxide and carbonate mineral phases and adsorption to negatively charged surfaces. Therefore, lead solubility should increase with decreasing pH (USEPA 2007). Due to the adsorption of lead to soil particles, concentrations of lead in groundwater under circumneutral to alkaline pH are often associated with suspended particles and, therefore, are correlated with turbidity.

Distinguishing between dissolved and turbidity-associated lead is important as it controls the mobility of lead in groundwater. Specifically, larger particles exhibit decreased transportability in groundwater aquifers due to straining by the solids matrix relative to finer particles. In a study of the transportable lead fraction at two sites exhibiting elevated lead concentrations, with PTA included as one of the two sites, Bailey *et al.* (2005) distinguished between the transportable and non-transportable turbidity fraction with an operational cutoff of a 10-micron (μm) particle size.

During the fall 2013 monitoring event, the groundwater samples from monitoring wells SB1-1 and SB1-2 were further characterized using field filtration to determine if transportable and non-transportable lead can be distinguished using an operational cutoff of a 10- μm particle size. The results from these wells not only demonstrated that the lead in groundwater at the two monitoring points is associated with suspended particles, but that the suspended particles are sufficiently coarse that they can be considered effectively non-transportable (Bailey *et al.* 2005).

4.3 Overall Evaluation

An evaluation of field parameter values and anion concentrations versus arsenic and lead concentrations was conducted for the nine rounds of LTM sampling data to determine if the concentrations appear to be affected by these factors. Refer to Tables 4-1 and 4-2 below for a summary of the field parameters and arsenic/lead concentrations. Only wells and monitoring events that had arsenic/lead levels above LOCs are included in these tables. Overall, the data do indicate that many of the highest arsenic concentrations are correlated with low DO and ORP (and in some cases turbidity), indicating that iron-reducing conditions may be contributing to arsenic in some areas. Although lead concentrations appear to be weakly correlated with turbidity, the filtration analysis described above does confirm a suspended-solid association for lead, possibly suggesting that field turbidity is not an ideal proxy for lead-associated suspended colloids (*i.e.*, lead-containing colloids may be present even under low apparent turbidity).

Table 4-1
Arsenic Concentrations versus Fiel Parameter Values

Well No.	Date	DO (mg/L)	pH (s.u.)	Redox (mV)	Turbidity (NTU)	Arsenic Concentration (µg/L) ^a
SB2-2	Winter 2010	0.74	6.69	-87	50	7.3 J ^b
	Summer 2010	0.25	6.67	-107.9	8.9	6.4 J
	Spring 2011	0	6.66	-60	117	5.3 J
	Fall 2011	0	6.54	-86	18.7	5.1
	Summer 2012	0	6.71	-108	48.1	6.5
	Winter 2013	NR ^c	6.81	-103	6.6	4.9 J
	Fall 2013	0.58	6.73	-95	29.3	8.8
	Spring 2014	0.38	6.55	-104	45	6.6
	Summer 2014	1.84	5.41	73	8.2	4.8 J
C-1B	Winter 2010	0.17	6.95	93.4	2.9	4.9 J
	Summer 2010	0.25	7.35	8.2	6.6	7.6 J
	Spring 2011	0.15	7.37	325	12.8	8.8 J
	Fall 2011	0	6.74	125	0	5.1
	Summer 2012	0	6.07	215	19.4	8.4
	Winter 2013	NR	7.14	24	15.1	6.6
	Fall 2013	0.84	7.91	97	14.5	5.8
	Summer 2014	0.92	7.31	-63	21.8	20
DM19-1	Summer 2012	0	6.66	-106	11.8	7.8
	Winter 2013	5.35	6.67	-73	24.7	3.4
	Fall 2013	0.97	6.73	-110	0.8	3.3
	Spring 2014	0.70	6.73	-86	48.2	3.2
	Summer 2014	0.84	7.08	-149	0.0	4.8 J
DM19-2	Winter 2010	0.21	6.71	-52	38.5	45.1
	Summer 2010	0.62	6.48	-84.4	0	80.3
	Spring 2011	8.16	6.77	-72	57.3	97
	Fall 2011	0	6.36	-102	63.9	60
	Summer 2012	0	7.16	-166	32.9	95
	Winter 2013	NR	6.75	-53	19.7	52
	Fall 2013	0.35	5.65	62	21.2	43
	Summer 2014	2.03	5.66	95	23.9	87
DM25-2	Winter 2010	0.78	6.2	-65.3	9.3	11.8
	Summer 2010	0.23	5.99	-49.6	1.9	5.6 J
	Fall 2011	0	6	-22	0	4.7 J
	Summer 2012	0	6.18	-42	23.5	4.5
	Fall 2013	1.19	6.25	-48	3.0	4.3 J
	Summer 2014	1.48	5.77	-78	9.7	4.4 J
MW25-8	Winter 2010	2.21	6.18	-57.2	14.9	9.4 J
	Summer 2010	0.14	6.21	-38.1	8.1	8.0 J
	Spring 2011	0	6.35	-52	81.2	13 J
	Fall 2011	0	3.83	326	5.5	6.7
	Summer 2012	0	6.21	-17	38.4	9.1
	Fall 2013	0.42	6.26	-39	14.1	9.5
	Summer 2014	0.37	6.06	-61	13.2	10

Well No.	Date	DO (mg/L)	pH (s.u.)	Redox (mV)	Turbidity (NTU)	Arsenic Concentration (µg/L) ^a
MW180-1	Summer 2010	1.87	6.39	54.2	8.2	9.5 J
	Spring 2011	2.67	6.54	159	129	17 J
	Fall 2011	0	6.8	18	0	12 J
	Summer 2012	1.6	6.64	77	25.1	13
	Fall 2013	1.95	6.77	96	25.6	14
	Summer 2014	2.82	7.48	-76	0	1.8 J
1181-3	Winter 2010	0.51	6.71	-96	8.7	24
	Summer 2010	0.17	6.67	-92.1	5.8	11.8
	Spring 2011	0.19	6.45	-6	49.8	9.9 J
	Fall 2011	0	6.65	-76	0	7.7
	Summer 2012	3.26	6.69	-90	9.9	13
	Fall 2013	0.91	7.03	-24	21.3	26
	Summer 2014	1.97	6.95	-82	0.0	2.6 J

Notes:

- Arsenic solubility is affected by pH, redox potential, DO, and turbidity. When the solubility is expected to be decreased by a parameter, the value is in *italicized blue font*. When the solubility is expected to be increased by a parameter, the value is in **bolded red font**.
- J indicates value is estimated.
- NR indicates that DO was not reported during this sample period due to a malfunctioning DO probe.

Table 4-2
Lead Concentrations versus Field Parameter Values

Well No.	Date	pH (s.u.)	Turbidity (NTU)	Lead Concentration (µg/L) ^a
SB1-1	Winter 2010	6.09	8.4	19.6
	Summer 2010	6.24	6.4	25.9
	Spring 2011	6.15	72	50
	Fall 2011	6.05	6.2	5.2 J ^b
	Summer 2012	6.17	8.9	19
	Winter 2013	6.17	5.4	34
	Fall 2013	6.32	3.7	53
	Summer 2014	5.66	25.4	42
SB1-2	Winter 2010	6.26	7.6	35.7
	Summer 2010	6.03	0	26.8
	Spring 2011	6.2	22.3	78
	Summer 2012	6.26	3	15
	Winter 2013	6.34	1.9	32
	Fall 2013	6.05	0	33
	Summer 2014	5.37	7.8	86
SB1-3	Summer 2010	6.13	1	20.8
	Spring 2011	6.17	12.4	8.2 J
	Fall 2011	6.14	6.9	16 J
	Summer 2012	6.33	5.4	11
	Winter 2013	6.41	2.7	16
	Fall 2013	6.24	0	29
	Spring 2014	6.61	7.2	24
	Summer 2014	6.16	0.0	5.6 J

Well No.	Date	pH (s.u.)	Turbidity (NTU)	Lead Concentration (µg/L) ^a
SB2-1A	Summer 2010	<i>11.66</i>	0	6.0
	Spring 2011	<i>11.72</i>	21.9	11 J
	Summer 2012	<i>11.54</i>	1	10
	Summer 2014	<i>10.88</i>	0.0	14 J
SB3-3	Summer 2010	6.61	9.5	4.0
	Summer 2012	5.81	48.4	5.4 J
MW-17	Summer 2010	6.2	5.7	21
	Summer 2010	6.2	5.7	21
	Spring 2011	6.36	29.3	5.3 J
	Fall 2011	4.09	5.1	18 J
	Summer 2012	6.35	44.9	9.4 J
	Fall 2013	6.62	14.7	17

Notes:

- a. Lead solubility is affected by pH and turbidity. When the solubility is expected to be decreased by a parameter, the value is in *italicized blue font*. When the solubility is expected to be increased by a parameter, the value is in **bolded red font**.
- b. J indicates value is estimated.

5 SUMMARY OF ANALYTICAL RESULTS

Groundwater samples were collected to monitor changes in the selected analyte list in support of the LTM program specified in the 2009 ROD. This semi-annual groundwater event is the ninth event to be conducted following implementation of the LTM program. Tables 1 through 26 present the results for all wells currently in the LTM program. A summary of analytical results associated with the ninth sampling event is provided below; the statistical evaluation for all LTM data is included in Section 6. A summary of compounds detected in Area C wells and southern boundary wells during the ninth sampling round is provided in Table 27, which is attached to this report. The full analytical data packages are provided in Appendix D. Refer to Table 30 for a summary of the analyte exceedances for all rounds of LTM sampling.

5.1 Volatile Organic Compounds

Samples analyzed for vinyl chloride (the only VOC remaining in the LTM) were collected from Area C wells DM19-1 and DM25-2, UG wells MW25-6A and MW25-6B, and the southern boundary wells. Vinyl chloride was not detected in either of the UG wells nor the southern boundary wells. Vinyl chloride was detected in two site wells; monitoring well DM25-2 at a concentration of 0.92 µg/L, which is below the LOC of 1 µg/L and monitoring well DM19-1 at a concentration of 15 µg/L, which is above the LOC of 1 µg/L.

5.2 Metals

The southern boundary wells and the two UG wells were all sampled for arsenic and lead. In addition, seven Area C wells (MW25-8, DM19-1, DM19-2, DM25-2, 1181-3, MW180-1, and C1-B) were sampled for arsenic and one Area C well, MW-17, was sampled for lead. Refer to Table 3-1 for a summary of sampling locations and analytical parameters. As shown in Table 5-1, both of these metals were detected in one or more of the groundwater samples collected.

**Table 5-1
Metals Concentrations Compared to LOCs**

Analyte	LOC (µg/L)	Number of Detections	Detections Above the LOC	Maximum Concentration (µg/L)
Arsenic	3	19 wells	7 wells	87
Lead	5	5 wells	4 wells	86

6 STATISTICAL EVALUATION

Tables 1 through 26 include the data for analytes remaining in the LTM program for all nine rounds of sampling. These data were used to determine if the LTM program should be modified based on the exit strategy outlined in the LTM Plan and summarized in Section 1.5. The sections below summarize steps A, B, and C in the exit strategy. The following inputs/assumptions were used in this evaluation:

- Unless otherwise indicated, no substitution was conducted for non-detect (ND) values since reporting limits, not method detection limit (MDLs), are included in the ePrism database for the historical data.
- The analyses assume that only one data value per time period exists. Therefore, when field duplicate results are present a conservative selection based on the magnitude of data or the detected value was used to determine what data to include in the analyses.

6.1 Step A: Analytes to Remove From Program

Step A of the LTM Plan indicates that if measurements for an analyte are less than the ARAR (corresponding to the LOC) for four or more consecutive sampling events, sampling for that analyte under the LTM program should be discontinued. Step A does not apply to the southern boundary wells, unless an analyte has been removed from the analytical list for all Area C wells, because it is the intent of the LTM program to be protective of off-site migration of contaminated groundwater. Step A also does not apply to the UG wells, unless an analyte has been removed from the analytical list for all Area C wells, because MW25-6A and MW25-6B are used to monitor whether contaminated groundwater is migrating from outside of Area C into Area C. Based on these criteria and the results of the summer 2014 monitoring event, no analytes will be removed from the program at this time.

6.2 Step B: Determine Frequency of Sampling for Analytes Remaining in Program

Based on the information in Section 6.1, the following analytes need further evaluation (refer to Figure 8 for a summary of LTM data above the LOCs):

- Vinyl chloride – DM19-1 and DM25-2
- Arsenic – SB2-2, MW-25-8, DM19-1, DM19-2, DM25-2, 1181-1, MW180-1, and C1-B
- Lead – SB1-1, SB1-2, SB1-3, SB2-1A, SB3-3, and MW-17

Step B consists of two steps, described below as Steps B1 and B2. First, an evaluation must be conducted to determine if analyte concentrations in a well are increasing or decreasing over time (Step B1). If the concentrations are decreasing, the frequency of sample collection and analysis can be reduced to annually, and Step B2 does not have to be conducted. If there is no evidence that the concentrations have decreased over the recent sampling period, it must be determined if the concentrations are consistent with the historical data (Step B2). Both steps are described in more detail below.

Note that a statistical evaluation was not conducted for the samples from MW25-6A and MW25-6B since these are UG wells and the frequency of sample collection and analyses will be determined by the most conservative sampling frequency required for the site and sentinel wells.

6.2.1 Step B1: Determining if Concentrations are Decreasing or Increasing

The following steps were followed for this evaluation:

1. The first step was to determine on a well-by-well basis whether the measurement for an analyte was increasing or decreasing over the four most recent sampling events during the LTM period. In accordance with the LTM Plan, concentrations near or at the MDL were evaluated on an individual basis to determine consistency. If all results for an analyte in a well during the LTM were ND or below LOCs, the data were considered to be not increasing/consistent and no further evaluation was conducted.
2. Further evaluation was required for analytes in wells that were not all ND and/or less than LOCs. Therefore, the evaluation described in Step 3 below was conducted for the following analyte/well pairs:

Vinyl chloride: DM19-1

Arsenic: SB2-2, MW-25-8, DM19-1, DM19-2, DM25-2, 1181-3, MW180-1, and C1-B

Lead: SB1-1, SB1-2, SB1-3, SB2-1A, SB3-3, and MW-17

3. If there was at least one detection above the LOC for an analyte in a well, the Mann-Whitney U test was performed. The Mann-Whitney U test is a non-parametric test that computes a U statistic that indicates whether individual concentrations of an analyte in a well are decreasing or increasing over time. This analysis was selected because the data sets do not need to conform to any particular distribution, and data reported as NDs can be included by assigning them a common value that is smaller than the smallest measured value in the data set. The approach and assumptions used in this evaluation are listed below. Note that this evaluation was conducted in accordance with *NJDEP's Technical Requirements for Site Remediation – Appendix B* (NJDEP 2011).
 - i. The test was applied to eight consecutive sampling events for each analyte per well. The four most recent consecutive valid sampling events (recent) and the previous four consecutive valid sampling events (historical) were used.
 - ii. In instances where one of the most recent or historical data points was found to be unusable, the next recent data point was used in the analysis.
 - iii. The following hypotheses (H) were tested. Note that the null hypothesis is that the concentrations of a specific analyte have increased with time, and the alternative hypothesis is that the concentrations of a specific analyte have decreased with time. θ_1 represents the historical sampling events, and θ_2 represents the recent sampling events.
 - a. $H_0: \theta_1 \leq \theta_2$ (null hypothesis)

- b. $H_1: \theta_1 > \theta_2$ (alternate hypothesis)
- iv. The H test was evaluated based on the following:
 - a. If U was three or less, the null hypothesis was rejected, and it was concluded, with at least 90% confidence, that the concentration for the individual contaminant has decreased over time at the specific monitoring well.
 - b. If U was greater than three, the null hypothesis was accepted, and it could not be concluded with 90% or greater confidence that the concentration for the individual contaminant has decreased over time at the specific monitoring well.
- v. All ND values or values detected below the limits of quantitation were ranked as zero.

Refer to Table 6-1 for a summary of the Mann-Whitney U statistic calculations. Based on the Mann-Whitney test, the following conclusions were made.

- Null Hypothesis Rejected – For the following analytes/well pairs, the null hypothesis was rejected and it could be determined with 90% or greater confidence that the analyte concentration at that well was decreasing. Therefore no further evaluation was conducted for the following analytes/well pairs:

Vinyl Chloride: DM25-2
Arsenic: DM25-2 and MW180-1

- Null Hypothesis Accepted – For the following analyte/well pairs, the null hypothesis was accepted and it could not be determined with 90% or greater confidence that that the analyte concentration at that well was decreasing. Therefore, further evaluation (*i.e.*, Step B2) was conducted for the following, as described in Section 6.2.2:

Vinyl chloride: DM19-1
Arsenic: SB2-2, MW25-8, DM-19-1, DM19-2, DM25-2, 1181-3, and C1-B
Lead: SB1-1, SB1-2, SB1-3, SB2-1A, SB3-3 and MW-17

**Table 6-1
Mann-Whitney U Statistic Values**

Well	Vinyl Chloride		Arsenic		Lead	
	Accept/Reject H0 ¹	U	Accept/Reject H0	U	Accept/Reject H0	U
SB1-1	Not required		Not required		Accept ²	11
SB1-2	Not required		Not required		Accept	9
SB1-3	Not required		Not required		Accept	11
SB2-1A	Not required		Not required		Accept	8.5
SB2-2	Not required		Accept	8	Not required	

Well	Vinyl Chloride		Arsenic		Lead	
	Accept/Reject H0 ¹	U	Accept/Reject H0	U	Accept/Reject H0	U
SB3-3	Not required		Not required		Accept	8
DM19-1	Accept	11	Accept	8	Not required	
DM19-2	Not required		Accept	7	Not required	
DM25-2	Reject ³	0	Reject	0	Not required	
MW-17	Not required		Not required		Accept	6
MW25-8	Not required		Accept	5	Not required	
1181-3	Not required		Accept	7	Not required	
MW180-1	Not required		Reject	3	Not required	
C1-B	Not required		Accept	11	Not required	

Notes:

1. H0 is the null hypothesis.
2. For cells highlighted in green, the null hypothesis was accepted.
3. For cells highlighted in blue, the null hypothesis was rejected.

6.2.2 Step B2: Determining if Concentrations are Consistent

To investigate consistency, the average concentration of the four most recent consecutive sampling data was compared to the 95% confidence window of the historical data. The following assumptions/inputs were used in this evaluation:

1. All valid historical data were used.
2. The data distribution for the historical data set was determined.
3. The confidence limits were not determined for analyte data sets with less than four distinct values.
4. ProUCL Version 5.0.00, a USEPA-approved statistical software (USEPA 2013), was used to calculate the 95% upper confidence limit (UCL) statistics, including data distribution and 95% confidence limits. For purposes of this analysis, the recommended UCL value of the individual historical analyte data was compared to the mean of the recent data. When the UCL exceeded the range of concentrations detected or the data set did not meet the criteria for the number of observations necessary to calculate any meaningful statistics, the default maximum value of the data sets was used in the evaluation.
5. The 95% UCL was determined and then compared to the mean or maximum of the most recent sampling events. If the most recent sampling data set had at least two ND values, the maximum instead of the mean value was used in the analysis.
6. The option to determine the statistics with NDs was selected for all analyses in ProUCL. Analytes with mean values for the most recent sampling period that are less than the 95% UCL of the historical data are considered consistent.
7. Most of the historical data sets were small and did not yield any meaningful UCL statistics. Therefore, the concentration range of the historical data was used to compare to the mean of the most recent data.

Refer to Table 6-2 for a summary of the ProUCL calculations.

For the following analyte/well pairs, the mean or maximum concentration of the analyte did not fall within the 95% confidence window of the historical data. Therefore, these data are not considered consistent and, unless the next evaluation indicates otherwise, sampling should continue on a semi-annual basis.

Arsenic: SB2-2, C1-B

Lead: SB1-3

Refer to Table 6-3 for a summary of the Step B results.

**Table 6-2
ProUCL Statistics**

Well	Data Distribution for Historical Data	Percentage NDs for Historical Data ¹	Historical Mean	UCL Method	95% UCL or Range of Historical Data (in µg/L) ²	Maximum/Mean of Recent Data (in µg/L) ^{3,4}	Consistent?
Vinyl Chloride							
DM19-1	No Discernible Distribution – Limited Number of Detections	55%	NA	NA	ND – 24	Mean = 12.9	Yes
Arsenic							
SB2-2	Normal	18%	5.6	Kaplan-Meier (<i>t</i>)	5.5	Mean = 6.3	No
MW25-8	No Discernible Distribution – Limited Number of Dataset	0%	7.5	NA	2.7 – 13	Mean = 8.8	Yes
DM19-1	No Discernible Distribution – Limited Number of Dataset	16.7	5.8	NA	3.2 – 8.2	Mean=3.7	Yes
DM19-2	No Discernible Distribution – Limited Number of Dataset	0%	37.3	NA	ND – 97	Mean=69.3	Yes
1181-3	Normal	0%	11.1	Limited dataset	4.6 – 24	Mean=12.6	Yes
C1-B	Normal	10%	5.4	Kaplan-Meier (<i>t</i>) UCL	6.2	Mean = 10	No
Lead							
SB1-1	Gamma	4.8%	28.3	Kaplan-Meier (Chebyshev)	54.5	Mean = 37	Yes
SB1-2	Gamma	9.5%	35.8	Kaplan-Meier (Chebyshev)	59.9	Mean= 41.5	Yes
SB1-3	Normal	41%	9.6	Kaplan-Meier (<i>t</i>) UCL	8.5	Mean = 18.7	No
SB2-1A	No Discernible Distribution at 5% Significance Level	25%	23.3	NA	ND – 215	Mean = 8.9	Yes

Well	Data Distribution for Historical Data	Percentage NDs for Historical Data ¹	Historical Mean	UCL Method	95% UCL or Range of Historical Data (in µg/L) ²	Maximum/Mean of Recent Data (in µg/L) ^{3,4}	Consistent?
SB3-3	No Discernible Distribution at 5% Significance Level	45%	10.1	NA	ND – 48.5	Maximum = 5.4	Yes
MW-17	No Discernible Distribution – Limited Number of Detections	12.5%	65.7	NA	ND – 320	Mean = 14.8	Yes

Notes:

1. The percentage of NDs is based on all historical data, excluding the most recent four consecutive sample data results.
2. When the data set is small or the data set contains a large proportion of ND values, the range is listed instead of the mean.
3. If the most recent sampling data set had at least two ND values, the maximum (Max) instead of the mean value was used in the analysis.
4. The recent data include the results of the four most recent valid sampling events.
5. NA – not applicable

**Table 6-3
Step B1/B2 Results**

Well ID	Vinyl Chloride	Arsenic	Lead
SB1-1	NP ¹	NP	Consistent ²
SB1-2	NP	NP	Consistent
SB1-3	NP	NP	Not Consistent ³
SB2-1A	NP	NP	Consistent
SB2-2	NP	Not Consistent	NP
SB3-3	NP	NP	Consistent
DM19-1	Consistent	Consistent	NP
DM19-2	NP	Consistent	NP
DM25-2	Decreasing ⁴	Decreasing	NP
MW-17	NP	NP	Consistent
MW25-8	NP	Consistent	NP
1181-3	NP	Consistent	NP
MW180-1	NP	Decreasing	NP
C1-B	NP	Not Consistent	NP

Notes:

1. NP – a statistical evaluation was not performed for these analyte/well pairs.
2. **Consistent** – Based on the trend analysis, concentrations for this analyte in this well during the sampling period are not increasing. Therefore, monitoring for this analyte at this well can be reduced to annual.
3. **Not Consistent** – Based on the trend analysis, concentrations for this analyte in this well during the sampling period are increasing with respect to the historical data. Therefore, monitoring for this analyte at this well should be increased, or should continue, on a semi-annual basis, with the data being reassessed after each monitoring period.
4. **Decreasing** – Based on the trend analysis, concentrations for this analyte in this well during the sampling event are decreasing with respect to the historical data. Therefore, monitoring for this analyte at this well can be reduced to annual.

6.3 Step C: Determine if Analytes Are Present Above Trigger Levels

If average concentrations of an analyte in a well for the two most recent consecutive sampling events are above the trigger levels provided in Table 1-1 and concentrations at that sampling point have shown a statistically significant increase over the span of the LTM program, Step C of the LTM Plan must be evaluated for that analyte/well pair. For the LTM program, the following analyte/well pair had average concentrations above the trigger levels for the two most recent consecutive sampling events:

- Vinyl chloride in DM19-1. As shown in Table 28, vinyl chloride was detected at 16 µg/L during the spring 2014 event and at 15 µg/L during the summer 2014 event, which results in an average concentration of 15.5 µg/L; this is above the trigger level of 6.6 µg/L.

- Arsenic in DM19-1. As shown in Table 28, arsenic was detected at 43 µg/L during the spring 2014 event and at 87 µg/L during the summer 2014 event, which results in an average concentration of 65 µg/L; this is above the trigger level of 49.6µg/L.
- Lead in SB1-2. As shown in Table 28, lead was detected at 33 µg/L during the spring 2014 event and at 86 µg/L during the summer 2014 event, which results in an average concentration of 59.5µg/L; this is above the trigger level of 50µg/L.

However, the LTM indicates that an analyte does not fail Step C unless the concentrations at a sampling point (or sampling points) have shown a statistically significant increase over the span of the LTM program. Because vinyl chloride, arsenic and lead have been consistent in these wells, these analytes do not fail Step C of the LTM program.

7 CONCLUSIONS

While the LTM program has shown some sporadic detections of analytes at concentrations above the LOCs, overall, the LTM is demonstrating that the majority of the analyte concentrations in the Area C wells are either decreasing or are consistent with historical data. Furthermore, as discussed below, there does not appear to be significant off-site migration of contamination associated with Area C activities. Note that the data discussed below include only data stored in the ePrism database and include historical and LTM results.

- **VOCs** - Vinyl chloride is the only VOC remaining in the LTM program. Vinyl chloride has not been detected during the LTM program in any of the southern boundary wells.
- **Arsenic** - Arsenic has been detected in two southern boundary wells during the LTM program: SB2-1A and SB2-2.
 - **SB2-1A** - Arsenic was only detected above the LOC once, during the winter 2010 sampling event, and has not been detected above the LOC during the six subsequent sampling events in which it was sampled.
 - **SB2-2** - Although the summer 2014 sampling event indicates that the concentrations are not consistent with the historical trend, the historical average is 5.6 µg/L, while the average from the four most recent sampling events is 6.3 µg/L.
- **Lead**
 - Elevated lead levels were detected in four of the southern boundary wells during the summer 2014 event: SB1-1, SB1-2, SB1-3, and SB2-1A. However, a field-filtration analysis, which was based on the methods of Bailey *et al.* (2005), was conducted for samples from SB1-1 and SB1-2 during the winter 2013 event. This filtration demonstrated that the lead in groundwater in these areas is associated with a colloid fraction that likely has extremely low mobility in groundwater.

8 RECOMMENDATIONS

The following analytes will remain in the LTM program and will be sampled for in each well in accordance with the schedule provided in Table 8-1:

- VOC
 - Vinyl chloride
- Metals
 - Arsenic
 - Lead

**Table 8-1
LTM Recommendations**

Well ID	Vinyl Chloride	Arsenic	Lead
SB1-1	Annual	Annual	Annual
SB1-2	Annual	Annual	Annual
SB1-3	Annual	Annual	Semi-annual
SB1-5	Annual	Annual	Annual
SB1-6	Annual	Annual	Annual
SB1-7	Annual	Annual	Annual
SB2-1A	Annual	Annual	Annual
SB2-2	Annual	Semi-annual^b	Annual
SB2-3	Annual	Annual	Annual
SB3-1B	Annual	Annual	Annual
SB3-2	Annual	Annual	Annual
SB3-3	Annual	Annual	Annual
SB4-1	Annual	Annual	Annual
SB4-2	Annual	Annual	Annual
SB4-3	Annual	Annual	Annual
SB4-4	Annual	Annual	Annual
MW-17	a		Annual
MW25-8		Annual	
DM19-1	Annual	Annual	
DM19-2		Annual	
DM25-2	Annual	Annual	
1181-3		Annual	
MW180-1		Annual	
C1-B		Semi-annual	
MW25-6A	Annual	Semi-annual	Semi-Annual
MW25-6B	Annual	Semi-annual	Semi-Annual

Notes:

- a. If a cell is blank, sampling for this analyte is not required for this well.
- b. Wells marked with **semi-annual** in red font have LTM results that are not consistent with the historical data. After each monitoring event, the data will be reassessed in accordance with the LTM Plan.

9 REFERENCES

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TABLES

Table 1
Well SBI-1 LTM Data
Area C Groundwater Long-Term Monitoring Report Round I Statistical Evaluation

Picatinny Arsenal
New Jersey

Constituent	Trigger Level	LOC	Sample ID	SBI-1 83-93 1/26/2010				SBI-1 83-93 7/20/2010				SBI-1 83-93 4/12/2011				SBI-1 83-93 11/1/2011				SBI-1 83-93 7/27/2012				SBI-1 83-93 3/20/2013				SBI-1 (10 um filter) 83-93 10/24/2013				SBI-1 (0.45 um filter) 83-93 10/24/2013				SBI-1 83-93 4/1/2014				SBI-1 83-93 8/19/2014							
			Sample Depth (ft)	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL								
			LOC Source																																												
Volatile Organic Compounds (µg/L)																																															
Vinyl chloride	6.6	1	PQL	ND	U	Unk	1	ND	U	0.2	1	ND	U	0.4	1.5	ND	U	0.4	1.5	ND	U	0.4	1.5	NT				ND	U	0.1	1.5	NT				NT				NT				ND	U	0.1	1.5
Metals (µg/L)																																															
Arsenic	49.6	3	PQL	ND	U	3.3	1.1	ND	U	3	10	0.57		0.21	6	ND	U	0.21	5	ND	U	0.33	5	NT				0.38	J	0.33	5	NT				NT				NT				ND	U	0.33	5
Lead	50	5	GWQC	19.6		1.6	0.6	25.9		1.5	3	50		2.61	15	5.2	J	2.6	15	19		2.6	15	34				2.6	15	53		2.6	15	ND	U	2.6	15	ND	U	2.6	15	NT		42		2.6	15

Notes:

Indicates the value is greater than the Applicable or Relevant and Appropriate Requirement.

Indicates value is greater than the Trigger Level.

LOC is the lowest of the Safe Drinking Water Act Maximum Contaminant Levels (MCLs) and any non-zero MCL Goal (40 Code of Federal Regulations 141), the New Jersey (NJ) Drinking Water Quality Act MCLs (New Jersey Administrative Code [N.J.A.C.] 7:10-16), and the NJ Groundwater Quality Criteria (N.J.A.C. 7:9-6). If a chemical is not listed under these promulgated standards, then the LOC is taken from the lowest of the United States Environmental Protection Agency (USEPA) Regional Screening Levels for Tapwater Risk-Based Concentrations (USEPA 2009c) and the USEPA Federal Drinking Water Health Advisories (USEPA 2009a).

U = The contaminant was not detected in the sample above the reporting limit.

J = Estimated value.

Conc = concentration

FEDMCL = Federal Maximum Contaminant Level

ft = feet

GWQC = Groundwater Quality Criteria

LOC = level of concern

MDL = Method Detection Limit

MRL = Method Reporting Limit

NA = not available and/or non-applicable

ND = non-detect

NJMCL = New Jersey Maximum Contaminant Level

NT = not tested

PQL = Practical Quantitation Limit

Qual = qualifier

µg/L = micrograms per liter

Unk = unknown

Table 2
Well SB1-2 LTM Data

Area C Groundwater Long-Term Monitoring Report Round I Statistical Evaluation

Picatinny Arsenal
New Jersey

Constituent	Trigger Level	LOC	Sample ID	SB1-2 8-18				SB1-2 8-18				SB1-2 8-18				SB1-2 8-18				SB1-2 8-18				SB1-2 8-18				SB1-2 83-93				SB1-2 83-93				SB1-2 83-93				SB1-2 83-93											
			Sample Depth (ft)	1/26/2010				7/20/2010				4/12/2011				11/3/2011				7/27/2012				3/20/2013				10/24/2013				10/24/2013				4/1/2014				8/19/2014				8/19/2014							
			LOC Source	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL								
Volatile Organic Compounds (µg/L)																																																			
Vinyl chloride	6.6	1	PQL	ND	U	Unk	1	ND	U	0.2	1	ND	U	0.4	1.5	ND	U	0.4	1.5	ND	U	0.4	1.5	NT				ND	U	0.1	1.5	NT				NT				ND	U	0.10	1.5	ND	U	0.10	1.5				
Metals (µg/L)																																																			
Arsenic	49.6	3	PQL	ND	U	3.3	1.1	ND	U	3	10	0.67		0.21	6	ND	U	0.21	5	0.35	J	0.33	5	NT				ND	U	0.33	5	NT				NT				0.69	J	0.33	5.0	0.63	J	0.33	5.0				
Lead	50	5	GWQC	35.7		1.6	0.6	26.8		1.5	3	78		2.61	15	ND	U	2.6	15	15		2.6	15	32				2.6	15	33								NT				86				73				2.6	15

Notes:

Indicates the value is greater than the Applicable or Relevant and Appropriate Requirement.

Indicates value is greater than the Trigger Level.

LOC is the lowest of the Safe Drinking Water Act Maximum Contaminant Levels (MCLs) and any non-zero MCL Goal (40 Code of Federal Regulations 141), the New Jersey (NJ) Drinking Water Quality Act MCLs (New Jersey Administrative Code [N.J.A.C.] 7:10-16), and the NJ Groundwater Quality Criteria (N.J.A.C. 7:9-6). If a chemical is not listed under these promulgated standards, then the LOC is taken from the lowest of the United States Environmental Protection Agency (USEPA) Regional Screening Levels for Tapwater Risk-Based Concentrations (USEPA 2009c) and the USEPA Federal Drinking Water Health Advisories (USEPA 2009a).

U = The contaminant was not detected in the sample above the reporting limit.

J = Estimated value.

Conc = concentration

FEDMCL = Federal Maximum Contaminant Level

ft = feet

GWQC = Groundwater Quality Criteria

LOC = level of concern

MDL = Method Detection Limit

MRL = Method Reporting Limit

NA = not available and/or non-applicable

ND = non-detect

NJMCL = New Jersey Maximum Contaminant Level

NT = not tested

PQL = Practical Quantitation Limit

Qual = qualifier

µg/L = micrograms per liter

Unk = unknown

Table 3
Well SB1-3 LTM Data

Area C Groundwater Long-Term Monitoring Report Round I Statistical Evaluation

Picatiny Arsenal
New Jersey

Constituent	Trigger Level	LOC	Sample ID	SB1-3 24-34				SB1-3 24-34				SB1-3 24-34				SB1-3 24-34				SB1-3 24-34				SB1-3 24-34				SB1-3 24-34											
			Sample Depth (ft)	1/26/2010				7/20/2010				4/12/2011				11/1/2011				7/27/2012				3/20/2013				10/24/2013				4/1/2014				8/19/2014			
			Date Sampled	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL				
			LOC Source	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL				
Volatile Organic Compounds (µg/L)																																							
Vinyl chloride	6.6	1	PQL	ND	U	Unk	1	ND	U	0.2	1	ND	U	0.4	1.5	ND	U	0.4	1.5	ND	U	0.4	1.5	NT				ND	U	0.1	1.5	NT				ND	U	0.10	1.5
Metals (µg/L)																																							
Arsenic	49.6	3	PQL	ND	U	3.3	1.1	ND	U	3	10	0.6	U	0.21	6	ND	U	0.21	5	ND	U	0.33	5	NT				ND	U	0.33	5	NT				ND	U	0.33	5
Lead	50	5	GWQC	4.6	J	1.6	0.6	20.8		1.5	3	8.2	J	2.61	15	16		2.6	15	11	J	2.6	15	16		2.6	15	29		2.6	15	24		5.0	15	5.6	J	2.6	15

Notes:
Indicates the value is greater than the Applicable or Relevant and Appropriate Requirement.

Indicates value is greater than the Trigger Level.
LOC is the lowest of the Safe Drinking Water Act Maximum Contaminant Levels (MCLs) and any non-zero MCL Goal (40 Code of Federal Regulations 141), the New Jersey (NJ) Drinking Water Quality Act MCLs (New Jersey Administrative Code [N.J.A.C.] 7:10-16), and the NJ Groundwater Quality Criteria (N.J.A.C. 7:9-6). If a chemical is not listed under these promulgated standards, then the LOC is taken from the lowest of the United States Environmental Protection Agency (USEPA) Regional Screening Levels for Tapwater Risk-Based Concentrations (USEPA 2009c) and the USEPA Federal Drinking Water Health Advisories (USEPA 2009a).

U = The contaminant was not detected in the sample above the reporting limit.
J = Estimated value.

Conc = concentration
FEDMCL = Federal Maximum Contaminant Level
ft = feet
GWQC = Groundwater Quality Criteria
LOC = level of concern
MDL = Method Detection Limit
MRL = Method Reporting Limit
NA = not available and/or non-applicable
ND = non-detect
NJMCL = New Jersey Maximum Contaminant Level
NT = not tested
PQL = Practical Quantitation Limit
Qual = qualifier
µg/L = micrograms per liter
Unk = unknown

Table 4
Well SB1-5 LTM Data

Area C Groundwater Long-Term Monitoring Report Round I Statistical Evaluation

Picatinny Arsenal
New Jersey

Constituent	Trigger Level	LOC	Sample ID	SB1-5 90-100 1/26/2010				SB1-5 90-100 7/20/2010				SB1-5 90-100 4/13/2011				SB1-5 90-100 11/1/2011				SB1-5 90-100 7/27/2012				SB1-5 90-100 3/18/2013				SB1-5 90-100 10/24/2013				SB1-5 90-100 4/1/2014				SB1-5 90-100 8/19/2014			
			Sample Depth (ft)	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL				
			Date Sampled																																				
			LOC Source																																				
Volatile Organic Compounds (µg/L)																																							
Vinyl chloride	6.6	1	PQL	ND	U	Unk	1	ND	U	0.2	1	ND	U	0.4	1.5	ND	U	0.4	1.5	ND	U	0.4	1.5	NT				ND	U	0.1	1.5	NT				ND	U	0.4	1.5
Metals (µg/L)																																							
Arsenic	49.6	3	PQL	2.1	J	3.3	1.1	ND	U	3	10	ND	U	0.66	15	ND	U	0.21	5	0.35	J	0.33	5	NT				ND	U	0.33	5	NT				0.36	J	0.33	5
Lead	50	5	GWQC	2.3	J	1.6	0.6	22.3		1.5	3	ND	U	2.61	15	ND	U	2.6	15	ND	U	2.6	15	ND	U	2.6	15	ND	U	2.6	15	NT				ND	U	2.6	15

Notes:

Indicates the value is greater than the Applicable or Relevant and Appropriate Requirement.

Indicates value is greater than the Trigger Level.

LOC is the lowest of the Safe Drinking Water Act Maximum Contaminant Levels (MCLs) and any non-zero MCL Goal (40 Code of Federal Regulations 141), the New Jersey (NJ) Drinking Water Quality Act MCLs (New Jersey Administrative Code [N.J.A.C.] 7:10-16), and the NJ Groundwater Quality Criteria (N.J.A.C. 7:9-6). If a chemical is not listed under these promulgated standards, then the LOC is taken from the lowest of the United States Environmental Protection Agency (USEPA) Regional Screening Levels for Tapwater Risk-Based Concentrations (USEPA 2009c) and the USEPA Federal Drinking Water Health Advisories (USEPA 2009a).

U = The contaminant was not detected in the sample above the reporting limit.

UB = Compound considered non-detect at the listed value due to associated blank contamination.

J = Estimated value.

Conc = concentration

FEDMCL = Federal Maximum Contaminant Level

ft = feet

GWQC = Groundwater Quality Criteria

LOC = level of concern

MDL = Method Detection Limit

MRL = Method Reporting Limit

NA = not available and/or non-applicable

ND = non-detect

NJMCL = New Jersey Maximum Contaminant Level

NT = not tested

PQL = Practical Quantitation Limit

Qual = qualifier

µg/L = micrograms per liter

Unk = unknown

Table 5
Well SB1-6 LTM Data

Area C Groundwater Long-Term Monitoring Report Round I Statistical Evaluation

Picatinny Arsenal
New Jersey

Constituent	Trigger Level	LOC	Sample ID	SB1-6 8-18				SB1-6 8-18				SB1-6 8-18				SB1-6 8-18				SB1-6 8-18				SB1-6 8-18				SB1-6 8-18											
			Sample Depth (ft)	1/28/2010				7/20/2010				4/14/2011				11/3/2011				7/27/2012				3/20/2013				10/24/2013				4/1/2014				8/19/2014			
			Date Sampled	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL				
			LOC Source	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL				
Volatile Organic Compounds (µg/L)																																							
Vinyl chloride	6.6	1	PQL	ND	U	Unk	1	ND	U	0.2	1	ND	U	0.4	1.5	ND	U	0.4	1.5	ND	U	0.4	1.5	NT				ND	U	0.1	1.5	NT				ND	U	0.4	1.5
Metals (µg/L)																																							
Arsenic	49.6	3	PQL	ND	U	3.3	1.1	ND	U	3	10	0.92		0.21	6	0.59	J	0.21	5	0.92	J	0.33	5	NT				0.89	J	0.33	5	NT				0.48	J	0.33	5
Lead	50	5	GWQC	ND	U	1.6	0.6	14.6		1.5	3	ND	U	2.61	15	ND	U	2.6	15	ND	U	2.6	15	ND	U	2.6	15	ND	U	2.6	15	NT				ND	U	2.6	15

Notes:

Indicates the value is greater than the Applicable or Relevant and Appropriate Requirement.

Indicates value is greater than the Trigger Level.

LOC is the lowest of the Safe Drinking Water Act Maximum Contaminant Levels (MCLs) and any non-zero MCL Goal (40 Code of Federal Regulations 141), the New Jersey (NJ) Drinking Water Quality Act MCLs (New Jersey Administrative Code [N.J.A.C.] 7:10-16), and the NJ Groundwater Quality Criteria (N.J.A.C. 7:9-6). If a chemical is not listed under these promulgated standards, then the LOC is taken from the lowest of the United States Environmental Protection Agency (USEPA) Regional Screening Levels for Tapwater Risk-Based Concentrations (USEPA 2009c) and the USEPA Federal Drinking Water Health Advisories (USEPA 2009a).

U = The contaminant was not detected in the sample above the reporting limit.

J = Estimated value.

Conc = concentration

FEDMCL = Federal Maximum Contaminant Level

ft = feet

GWQC = Groundwater Quality Criteria

LOC = level of concern

MDL = Method Detection Limit

MRL = Method Reporting Limit

NA = not available and/or non-applicable

ND = non-detect

NJMCL = New Jersey Maximum Contaminant Level

NT = not tested

PQL = Practical Quantitation Limit

Qual = qualifier

µg/L = micrograms per liter

Unk = unknown

Table 6
Well SB1-7 LTM Data

Area C Groundwater Long-Term Monitoring Report Round I Statistical Evaluation

Picatiny Arsenal
New Jersey

Constituent	Trigger Level	LOC	Sample ID	SB1-7				SB1-7				SB1-7				SB1-7				SB1-7				SB1-7				SB1-7											
			Sample Depth (ft)	9.5-19.5				9.5-19.5				9.5-19.5				9.5-19.5				9.5-19.5				9.5-19.5															
			Date Sampled	1/28/2010				7/20/2010				4/14/2011				11/3/2011				7/27/2012				3/20/2013				10/24/2013				4/1/2014				8/19/2014			
			LOC Source	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL				
Volatile Organic Compounds (µg/L)																																							
Vinyl chloride	6.6	1	PQL	ND	U	Unk	1	ND	U	0.2	1	ND	U	0.4	1.5	ND	U	0.4	1.5	ND	U	0.4	1.5	NT				ND	U	0.1	1.5	NT				ND	U	0.4	1.5
Metals (µg/L)																																							
Arsenic	49.6	3	PQL	ND	U	3.3	1.1	ND	U	3	10	ND	U	0.21	6	ND	U	0.21	5	ND	U	0.33	5	NT				0.36	J	0.33	5	NT				ND	U	0.33	5
Lead	50	5	GWQC	1.2	J	1.6	0.6	15.1		1.5	3	ND	U	2.61	15	ND	U	2.6	15	ND	U	2.6	15	ND	U	2.6	15	ND	U	2.6	15	NT				ND	U	2.6	15

Notes:

Indicates the value is greater than the Applicable or Relevant and Appropriate Requirement.

Indicates value is greater than the Trigger Level.

LOC is the lowest of the Safe Drinking Water Act Maximum Contaminant Levels (MCLs) and any non-zero MCL Goal (40 Code of Federal Regulations 141), the New Jersey (NJ) Drinking Water Quality Act MCLs (New Jersey Administrative Code [N.J.A.C.] 7:10-16), and the NJ Groundwater Quality Criteria (N.J.A.C. 7:9-6). If a chemical is not listed under these promulgated standards, then the LOC is taken from the lowest of the United States Environmental Protection Agency (USEPA) Regional Screening Levels for Tapwater Risk-Based Concentrations (USEPA 2009c) and the USEPA Federal Drinking Water Health Advisories (USEPA 2009a).

U = The contaminant was not detected in the sample above the reporting limit.

J = Estimated value.

Conc = concentration

FEDMCL = Federal Maximum Contaminant Level

ft = feet

GWQC = Groundwater Quality Criteria

LOC = level of concern

MDL = Method Detection Limit

MRL = Method Reporting Limit

NA = not available and/or non-applicable

ND = non-detect

NJMCL = New Jersey Maximum Contaminant Level

NT = not tested

PQL = Practical Quantitation Limit

Qual = qualifier

µg/L = micrograms per liter

Unk = unknown

Table 7
Well SB2-1A LTM Data

Area C Groundwater Long-Term Monitoring Report Round I Statistical Evaluation

Picatiny Arsenal
New Jersey

Constituent	Trigger Level	LOC	Sample ID	SB2-1A				SB2-1A				SB2-1A				SB2-1A				SB2-1A				SB2-1A				SB2-1A											
			Sample Depth (ft)	158-168				158-168				158-168				158-168				158-168				158-168															
			Date Sampled	2/2/2010				8/4/2010				4/15/2011				11/4/2011				7/26/2012				March 2013				10/22/2013				4/2/2014				8/20/2014			
			LOC Source	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL				
Volatile Organic Compounds (µg/L)																																							
Vinyl chloride	6.6	1	PQL	ND	U	Unk	1	ND	U	0.2	1	ND	U	0.4	1.5	ND	U	0.4	1.5	ND	U	0.4	1.5	NT				ND	U	0.1	1.5	NT				ND	U	0.1	1.5
Metals (µg/L)																																							
Arsenic	49.6	3	PQL	8.3	J	3.3	1.1	ND	U	3	10	2.6		0.21	6	0.65	J	0.21	5	0.81	J	0.33	5	NT				1.2	J	0.33	5	NT				1.1	J	0.33	5
Lead	50	5	GWQC	2.2	J	1.6	0.6	6.05		1.5	3	11	J	2.61	15	ND	U	2.6	15	10	J	2.6	15	NT				2.6	J	2.6	15	NT				14	J	2.6	15

Notes:

Indicates the value is greater than the Applicable or Relevant and Appropriate Requirement.

Indicates value is greater than the Trigger Level.

LOC is the lowest of the Safe Drinking Water Act Maximum Contaminant Levels (MCLs) and any non-zero MCL Goal (40 Code of Federal Regulations 141), the New Jersey (NJ) Drinking Water Quality Act MCLs (New Jersey Administrative Code [N.J.A.C.] 7:10-16), and the NJ Groundwater Quality Criteria (N.J.A.C. 7:9-6). If a chemical is not listed under these promulgated standards, then the LOC is taken from the lowest of the United States Environmental Protection Agency (USEPA) Regional Screening Levels for Tapwater Risk-Based Concentrations (USEPA 2009c) and the USEPA Federal Drinking Water Health Advisories (USEPA 2009a).

U = The contaminant was not detected in the sample above the reporting limit.

J = Estimated value.

UJ = The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.

Conc = concentration

FEDMCL = Federal Maximum Contaminant Level

ft = feet

GWQC = Groundwater Quality Criteria

LOC = level of concern

MDL = Method Detection Limit

MRL = Method Reporting Limit

NA = not available and/or non-applicable

ND = non-detect

NJMCL = New Jersey Maximum Contaminant Level

NT = not tested

PQL = Practical Quantitation Limit

Qual = qualifier

µg/L = micrograms per liter

Unk = unknown

Table 8
Well SB2-2 LTM Data

Area C Groundwater Long-Term Monitoring Report Round I Statistical Evaluation

Picatinny Arsenal
New Jersey

Constituent	Trigger Level	LOC	Sample ID	SB2-2				SB2-2				SB2-2				SB2-2				SB2-2				SB2-2															
			Sample Depth (ft)	25-35				25-35				25-35				25-35				25-35				25-35															
			Date Sampled	2/2/2010				8/4/2010				4/15/2011				11/4/2011				7/26/2012				3/21/2013				10/22/2013				4/2/2014							
			LOC Source	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL				
Volatile Organic Compounds (µg/L)																																							
Vinyl chloride	6.6	1	PQL	ND	U	Unk	1	ND	U	0.2	1	ND	U	0.4	1.5	ND	U	0.4	1.5	ND	U	0.4	1.5	NT				ND	U	0.1	1.5	NT				ND	U	0.1	1.5
Metals (µg/L)																																							
Arsenic	49.6	3	PQL	7.3	J	3.3	1.1	6.45	J	3	10	5.3	J	0.21	6	5.1		0.21	5	6.5		0.33	5	4.9	J	0.33	5	8.8		0.33	5	6.6		1.0	5.0	4.8	J	0.33	5
Lead	50	5	GWQC	2.3	J	1.6	0.6	ND		1.5	3	ND	U	2.61	15	ND	U	2.6	15	ND	U	2.6	15	NT				ND	U	2.6	15	NT				ND	UJ	2.6	15

Notes:

Indicates the value is greater than the Applicable or Relevant and Appropriate Requirement.

Indicates value is greater than the Trigger Level.

LOC is the lowest of the Safe Drinking Water Act Maximum Contaminant Levels (MCLs) and any non-zero MCL Goal (40 Code of Federal Regulations 141), the New Jersey (NJ) Drinking Water Quality Act MCLs (New Jersey Administrative Code [N.J.A.C.] 7:10-16), and the NJ Groundwater Quality Criteria (N.J.A.C. 7:9-6). If a chemical is not listed under these promulgated standards, then the LOC is taken from the lowest of the United States Environmental Protection Agency (USEPA) Regional Screening Levels for Tapwater Risk-Based Concentrations (USEPA 2009c) and the USEPA Federal Drinking Water Health Advisories (USEPA 2009a).

U = The contaminant was not detected in the sample above the reporting limit.

J = Estimated value.

UJ = The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.

Conc = concentration

FEDMCL = Federal Maximum Contaminant Level

ft = feet

GWQC = Groundwater Quality Criteria

LOC = level of concern

MDL = Method Detection Limit

MRL = Method Reporting Limit

NA = not available and/or non-applicable

ND = non-detect

NJMCL = New Jersey Maximum Contaminant Level

NT = not tested

PQL = Practical Quantitation Limit

Qual = qualifier

µg/L = micrograms per liter

Unk = unknown

Table 9
Well SB2-3 LTM Data

Area C Groundwater Long-Term Monitoring Report Round I Statistical Evaluation

Picatinny Arsenal
New Jersey

Constituent	Trigger Level	LOC	Sample ID	SB2-3				SB2-3				SB2-3				SB2-3				SB2-3				SB2-3				SB2-3											
			Sample Depth (ft)	243-253				243-253				243-253				243-253				243-253				243-253															
			Date Sampled	2/2/2010				8/4/2010				4/15/2011				11/4/2011				7/26/2012				March 2013				10/22/2013				4/2/2014							
			LOC Source	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL				
Volatile Organic Compounds (µg/L)																																							
Vinyl chloride	6.6	1	PQL	ND	U	Unk	1	ND	U	0.2	1	ND	U	0.4	1.5	ND	U	0.4	1.5	ND	U	0.4	1.5	NT				ND	U	0.1	1.5	NT				ND	U	0.1	1.5
Metals (µg/L)																																							
Arsenic	49.6	3	PQL	ND	U	3.3	1.1	ND	U	3	10	ND	U	0.21	6	ND	U	0.21	5	ND	U	0.33	5	NT				ND	U	0.33	5	NT				ND	U	0.33	5
Lead	50	5	GWQC	1.4	J	1.6	0.6	2.6		1.5	3	ND	U	2.61	15	ND	U	2.6	15	ND	U	2.6	15	NT				ND	U	2.6	15	NT				ND	U	2.6	15

Notes:

Indicates the value is greater than the Applicable or Relevant and Appropriate Requirement.

Indicates value is greater than the Trigger Level.

LOC is the lowest of the Safe Drinking Water Act Maximum Contaminant Levels (MCLs) and any non-zero MCL Goal (40 Code of Federal Regulations 141), the New Jersey (NJ) Drinking Water Quality Act MCLs (New Jersey Administrative Code [N.J.A.C.] 7:10-16), and the NJ Groundwater Quality Criteria (N.J.A.C. 7:9-6). If a chemical is not listed under these promulgated standards, then the LOC is taken from the lowest of the United States Environmental Protection Agency (USEPA) Regional Screening Levels for Tapwater Risk-Based Concentrations (USEPA 2009c) and the USEPA Federal Drinking Water Health Advisories (USEPA 2009a).

U = The contaminant was not detected in the sample above the reporting limit.

J = Estimated value.

UJ = The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.

Conc = concentration

FEDMCL = Federal Maximum Contaminant Level

ft = feet

GWQC = Groundwater Quality Criteria

LOC = level of concern

MDL = Method Detection Limit

MRL = Method Reporting Limit

NA = not available and/or non-applicable

ND = non-detect

NJMCL = New Jersey Maximum Contaminant Level

NT = not tested

PQL = Practical Quantitation Limit

Qual = qualifier

µg/L = micrograms per liter

Unk = unknown

Table 10
Well SB3-1B LTM Data
Area C Groundwater Long-Term Monitoring Report Round I Statistical Evaluation

Picatinny Arsenal
New Jersey

Constituent	Trigger Level	LOC	SB3-1B 326-336 1/27/2010				SB3-1B 326-336 3/17/2010				SB3-1B 326-336 7/21/2010				SB3-1B DUP 326-336 7/21/2010				SB3-1B 326-336 4/18/2011				SB3-1B 326-336 11/4/2011				SB3-1B 326-336 7/30/2012				SB3-1B 326-336 3/20/2013				SB3-1B 326-336 10/24/2013				SB3-1B 326-336 4/2/2014				SB3-1B 326-336 8/20/2014				
			Sample ID	Sample Depth (ft)	Date Sampled	LOC Source	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL					
			Volatile Organic Compounds (µg/L)																																												
			Vinyl chloride	6.6	J	PQL	ND	U	Unk	1	ND	U	Unk	1	ND	U	0.2	1	ND	U	0.4	1	ND	U	0.4	1.5	ND	U	0.4	1.5	ND	U	0.4	1.5	NT				ND	U	0.1	1.5	NT				ND
Metals (µg/L)																																															
Arsenic	49.6	3	PQL	ND	U	3.3	1.1	NT	NA	NA	NA	ND	U	3	10	ND	U	3	10	5.6	UB	25	4.4	1.2	J	0.21	5	1.1	J	0.33	5	NT				1.1	J	0.33	5	NT				1.2	J	0.33	5
Lead	50	5	GWQC	0.61	J	1.6	0.6	NT		NA	NA	12.3	I	1.5	3	14.2	I	1.5	3	ND	U	2.61	15	ND	U	2.6	15	ND	U	2.6	15	NT				ND	U	2.6	15	NT				ND	U	2.6	15

Notes:
Indicates the value is greater than the Applicable or Relevant and Appropriate Requirement.
 Indicates value is greater than the Trigger Level.
 LOC is the lowest of the Safe Drinking Water Act Maximum Contaminant Levels (MCLs) and any non-zero MCL Goal (40 Code of Federal Regulations 141), the New Jersey (NJ) Drinking Water Quality Act MCLs (New Jersey Administrative Code [N.J.A.C.] 7:10-16), and the NJ Groundwater Quality Criteria (N.J.A.C. 7:9-6). If a chemical is not listed under these promulgated standards, then the LOC is taken from the lowest of the United States Environmental Protection Agency (USEPA) Regional Screening Levels for Tapwater Risk-Based Concentrations (USEPA 2009c) and the USEPA Federal Drinking Water Health Advisories (USEPA 2009a).
 U = The contaminant was not detected in the sample above the reporting limit.
 J = Estimated value.
 UB = Compound considered non-detect at the listed value due to associated blank contamination.
 Conc = concentration
 FEDMCL = Federal Maximum Contaminant Level
 ft = feet
 GWQC = Groundwater Quality Criteria
 HPLC = High-performance liquid chromatography
 LOC = level of concern
 MDL = Method Detection Limit
 MRL = Method Reporting Limit
 NA = not available and/or non-applicable
 ND = non-detect
 NJMCL = New Jersey Maximum Contaminant Level
 NT = not tested
 PQL = Practical Quantitation Limit
 QC = quality control
 Qual = qualifier
 µg/L = micrograms per liter
 Unk = unknown

Table 11
Well SB3-2 LTM Data

Area C Groundwater Long-Term Monitoring Report Round I Statistical Evaluation

Picatunny Arsenal
New Jersey

Constituent	Trigger Level	LOC	Sample ID	SB3-2				SB3-2				SB3-2				SB3-2				SB3-2				SB3-2															
			Sample Depth (ft)	170-180				170-180				170-180				170-180				170-180				170-180															
			Date Sampled	1/27/2010				7/21/2010				4/18/2011				11/4/2011				7/30/2012				3/21/2013				10/22/2013				4/2/2014				8/20/2014			
			LOC Source	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL				
Volatile Organic Compounds (µg/L)																																							
Vinyl chloride	6.6	1	PQL	ND	U	Unk	1	ND	U	0.2	1	ND	U	0.4	1.5	ND	U	0.4	1.5	ND	U	0.4	1.5	NT				ND	U	0.1	1.5	NT				ND	U	0.1	1.5
Metals (µg/L)																																							
Arsenic	49.6	3	PQL	1.5	J	3.3	1.1	ND	U	3	10	0.91		0.21	6	1	J	0.21	5	1	J	0.33	5	NT				0.94	J	0.33	5	NT				0.95	J	0.33	5
Lead	50	5	GWQC	ND	U	1.6	0.6	11.5		1.5	3	ND	U	2.61	15	ND	U	2.6	15	ND	U	2.6	15	ND	U	2.6	15	ND	U	2.6	15	NT				ND	U	2.6	15

Notes:

Indicates the value is greater than the Applicable or Relevant and Appropriate Requirement.

Indicates value is greater than the Trigger Level.

LOC is the lowest of the Safe Drinking Water Act Maximum Contaminant Levels (MCLs) and any non-zero MCL Goal (40 Code of Federal Regulations 141), the New Jersey (NJ) Drinking Water Quality Act MCLs (New Jersey Administrative Code [N.J.A.C.] 7:10-16), and the NJ Groundwater Quality Criteria (N.J.A.C. 7:9-6). If a chemical is not listed under these promulgated standards, then the LOC is taken from the lowest of the United States Environmental Protection Agency (USEPA) Regional Screening Levels for Tapwater Risk-Based Concentrations (USEPA 2009c) and the USEPA Federal Drinking Water Health Advisories (USEPA 2009a).

U = The contaminant was not detected in the sample above the reporting limit.

J = Estimated value.

Conc = concentration

FEDMCL = Federal Maximum Contaminant Level

ft = feet

GWQC = Groundwater Quality Criteria

LOC = level of concern

MDL = Method Detection Limit

MRL = Method Reporting Limit

NA = not available and/or non-applicable

ND = non-detect

NJMCL = New Jersey Maximum Contaminant Level

NT = not tested

PQL = Practical Quantitation Limit

Qual = qualifier

µg/L = micrograms per liter

Unk = unknown

Table 12
Well SB3-3 LTM Data

Area C Groundwater Long-Term Monitoring Report Round I Statistical Evaluation

Picatinny Arsenal
New Jersey

Constituent	Trigger Level	LOC	Sample ID	SB3-3				SB3-3				SB3-3				SB3-3				SB3-3				SB3-3				SB3-3											
			Sample Depth (ft)	21-31				21-31				21-31				21-31				21-31				21-31															
			Date Sampled	1/27/2010				8/5/2010				4/18/2011				11/4/2011				7/30/2012				March 2013				10/22/2013				4/2/2014				8/20/2014			
			LOC Source	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL				
Volatile Organic Compounds (µg/L)																																							
Vinyl chloride	6.6	1	PQL	ND	U	Unk	1	ND	U	0.2	1	ND	U	0.4	1.5	ND	U	0.4	1.5	ND	U	0.4	1.5	NT				ND	U	0.1	1.5	NT				ND	U	0.1	1.5
Metals (µg/L)																																							
Arsenic	49.6	3	PQL	ND	U	3.3	1.1	ND	U	3	10	ND	U	0.21	6	ND	U	0.21	5	0.82	J	0.33	5	NT				ND	U	0.33	5	NT				0.65	J	0.33	5
Lead	50	5	GWQC	ND	U	1.6	0.6	3.99		1.5	3	ND	U	2.61	15	ND	U	2.6	15	5.4	J	2.6	15	NT				ND	U	2.6	15	NT				4.8	J	2.6	15

Notes:

Indicates the value is greater than the Applicable or Relevant and Appropriate Requirement.

Indicates value is greater than the Trigger Level.

LOC is the lowest of the Safe Drinking Water Act Maximum Contaminant Levels (MCLs) and any non-zero MCL Goal (40 Code of Federal Regulations 141), the New Jersey (NJ) Drinking Water Quality Act MCLs (New Jersey Administrative Code [N.J.A.C.] 7:10-16), and the NJ Groundwater Quality Criteria (N.J.A.C. 7:9-6). If a chemical is not listed under these promulgated standards, then the LOC is taken from the lowest of the United States Environmental Protection Agency (USEPA) Regional Screening Levels for Tapwater Risk-Based Concentrations (USEPA 2009c) and the USEPA Federal Drinking Water Health Advisories (USEPA 2009a).

U = The contaminant was not detected in the sample above the reporting limit.

J = Estimated value.

Conc = concentration

FEDMCL = Federal Maximum Contaminant Level

ft = feet

GWQC = Groundwater Quality Criteria

LOC = level of concern

MDL = Method Detection Limit

MRL = Method Reporting Limit

NA = not available and/or non-applicable

ND = non-detect

NJMCL = New Jersey Maximum Contaminant Level

NT = not tested

PQL = Practical Quantitation Limit

Qual = qualifier

µg/L = micrograms per liter

Unk = unknown

Table 13
Well SB4-1 LTM Data
Area C Groundwater Long-Term Monitoring Report Round I Statistical Evaluation

Picatinny Arsenal
New Jersey

Constituent	Trigger Level	LOC	SB4-1 369-379				SB4-1 DUP 369-379				SB4-1 369-379				SB4-1 369-379				SB4-1 369-379				SB4-1 369-379				SB4-1 369-379				SB4-1 369-379																
			Sample ID				Sample Depth (ft)				Date Sampled				Date Sampled				Date Sampled				Date Sampled				Date Sampled				Date Sampled																
			1/11/2010				1/11/2010				3/17/2010				8/3/2010				4/20/2011				11/1/2011				7/31/2012				March 2013				10/25/2013				4/3/2014				8/21/2014				
			Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL					
Volatile Organic Compounds (µg/L)																																															
Vinyl chloride	6.6	1	PQL	ND	U	Unk	1	ND	U	Unk	1	ND	U	Unk	1	ND	U	0.2	1	ND	U	0.4	1.5	ND	U	0.4	1.5	ND	U	0.4	1.5	NT				ND	U	0.1	1.5	NT				ND	U	0.1	1.5
Metals (µg/L)																																															
Arsenic	49.6	3	PQL	ND	U	3.3	1.1	ND	U	3.3	1.1	NT	NA	NA	NA	ND	U	3	10	0.26		0.21	6	0.22	J	0.21	5	ND	U	0.33	5	NT				ND	U	0.33	5	NT				ND	U	0.33	5
Lead	50	5	GWQC	1	J	1.6	0.6	1.3		1.6	0.6	NT	NA	NA	NA	ND	U	1.5	3	ND	U	2.61	15	ND	U	2.6	15	ND	U	2.6	15	NT				ND	U	2.6	15	NT				ND	U	2.6	15

Notes:
Indicates the value is greater than the Applicable or Relevant and Appropriate Requirement.
 Indicates value is greater than the Trigger Level.
 LOC is the lowest of the Safe Drinking Water Act Maximum Contaminant Levels (MCLs) and any non-zero MCL Goal (40 Code of Federal Regulations 141), the New Jersey (NJ) Drinking Water Quality Act MCLs (New Jersey Administrative Code [N.J.A.C.] 7:10-16), and the NJ Groundwater Quality Criteria (N.J.A.C. 7:9-6). If a chemical is not listed under these promulgated standards, then the LOC is taken from the lowest of the United States Environmental Protection Agency (USEPA) Regional Screening Levels for Tapwater Risk-Based Concentrations (USEPA 2009c) and the USEPA Federal Drinking Water Health Advisories (USEPA 2009a).
 U = The contaminant was not detected in the sample above the reporting limit.
 J = Estimated value.
 Conc = concentration
 FEDMCL = Federal Maximum Contaminant Level
 ft = feet
 GWQC = Groundwater Quality Criteria
 LOC = level of concern
 MDL = Method Detection Limit
 MRL = Method Reporting Limit
 NA = not available and/or non-applicable
 ND = non-detect
 NJMCL = New Jersey Maximum Contaminant Level
 NT = not tested
 PQL = Practical Quantitation Limit
 Qual = qualifier
 µg/L = micrograms per liter
 Unk = unknown

Table 14
Well SB4-2 LTM Data

Area C Groundwater Long-Term Monitoring Report Round I Statistical Evaluation

Picatunny Arsenal
New Jersey

Constituent	Trigger Level	LOC	Sample ID	SB4-2				SB4-2				SB4-2				SB4-2				SB4-2				SB4-2															
			Sample Depth (ft)	36-46				36-46				36-46				36-46				36-46				36-46															
			Date Sampled	1/12/2010				8/3/2010				4/20/2011				11/1/2011				7/31/2012				March 2013				10/25/2013				4/3/2014				8/21/2014			
			LOC Source	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL				
Volatile Organic Compounds (µg/L)																																							
Vinyl chloride	6.6	1	PQL	ND	U	Unk	1	ND	U	0.2	1	ND	U	0.4	1.5	ND	U	0.4	1.5	ND	U	0.4	1.5	NT				ND	U	0.1	1.5	NT				ND	U	0.1	1.5
Metals (µg/L)																																							
Arsenic	49.6	3	PQL	ND	U	3.3	1.1	ND	U	3	10	ND	U	0.21	6	0.23	J	0.21	5	ND	U	0.33	5	NT				ND	U	0.33	5	NT				ND	U	0.33	5
Lead	50	5	GWQC	2.8	J	1.6	0.6	ND		1.5	3	ND	U	2.61	15	ND	U	2.6	15	ND	U	2.6	15	NT				ND	U	2.6	15	NT				ND	U	2.6	15

Notes:

Indicates the value is greater than the Applicable or Relevant and Appropriate Requirement.

Indicates value is greater than the Trigger Level.

LOC is the lowest of the Safe Drinking Water Act Maximum Contaminant Levels (MCLs) and any non-zero MCL Goal (40 Code of Federal Regulations 141), the New Jersey (NJ) Drinking Water Quality Act MCLs (New Jersey Administrative Code [N.J.A.C.] 7:10-16), and the NJ Groundwater Quality Criteria (N.J.A.C. 7:9-6). If a chemical is not listed under these promulgated standards, then the LOC is taken from the lowest of the United States Environmental Protection Agency (USEPA) Regional Screening Levels for Tapwater Risk-Based Concentrations (USEPA 2009c) and the USEPA Federal Drinking Water Health Advisories (USEPA 2009a).

U = The contaminant was not detected in the sample above the reporting limit.

UB = Compound considered non-detect at the listed value due to associated blank contamination.

J = Estimated value.

Conc = concentration

FEDMCL = Federal Maximum Contaminant Level

ft = feet

GWQC = Groundwater Quality Criteria

LOC = level of concern

MDL = Method Detection Limit

MRL = Method Reporting Limit

NA = not available and/or non-applicable

ND = non-detect

NJMCL = New Jersey Maximum Contaminant Level

NT = not tested

PQL = Practical Quantitation Limit

Qual = qualifier

µg/L = micrograms per liter

Unk = unknown

Table 15
Well SB4-3 LTM Data

Area C Groundwater Long-Term Monitoring Report Round I Statistical Evaluation

Picatinny Arsenal
New Jersey

Constituent	Trigger Level	LOC	Sample ID	SB4-3				SB4-3				SB4-3				SB4-3				SB4-3				SB4-3															
			Sample Depth (ft)	92-102				92-102				92-102				92-102				92-102																			
			Date Sampled	1/12/2010				8/3/2010				4/20/2011				11/1/2011				7/31/2012				March 2013				10/25/2013				4/3/2014				8/21/2014			
			LOC Source	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL				
Volatile Organic Compounds (µg/L)																																							
Vinyl chloride	6.6	1	PQL	ND	U	Unk	1	ND	U	0.2	1	ND	U	0.4	1.5	ND	U	0.4	1.5	ND	U	0.4	1.5	NT				ND	U	0.1	1.5	NT				ND	U	0.1	1.5
Metals (µg/L)																																							
Arsenic	49.6	3	PQL	ND	U	3.3	1.1	ND	U	3	10	2.7	J	0.21	6	2.9	J	0.21	5	1.9	J	0.33	5	NT				2.1	J	0.33	5	NT				2.3	J	0.33	5
Lead	50	5	GWQC	2.4	J	1.6	0.6	ND		1.5	3	ND	U	2.61	15	ND	U	2.6	15	ND	U	2.6	15	NT				ND	U	2.6	15	NT				ND	U	2.6	15

Notes:
Indicates the value is greater than the Applicable or Relevant and Appropriate Requirement.

Indicates value is greater than the Trigger Level.
LOC is the lowest of the Safe Drinking Water Act Maximum Contaminant Levels (MCLs) and any non-zero MCL Goal (40 Code of Federal Regulations 141), the New Jersey (NJ) Drinking Water Quality Act MCLs (New Jersey Administrative Code [N.J.A.C.] 7:10-16), and the NJ Groundwater Quality Criteria (N.J.A.C. 7:9-6). If a chemical is not listed under these promulgated standards, then the LOC is taken from the lowest of the United States Environmental Protection Agency (USEPA) Regional Screening Levels for Tapwater Risk-Based Concentrations (USEPA 2009c) and the USEPA Federal Drinking Water Health Advisories (USEPA 2009a).

U = The contaminant was not detected in the sample above the reporting limit.

J = Estimated value.

Conc = concentration

FEDMCL = Federal Maximum Contaminant Level

ft = feet

GWQC = Groundwater Quality Criteria

LOC = level of concern

MDL = Method Detection Limit

MRL = Method Reporting Limit

NA = not available and/or non-applicable

ND = non-detect

NJMCL = New Jersey Maximum Contaminant Level

NT = not tested

PQL = Practical Quantitation Limit

Qual = qualifier

µg/L = micrograms per liter

Unk = unknown

Table 16
Well SB4-4 LTM Data

Area C Groundwater Long-Term Monitoring Report Round I Statistical Evaluation

Picatinny Arsenal
New Jersey

Constituent	Trigger Level	LOC	Sample ID	SB4-4 155-165 1/12/2010				SB4-4 155-165 8/3/2010				SB4-4 155-165 4/20/2011				SB4-4 155-165 11/1/2011				SB4-4 155-165 7/31/2012				SB4-4 155-165 March 2013				SB4-4 155-165 10/25/2013				SB4-4 155-165 4/3/2014				SB4-4 155-165 8/21/2014			
			Sample Depth (ft)	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL				
			Date Sampled																																				
			LOC Source																																				
Volatile Organic Compounds (µg/L)																																							
Vinyl chloride	6.6	1	PQL	ND	U	Unk	1	ND	U	0.2	1	ND	U	0.4	1.5	ND	U	0.4	1.5	ND	U	0.4	1.5	NT				ND	UJ	0.1	1.5	NT				ND	U	0.1	1.5
Metals (µg/L)																																							
Arsenic	49.6	3	PQL	ND	U	3.3	1.1	ND	U	3	10	ND	U	0.21	6	1.5	J	0.21	5	1.5	J	0.33	5	NT				1.3	J	0.33	5	NT				1.5	J	0.33	5
Lead	50	5	GWQC	ND	U	1.6	0.6	ND		1.5	3	ND	U	2.61	15	ND	U	2.6	15	ND	U	2.6	15	NT				ND	U	2.6	15	NT				ND	U	2.6	15

Notes:

Indicates the value is greater than the Applicable or Relevant and Appropriate Requirement.

Indicates value is greater than the Trigger Level.

LOC is the lowest of the Safe Drinking Water Act Maximum Contaminant Levels (MCLs) and any non-zero MCL Goal (40 Code of Federal Regulations 141), the New Jersey (NJ) Drinking Water Quality Act MCLs (New Jersey Administrative Code [N.J.A.C.] 7:10-16), and the NJ Groundwater Quality Criteria (N.J.A.C. 7:9-6). If a chemical is not listed under these promulgated standards, then the LOC is taken from the lowest of the United States Environmental Protection Agency (USEPA) Regional Screening Levels for Tapwater Risk-Based Concentrations (USEPA 2009c) and the USEPA Federal Drinking Water Health Advisories (USEPA 2009a).

U = The contaminant was not detected in the sample above the reporting limit.

J = Estimated value.

UJ = The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.

Conc = concentration

FEDMCL = Federal Maximum Contaminant Level

ft = feet

GWQC = Groundwater Quality Criteria

LOC = level of concern

MDL = Method Detection Limit

MRL = Method Reporting Limit

NA = not available and/or non-applicable

ND = non-detect

NJMCL = New Jersey Maximum Contaminant Level

NT = not tested

PQL = Practical Quantitation Limit

Qual = qualifier

µg/L = micrograms per liter

Unk = unknown

Table 17
Well MW25-6A LTM Data
Area C Groundwater Long-Term Monitoring Report Round I Statistical Evaluation
Picatinny Arsenal
New Jersey

Constituent	Trigger Level	LOC	MW25-6A 10-20				MW25-6A 10-20				MW25-6A 10-20				MW25-6A 10-20				MW25-6A 10-20				MW25-6A 10-20				MW25-6A 10-20				MW25-6A 10-20				MW25-6A 10-20				MW25-6A 10-20							
			1/13/2010				7/15/2010				4/21/2011				11/2/2011				7/25/2012				3/19/2013				10/21/2013				10/21/2013				3/31/2014				8/18/2014				8/18/2014			
			Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL				
			LOC Source																																											
Volatile Organic Compounds (µg/L)																																														
Vinyl chloride	6.6	1	PQL	ND	U	Unk	1	ND	U	0.2	1	ND	U	0.4	1.5	ND	U	0.4	1.5	ND	U	0.4	1.5	ND	U	0.1	1.5	ND	UJ	0.1	1.5	ND	U	0.1	1.5	ND	U	0.40	1.5	ND	U	0.40	1.5			
Metals (µg/L)																																														
Arsenic	49.6	3	PQL	1.7	J	3.3	1.1	ND	U	3	10	1.2	J	0.21	6	3.6	J	0.21	5	3.7	J	0.33	5	0.96	J	0.33	5	1.2	J	0.33	5	1.2	J	0.33	5	0.52	J	1.0	5.0	0.60	J	1.0	5.0			
Lead	50	5	GWQC	1.1	J	1.6	0.6	ND	U	1.5	3	ND	U	2.61	15	ND	U	2.6	15	ND	U	5.0	15	ND	U	5.0	15																			

Notes:
Indicates the value is greater than the Applicable or Relevant and Appropriate Requirement.
 Indicates value is greater than the Trigger Level.
 LOC is the lowest of the Safe Drinking Water Act Maximum Contaminant Levels (MCLs) and any non-zero MCL Goal (40 Code of Federal Regulations 141), the New Jersey (NJ) Drinking Water Quality Act MCLs (New Jersey Administrative Code [N.J.A.C.] 7:10-16), and the NJ Groundwater Quality Criteria (N.J.A.C. 7:9-6). If a chemical is not listed under these promulgated standards, then the LOC is taken from the lowest of the United States Environmental Protection Agency (USEPA) Regional Screening Levels for Tapwater Risk-Based Concentrations (USEPA 2009c) and the USEPA Federal Drinking Water Health Advisories (USEPA 2009a).
 U = The contaminant was not detected in the sample above the reporting limit.
 UB = Compound considered non-detect at the listed value due to associated blank contamination.
 J = Estimated value.
 UJ = The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.
 Conc = concentration
 FEDMCL = Federal Maximum Contaminant Level
 ft = feet
 GWQC = Groundwater Quality Criteria
 LOC = level of concern
 MDL = Method Detection Limit
 MRL = Method Reporting Limit
 NA = not available and/or non-applicable
 ND = non-detect
 NJMCL = New Jersey Maximum Contaminant Level
 NT = not tested
 PQL = Practical Quantitation Limit
 Qual = qualifier
 µg/L = micrograms per liter
 Unk = unknown

Table 18
Well MW25-6B LTM Data

Area C Groundwater Long-Term Monitoring Report Round I Statistical Evaluation

Picatiny Arsenal
New Jersey

Constituent	Trigger Level	LOC	Sample ID	MW25-6B 65-75 7/15/2010				MW25-6B 65-75 7/15/2010				MW25-6B 65-75 4/21/2011				MW25-6B 65-75 11/3/2011				MW25-6B 65-75 7/25/2012				MW25-6B 65-75 3/19/2013				MW25-6B 65-75 10/21/2013				MW25-6B 65-75 3/31/2014				MW25-6B 65-75 8/18/2014			
			Sample Depth (ft)	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL				
			Date Sampled	LOC Source																																			
Volatiles Organic Compounds (µg/L)																																							
Vinyl chloride	6.6	1	PQL	ND	U	Unk	1	ND	U	0.2	1	ND	U	0.4	1.5	ND	U	0.4	1.5	ND	U	0.4	1.5	ND	U	0.1	1.5	ND	U	0.1	1.5	ND	U	0.40	1.5	ND	U	0.10	1.5
Metals (µg/L)																																							
Arsenic	49.6	3	PQL	3	J	3.3	1.1	ND	U	3	10	2	J	0.21	6	1.2	J	0.21	5	1.7	J	0.33	5	1.5	J	0.33	5	1.1	J	0.33	5	1.6	J	1.0	5.0	1.6	J	1.0	5.0
Lead	50	5	GWQC	1.8	J	1.6	0.6	1.85	J	1.5	3	ND	U	2.61	15	ND	U	2.6	15	ND	U	2.6	15	ND	U	2.6	15	ND	U	2.6	15	ND	U	5.0	15	ND	U	5.0	15

Notes:
Indicates the value is greater than the Applicable or Relevant and Appropriate Requirement.

Indicates value is greater than the Trigger Level.
LOC is the lowest of the Safe Drinking Water Act Maximum Contaminant Levels (MCLs) and any non-zero MCL Goal (40 Code of Federal Regulations 141), the New Jersey (NJ) Drinking Water Quality Act MCLs (New Jersey Administrative Code [N.J.A.C.] 7:10-16), and the NJ Groundwater Quality Criteria (N.J.A.C. 7:9-6). If a chemical is not listed under these promulgated standards, then the LOC is taken from the lowest of the United States Environmental Protection Agency (USEPA) Regional Screening Levels for Tapwater Risk-Based Concentrations (USEPA 2009c) and the USEPA Federal Drinking Water Health Advisories (USEPA 2009a).

U = The contaminant was not detected in the sample above the reporting limit.

J = Estimated value.

Conc = concentration

FEDMCL = Federal Maximum Contaminant Level

ft = feet

GWQC = Groundwater Quality Criteria

LOC = level of concern

MDL = Method Detection Limit

MRL = Method Reporting Limit

NA = not available and/or non-applicable

ND = non-detect

NJMCL = New Jersey Maximum Contaminant Level

NT = not tested

PQL = Practical Quantitation Limit

Qual = qualifier

µg/L = micrograms per liter

Unk = unknown

Table 19
Well MW-17 LTM Data

Area C Groundwater Long-Term Monitoring Report Round I Statistical Evaluation

Picatunny Arsenal
New Jersey

Constituent	Trigger Level	LOC	MW-17				MW-17				MW-17				MW-17				MW-17				MW-17				MW-17				MW-17													
			7-17				7-17				7-17				7-17				7-17				7-17				7-17																	
			1/19/2010				7/22/2010				4/20/2011				4/20/2011				11/3/2011				7/26/2012				March 2013				10/23/2013				April 2014				8/19/2014					
			Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL						
Metals (µg/L)																																												
Lead	50	5	GWQC	4.8	J	1.6	0.06	21		1.5	3	5.3	J	2.61	15	6.5	J	2.61	15	18	J	2.6	15	9.4	J	2.6	15	NT					17	J	2.6	15	NT				ND	U	2.6	15

Notes:

Indicates the value is greater than the Applicable or Relevant and Appropriate Requirement.

Indicates value is greater than the Trigger Level.

LOC is the lowest of the Safe Drinking Water Act Maximum Contaminant Levels (MCLs) and any non-zero MCL Goal (40 Code of Federal Regulations 141), the New Jersey (NJ) Drinking Water Quality Act MCLs (New Jersey Administrative Code [N.J.A.C.] 7:10-16), and the NJ Groundwater Quality Criteria (N.J.A.C. 7:9-6). If a chemical is not listed under these promulgated standards, then the LOC is taken from the lowest of the United States Environmental Protection Agency (USEPA) Regional Screening Levels for Tapwater Risk-Based Concentrations (USEPA 2009c) and the USEPA Federal Drinking Water Health Advisories (USEPA 2009a).

J = Estimated value.

Conc = concentration

ft = feet

GWQC = Groundwater Quality Criteria

LOC = level of concern

MDL = Method Detection Limit

MRL = Method Reporting Limit

NT = not tested

Qual = qualifier

µg/L = micrograms per liter

Table 20
Well MW25-8 LTM Data

Area C Groundwater Long-Term Monitoring Report Round I Statistical Evaluation

Picatinny Arsenal
New Jersey

Constituent	Trigger Level	LOC	Sample ID	MW25-8				MW25-8				MW25-8				MW25-8				MW25-8				MW25-8				MW25-8												
			Sample Depth (ft)	20-30				20-30				20-30				20-30				20-30				20-30																
			Date Sampled	1/18/2010				7/22/2010				4/15/2011				11/3/2011				7/25/2012				March 2013				10/23/2013				April 2014								
			LOC Source	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL					
Metals (µg/L)																																								
Arsenic	49.6	3	PQL	9.4	J	3.3	1.1	8.04	J	3	10	13	J	0.21	6	6.7		0.21	5	9.1		0.33	5	NT					9.5		0.33	5	NT				10		0.33	5

Notes:
Indicates the value is greater than the Applicable or Relevant and Appropriate Requirement.
Indicates value is greater than the Trigger Level.

LOC is the lowest of the Safe Drinking Water Act Maximum Contaminant Levels (MCLs) and any non-zero MCL Goal (40 Code of Federal Regulations 141), the New Jersey (NJ) Drinking Water Quality Act MCLs (New Jersey Administrative Code [N.J.A.C.] 7:10-16), and the NJ Groundwater Quality Criteria (N.J.A.C. 7:9-6). If a chemical is not listed under these promulgated standards, then the LOC is taken from the lowest of the United States Environmental Protection Agency (USEPA) Regional Screening Levels for Tapwater Risk-Based Concentrations (USEPA 2009c) and the USEPA Federal Drinking Water Health Advisories (USEPA 2009a).

J = Estimated value.
U = The contaminant was not detected in the sample above the reporting limit.

CFR = Code of Federal Regulations
Conc = concentration

ft = feet
GWQC = Groundwater Quality Criteria

LOC = level of concern

MDL = Method Detection Limit

MRL = Method Reporting Limit

ND = non-detect

NT = not tested

PQL = Practical Quantitation Limit

Qual = qualifier

µg/L = micrograms per liter

Table 21
Well DM19-1 LTM Data
Area C Groundwater Long-Term Monitoring Report Round 1 Statistical Evaluation

Picatinny Arsenal
New Jersey

Constituent	Trigger Level	LOC	Sample ID	DM19-1				DM19-1				DM19-1 DUP				DM19-1																											
			Sample Depth (ft)	9.5-19.5				9.5-19.5				9.5-19.5				9.5-19.5				9.5-19.5				9.5-19.5				9.5-19.5															
			Date Sampled	1/28/2010				7/15/2010				7/15/2010				4/13/2011				11/2/2011				7/26/2012				3/19/2013				10/21/2013				3/31/2014				8/19/2014			
LOC Source	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL							
Volatile Organic Compounds (µg/L)																																											
Vinyl chloride	6.6	1	PQL	5.3		Unk	1	10.6		0.2	1	10.2		0.2	1	ND	U	0.4	1.5	ND	U	0.4	1.5	24		0.4	1.5	1.6		0.1	1.5	19		0.1	1.5	16		0.40	1.5	15		0.10	1.5
Metals (µg/L)																																											
Arsenic	49.6	3	PQL	NT				NT					NT				NT							7.8		0.33	5	3.4	J	0.33	5	3.3	J	0.33	5	3.2	J	1.0	5.0	4.8	J	1.0	5.0

Notes:
Indicates the value is greater than the Applicable or Relevant and Appropriate Requirement.

Indicates value is greater than the Trigger Level.
LOC is the lowest of the Safe Drinking Water Act Maximum Contaminant Levels (MCLs) and any non-zero MCL Goal (40 Code of Federal Regulations 141), the New Jersey (NJ) Drinking Water Quality Act MCLs (New Jersey Administrative Code [N.J.A.C.] 7:10-16), and the NJ Groundwater Quality Criteria (N.J.A.C. 7:9-6). If a chemical is not listed under these promulgated standards, then the LOC is taken from the lowest of the United States Environmental Protection Agency (USEPA) Regional Screening Levels for Tapwater Risk-Based Concentrations (USEPA 2009c) and the USEPA Federal Drinking Water Health Advisories (USEPA 2009a).

U = The contaminant was not detected in the sample above the reporting limit.
J = Estimated value.

Conc = concentration
FEDMCL = Federal Maximum Contaminant Level

ft = feet
LOC = level of concern

MDL = Method Detection Limit
MRL = Method Reporting Limit

ND = non-detect
NT = not tested

PQL = Practical Quantitation Limit
Qual = qualifier

µg/L = micrograms per liter
Unk = unknown

Table 22
Well DM19-2 LTM Data

Area C Groundwater Long-Term Monitoring Report Round I Statistical Evaluation

Picatinny Arsenal
New Jersey

Constituent	Trigger Level	LOC	Sample ID	DM19-2				DM19-2																														
			Sample Depth (ft)	9.5-19.5				9.5-19.5				9.5-19.5				9.5-19.5				9.5-19.5				9.5-19.5				9.5-19.5										
			Date Sampled	1/19/2010				7/15/2010				4/13/2011				11/2/2011				7/26/2012				3/19/2013				10/21/2013				April 2014				8/19/2014		
LOC Source	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL		
Metals (µg/L)																																						
Arsenic	49.6	3	PQL	45.1		3.3	1.1	80.3		3	10	97		0.21	6	60		0.21	5	95		0.33	5	52		0.33	5	43		0.33	5	NT			87		0.33	5

Notes:

Indicates the value is greater than the Applicable or Relevant and Appropriate Requirement.

Indicates value is greater than the Trigger Level.

LOC is the lowest of the Safe Drinking Water Act Maximum Contaminant Levels (MCLs) and any non-zero MCL Goal (40 Code of Federal Regulations 141), the New Jersey (NJ) Drinking Water Quality Act MCLs (New Jersey Administrative Code [N.J.A.C.] 7:10-16), and the NJ Groundwater Quality Criteria (N.J.A.C. 7:9-6). If a chemical is not listed under these promulgated standards, then the LOC is taken from the lowest of the United States Environmental Protection Agency (USEPA) Regional Screening Levels for Tapwater Risk-Based Concentrations (USEPA 2009c) and the USEPA Federal Drinking Water Health Advisories (USEPA 2009a).

Conc = concentration

ft = feet

LOC = level of concern

MDL = Method Detection Limit

MRL = Method Reporting Limit

NT = not tested

PQL = Practical Quantitation Limit

Qual = qualifier

µg/L = micrograms per liter

Table 23
Well DM25-2 LTM Data

Area C Groundwater Long-Term Monitoring Report Round I Statistical Evaluation

Picatunny Arsenal
New Jersey

Constituent	Trigger Level	LOC	Sample ID	DM25-2 10.1-20.1 1/18/2010				DM25-2 10.1-20.1 7/15/2010				DM25-2 10.1-20.1 4/18/2011				DM25-2 (Dup) 10.1-20.1 4/18/2011				DM25-2 10.1-20.1 11/2/2011				DM25-2 10.1-20.1 7/25/2012				DM25-2 10.1-20.1 March 2013				DM25-2 10.1-20.1 10/23/2013				DM25-2 10.1-20.1 April 2014				DM25-2 10.1-20.1 8/21/2014				
			Date Sampled	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL					
			LOC Source																																									
Volatile Organic Compounds (µg/L)																																												
Vinyl chloride	6.6	1	PQL	7		Unk	1	2.88		0.2	1	7.3		0.4	1.5	8.5		0.4	1.5	1.5	J	0.4	1.5	1.5		0.4	1.5	NT					1	J	0.1	1.5	NT				0.92	J	0.1	1.5
Metals (µg/L)																																												
Arsenic	49.6	3	PQL	11.8		3.3	1.1	5.55	J	3	10	14	UB	0.21	6	12	UB	0.21	6	4.7	J	0.21	5	4.5	J	0.33	5	NT					4.3	J	0.33	5	NT				4.4	J	0.33	5

Notes:

Indicates the value is greater than the Applicable or Relevant and Appropriate Requirement.

Indicates value is greater than the Trigger Level.

LOC is the lowest of the Safe Drinking Water Act Maximum Contaminant Levels (MCLs) and any non-zero MCL Goal (40 Code of Federal Regulations 141), the New Jersey (NJ) Drinking Water Quality Act MCLs (New Jersey Administrative Code [N.J.A.C.] 7:10-16), and the NJ Groundwater Quality Criteria (N.J.A.C. 7:9-6). If a chemical is not listed under these promulgated standards, then the LOC is taken from the lowest of the United States Environmental Protection Agency (USEPA) Regional Screening Levels for Tapwater Risk-Based Concentrations (USEPA 2009c) and the USEPA Federal Drinking Water Health Advisories (USEPA 2009a).

J = Estimated value.

UB = Compound considered non-detect at the listed value due to associated blank contamination.

Conc = concentration

ft = feet

LOC = level of concern

MDL = Method Detection Limit

MRL = Method Reporting Limit

NT = not tested

PQL = Practical Quantitation Limit

Qual = qualifier

µg/L = micrograms per liter

Unk = unknown

Table 24
Well 1181-3 LTM Data

Area C Groundwater Long-Term Monitoring Report Round I Statistical Evaluation

Picatinny Arsenal
New Jersey

Constituent	Trigger Level	LOC	1181-3 12.5-22.5 2/3/2010				1181-3 12.5-22.5 7/22/2010				1181-3 12.5-22.5 4/13/2011				1181-3 12.5-22.5 11/2/2011				1181-3 12.5-22.5 7/31/2012				1181-3 12.5-22.5 March 2013				1181-3 12.5-22.5 10/23/2013				1181-3 12.5-22.5 April 2014				1181-3 12.5-22.5 9/19/2014					
			Sample ID	Sample Depth (ft)	Date Sampled	LOC Source	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL						
			Metals (µg/L)																																					
			Arsenic	49.6	3	PQL	24		3.3	1.1	11.8		3	10	9.9	J	0.21	6	7.7		0.21	5	13		0.33	5	NT					26		0.33	5	NT				3.6

Notes:
Indicates the value is greater than the Applicable or Relevant and Appropriate Requirement.

Indicates value is greater than the Trigger Level.
LOC is the lowest of the Safe Drinking Water Act Maximum Contaminant Levels (MCLs) and any non-zero MCL Goal (40 Code of Federal Regulations 141), the New Jersey (NJ) Drinking Water Quality Act MCLs (New Jersey Administrative Code [N.J.A.C.] 7:10-16), and the NJ Groundwater Quality Criteria (N.J.A.C. 7:9-6). If a chemical is not listed under these promulgated standards, then the LOC is taken from the lowest of the United States Environmental Protection Agency (USEPA) Regional Screening Levels for Tapwater Risk-Based Concentrations (USEPA 2009c) and the USEPA Federal Drinking Water Health Advisories (USEPA 2009a).

- J = Estimated value.
- Conc = concentration
- ft = feet
- LOC = level of concern
- MDL = Method Detection Limit
- MRL = Method Reporting Limit
- NT = not tested
- PQL = Practical Quantitation Limit
- Qual = qualifier
- µg/L = micrograms per liter

Table 25
Well MW180-1 LTM Data

Area C Groundwater Long-Term Monitoring Report Round I Statistical Evaluation

Picatinny Arsenal
New Jersey

Constituent	Trigger Level	LOC	Sample ID	MW180-1				MW180-1 DUP				MW180-1				MW180-1				MW180-1				MW180-1				MW180-1				MW180-1											
			Sample Depth (ft)	5-15				5-15				5-15				5-15				5-15				5-15				5-15															
			Date Sampled	2/3/2010				2/3/2010				7/19/2010				4/13/2011				11/2/2011				7/31/2012				March 2013				10/23/2013				April 2014							
			LOC Source	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL				
Metals (µg/L)																																											
Arsenic	49.6	3	PQL	112		3	10	8.8	J	3	10	9.46	J	3	10	17	J	0.21	6	12		0.21	5	13		0.33	5	NT				14		0.33	5	NT				1.8	J	0.33	5

Notes:

Indicates the value is greater than the Applicable or Relevant and Appropriate Requirement.

Indicates value is greater than the Trigger Level.

LOC is the lowest of the Safe Drinking Water Act Maximum Contaminant Levels (MCLs) and any non-zero MCL Goal (40 Code of Federal Regulations 141), the New Jersey (NJ) Drinking Water Quality Act MCLs (New Jersey Administrative Code [N.J.A.C.] 7:10-16), and the NJ Groundwater Quality Criteria (N.J.A.C. 7:9-6). If a chemical is not listed under these promulgated standards, then the LOC is taken from the lowest of the United States Environmental Protection Agency (USEPA) Regional Screening Levels for Tapwater Risk-Based Concentrations (USEPA 2009c) and the USEPA Federal Drinking Water Health Advisories (USEPA 2009a).

J = Estimated value.

Conc = concentration

ft = feet

LOC = level of concern

MDL = Method Detection Limit

MRL = Method Reporting Limit

NT = not tested

PQL = Practical Quantitation Limit

Qual = qualifier

µg/L = micrograms per liter

USEPA = United States Environmental Protection Agency

Table 26
Well C-1B LTM Data

Area C Groundwater Long-Term Monitoring Report Round I Statistical Evaluation

Picatunny Arsenal
New Jersey

Constituent	Trigger Level	LOC	Sample ID	C1-B				C1-B				C1-B				C1-B				C1-B				C1-B				C1-B															
			Sample Depth (ft)	12.3-22.3				12.3-22.3				12.3-22.3				12.3-22.3				12.3-22.3				12.3-22.3				12.3-22.3															
			Date Sampled	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL	Conc	Qual	MDL	MRL								
Metals (µg/L)			LOC Source																																								
Arsenic	49.6	3	PQL	4.9	J	3.3	1.1	7.55	J	3	10	8.8	J	0.21	6	5.1		0.21	5	8.4		0.33	5	8.4		0.21	6	6.6		0.33	5	5.8		0.33	5	NT				20		0.33	5

Notes:

Indicates the value is greater than the Applicable or Relevant and Appropriate Requirement.

Indicates value is greater than the Trigger Level.

LOC is the lowest of the Safe Drinking Water Act Maximum Contaminant Levels (MCLs) and any non-zero MCL Goal (40 Code of Federal Regulations 141), the New Jersey (NJ) Drinking Water Quality Act MCLs (New Jersey Administrative Code [N.J.A.C.] 7:10-16), and the NJ Groundwater Quality Criteria (N.J.A.C. 7:9-6). If a chemical is not listed under these promulgated standards, then the LOC is taken from the lowest of the United States Environmental Protection Agency (USEPA) Regional Screening Levels for Tapwater Risk-Based Concentrations (USEPA 2009c) and the USEPA Federal Drinking Water Health Advisories (USEPA 2009a).

J = Estimated value.

Conc = concentration

ft = feet

LOC = level of concern

MDL = Method Detection Limit

MRL = Method Reporting Limit

NT = not tested

PQL = Practical Quantitation Limit

Qual = qualifier

µg/L = micrograms per liter

Table 27
Data Summary - Southern Boundary and Area C Wells

Area C Groundwater Long-Term Monitoring Report Round I Statistical Evaluation

Well ID Sample ID Sample Date	LOC ^a	SB1-1 SB1-001 ^b 8/19/2014	SB1-2 SB1-002 8/19/2014	SB1-3 SB1-003 8/19/2014	SB1-5 SB1-005 8/19/2014	SB1-6 SB1-006 8/19/2014	SB1-7 SB1-007 8/19/2014	SB2-1A SB2-01A 8/20/14	SB2-2 SB2-002 8/20/14	SB2-3 SB2-003 8/20/14	SB3-1B SB3-01B 8/20/14	SB3-2 SB3-002 8/20/14	SB3-3 SB3-003 8/20/14	SB4-1 SB4-001 8/21/14	SB4-2 SB4-002 8/21/14	SB4-3 SB4-003 8/21/14	SB4-4 SB4-004 8/21/14	MW17 MW-017 8/19/2014	MW25-6A MW25-06A 8/18/2014	MW25-6B MW25-06B 8/18/2014	MW25-8 MW25-008 8/21/2014	MW180-1 MW180-1 9/19/2014	DM19-1 DM19-001 8/18/2014	DM19-2 DM19-002 8/18/2014	DM25-2 DM25-002 8/21/2014	1181-3 1181-3 9/19/2014	C1-B C1-B 8/18/2014	
Metals (µg/L)																												
Arsenic	3	1.0 U	0.69 J	1.0 U	0.36 J	0.48 J	1.0 U	1.1 J	4.8 J	1.0 U	1.2 J	0.95 J	0.65 J	1.0 U	1.0 U	2.3 J	1.5 J	NT	1.6 J	1.6 J	10	1.8 J	4.8 J	87	4.4 J	3.6 J	20	
Lead	5	42	86	5.6 J	5.0 U	5.0 U	5.0 U	14 J	5.0 U	5.0 U	5.0 U	5.0 U	4.6 J	5.0 U	5.0 U	NT	NT	NT	NT	NT	NT	NT	NT					
VOCs (µg/L)																												
Vinyl chloride	1	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	NT	0.40 U	0.40 U	NT	NT	15	NT	0.92 J	NT	NT	

Notes:
a. Level of Concern (LOC) is the lowest of the Safe Drinking Water Act Maximum Contaminant Levels (MCLs) and any non-zero MCL Goal (40 Code of Federal Regulations 141), the New Jersey (NJ) Drinking Water Quality Act MCLs (New Jersey Administrative Code [N.J.A.C.] 7:10-16), and the NJ Groundwater Quality Criteria (N.J.A.C. 7:9-6). If a chemical is not listed under these promulgated standards, then the LOC is taken from the lowest of the United States Environmental Protection Agency (USEPA) Regional Screening Levels for Tapwater Risk-Based Concentrations (USEPA 2009c) and the USEPA Federal Drinking Water Health Advisories (USEPA 2009a).
b. All sample IDs begin with C- and end with the sample date in parentheses (e.g., 081914)

Shaded and bolded values exceed the Level of Concern for that chemical.
U = Compound analyzed but not detected above the method detection limit
J = Estimated Value
NT = not tested
µg/L = micrograms per liter

Table 28
Table of Analyte Exceedances

Area C Groundwater Long-Term Monitoring Report Round I Statistical Evaluation

Picatinny Arsenal
New Jersey

Well	Trigger Level	LOC ^A	Historical Data Range (µg/L) ^B	Historical Data Mean (µg/L) ^C	Analyte (all concentrations in µg/L)																				
					Winter 2010		Summer 2010		Spring 2011		Fall 2011		Summer 2012		Winter 2013		Fall 2013		Fall 2013 - filtered ^F		Spring 2014		Summer 2014		
					Conc ^D	Qual ^E	Conc	Qual	Conc	Qual	Conc	Qual	Conc	Qual	Conc	Qual	Conc	Qual	Conc	Qual	Conc	Qual	Conc	Qual	
Vinyl Chloride																									
DM19-1 ^G	6.6	1	ND - 2.6 ^H	0.97	5.3^I		10.6^I		0.4	U ^{K,L}	0.4	U	24		1.6		19		NA ^M	NA	16		15		
DM25-2 ^N			ND - 6.6	0.97	7		2.9		7.3		1.5	J ^O	1.5	J	NT ^P	NA	1	J	NA	NA	NT		0.92	J	
Arsenic																									
SB2-2	49.6	3	ND - 7.8	5.2	7.3	J	6.4	J	5.3	J	5.1		6.5		4.9	J	8.8		NA	NA	6.6		4.8	J	
MW25-8			2.7 - 11	6.2	9.4	J	8	J	13	J	6.7			NT	NA	9.5			NA	NA	NT		10		
DM19-1			ND - 8.2	5.2	NT	NA	NT	NA	NT	NA	NT	NA	7.8		3.4		3.3	J		NA	NA	3.2	J	4.8	J
DM19-2			4.2 - 16	10.7	45		80		97		60		95		52		43			NA	NA	NT		87	
DM25-2 ^N			4.1 - 10.8	7.8	12		5.5	J	14	UB ^Q	4.7	J	4.5	J	NT	NA	4.3	J		NA	NA	NT		4.4	J
1181-3			Not available		24		12		10	J	8		13		NT	NA	26			NA	NA	NT		3.6	J
MW180-1 ^R			2.4 - 49.6	20.3	112	R ^S	9.5	J	17	J	12		13		NT	NA	14			NA	NA	NT		1.8	J
C1-B	3.1 - 5.6	4.0	4.9	J	7.6	J	8.8	J	5.1		8.4		6.6		5.8			NA	NA	NT		20			
Lead																									
SB1-1	50	5	ND - 109	26	20		26		50		5.2	J	19		34		53		2.6	U	NT		42		
SB1-2			ND - 101	32	36		27		78		2.6	U	15		32		33		2.6	U	NT		86		
SB1-3			ND - 26.4	6.1	4.6	J	21		8.2	J	16	J	11		16		29			NA	NA	24		5.6	J
SB2-1A			ND - 215	21	2.2	J	6		11	J	2.6	U	10	J	NT	NA	2.6	J		NA	NA	NT		14	J
SB3-3			ND - 48.5	7.5	1.6	U	4		2.6	U	2.6	U	5.4	J	NT	NA	2.6	U		NA	NA	NT		4.6	J
MW-17 ^T			ND - 320	58	4.8	J	21		5.3	J	18	J	9.4	J	NT	NA	17	J		NA	NA	NT		5.0	U

Notes:

A. Level of Concern (LOC) is the lowest of the Safe Drinking Water Act Maximum Contaminant Levels (MCLs) and any non-zero MCL Goal (40 Code of Federal Regulations 141), the New Jersey (NJ) Drinking Water Quality Act MCLs (New Jersey Administrative Code [N.J.A.C.] 7:10-16), and the NJ Groundwater Quality Criteria (N.J.A.C. 7:9-6). If a chemical is not listed under these promulgated standards, then the LOC is taken from the lowest of the United States Environmental Protection Agency (USEPA) Regional Screening Levels for Tapwater Risk-Based Concentrations (USEPA 2009c) and the USEPA Federal Drinking Water Health Advisories (USEPA 2009a).

B. µg/L = micrograms per liter

C. For the historical data mean, non-detect values were set at the detection limit.

D. Conc = concentration

E. Qual = qualifier

F. At the request of the New Jersey Department of Environmental Protection, three groundwater samples were collected from monitoring wells SB1-1 and SB1-2 during the fall 2013 monitoring event. An unfiltered sample, a sample filtered through a 10 micron (µm) filter and a sample filtered through a 0.45 µm filter. For both wells, both filtered sample concentrations were non-detect. Therefore, only one result is shown on this table.

G. A duplicate sample was collected for the DM19-1 summer 2010 sample; the duplicate vinyl chloride result was 10.2 µg/L.

H. ND = non-detect

I. **Indicates the value is greater than the applicable or relevant and appropriate requirement.**

J. Indicates the value is greater than the trigger level.

K. When an analyte concentration is non-detect, the method detection limit is shown.

L. U = The contaminant was not detected in the sample above the reporting limit.

M. NA = not applicable

N. A duplicate sample was collected for the DM25-2 spring 2011 sample; the duplicate vinyl chloride result was 8.5 µg/L and the duplicate arsenic result was non-detect.

O. J = Estimated value.

P. NT = not tested

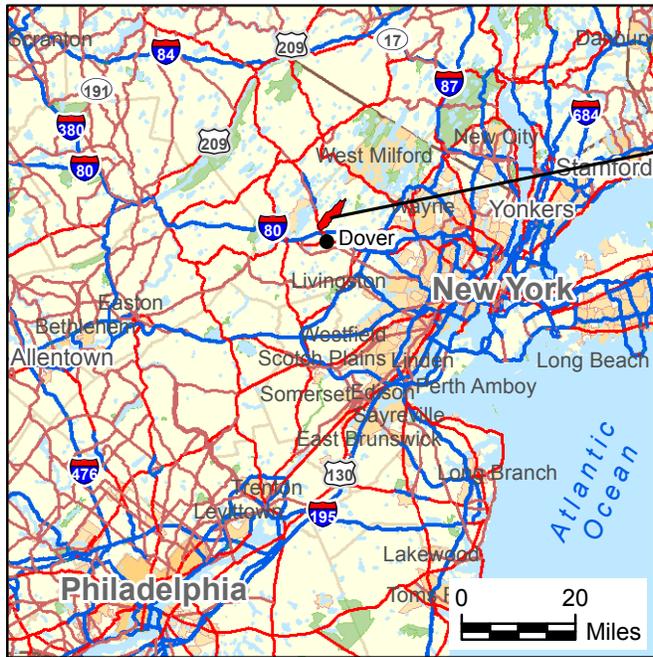
Q. B = analyte found in a blank sample

R. A duplicate sample was collected for the MW-180-1 winter 2010 sample. The original sample result for arsenic was 112 µg/L while the duplicate result was 8.8 µg/L. The results from the other three rounds of sampling range from 9.5 to 17 µg/L. Due to the significant difference between the original and duplicate sample results, both results were considered invalid.

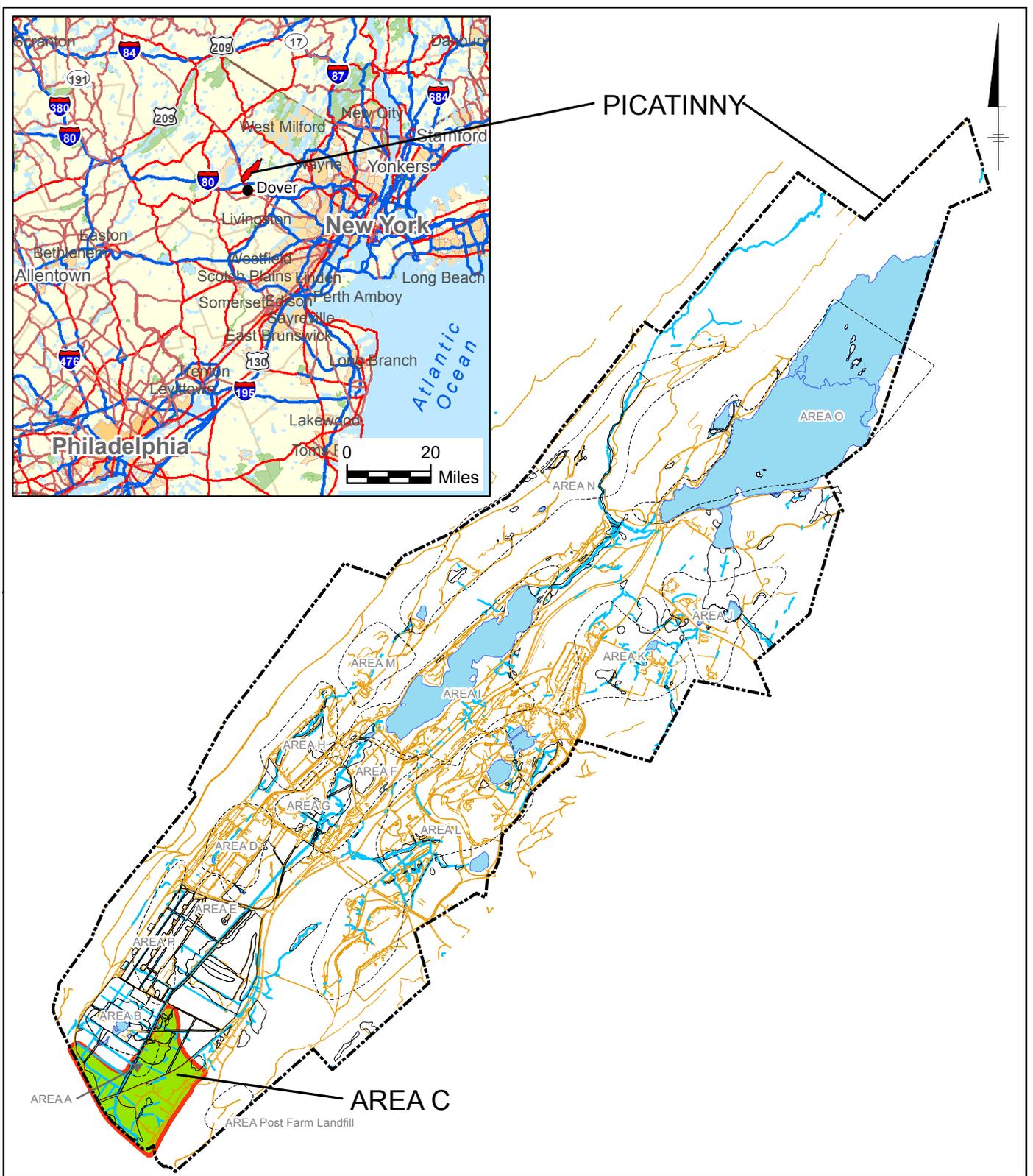
S. R = This result is considered invalid due to the difference between the original and duplicate sample results.

T. A duplicate sample was collected for the MW-17 spring 2011 sample. The lead duplicate result is 6.5 J µg/L.

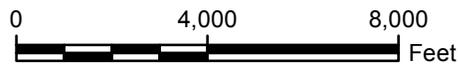
FIGURES



PICATINNY



AREA C



LEGEND:

- SURFICIAL HYDROLOGY
- ROAD
- AREA BOUNDARY
- PICATINNY BOUNDARY

GRAPHIC SCALE

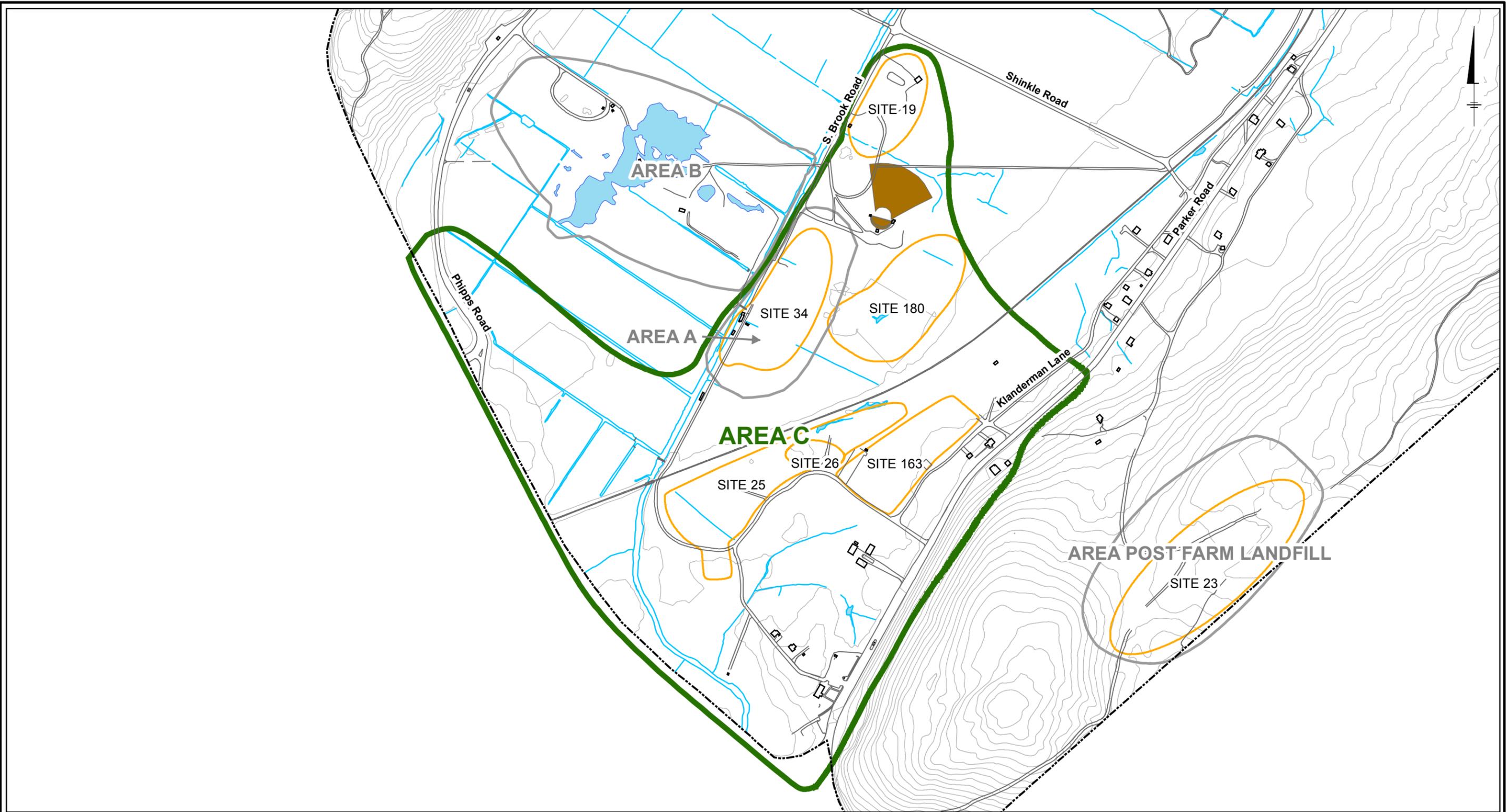
AREA C
PICATINNY ARSENAL, DOVER, NEW JERSEY

LOCATION OF AREA C AND PICATINNY ARSENAL

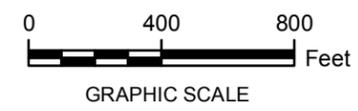


FIGURE
1

CITY: MPLS. DIV/GROUP: IM DB: MG LD: EC
Picatinny (G:\P06\CA.SITE)
G:\GIS\Projects\Picatinny\GIS\data\GIS\Projects\AREA_C\Site_Map_20111018.mxd - 10/19/2011 @ 8:16:53 AM



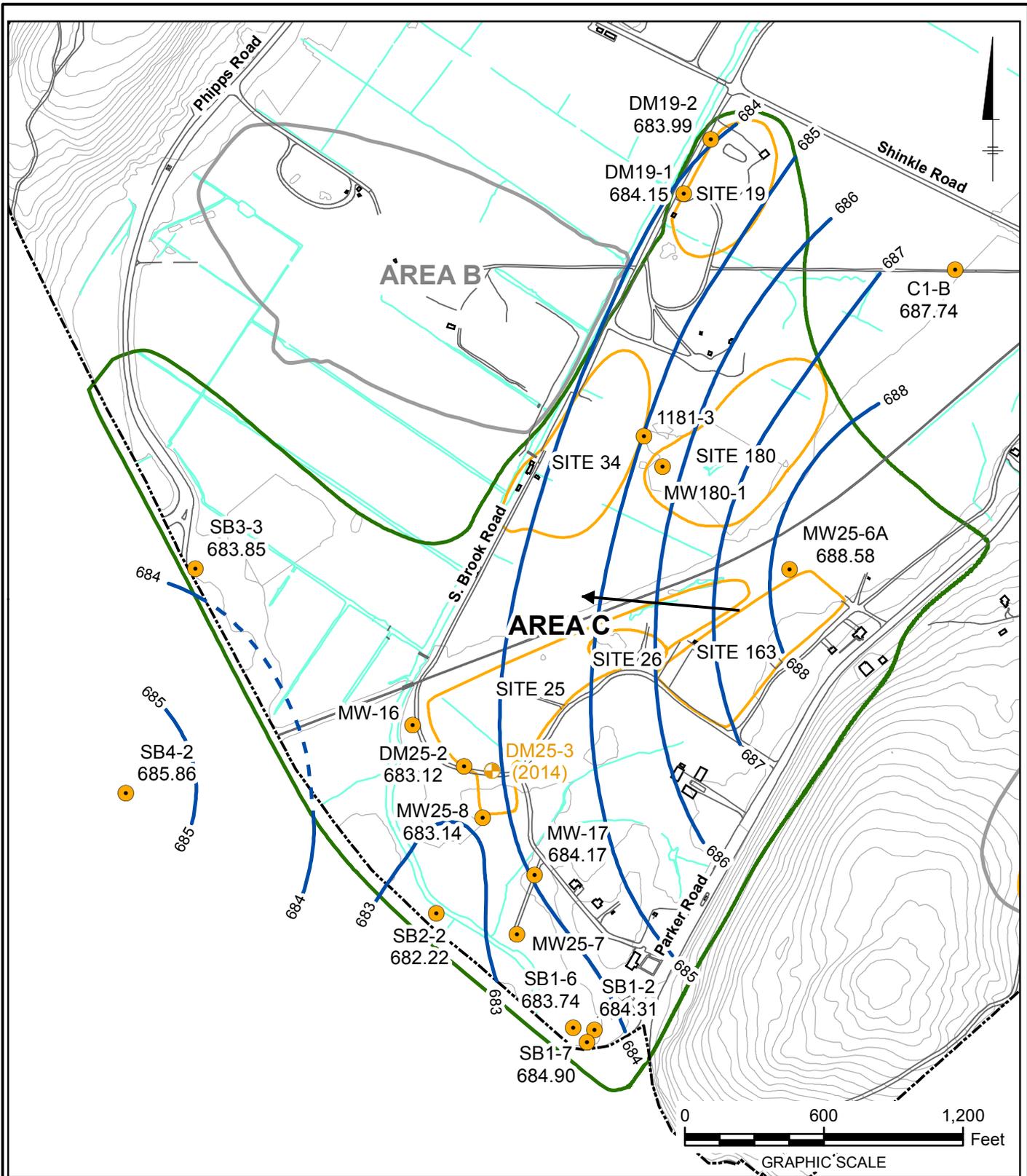
- LEGEND:
- ROAD
 - 10' SURFACE CONTOUR
 - SURFICIAL HYDROLOGY
 - SKET RANGE
 - BUILDING
 - AREA C BOUNDARY
 - SITE BOUNDARY
 - BASE BOUNDARY



AREA C
PICATINNY ARSENAL, DOVER, NEW JERSEY

AREA C SITE MAP

FIGURE
2



LEGEND:

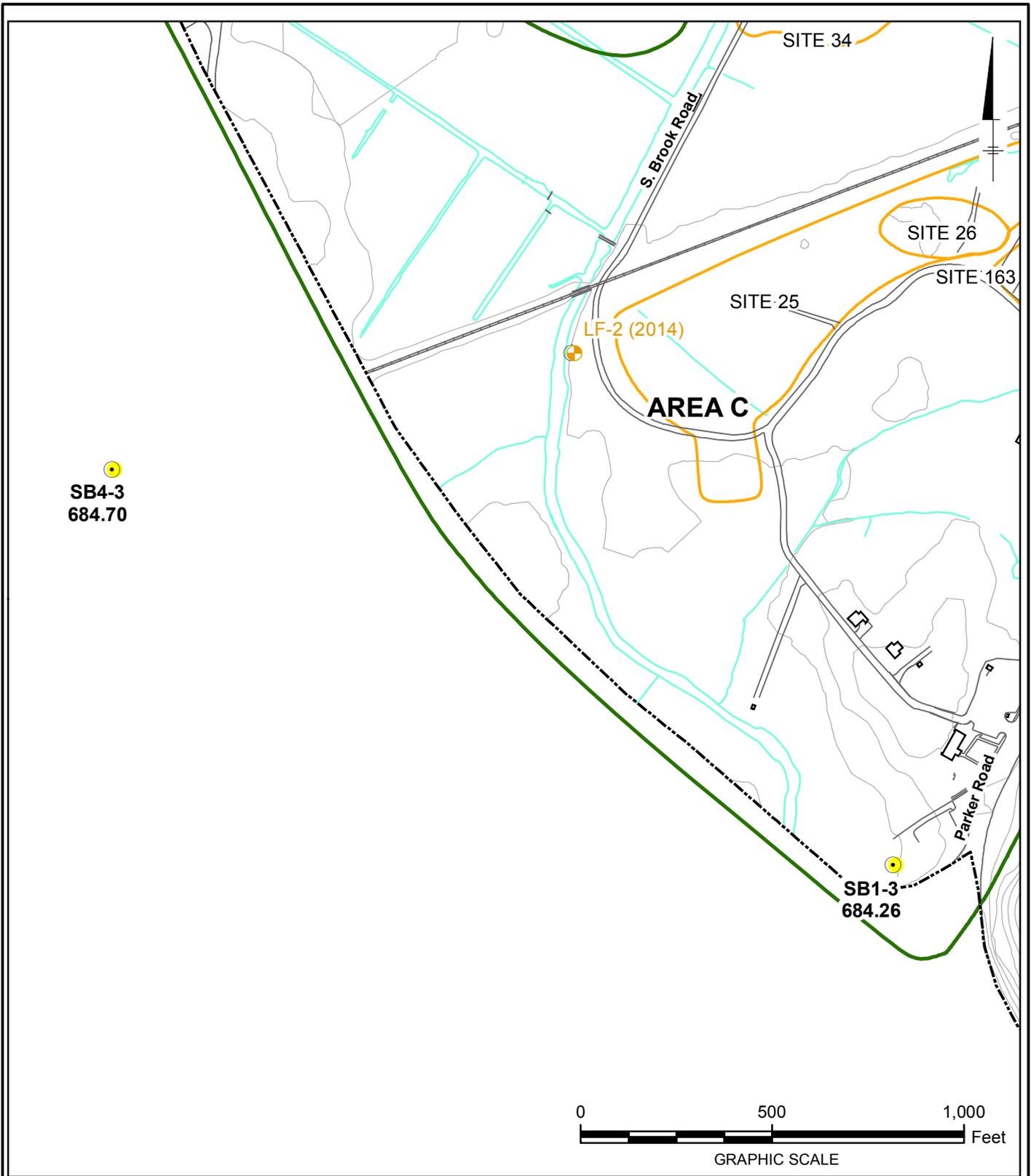
- UNCONFINED AQUIFER WELLS
 - ⊕ DECOMMISSIONED WELLS (YEAR DECOMMISSIONED)
 - LINE OF EQUAL WATER LEVEL ELEVATION (DASHED WHERE INFERRED)
 - ROAD
 - 10' SURFACE CONTOUR
 - SURFACE WATER BODIES AND DRAINAGE DITCHES
 - BUILDING
 - BASE BOUNDARY
 - AREA C BOUNDARY
 - SITE BOUNDARY
 - INFERRED GROUNDWATER FLOW DIRECTION
- CONTOUR INTERVAL = 1 FOOT

AREA C
 PICATIMNY ARSENAL, DOVER, NEW JERSEY

**UNCONFINED AQUIFER
 GROUNDWATER CONTOURS
 AUGUST 2014**



FIGURE
3



LEGEND:

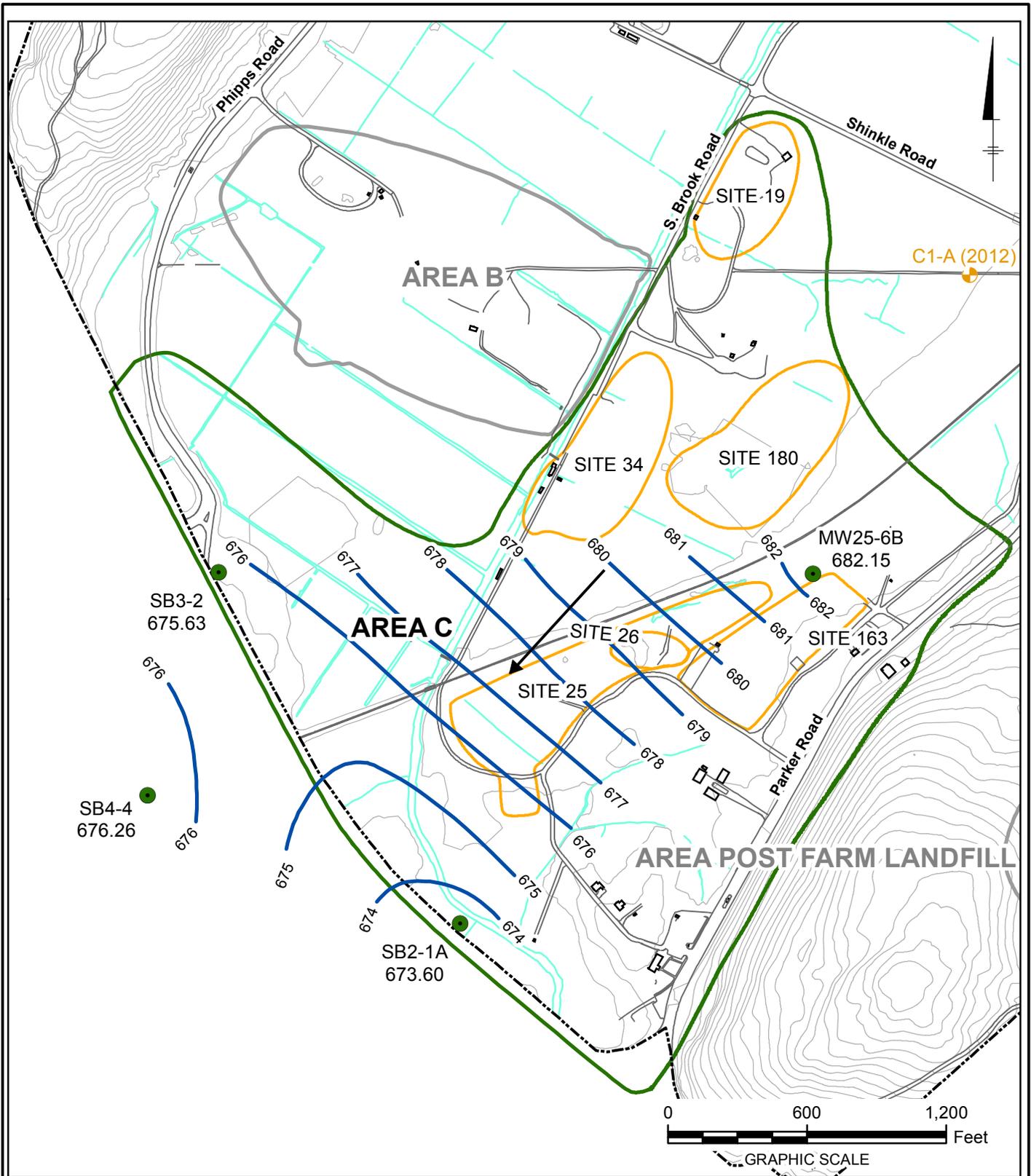
- UPPER SEMI-CONFINED AQUIFER WELLS
- DECOMMISSIONED WELLS (YEAR DECOMMISSIONED)
- ROAD
- 10' SURFACE CONTOUR
- SURFACE WATER BODIES AND DRAINAGE DITCHES
- BUILDING
- BASE BOUNDARY
- AREA C BOUNDARY
- SITE BOUNDARY

AREA C
 PICATINNY ARSENAL, DOVER, NEW JERSEY

**UPPER SEMI-CONFINED AQUIFER
 GROUNDWATER ELEVATIONS
 AUGUST 2014**



FIGURE
4



LEGEND:

- LOWER SEMI-CONFINED AQUIFER WELLS
 - ⊕ DECOMMISSIONED WELLS (YEAR DECOMMISSIONED)
 - LINE OF EQUAL WATER LEVEL ELEVATION
 - ROAD
 - 10' SURFACE CONTOUR
 - SURFACE WATER BODIES AND DRAINAGE DITCHES
 - BUILDING
 - BASE BOUNDARY
 - AREA C BOUNDARY
 - SITE BOUNDARY
 - INFERRED GROUNDWATER FLOW DIRECTION
- CONTOUR INTERVAL = 1 FOOT

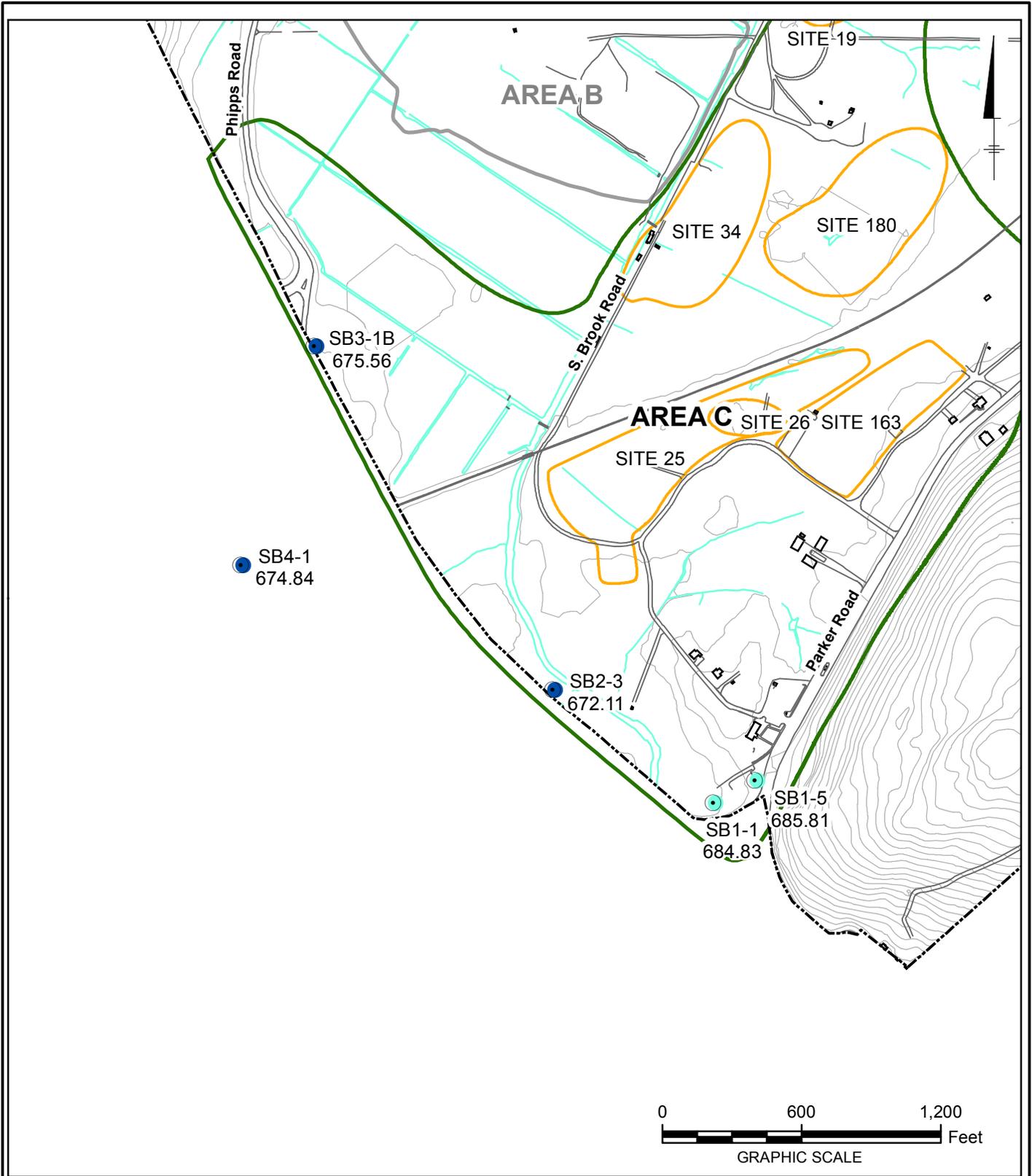
AREA C
 PICATINNY ARSENAL, DOVER, NEW JERSEY

**LOWER SEMI-CONFINED AQUIFER
 GROUNDWATER CONTOURS
 AUGUST 2014**



FIGURE
5

CITY: MPLS DIV/GROUP: IM DB: MG LD: EB
 Picatinny (G06PICA.SITE)
 Path: Z:\GIS\PROJECTS\ENV\Picatinny\GIS\data\GSPicatinny\Bedrock\Picatinny_BedrockCont_20140918.mxd



LEGEND:

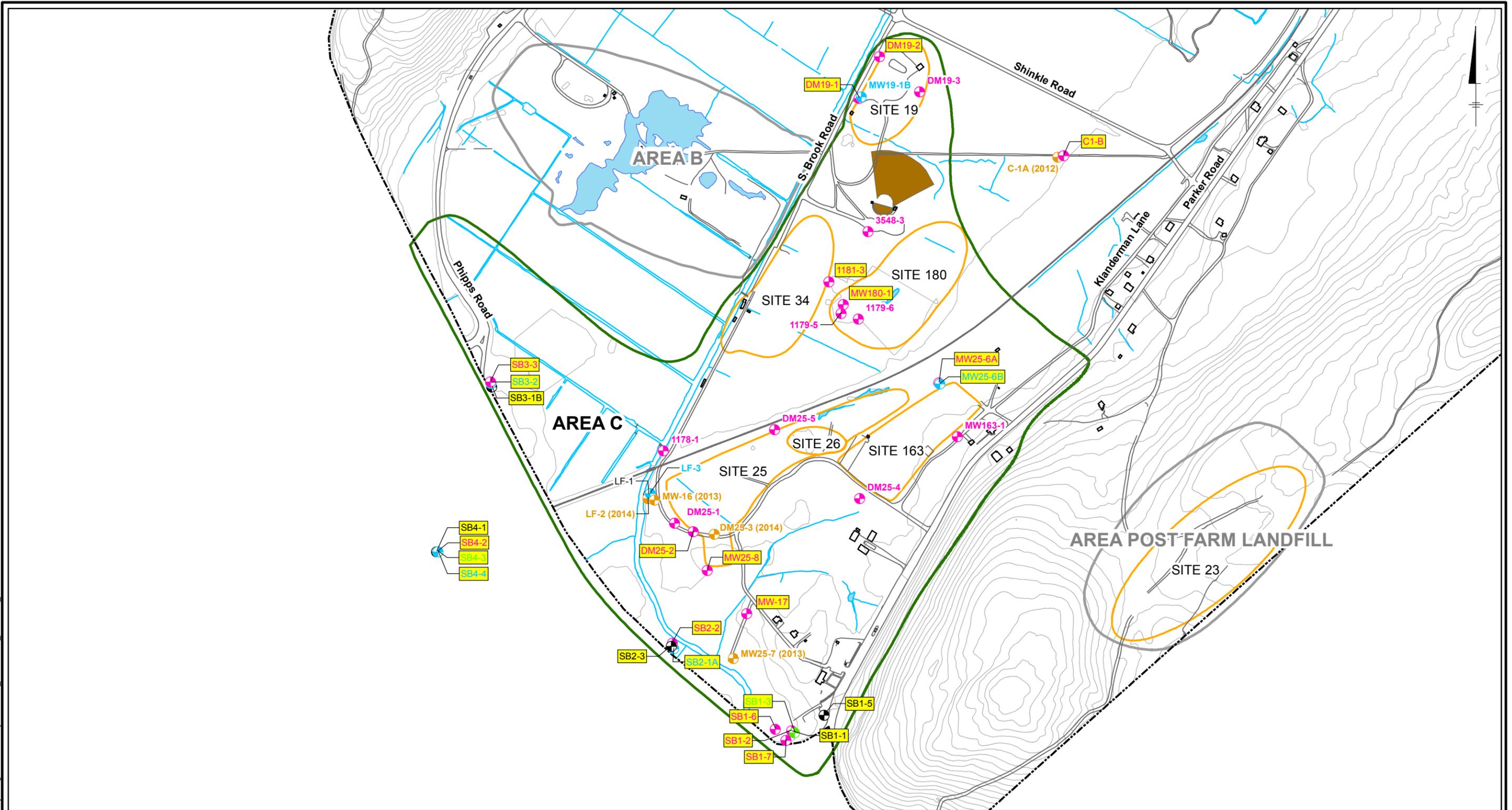
- | | |
|---|---|
|  BEDROCK - DOLOMITE |  BUILDING |
|  BEDROCK - GNEISS |  BASE BOUNDARY |
|  ROAD |  AREA C BOUNDARY |
|  10' SURFACE CONTOUR |  SITE BOUNDARY |
|  SURFACE WATER BODIES AND DRAINAGE DITCHES | |

AREA C
 PICATINNY ARSENAL, DOVER, NEW JERSEY

**BEDROCK AQUIFER
 GROUNDWATER ELEVATIONS
 AUGUST 2014**



FIGURE
6



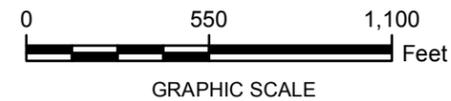
LEGEND:

MONITORING WELLS

- WELL SCREENED WITHIN THE UNCONFINED AQUIFER
- WELL SCREENED WITHIN THE LOWER SEMI-CONFINED AQUIFER
- WELL SCREENED WITHIN THE UPPER SEMI-CONFINED AQUIFER
- WELL SCREENED WITHIN THE BEDROCK AQUIFER
- DECOMMISSIONED WELL (YEAR DECOMMISSIONED)
- WELL IN LTM PLAN

- ROAD
- 10' SURFACE CONTOUR
- SURFICIAL HYDROLOGY
- SKEET RANGE

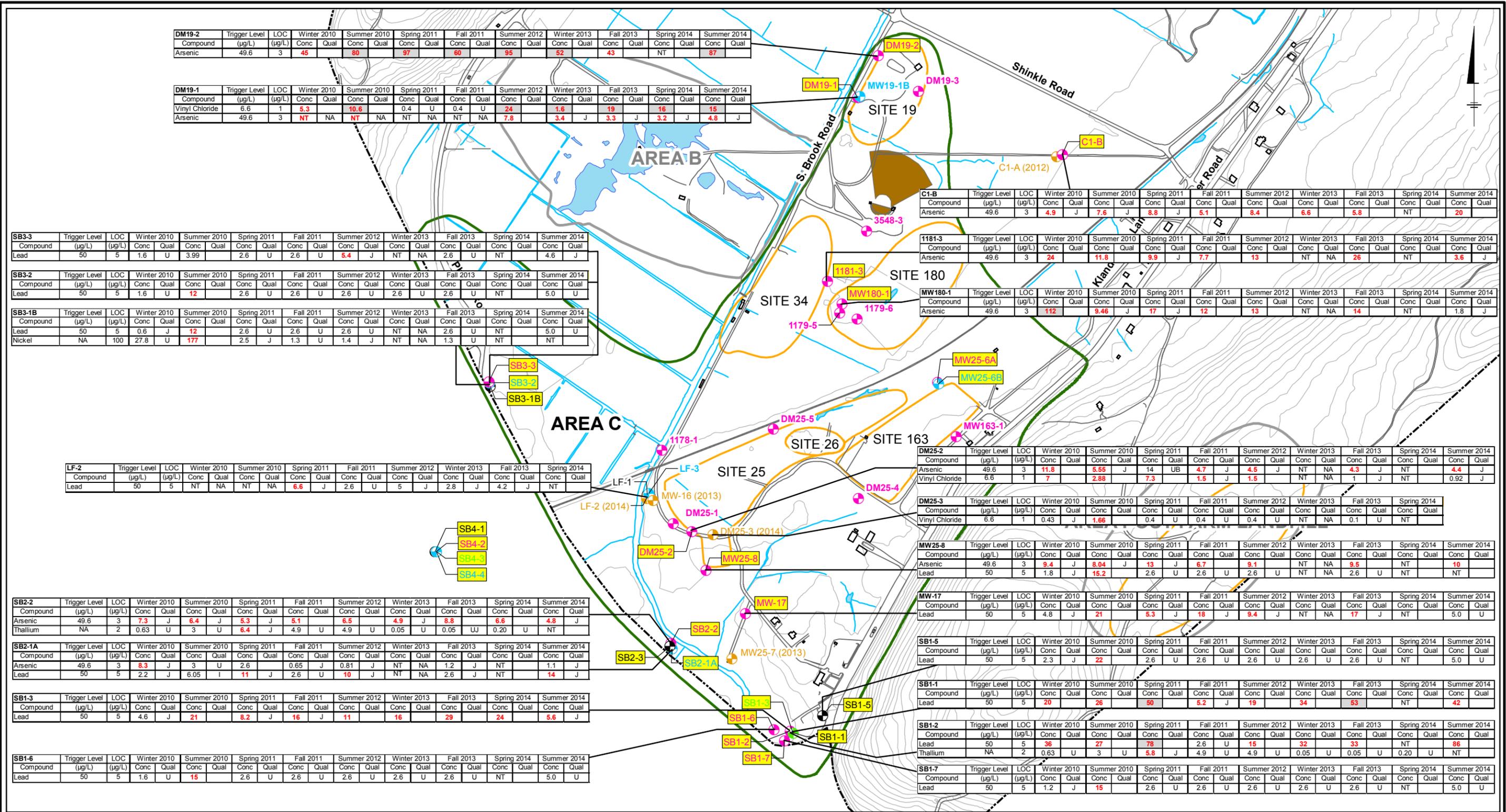
- BUILDING
- AREA C BOUNDARY
- SITE BOUNDARY
- BASE BOUNDARY



AREA C
 PICATINNY ARSENAL, DOVER, NEW JERSEY

**LONG-TERM GROUNDWATER
 MONITORING WELL LOCATIONS**





DM19-2	Trigger Level	LOC	Winter 2010	Summer 2010	Spring 2011	Fall 2011	Summer 2012	Winter 2013	Fall 2013	Spring 2014	Summer 2014
Compound	(µg/L)	(µg/L)	Conc	Qual	Conc	Qual	Conc	Qual	Conc	Qual	Conc
Arsenic	49.6	3	45	80	97	60	95	52	43	NT	87

DM19-1	Trigger Level	LOC	Winter 2010	Summer 2010	Spring 2011	Fall 2011	Summer 2012	Winter 2013	Fall 2013	Spring 2014	Summer 2014
Compound	(µg/L)	(µg/L)	Conc	Qual	Conc	Qual	Conc	Qual	Conc	Qual	Conc
Vinyl Chloride	6.6	1	5.3	10.6	0.4	U	0.4	U	24	1.6	19
Arsenic	49.6	3	NT	NA	NT	NA	NT	NA	NT	NA	7.8

C1-B	Trigger Level	LOC	Winter 2010	Summer 2010	Spring 2011	Fall 2011	Summer 2012	Winter 2013	Fall 2013	Spring 2014	Summer 2014
Compound	(µg/L)	(µg/L)	Conc	Qual	Conc	Qual	Conc	Qual	Conc	Qual	Conc
Arsenic	49.6	3	4.9	J	7.6	J	8.8	J	5.1	J	8.4

1181-3	Trigger Level	LOC	Winter 2010	Summer 2010	Spring 2011	Fall 2011	Summer 2012	Winter 2013	Fall 2013	Spring 2014	Summer 2014
Compound	(µg/L)	(µg/L)	Conc	Qual	Conc	Qual	Conc	Qual	Conc	Qual	Conc
Arsenic	49.6	3	24	11.8	9.9	J	7.7	13	NT	NA	26

MW180-1	Trigger Level	LOC	Winter 2010	Summer 2010	Spring 2011	Fall 2011	Summer 2012	Winter 2013	Fall 2013	Spring 2014	Summer 2014
Compound	(µg/L)	(µg/L)	Conc	Qual	Conc	Qual	Conc	Qual	Conc	Qual	Conc
Arsenic	49.6	3	112	9.46	J	17	J	12	13	NT	NA

DM25-2	Trigger Level	LOC	Winter 2010	Summer 2010	Spring 2011	Fall 2011	Summer 2012	Winter 2013	Fall 2013	Spring 2014	Summer 2014
Compound	(µg/L)	(µg/L)	Conc	Qual	Conc	Qual	Conc	Qual	Conc	Qual	Conc
Arsenic	49.6	3	11.8	5.55	J	14	UB	4.7	J	4.5	J
Vinyl Chloride	6.6	1	7	2.88	J	7.3	J	1.5	J	1.5	J

DM25-3	Trigger Level	LOC	Winter 2010	Summer 2010	Spring 2011	Fall 2011	Summer 2012	Winter 2013	Fall 2013	Spring 2014	
Compound	(µg/L)	(µg/L)	Conc	Qual	Conc	Qual	Conc	Qual	Conc	Qual	
Vinyl Chloride	6.6	1	0.43	J	1.66	0.4	U	0.4	U	0.4	U

MW25-8	Trigger Level	LOC	Winter 2010	Summer 2010	Spring 2011	Fall 2011	Summer 2012	Winter 2013	Fall 2013	Spring 2014	Summer 2014
Compound	(µg/L)	(µg/L)	Conc	Qual	Conc	Qual	Conc	Qual	Conc	Qual	Conc
Arsenic	49.6	3	9.4	J	8.04	J	13	J	6.7	J	9.1
Lead	50	5	1.8	J	15.2	2.6	U	2.6	U	2.6	U

MW-17	Trigger Level	LOC	Winter 2010	Summer 2010	Spring 2011	Fall 2011	Summer 2012	Winter 2013	Fall 2013	Spring 2014	Summer 2014
Compound	(µg/L)	(µg/L)	Conc	Qual	Conc	Qual	Conc	Qual	Conc	Qual	Conc
Lead	50	5	4.8	J	21	5.3	J	18	J	9.4	J

SB1-5	Trigger Level	LOC	Winter 2010	Summer 2010	Spring 2011	Fall 2011	Summer 2012	Winter 2013	Fall 2013	Spring 2014	Summer 2014
Compound	(µg/L)	(µg/L)	Conc	Qual	Conc	Qual	Conc	Qual	Conc	Qual	Conc
Lead	50	5	2.3	J	22	2.6	U	2.6	U	2.6	U

SB1-1	Trigger Level	LOC	Winter 2010	Summer 2010	Spring 2011	Fall 2011	Summer 2012	Winter 2013	Fall 2013	Spring 2014	Summer 2014
Compound	(µg/L)	(µg/L)	Conc	Qual	Conc	Qual	Conc	Qual	Conc	Qual	Conc
Lead	50	5	20	26	50	5.2	J	19	34	53	NT

SB1-2	Trigger Level	LOC	Winter 2010	Summer 2010	Spring 2011	Fall 2011	Summer 2012	Winter 2013	Fall 2013	Spring 2014	Summer 2014
Compound	(µg/L)	(µg/L)	Conc	Qual	Conc	Qual	Conc	Qual	Conc	Qual	Conc
Lead	50	5	36	27	78	2.6	U	15	32	33	NT
Thallium	NA	2	0.63	U	3	U	5.8	J	4.9	U	0.05

SB1-7	Trigger Level	LOC	Winter 2010	Summer 2010	Spring 2011	Fall 2011	Summer 2012	Winter 2013	Fall 2013	Spring 2014	Summer 2014
Compound	(µg/L)	(µg/L)	Conc	Qual	Conc	Qual	Conc	Qual	Conc	Qual	Conc
Lead	50	5	1.2	J	15	2.6	U	2.6	U	2.6	U

SB3-3	Trigger Level	LOC	Winter 2010	Summer 2010	Spring 2011	Fall 2011	Summer 2012	Winter 2013	Fall 2013	Spring 2014	Summer 2014
Compound	(µg/L)	(µg/L)	Conc	Qual	Conc	Qual	Conc	Qual	Conc	Qual	Conc
Lead	50	5	1.6	U	3.99	2.6	U	2.6	U	5.4	J

SB3-2	Trigger Level	LOC	Winter 2010	Summer 2010	Spring 2011	Fall 2011	Summer 2012	Winter 2013	Fall 2013	Spring 2014	Summer 2014
Compound	(µg/L)	(µg/L)	Conc	Qual	Conc	Qual	Conc	Qual	Conc	Qual	Conc
Lead	50	5	1.6	U	12	2.6	U	2.6	U	2.6	U

SB3-1B	Trigger Level	LOC	Winter 2010	Summer 2010	Spring 2011	Fall 2011	Summer 2012	Winter 2013	Fall 2013	Spring 2014	Summer 2014
Compound	(µg/L)	(µg/L)	Conc	Qual	Conc	Qual	Conc	Qual	Conc	Qual	Conc
Lead	50	5	0.6	J	12	2.6	U	2.6	U	NT	NA
Nickel	NA	100	27.8	U	177	2.5	J	1.3	U	1.4	J

LF-2	Trigger Level	LOC	Winter 2010	Summer 2010	Spring 2011	Fall 2011	Summer 2012	Winter 2013	Fall 2013	Spring 2014
Compound	(µg/L)	(µg/L)	Conc	Qual	Conc	Qual	Conc	Qual	Conc	Qual
Lead	50	5	NT	NA	NT	NA	6.6	J	2.6	U

SB2-2	Trigger Level	LOC	Winter 2010	Summer 2010	Spring 2011	Fall 2011	Summer 2012	Winter 2013	Fall 2013	Spring 2014	Summer 2014
Compound	(µg/L)	(µg/L)	Conc	Qual	Conc	Qual	Conc	Qual	Conc	Qual	Conc
Arsenic	49.6	3	7.3	J	6.4	J	5.3	J	5.1	J	6.5
Thallium	NA	2	0.63	U	3	U	6.4	J	4.9	U	0.05

SB2-1A	Trigger Level	LOC	Winter 2010	Summer 2010	Spring 2011	Fall 2011	Summer 2012	Winter 2013	Fall 2013	Spring 2014	Summer 2014
Compound	(µg/L)	(µg/L)	Conc	Qual	Conc	Qual	Conc	Qual	Conc	Qual	Conc
Arsenic	49.6	3	8.3	J	3	U	2.6	U	0.65	J	0.81
Lead	50	5	2.2	J	6.05	I	11	J	2.6	U	10

SB1-3	Trigger Level	LOC	Winter 2010	Summer 2010	Spring 2011	Fall 2011	Summer 2012	Winter 2013	Fall 2013	Spring 2014	Summer 2014
Compound	(µg/L)	(µg/L)	Conc	Qual	Conc	Qual	Conc	Qual	Conc	Qual	Conc
Lead	50	5	4.6	J	21	8.2	J	16	J	11	16

SB1-6	Trigger Level	LOC	Winter 2010	Summer 2010	Spring 2011	Fall 2011	Summer 2012	Winter 2013	Fall 2013	Spring 2014	Summer 2014
Compound	(µg/L)	(µg/L)	Conc	Qual	Conc	Qual	Conc	Qual	Conc	Qual	Conc
Lead	50	5	1.6	U	15	2.6	U	2.6	U	2.6	U

LEGEND:

- MONITORING WELLS
- Well screened within the unconfined aquifer
- Well screened within the lower semi-confined aquifer
- Well screened within the upper semi-confined aquifer
- Well screened within the bedrock aquifer
- Decommissioned well (year decommissioned)
- Road
- 10' surface contour
- Surficial hydrology
- Skeet range
- Building
- Area C boundary
- Site boundary
- Base boundary
- C-1B Well in LTM plan sampled in Summer 2014

NOTES:

- µg/L - MICROGRAMS/LITER
- B - INDICATES THE ANALYTE WAS FOUND IN THE ASSOCIATED METHOD BLANK
- D - CONCENTRATION IDENTIFIED FROM ANALYSIS OF A SECONDARY DILUTION
- I - VALUE DETERMINED INVALID BASED ON COMPARISON TO HISTORICAL DATA AND OTHER LTM RESULTS.
- J - ESTIMATED VALUE
- NA - NOT APPLICABLE
- NT - NOT TESTED
- R - REJECTED
- U - THE CONTAMINANT WAS NOT DETECTED IN THE SAMPLE ABOVE THE REPORTING LIMIT
- INDICATES THE VALUE IS ABOVE ARAR
- INDICATES THE VALUE IS ABOVE TRIGGER LEVEL



AREA C
 PICATINNY ARSENAL, DOVER, NEW JERSEY

**AREA C MONITORING WELL LOCATIONS
 GROUNDWATER EXCEEDANCES**

FIGURE
8

APPENDIX A

AREA C WELL ASSESSMENT CHECKLISTS

EPA Region 2 Superfund Well Assessment Checklist: SB1-1

Facility Information

Site Name: Picatinny Arsenal, Area C
 Site Address: Morris County, New Jersey
 Site County: Morris
 Site State: New Jersey
 EPA Site ID Number: NJ3210020704
 Site Owner: U.S. Army
 EPA Project Manager: Bill Roach

Well Locational Information

State Well ID: 25-31641
 Well Tag ID: SB1-1
 Well Installation date: June 27, 1988

	From Log	By GPS
Ground Surface Elevation	690.00	
Latitude		
Longitude		
Northing (State Plane)	758701.00 (NAD 1983)	
Easting (State Plane)	469712.99 (NAD 1983)	

Cross streets (if applicable): In front of visitor center

GPS Instrument used: _____ Datum: _____
 Accuracy/Precision: _____

Well Construction Details

Type of well (Circle one) Flush Mount Stick up

Well lock/security type: pad lock 2402

Elevation (Top of inner Riser - TOR): 691.88

Surface (Stick up) casing material: metal Well riser material: PVC

Measuring/Reference Point: TOR? TOR ← Write in

Stick up Height (ags): 2.5 ft (as built) 2.55 (ft) ← As found

Inner Riser Height - TOR (ags): 2.35 ft (as built) 2.45 (ft) ← As found

Difference; Stick up & TOR: 0.10 (ft) ← As found

Surface Casing diameter: 8 Inner Riser diameter: 4 inches

Well Depth (as installed): 93 ft (bgs)

Well Depth (as measured): 94.50 ft (TOR) ← As found

Screened interval (as installed): 83 - 93 ft (bgs)

Depth to water: 7.05 ft (TOR) ← As found

Date: 8/8/14 Time: 0955

NOTE: 'ags' means above ground surface; positive if above, negative if below. 'bgs' means below ground surface. 'TOR' means Top Of inner Riser pipe.

EPA Region 2 Superfund Well Assessment Checklist: SB1-1

Well Headspace Readings

PID/FID Reading taken inside top of casing (if applicable): 0.0 ppm

Multi-gas/CGI meter Readings taken (if applicable):

LEL: _____ % LEL
 O₂: _____ 40% Vol.
 CO: _____ ppm
 H₂S: _____ ppm

Do readings indicate unsafe conditions exist? Yes No

Well Condition

Is the concrete pad in good condition?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Is the well surface casing in good condition?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Is the surface casing vertical?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Is there an internal well seal/J-Plug?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Has there been physical damage to the well?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Does sounding depth match completed depth ⁽¹⁾ ?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Is measuring point marked?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Is the well clearly labeled?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Flush mount - Is it secure from runoff?	<u>NA</u> <input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No

Other Comments _____

(1) If sounding depth is within 0.5 feet of the previous sounding depth then check yes (previous depth 94.45 TOR)

Recommendations

Well needs to be redeveloped	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Well needs to be re-surveyed.	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Well needs to be repaired.	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Well needs to be replaced.	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Well needs to be properly abandoned.	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Action necessary.	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No

Comments

Inspected by: C. Goldsmith
Date of Inspection: 8/18/14
Reviewed by: _____ (Print)
 _____ (Sign)

EPA Region 2 Superfund Well Assessment Checklist: SB1-2

Facility Information

Site Name: Picatinny Arsenal, Area C
 Site Address: Morris County, New Jersey
 Site County: Morris
 Site State: New Jersey
 EPA Site ID Number: NJ3210020704
 Site Owner: U.S. Army
 EPA Project Manager: Bill Roach

Well Locational Information

State Well ID: 25-31644
 Well Tag ID: SB1-2
 Well Installation date: June 26, 1988

	From Log	By GPS
Ground Surface Elevation	690.00	
Latitude		
Longitude		
Northing (State Plane)	758706.31 (NAD 1983)	
Easting (State Plane)	469708.30 (NAD 1983)	

Cross streets (if applicable): By visitor center

GPS Instrument used: _____ Datum: _____
 Accuracy/Precision: _____

Well Construction Details

Type of well (Circle one) Flush Mount **Stick up**

Well lock/security type: pad lock 2402

Elevation (Top of inner Riser - TOR): 691.74

Surface (Stick up) casing material: metal Well riser material: PVC

Measuring/Reference Point: TOR? TOR ← Write in

Stick up Height (ags): 2.8 ft (as built) 2.65 (ft) ← As found

Inner Riser Height - TOR (ags): 2.45 ft (as built) 2.45 (ft) ← As found

Difference; Stick up & TOR: 0.20 (ft) ← As found

Surface Casing diameter: 8 Inner Riser diameter: 4 inches

Well Depth (as installed): 18 ft (bgs)

Well Depth (as measured): 20.99 ft (TOR) ← As found

Screened interval (as installed): 8 - 18 ft (bgs)

Depth to water: 7.43 ft (TOR) ← As found

Date: 8/18/14 Time: 1000

NOTE: 'ags' means above ground surface; positive if above, negative if below. 'bgs' means below ground surface. 'TOR' means Top Of inner Riser pipe.

EPA Region 2 Superfund Well Assessment Checklist: SB1-2

Well Headspace Readings

PID/FID Reading taken inside top of casing (if applicable): 0.0 ppm

Multi-gas/CGI meter Readings taken (if applicable):

LEL: _____ % LEL
 O₂: _____ 40% Vol.
 CO: _____ ppm
 H₂S: _____ ppm

Do readings indicate unsafe conditions exist? Yes No

Well Condition

Is the concrete pad in good condition?	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Is the well surface casing in good condition?	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Is the surface casing vertical?	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Is there an internal well seal/J-Plug?	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Has there been physical damage to the well?	<input type="radio"/> Yes	<input checked="" type="radio"/> No
Does sounding depth match completed depth ⁽¹⁾ ?	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Is measuring point marked?	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Is the well clearly labeled?	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Flush mount - Is it secure from runoff?	<u>NA</u> <input checked="" type="radio"/> Yes	<input type="radio"/> No

Other Comments _____

(1) If sounding depth is within 0.5 feet of the previous sounding depth then check yes (previous depth 20.8 TOR)

Recommendations

Well needs to be redeveloped	<input type="radio"/> Yes	<input checked="" type="radio"/> No
Well needs to be re-surveyed.	<input type="radio"/> Yes	<input checked="" type="radio"/> No
Well needs to be repaired.	<input type="radio"/> Yes	<input checked="" type="radio"/> No
Well needs to be replaced.	<input type="radio"/> Yes	<input checked="" type="radio"/> No
Well needs to be properly abandoned.	<input type="radio"/> Yes	<input checked="" type="radio"/> No
Action necessary.	<input type="radio"/> Yes	<input checked="" type="radio"/> No

Comments

Inspected by: C. G. Hsmit
 Date of Inspection: 8/18/14
 Reviewed by: _____ (Print)
 _____ (Sign)

EPA Region 2 Superfund Well Assessment Checklist: SB1-3

Facility Information

Site Name: Picatinny Arsenal, Area C
 Site Address: Morris County, New Jersey
 Site County: Morris
 Site State: New Jersey
 EPA Site ID Number: NJ3210020704
 Site Owner: U.S. Army
 EPA Project Manager: Bill Roach

Well Locational Information

State Well ID: 25-31645
 Well Tag ID: SB1-3
 Well Installation date: July 28, 1988

	From Log	By GPS
Ground Surface Elevation	690.17	
Latitude		
Longitude		
Northing (State Plane)	758702.01 (NAD 1983)	
Easting (State Plane)	2023552.0 (NAD 1983)	

Cross streets (if applicable): By visitor center

GPS Instrument used: _____ Datum: _____
 Accuracy/Precision: _____

Well Construction Details

Type of well (Circle one) Flush Mount **Stick up**

Well lock/security type: pad lock 2402

Elevation (Top of inner Riser - TOR): 692.17

Surface (Stick up) casing material: metal Well riser material: PVC

Measuring/Reference Point: TOR? TOR ← Write in

Stick up Height (ags): 2.9 ft (as built) 2.9 (ft) ← As found

Inner Riser Height - TOR (ags): 2.7 ft (as built) 2.7 (ft) ← As found

Difference; Stick up & TOR: 0.20 (ft) ← As found

Surface Casing diameter: 8 Inner Riser diameter: 4 inches

Well Depth (as installed): 34 ft (bgs)

Well Depth (as measured): 36.85 ft (TOR) ← As found

Screened interval (as installed): 29 - 34 ft (bgs)

Depth to water: 7.91 ft (TOR) ← As found

Date: 8/18/14 Time: 1603

NOTE: 'ags' means above ground surface; positive if above, negative if below. 'bgs' means below ground surface. 'TOR' means Top Of inner Riser pipe.

EPA Region 2 Superfund Well Assessment Checklist: SB1-3

Well Headspace Readings

PID/FID Reading taken inside top of casing (if applicable): 0.0 ppm

Multi-gas/CGI meter Readings taken (if applicable):

LEL: _____ % LEL
 O₂: _____ 40% Vol.
 CO: _____ ppm
 H₂S: _____ ppm

Do readings indicate unsafe conditions exist? Yes No

Well Condition

Is the concrete pad in good condition?	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Is the well surface casing in good condition?	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Is the surface casing vertical?	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Is there an internal well seal/J-Plug?	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Has there been physical damage to the well?	<input type="radio"/> Yes	<input checked="" type="radio"/> No
Does sounding depth match completed depth ⁽¹⁾ ?	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Is measuring point marked?	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Is the well clearly labeled?	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Flush mount - Is it secure from runoff?	<u>NA</u> <input checked="" type="radio"/> Yes	<input type="radio"/> No

Other Comments _____

(1) If sounding depth is within 0.5 feet of the previous sounding depth then check yes (previous depth 36.7 TOR)

Recommendations

Well needs to be redeveloped	<input type="radio"/> Yes	<input checked="" type="radio"/> No
Well needs to be re-surveyed.	<input type="radio"/> Yes	<input checked="" type="radio"/> No
Well needs to be repaired.	<input type="radio"/> Yes	<input checked="" type="radio"/> No
Well needs to be replaced.	<input type="radio"/> Yes	<input checked="" type="radio"/> No
Well needs to be properly abandoned.	<input type="radio"/> Yes	<input checked="" type="radio"/> No
Action necessary.	<input type="radio"/> Yes	<input checked="" type="radio"/> No

Comments

Inspected by: C. Goldsmith
Date of Inspection: _____
Reviewed by: _____ (Print)
 _____ (Sign)

EPA Region 2 Superfund Well Assessment Checklist: SB1-5

Facility Information

Site Name: Picatinny Arsenal, Area C

Site Address: Morris County, New Jersey

Site County: Morris

Site State: New Jersey

EPA Site ID Number: NJ3210020704

Site Owner: U.S. Army

EPA Project Manager: Bill Roach

Well Locational Information

State Well ID: 25-59495

Well Tag ID: SB1-5

Well Installation date: January 24, 2002

	From Log	By GPS
Ground Surface Elevation	708.87	
Latitude		
Longitude		
Northing (State Plane)	758803.00 (NAD 1983)	
Easting (State Plane)	2023721.00 (NAD 1983)	

Cross streets (if applicable): By visitor center

GPS Instrument used: _____ Datum: _____

Accuracy/Precision: _____

Well Construction Details

Type of well (Circle one)

Flush Mount

Stick up

Well lock/security type: pad lock 2402

Elevation (Top of inner Riser - TOR): 708.87

Flush Mount material:

metal

Well riser material:

PVC

Measuring/Reference Point:

TOR?

TOR

← Write in

Flush Mount Height (ags):

No record (as built)

- 0.40 (ft)

← As found

Flush Mount Height - TOR (ags):

No record (as built)

(ft)

← As found

Difference; Flush Mount & TOR:

(ft)

← As found

Surface Casing diameter: 4

Inner Riser diameter: 2

inches

Well Depth (as installed):

110

ft (bgs)

Well Depth (as measured):

109.65

ft (TOR)

← As found

Screened interval (as installed):

90 - 110

ft (bgs)

Depth to water: 23.06

ft (TOR)

← As found

Date: 8/18/14

Time: 0945

NOTE: 'ags' means above ground surface; positive if above, negative if below. 'bgs' means below ground surface.

* If multilevel well please see attached worksheet.

EPA Region 2 Superfund Well Assessment Checklist: SB1-5

Well Headspace Readings

PID/FID Reading taken inside top of casing (if applicable): 00 ppm

Multi-gas/CGI meter Readings taken (if applicable):

LEL: NA % LEL
 O₂: NA 40% Vol.
 CO: NA ppm
 H₂S: NA ppm

Do readings indicate unsafe conditions exist? Yes No

Well Condition

Is the concrete pad in good condition?	<u>Yes</u>	No
Is the well surface casing in good condition?	<u>NA</u> Yes	No
Is the surface casing vertical?	<u>NA</u> Yes	No
Is there an internal well seal/J-Plug?	<u>Yes</u>	No
Has there been physical damage to the well?	Yes	<u>No</u>
Does sounding depth match completed depth ⁽¹⁾ ?	<u>Yes</u>	No
Is measuring point marked?	<u>Yes</u>	No
Is the well clearly labeled?	<u>Yes</u>	No
Flush mount - Is it secure from runoff?	<u>Yes</u>	No

Other Comments _____

(1) If sounding depth is within 0.5 feet of the previous sounding depth then check yes (previous depth 109.55 TOR)

Recommendations

Well needs to be redeveloped	Yes	<u>No</u>
Well needs to be re-surveyed.	Yes	<u>No</u>
Well needs to be repaired.	Yes	<u>No</u>
Well needs to be replaced.	Yes	<u>No</u>
Well needs to be properly abandoned.	Yes	<u>No</u>
Action necessary.	Yes	<u>No</u>

Comments

Inspected by: C. Gaskins
 Date of Inspection: 8/18/14
 Reviewed by: _____ (Print)
 _____ (Sign)

EPA Region 2 Superfund Well Assessment Checklist: SB1-6

Facility Information

Site Name: Picatinny Arsenal, Area C
 Site Address: Morris County, New Jersey
 Site County: Morris
 Site State: New Jersey
 EPA Site ID Number: NJ3210020704
 Site Owner: U.S. Army
 EPA Project Manager: Bill Roach

Well Locational Information

State Well ID: 25-59078
 Well Tag ID: SB1-6
 Well Installation date: January 28, 2002

	From Log	By GPS
Ground Surface Elevation	688.25	
Latitude		
Longitude		
Northing (State Plane)	758722.00 (NAD 1983)	
Easting (State Plane)	2023433.00 (NAD 1983)	

Cross streets (if applicable): By visitor center

GPS Instrument used: _____ Datum: _____
 Accuracy/Precision: _____

Well Construction Details

Type of well (Circle one) Flush Mount Stick up

Well lock/security type: pad lock

Elevation (Top of inner Riser - TOR): 690.75

Surface (Stick up) casing material: metal Well riser material: PVC

Measuring/Reference Point: TOR? TOR ← Write in

Stick up Height (ags): 3.1 ft (as built) 3.05 (ft) ← As found

Inner Riser Height - TOR (ags): 2.3 ft (as built) 2.3 (ft) ← As found

Difference; Stick up & TOR: 0.75 (ft) ← As found

Surface Casing diameter: 4 Inner Riser diameter: 2 inches

Well Depth (as installed): _____ 18 ft (bgs)

Well Depth (as measured): 20.04 ft (TOR) ← As found

Screened interval (as installed): 8 - 18 ft (bgs)

Depth to water: 7.01 ft (TOR) ← As found

Date: 8/18/14 Time: 1015

NOTE: 'ags' means above ground surface; positive if above, negative if below. 'bgs' means below ground surface. 'TOR' means Top Of inner Riser pipe.

EPA Region 2 Superfund Well Assessment Checklist: SB1-6

Well Headspace Readings

PID/FID Reading taken inside top of casing (if applicable): 0.0 ppm

Multi-gas/CGI meter Readings taken (if applicable):

LEL: _____ % LEL
 O₂: _____ 40% Vol.
 CO: _____ ppm
 H₂S: _____ ppm

Do readings indicate unsafe conditions exist? Yes No

Well Condition

Is the concrete pad in good condition?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Is the well surface casing in good condition?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Is the surface casing vertical?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Is there an internal well seal/J-Plug?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Has there been physical damage to the well?	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Does sounding depth match completed depth ⁽¹⁾ ?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Is measuring point marked?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Is the well clearly labeled?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Flush mount - Is it secure from runoff?	<u>NA</u> <input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No

Other Comments _____

(1) If sounding depth is within 0.5 feet of the previous sounding depth then check yes (previous depth 19.85 TOR)

Recommendations

Well needs to be redeveloped	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Well needs to be re-surveyed.	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Well needs to be repaired.	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Well needs to be replaced.	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Well needs to be properly abandoned.	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Action necessary.	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No

Comments

Inspected by: C. Goldsmith
 Date of Inspection: 8/18/14
 Reviewed by: _____ (Print)
 _____ (Sign)

EPA Region 2 Superfund Well Assessment Checklist: SB1-7

Facility Information

Site Name: Picatinny Arsenal, Area C
 Site Address: Morris County, New Jersey
 Site County: Morris
 Site State: New Jersey
 EPA Site ID Number: NJ3210020704
 Site Owner: U.S. Army
 EPA Project Manager: Bill Roach

Well Locational Information

State Well ID: 25-59079
 Well Tag ID: SB1-7
 Well Installation date: January 25, 2002

	From Log	By GPS
Ground Surface Elevation	689.16	
Latitude		
Longitude		
Northing (State Plane)	758660.00 (NAD 1983)	
Easting (State Plane)	2023503.00 (NAD 1983)	

Cross streets (if applicable): By visitor center in woods, then 2nd gated area

GPS Instrument used: _____ Datum: _____
 Accuracy/Precision: _____

Well Construction Details

Type of well (Circle one) Flush Mount Stick up

Well lock/security type: pad lock

Elevation (Top of inner Riser - TOR): 691.66

Surface (Stick up) casing material: metal Well riser material: PVC

Measuring/Reference Point: TOR? TOR ← Write in

Stick up Height (ags): 2.3 ft (as built) 2.30 (ft) ← As found

Inner Riser Height - TOR (ags): 1.97 ft (as built) 2.00 (ft) ← As found

Difference; Stick up & TOR: 0.30 (ft) ← As found

Surface Casing diameter: 4 Inner Riser diameter: 2 inches

Well Depth (as installed): 19.5 ft (bgs)

Well Depth (as measured): 20.82 ft (TOR) ← As found

Screened interval (as installed): 9.5 - 19.5 ft (bgs)

Depth to water: 6.76 ft (TOR) ← As found

Date: 8/18/14 Time: 1010

NOTE: 'ags' means above ground surface; positive if above, negative if below. 'bgs' means below ground surface. 'TOR' means Top Of inner Riser pipe.

EPA Region 2 Superfund Well Assessment Checklist: SB1-7

Well Headspace Readings

PID/FID Reading taken inside top of casing (if applicable): 0.0 ppm

Multi-gas/CGI meter Readings taken (if applicable):

LEL: _____ % LEL
 O₂: _____ 40% Vol.
 CO: _____ ppm
 H₂S: _____ ppm

Do readings indicate unsafe conditions exist? Yes No

Well Condition

Is the concrete pad in good condition?	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Is the well surface casing in good condition?	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Is the surface casing vertical?	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Is there an internal well seal/J-Plug?	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Has there been physical damage to the well?	<input checked="" type="radio"/> Yes	<input checked="" type="radio"/> No
Does sounding depth match completed depth ⁽¹⁾ ?	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Is measuring point marked?	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Is the well clearly labeled?	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Flush mount - Is it secure from runoff?	<input checked="" type="radio"/> Yes	<input type="radio"/> No

Other Comments _____

(1) If sounding depth is within 0.5 feet of the previous sounding depth then check yes (previous depth 20.6 TOR)

Recommendations

Well needs to be redeveloped	<input type="radio"/> Yes	<input checked="" type="radio"/> No
Well needs to be re-surveyed.	<input type="radio"/> Yes	<input checked="" type="radio"/> No
Well needs to be repaired.	<input type="radio"/> Yes	<input checked="" type="radio"/> No
Well needs to be replaced.	<input type="radio"/> Yes	<input checked="" type="radio"/> No
Well needs to be properly abandoned.	<input type="radio"/> Yes	<input checked="" type="radio"/> No
Action necessary.	<input type="radio"/> Yes	<input checked="" type="radio"/> No

Comments

Inspected by: C. Goldsmink
 Date of Inspection: 8/18/14
 Reviewed by: _____ (Print)
 _____ (Sign)

EPA Region 2 Superfund Well Assessment Checklist: SB2-1A

Facility Information

Site Name: Picatinny Arsenal, Area C
 Site Address: Morris County, New Jersey
 Site County: Morris
 Site State: New Jersey
 EPA Site ID Number: NJ3210020704
 Site Owner: U.S. Army
 EPA Project Manager: Bill Roach

Well Locational Information

State Well ID: 25-32577
 Well Tag ID: SB2-1A
 Well Installation date: December 6, 1988

	From Log	By GPS
Ground Surface Elevation	690.17	
Latitude		
Longitude		
Northing (State Plane)	759178.63 (NAD 1983)	
Easting (State Plane)	2022859.61 (NAD 1983)	

Cross streets (if applicable): By hot dog cart pulloff

GPS Instrument used: _____ Datum: _____
 Accuracy/Precision: _____

Well Construction Details

Type of well (Circle one) Flush Mount Stick up

Well lock/security type: pad lock

Elevation (Top of inner Riser - TOR): 691.77

Surface (Stick up) casing material: metal Well riser material: PVC

Measuring/Reference Point: TOR? TOR ← Write in

Stick up Height (ags): 2.95 ft (as built) 2.0 (ft) ← As found

Inner Riser Height - TOR (ags): 2.75 ft (as built) 2.75 (ft) ← As found

Difference; Stick up & TOR: 0.25 (ft) ← As found

Surface Casing diameter: 8 Inner Riser diameter: 4 inches

Well Depth (as installed): 168 ft (bgs)

Well Depth (as measured): 167.65 ft (TOR) ← As found

Screened interval (as installed): 158 - 168 ft (bgs)

Depth to water: 18.17 ft (TOR) ← As found

Date: 8/18/14 Time: 1205

NOTE: 'ags' means above ground surface; positive if above, negative if below. 'bgs' means below ground surface. 'TOR' means Top Of inner Riser pipe.

EPA Region 2 Superfund Well Assessment Checklist: SB2-1A

Well Headspace Readings

PID/FID Reading taken inside top of casing (if applicable): 0.0 ppm

Multi-gas/CGI meter Readings taken (if applicable):

LEL: _____ % LEL
 O₂: _____ 40% Vol.
 CO: _____ ppm
 H₂S: _____ ppm

Do readings indicate unsafe conditions exist? Yes No

Well Condition

Is the concrete pad in good condition?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Is the well surface casing in good condition?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Is the surface casing vertical?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Is there an internal well seal/J-Plug?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Has there been physical damage to the well?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Does sounding depth match completed depth ⁽¹⁾ ?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Is measuring point marked?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Is the well clearly labeled?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Flush mount - Is it secure from runoff?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No

Other Comments _____

(1) If sounding depth is within 0.5 feet of the previous sounding depth then check yes (previous depth 37.05 TOR)

Recommendations

Well needs to be redeveloped	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Well needs to be re-surveyed.	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Well needs to be repaired.	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Well needs to be replaced.	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Well needs to be properly abandoned.	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Action necessary.	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No

Comments

Inspected by: C. Goldsmith
 Date of Inspection: 8/18/14
 Reviewed by: _____ (Print)
 _____ (Sign)

EPA Region 2 Superfund Well Assessment Checklist: SB2-2

Facility Information

Site Name: Picatinny Arsenal, Area C
 Site Address: Morris County, New Jersey
 Site County: Morris
 Site State: New Jersey
 EPA Site ID Number: NJ3210020704
 Site Owner: U.S. Army
 EPA Project Manager: Bill Roach

Well Locational Information

State Well ID: 25-31646
 Well Tag ID: SB2-2
 Well Installation date: August 4, 1988

	From Log	By GPS
Ground Surface Elevation	688.43	
Latitude		
Longitude		
Northing (State Plane)	759208.24 (NAD 1983)	
Easting (State Plane)	469026.07 (NAD 1983)	

Cross streets (if applicable): By hot dog cart pulloff

GPS Instrument used: _____ Datum: _____
 Accuracy/Precision: _____

Well Construction Details

Type of well (Circle one) Flush Mount Stick up

Well lock/security type: pad lock

Elevation (Top of inner Riser - TOR): 690.16

Surface (Stick up) casing material: metal Well riser material: PVC

Measuring/Reference Point: TOR? TOR ← Write in

Stick up Height (ags): 2.7 ft (as built) 2.6 (ft) ← As found

Inner Riser Height - TOR (ags): 2.3 ft (as built) 2.35 (ft) ← As found

Difference; Stick up & TOR: ~~2.5~~ 2.8 0.25 (ft) ← As found

Surface Casing diameter: 8 Inner Riser diameter: 4 inches

Well Depth (as installed): 35 ft (bgs)

Well Depth (as measured): 37.33 ft (TOR) ← As found

Screened interval (as installed): 25 - 35 ft (bgs)

Depth to water: 7.99 ft (TOR) ← As found

Date: 8/18/14 Time: 1210

NOTE: 'ags' means above ground surface; positive if above, negative if below. 'bgs' means below ground surface. 'TOR' means Top Of inner Riser pipe.

EPA Region 2 Superfund Well Assessment Checklist: SB2-2

Well Headspace Readings

PID/FID Reading taken inside top of casing (if applicable): _____ ppm

Multi-gas/CGI meter Readings taken (if applicable):

LEL: _____ % LEL
 O₂: _____ 40% Vol.
 CO: _____ ppm
 H₂S: _____ ppm

Do readings indicate unsafe conditions exist? Yes No

Well Condition

Is the concrete pad in good condition?	<u>Yes</u>	No CS
Is the well surface casing in good condition?	<u>Yes</u>	No
Is the surface casing vertical?	<u>Yes</u>	No
Is there an internal well seal/J-Plug?	Yes	No
Has there been physical damage to the well?	Yes	<u>No</u>
Does sounding depth match completed depth ⁽¹⁾ ?	<u>Yes</u>	No
Is measuring point marked?	Yes	No
Is the well clearly labeled?	Yes	No
Flush mount - Is it secure from runoff?	NA Yes	No

Other Comments ~~well pad needs to be repaired~~
well pad repaired on 10/3/2014

(1) If sounding depth is within 0.5 feet of the previous sounding depth then check yes (previous depth 37.05 TOR)

Recommendations

Well needs to be redeveloped	Yes	<u>No</u>
Well needs to be re-surveyed.	Yes	<u>No</u>
Well needs to be repaired.	<u>Yes</u>	No
Well needs to be replaced.	Yes	<u>No</u>
Well needs to be properly abandoned.	Yes	<u>No</u>
Action necessary.	<u>Yes</u>	CS No

Comments

Inspected by: C. Goldsmith
Date of Inspection: 8/18/14
Reviewed by: _____ (Print)
 _____ (Sign)

EPA Region 2 Superfund Well Assessment Checklist: SB2-3

Facility Information

Site Name: Picatinny Arsenal, Area C
 Site Address: Morris County, New Jersey
 Site County: Morris
 Site State: New Jersey
 EPA Site ID Number: NJ3210020704
 Site Owner: U.S. Army
 EPA Project Manager: Bill Roach

Well Locational Information

State Well ID: 25-32957
 Well Tag ID: SB2-3
 Well Installation date: December 27, 1988

	From Log	By GPS
Ground Surface Elevation	688.8	
Latitude		
Longitude		
Northing (State Plane)	759193.65 (NAD 1983)	
Easting (State Plane)	2022847.08 (NAD 1983)	

Cross streets (if applicable): By hot dog cart pulloff

GPS Instrument used: _____ Datum: _____
 Accuracy/Precision: _____

Well Construction Details

Type of well (Circle one) Flush Mount **Stick up**

Well lock/security type: pad lock

Elevation (Top of inner Riser - TOR): 691.23

Surface (Stick up) casing material: metal Well riser material: PVC

Measuring/Reference Point: TOR? TOR ← Write in

Stick up Height (ags): 3.3 ft (as built) 3.1 (ft) ← As found

Inner Riser Height - TOR (ags): 2.9 ft (as built) 2.95 (ft) ← As found

Difference; Stick up & TOR: 0.15 (ft) ← As found

Surface Casing diameter: 8 Inner Riser diameter: 4 inches

Well Depth (as installed): 253 ft (bgs)

Well Depth (as measured): 252.10 ft (TOR) ← As found

Screened interval (as installed): 243 - 253 ft (bgs)

Depth to water: 18.96 ft (TOR) ← As found

Date: 8/19/14 Time: 1215

NOTE: 'ags' means above ground surface; positive if above, negative if below. 'bgs' means below ground surface. 'TOR' means Top Of inner Riser pipe.

EPA Region 2 Superfund Well Assessment Checklist: SB2-3

Well Headspace Readings

PID/FID Reading taken inside top of casing (if applicable): 0.0 ppm

Multi-gas/CGI meter Readings taken (if applicable):

LEL: _____ % LEL
 O₂: _____ 40% Vol.
 CO: _____ ppm
 H₂S: _____ ppm

Do readings indicate unsafe conditions exist? Yes No

Well Condition

Is the concrete pad in good condition?	<input checked="" type="checkbox"/> Yes	No
Is the well surface casing in good condition?	<input checked="" type="checkbox"/> Yes	No
Is the surface casing vertical?	<input checked="" type="checkbox"/> Yes	No
Is there an internal well seal/J-Plug?	<input checked="" type="checkbox"/> Yes	No
Has there been physical damage to the well?	Yes	<input checked="" type="checkbox"/> No
Does sounding depth match completed depth ⁽¹⁾ ?	<input checked="" type="checkbox"/> Yes	No
Is measuring point marked?	<input checked="" type="checkbox"/> Yes	No
Is the well clearly labeled?	<input checked="" type="checkbox"/> Yes	No
Flush mount - Is it secure from runoff?	<u>NA</u> Yes	No

Other Comments _____

(1) If sounding depth is within 0.5 feet of the previous sounding depth then check yes (previous depth 257.2 TOR)

Recommendations

Well needs to be redeveloped	Yes	<input checked="" type="checkbox"/> No
Well needs to be re-surveyed.	Yes	<input checked="" type="checkbox"/> No
Well needs to be repaired.	Yes	<input checked="" type="checkbox"/> No
Well needs to be replaced.	Yes	<input checked="" type="checkbox"/> No
Well needs to be properly abandoned.	Yes	<input checked="" type="checkbox"/> No
Action necessary.	Yes	<input checked="" type="checkbox"/> No

Comments

Inspected by: C. Goldsmith
 Date of Inspection: 8/18/14
 Reviewed by: _____ (Print)
 _____ (Sign)

EPA Region 2 Superfund Well Assessment Checklist: SB3-1B

Facility Information

Site Name: Picatinny Arsenal, Area C
 Site Address: Morris County, New Jersey
 Site County: Morris
 Site State: New Jersey
 EPA Site ID Number: NJ3210020704
 Site Owner: U.S. Army
 EPA Project Manager: Bill Roach

Well Locational Information

State Well ID: 25-46200
 Well Tag ID: SB3-1B
 Well Installation date: December 28, 1994

	From Log	By GPS
Ground Surface Elevation	699.60	
Latitude		
Longitude		
Northing (State Plane)	760671.57 (NAD 1983)	
Easting (State Plane)	2021817.17 (NAD 1983)	

Cross streets (if applicable): Rt. 15N and truck entrance loop

GPS Instrument used: _____ Datum: _____
 Accuracy/Precision: _____

Well Construction Details

Type of well (Circle one) Flush Mount Stick up

Well lock/security type: pad lock

Elevation (Top of inner Riser - TOR): 701.55

Surface (Stick up) casing material: metal Well riser material: PVC

Measuring/Reference Point: TOR? TOR ← Write in

Stick up Height (ags): 1.95 ft (as built) 1.95 (ft) ← As found

Inner Riser Height - TOR (ags): 1.35 ft (as built) 1.35 (ft) ← As found

Difference; Stick up & TOR: 0.60 (ft) ← As found

Surface Casing diameter: 8 Inner Riser diameter: 4 inches

Well Depth (as installed): 336 ft (bgs)

Well Depth (as measured): 332.2 ft (TOR) ← As found

Screened interval (as installed): 326 - 336 ft (bgs)

Depth to water: 25.89 ft (TOR) ← As found

Date: 8/18/14 Time: 12.35

NOTE: 'ags' means above ground surface; positive if above, negative if below. 'bgs' means below ground surface. 'TOR' means Top Of inner Riser pipe.

EPA Region 2 Superfund Well Assessment Checklist: SB3-1B

Well Headspace Readings

PID/FID Reading taken inside top of casing (if applicable): 0.0 ppm

Multi-gas/CGI meter Readings taken (if applicable):

LEL: _____ % LEL
 O₂: _____ 40% Vol.
 CO: _____ ppm
 H₂S: _____ ppm

Do readings indicate unsafe conditions exist? Yes No

Well Condition

Is the concrete pad in good condition?	<input checked="" type="checkbox"/> Yes	No <input type="checkbox"/>
Is the well surface casing in good condition?	<input checked="" type="checkbox"/> Yes	No <input type="checkbox"/>
Is the surface casing vertical?	<input checked="" type="checkbox"/> Yes	No <input type="checkbox"/>
Is there an internal well seal/J-Plug?	<input checked="" type="checkbox"/> Yes	No <input type="checkbox"/>
Has there been physical damage to the well?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
Does sounding depth match completed depth ⁽¹⁾ ?	<input checked="" type="checkbox"/> Yes	No <input type="checkbox"/>
Is measuring point marked?	<input checked="" type="checkbox"/> Yes	No <input type="checkbox"/>
Is the well clearly labeled?	<input checked="" type="checkbox"/> Yes	No <input type="checkbox"/>
Flush mount - Is it secure from runoff?	NA Yes <input type="checkbox"/>	No <input type="checkbox"/>

Other Comments _____

(1) If sounding depth is within 0.5 feet of the previous sounding depth then check yes (previous depth 332.05 TOR)

Recommendations

Well needs to be redeveloped	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
Well needs to be re-surveyed.	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
Well needs to be repaired.	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
Well needs to be replaced.	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
Well needs to be properly abandoned.	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
Action necessary.	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>

Comments

Inspected by: C Goldsmith
Date of Inspection: _____
Reviewed by: _____ (Print)
 _____ (Sign)

EPA Region 2 Superfund Well Assessment Checklist: SB3-2

Facility Information

Site Name: Picatinny Arsenal, Area C
 Site Address: Morris County, New Jersey
 Site County: Morris
 Site State: New Jersey
 EPA Site ID Number: NJ3210020704
 Site Owner: U.S. Army
 EPA Project Manager: Bill Roach

Well Locational Information

State Well ID: 25-33052
 Well Tag ID: SB3-2
 Well Installation date: February 1, 1989

	From Log	By GPS
Ground Surface Elevation	699.49	
Latitude		
Longitude		
Northing (State Plane)	760691.84 (NAD 1983)	
Easting (State Plane)	2021814.14 (NAD 1983)	

Cross streets (if applicable): Rt. 15N and truck entrance loop

GPS Instrument used: _____ Datum: _____
 Accuracy/Precision: _____

Well Construction Details

Type of well (Circle one) Flush Mount Stick up

Well lock/security type: pad lock

Elevation (Top of inner Riser - TOR): 701.78

Surface (Stick up) casing material: metal Well riser material: PVC

Measuring/Reference Point: TOR? TOR ← Write in

Stick up Height (ags): 2.83 ft (as built) 2.80 (ft) ← As found

Inner Riser Height - TOR (ags): 2.65 ft (as built) 2.65 (ft) ← As found

Difference; Stick up & TOR: 0.25 (ft) ← As found

Surface Casing diameter: 8 Inner Riser diameter: 4 inches

Well Depth (as installed): 180 ft (bgs)

Well Depth (as measured): 180.95 ft (TOR) ← As found

Screened interval (as installed): 170 - 180 ft (bgs)

Depth to water: 25.93 ft (TOR) ← As found

Date: 8/18/14 Time: 1245

NOTE: 'ags' means above ground surface; positive if above, negative if below. 'bgs' means below ground surface. 'TOR' means Top Of inner Riser pipe.

EPA Region 2 Superfund Well Assessment Checklist: SB3-2

Well Headspace Readings

PID/FID Reading taken inside top of casing (if applicable): 0.0 ppm

Multi-gas/CGI meter Readings taken (if applicable):

LEL: _____ % LEL
 O₂: _____ 40% Vol.
 CO: _____ ppm
 H₂S: _____ ppm

Do readings indicate unsafe conditions exist? Yes No

Well Condition

Is the concrete pad in good condition?	<u>Yes</u>	No
Is the well surface casing in good condition?	<u>Yes</u>	No
Is the surface casing vertical?	<u>Yes</u>	No
Is there an internal well seal/J-Plug?	<u>Yes</u>	No
Has there been physical damage to the well?	Yes	<u>No</u>
Does sounding depth match completed depth ⁽¹⁾ ?	<u>Yes</u>	No
Is measuring point marked?	<u>Yes</u>	No
Is the well clearly labeled?	<u>Yes</u>	No
Flush mount - Is it secure from runoff?	<u>NA</u> Yes	No

Other Comments _____

(1) If sounding depth is within 0.5 feet of the previous sounding depth then check yes (previous depth 180.25 TOR)

Recommendations

Well needs to be redeveloped	Yes	<u>No</u>
Well needs to be re-surveyed.	Yes	<u>No</u>
Well needs to be repaired.	Yes	<u>No</u>
Well needs to be replaced.	Yes	<u>No</u>
Well needs to be properly abandoned.	Yes	<u>No</u>
Action necessary.	Yes	<u>No</u>

Comments

Inspected by: C. Goldsmith
Date of Inspection: 8/18/14
Reviewed by: _____ (Print)
 _____ (Sign)

EPA Region 2 Superfund Well Assessment Checklist: SB3-3

Facility Information

Site Name: Picatinny Arsenal, Area C
 Site Address: Morris County, New Jersey
 Site County: Morris
 Site State: New Jersey
 EPA Site ID Number: NJ3210020704
 Site Owner: U.S. Army
 EPA Project Manager: Bill Roach

Well Locational Information

State Well ID: unknown
 Well Tag ID: SB3-3
 Well Installation date: February 1, 1989

	From Log	By GPS
Ground Surface Elevation	698.79	
Latitude		
Longitude		
Northing (State Plane)	760699.81 (NAD 1983)	
Easting (State Plane)	2021809.21 (NAD 1983)	

Cross streets (if applicable): Rt. 15N and truck entrance loop

GPS Instrument used: _____ Datum: _____
 Accuracy/Precision: _____

Well Construction Details

Type of well (Circle one) Flush Mount **Stick up**

Well lock/security type: pad lock

Elevation (Top of inner Riser - TOR): 701.04

Surface (Stick up) casing material: metal Well riser material: PVC

Measuring/Reference Point: TOR? TOR ← Write in

Stick up Height (ags): 3.05 ft (as built) 3.00 (ft) ← As found

Inner Riser Height - TOR (ags): 2.85 ft (as built) 2.78 (ft) ← As found

Difference; Stick up & TOR: 0.22 (ft) ← As found

Surface Casing diameter: 8 Inner Riser diameter: 4 inches

Well Depth (as installed): 31 ft (bgs)

Well Depth (as measured): 53.35 ft (TOR) ← As found

Screened interval (as installed): 21 - 31 ft (bgs)

Depth to water: 17.19 ft (TOR) ← As found

Date: 8/18/14 Time: 1255

NOTE: 'ags' means above ground surface; positive if above, negative if below. 'bgs' means below ground surface. 'TOR' means Top Of inner Riser pipe.

EPA Region 2 Superfund Well Assessment Checklist: SB3-3

Well Headspace Readings

PID/FID Reading taken inside top of casing (if applicable): 0.0 ppm

Multi-gas/CGI meter Readings taken (if applicable):

LEL: _____ % LEL
 O₂: _____ 40% Vol.
 CO: _____ ppm
 H₂S: _____ ppm

Do readings indicate unsafe conditions exist? Yes No

Well Condition

Is the concrete pad in good condition?	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Is the well surface casing in good condition?	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Is the surface casing vertical?	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Is there an internal well seal/J-Plug?	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Has there been physical damage to the well?	<input type="radio"/> Yes	<input checked="" type="radio"/> No
Does sounding depth match completed depth ⁽¹⁾ ?	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Is measuring point marked?	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Is the well clearly labeled?	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Flush mount - Is it secure from runoff?	<u>NA</u> Yes	<input type="radio"/> No

Other Comments _____

(1) If sounding depth is within 0.5 feet of the previous sounding depth then check yes (previous depth 31.7 TOR)

Recommendations

Well needs to be redeveloped	<input type="radio"/> Yes	<input checked="" type="radio"/> No
Well needs to be re-surveyed.	<input type="radio"/> Yes	<input checked="" type="radio"/> No
Well needs to be repaired.	<input type="radio"/> Yes	<input checked="" type="radio"/> No
Well needs to be replaced.	<input type="radio"/> Yes	<input checked="" type="radio"/> No
Well needs to be properly abandoned.	<input type="radio"/> Yes	<input checked="" type="radio"/> No
Action necessary.	<input type="radio"/> Yes	<input checked="" type="radio"/> No

Comments

Inspected by: C. Galkowski
 Date of Inspection: 8/18/14
 Reviewed by: _____ (Print)
 _____ (Sign)

EPA Region 2 Superfund Well Assessment Checklist: SB4-1

Facility Information

Site Name: Picatinny Arsenal, Area C
 Site Address: Morris County, New Jersey
 Site County: Morris
 Site State: New Jersey
 EPA Site ID Number: NJ3210020704
 Site Owner: U.S. Army
 EPA Project Manager: Bill Roach

Well Locational Information

State Well ID: 25-46118
 Well Tag ID: SB4-1
 Well Installation date: December 27, 1994

	From Log	By GPS
Ground Surface Elevation	705.66	
Latitude		
Longitude		
Northing (State Plane)	759730.10 (NAD 83)	
Easting (State Plane)	2021503.26 (NAD 83)	

Cross streets (if applicable): In Pond View across Rt. 15 by truck turn around

GPS Instrument used: _____ Datum: _____
 Accuracy/Precision: _____

Well Construction Details

Type of well (Circle one) Flush Mount **Stick up**

Well lock/security type: Well cap replaced 7/26/12

Elevation (Top of inner Riser - TOR): 707.17

Surface (Stick up) casing material: metal Well riser material: PVC

Measuring/Reference Point: TOR? TOR ← Write in

Stick up Height (ags): 1.75 ft (as built) 1.75 (ft) ← As found

Inner Riser Height - TOR (ags): 1.27 ft (as built) 1.25 (ft) ← As found

Difference; Stick up & TOR: 0.50 (ft) ← As found

Surface Casing diameter: 8 Inner Riser diameter: 4 inches

Well Depth (as installed): 379 ft (bgs)

Well Depth (as measured): 382.40 ft (TOR) ← As found

Screened interval (as installed): 369 - 379 ft (bgs)

Depth to water: 32.33 ft (TOR) ← As found

Date: 8/8/14 Time: 1025

NOTE: 'ags' means above ground surface; positive if above, negative if below. 'bgs' means below ground surface. 'TOR' means Top Of inner Riser pipe.

EPA Region 2 Superfund Well Assessment Checklist: SB4-1

Well Headspace Readings

PID/FID Reading taken inside top of casing (if applicable): 0.0 ppm

Multi-gas/CGI meter Readings taken (if applicable):

LEL: _____ % LEL
 O₂: _____ 40% Vol.
 CO: _____ ppm
 H₂S: _____ ppm

Do readings indicate unsafe conditions exist? Yes No

Well Condition

Is the concrete pad in good condition?	<input checked="" type="radio"/> Yes	<input checked="" type="radio"/> No <i>CS</i>
Is the well surface casing in good condition?	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Is the surface casing vertical?	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Is there an internal well seal/J-Plug?	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Has there been physical damage to the well?	<input type="radio"/> Yes	<input checked="" type="radio"/> No
Does sounding depth match completed depth ⁽¹⁾ ?	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Is measuring point marked?	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Is the well clearly labeled?	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Flush mount - Is it secure from runoff?	<i>NA</i> <input type="radio"/> Yes	<input type="radio"/> No

Other Comments ~~well pad needs to be repaired~~
well pad repaired on 10/3/14

(1) If sounding depth is within 0.5 feet of the previous sounding depth then check yes (previous depth 382.4 TOR)

Recommendations

Well needs to be redeveloped	<input type="radio"/> Yes	<input checked="" type="radio"/> No
Well needs to be re-surveyed.	<input type="radio"/> Yes	<input checked="" type="radio"/> No
Well needs to be repaired.	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Well needs to be replaced.	<input type="radio"/> Yes	<input checked="" type="radio"/> No
Well needs to be properly abandoned.	<input type="radio"/> Yes	<input checked="" type="radio"/> No
Action necessary.	<input checked="" type="radio"/> Yes	<input type="radio"/> No

Comments

Inspected by: C. G. / ds with
 Date of Inspection: 8/18/14
 Reviewed by: _____ (Print)
 _____ (Sign)

EPA Region 2 Superfund Well Assessment Checklist: SB4-2

Facility Information

Site Name: Picatinny Arsenal, Area C
 Site Address: Morris County, New Jersey
 Site County: Morris
 Site State: New Jersey
 EPA Site ID Number: NJ3210020704
 Site Owner: U.S. Army
 EPA Project Manager: Bill Roach

Well Locational Information

State Well ID: 25-45235
 Well Tag ID: SB4-2
 Well Installation date: January 1, 1992

	From Log	By GPS
Ground Surface Elevation	706.24	
Latitude		
Longitude		
Northing (State Plane)	759730.1057 (NAD 83)	
Easting (State Plane)	2021510.9394 (NAD 83)	

Cross streets (if applicable): In Pond View across Rt. 15 by truck turn around

GPS Instrument used: _____ Datum: _____
 Accuracy/Precision: _____

Well Construction Details

Type of well (Circle one) Flush Mount Stick up
 Well lock/security type: Padlock 2402
 Elevation (Top of inner Riser - TOR): 708.47
 Surface (Stick up) casing material: metal Well riser material: PVC
 Measuring/Reference Point: TOR? TOR ← Write in
 Stick up Height (ags): 2.2 ft (as built) 2.2 (ft) ← As found
 Inner Riser Height - TOR (ags): 1.95 ft (as built) 1.95 (ft) ← As found
 Difference; Stick up & TOR: 0.25 (ft) ← As found
 Surface Casing diameter: 8 Inner Riser diameter: 4 inches
 Well Depth (as installed): 46 ft (bgs)
 Well Depth (as measured): 45.74 ft (TOR) ← As found
 Screened interval (as installed): 36 - 46 ft (bgs)
 Depth to water: 22.61 ft (TOR) ← As found
 Date: 8/18/18 Time: 1038

NOTE: 'ags' means above ground surface; positive if above, negative if below. 'bgs' means below ground surface. 'TOR' means Top Of inner Riser pipe.

EPA Region 2 Superfund Well Assessment Checklist: SB4-2

Well Headspace Readings

PID/FID Reading taken inside top of casing (if applicable): 0.0 ppm

Multi-gas/CGI meter Readings taken (if applicable):

LEL: _____ % LEL
 O₂: _____ 40% Vol.
 CO: _____ ppm
 H₂S: _____ ppm

Do readings indicate unsafe conditions exist? Yes No

Well Condition

Is the concrete pad in good condition?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Is the well surface casing in good condition?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Is the surface casing vertical?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Is there an internal well seal/J-Plug?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Has there been physical damage to the well?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Does sounding depth match completed depth ⁽¹⁾ ?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Is measuring point marked?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Is the well clearly labeled?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Flush mount - Is it secure from runoff?	<u>N/A</u> Yes	<input type="checkbox"/> No

Other Comments _____

(1) If sounding depth is within 0.5 feet of the previous sounding depth then check yes (previous depth 45.7 TOR)

Recommendations

Well needs to be redeveloped	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Well needs to be re-surveyed.	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Well needs to be repaired.	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Well needs to be replaced.	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Well needs to be properly abandoned.	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Action necessary.	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No

Comments

Inspected by: C. Goldsmith
 Date of Inspection: 8/18/14
 Reviewed by: _____ (Print)
 _____ (Sign)

EPA Region 2 Superfund Well Assessment Checklist: SB4-3

Facility Information

Site Name: Picatinny Arsenal, Area C
 Site Address: Morris County, New Jersey
 Site County: Morris
 Site State: New Jersey
 EPA Site ID Number: NJ3210020704
 Site Owner: U.S. Army
 EPA Project Manager: Bill Roach

Well Locational Information

State Well ID: 25-45234
 Well Tag ID: SB4-3
 Well Installation date: January 1, 1992

	From Log	By GPS
Ground Surface Elevation	706.07	
Latitude		
Longitude		
Northing (State Plane)	759730.11 (NAD 83)	
Easting (State Plane)	2021510.94 (NAD 83)	

Cross streets (if applicable): In Pond View across Rt. 15 by truck turn around

GPS Instrument used: _____ Datum: _____
 Accuracy/Precision: _____

Well Construction Details

Type of well (Circle one) Flush Mount Stick up

Well lock/security type: Padlock 2402

Elevation (Top of inner Riser - TOR): 708.14

Surface (Stick up) casing material: metal Well riser material: PVC

Measuring/Reference Point: TOR? TOR ← Write in

Stick up Height (ags): 1.85 ft (as built) 1.8 (ft) ← As found

Inner Riser Height - TOR (ags): 1.7 ft (as built) 1.7 (ft) ← As found

Difference; Stick up & TOR: 0.2 (ft) ← As found

Surface Casing diameter: 8 Inner Riser diameter: 4 inches

Well Depth (as installed): 102 ft (bgs)

Well Depth (as measured): 100.25 ft (TOR) ← As found

Screened interval (as installed): 92 - 102 ft (bgs)

Depth to water: 23.44 ft (TOR) ← As found

Date: 8/18/14 Time: 1035

NOTE: 'ags' means above ground surface; positive if above, negative if below. 'bgs' means below ground surface. 'TOR' means Top Of inner Riser pipe.

EPA Region 2 Superfund Well Assessment Checklist: SB4-3

Well Headspace Readings

PID/FID Reading taken inside top of casing (if applicable): 0.0 ppm

Multi-gas/CGI meter Readings taken (if applicable):

LEL: _____ % LEL
 O₂: _____ 40% Vol.
 CO: _____ ppm
 H₂S: _____ ppm

Do readings indicate unsafe conditions exist? Yes No

Well Condition

- | | | |
|--|--|---|
| Is the concrete pad in good condition? | <input checked="" type="radio"/> Yes | <input checked="" type="radio"/> No CS |
| Is the well surface casing in good condition? | <input checked="" type="radio"/> Yes | <input type="radio"/> No |
| Is the surface casing vertical? | <input checked="" type="radio"/> Yes | <input type="radio"/> No |
| Is there an internal well seal/J-Plug? | <input checked="" type="radio"/> Yes | <input type="radio"/> No |
| Has there been physical damage to the well? | <input type="radio"/> Yes | <input checked="" type="radio"/> No |
| Does sounding depth match completed depth ⁽¹⁾ ? | <input checked="" type="radio"/> Yes | <input type="radio"/> No |
| Is measuring point marked? | <input checked="" type="radio"/> Yes | <input type="radio"/> No |
| Is the well clearly labeled? | <input checked="" type="radio"/> Yes | <input type="radio"/> No |
| Flush mount - Is it secure from runoff? | NA <input checked="" type="radio"/> Yes | <input type="radio"/> No |

Other Comments ~~well pad need repair~~
well pad repaired on 10/2/14

(1) If sounding depth is within 0.5 feet of the previous sounding depth then check yes (previous depth 100.1 TOR)

Recommendations

- | | | |
|--------------------------------------|--------------------------------------|-------------------------------------|
| Well needs to be redeveloped | <input type="radio"/> Yes | <input checked="" type="radio"/> No |
| Well needs to be re-surveyed. | <input type="radio"/> Yes | <input checked="" type="radio"/> No |
| Well needs to be repaired. | <input checked="" type="radio"/> Yes | <input type="radio"/> No |
| Well needs to be replaced. | <input type="radio"/> Yes | <input checked="" type="radio"/> No |
| Well needs to be properly abandoned. | <input type="radio"/> Yes | <input checked="" type="radio"/> No |
| Action necessary. | <input checked="" type="radio"/> Yes | <input type="radio"/> No |

Comments

Inspected by: e. Goldsmith
 Date of Inspection: 8/18/14
 Reviewed by: _____ (Print)
 _____ (Sign)

EPA Region 2 Superfund Well Assessment Checklist: SB4-4

Facility Information

Site Name: Picatinny Arsenal, Area C
 Site Address: Morris County, New Jersey
 Site County: Morris
 Site State: New Jersey
 EPA Site ID Number: NJ3210020704
 Site Owner: U.S. Army
 EPA Project Manager: Bill Roach

Well Locational Information

State Well ID: 25-45233
 Well Tag ID: SB4-4
 Well Installation date: September 3, 1994

	From Log	By GPS
Ground Surface Elevation	708.02	
Latitude		
Longitude		
Northing (State Plane)	759730.11 (NAD 83)	
Easting (State Plane)	2021510.94 (NAD 83)	

Cross streets (if applicable): In Pond View across Rt. 15 by truck turn around

GPS Instrument used: _____ Datum: _____
 Accuracy/Precision: _____

Well Construction Details

Type of well (Circle one) Flush Mount Stick up

Well lock/security type: Padlock 2402

Elevation (Top of inner Riser - TOR): 708.02

Surface (Stick up) casing material: metal Well riser material: PVC

Measuring/Reference Point: TOR? TOR ← Write in

Stick up Height (ags): 1.5 ft (as built) 1.5 (ft) ← As found

Inner Riser Height - TOR (ags): 1.44 ft (as built) 1.45 (ft) ← As found

Difference; Stick up & TOR: 0.05 (ft) ← As found

Surface Casing diameter: 8 Inner Riser diameter: 4 inches

Well Depth (as installed): 165 ft (bgs)

Well Depth (as measured): 166.88 ft (TOR) ← As found

Screened interval (as installed): 155 - 165 ft (bgs)

Depth to water: 31.76 ft (TOR) ← As found

Date: 8/18/14 Time: 1040

NOTE: 'ags' means above ground surface; positive if above, negative if below. 'bgs' means below ground surface. 'TOR' means Top Of inner Riser pipe.

EPA Region 2 Superfund Well Assessment Checklist: MW25-6A

Facility Information

Site Name: Picatinny Arsenal, Area C
 Site Address: Morris County, New Jersey
 Site County: Morris
 Site State: New Jersey
 EPA Site ID Number: NJ3210020704
 Site Owner: U.S. Army
 EPA Project Manager: Bill Roach

Well Locational Information

State Well ID: 25-44121
 Well Tag ID: MW25-6A
 Well Installation date: 10-22-1993

	From Log	By GPS
Ground Surface Elevation	697.3	
Latitude		
Longitude		
Northing (State Plane)	760699.25	
Easting (State Plane)	2024373.87	

Cross streets (if applicable): Behind batting cage

GPS Instrument used: _____ Datum: _____
 Accuracy/Precision: _____

Well Construction Details

Type of well (Circle one) Flush Mount **Stick up**

Well lock/security type: pad lock 2402

Elevation (Top of inner Riser - TOR): 699.33

Surface (Stick up) casing material: metal Well riser material: PVC

Measuring/Reference Point: TOR? ✓ TOR ← Write in

Stick up Height (ags): 1.75 ft (as built) 1.80 (ft) ← As found

Inner Riser Height - TOR (ags): NR ft (as built) 1.62 (ft) ← As found

Difference; Stick up & TOR: 0.18 (ft) ← As found

Surface Casing diameter: 8 Inner Riser diameter: 4 inches

Well Depth (as installed): 20 ft (bgs)

Well Depth (as measured): 19.12 ft (TOR) ← As found

Screened interval (as installed): 10 - 20 ft (bgs)

Depth to water: ~~10-8-3~~ 10.75 ft (TOR) ← As found

Date: 8-18-14 Time: 935

NOTE: 'ags' means above ground surface; positive if above, negative if below. 'bgs' means below ground surface.
 * 'NR' means no record. 'TOR' means Top Of inner Riser pipe.

EPA Region 2 Superfund Well Assessment Checklist: MW25-6A

Well Headspace Readings

PID/FID Reading taken inside top of casing (if applicable): 0 ppm

Multi-gas/CGI meter Readings taken (if applicable):

LEL: _____ % LEL
 O₂: _____ 40% Vol.
 CO: _____ ppm
 H₂S: _____ ppm

Do readings indicate unsafe conditions exist? Yes No

Well Condition

Is the concrete pad in good condition?	<input checked="" type="radio"/> Yes	No
Is the well surface casing in good condition?	<input checked="" type="radio"/> Yes	No
Is the surface casing vertical?	<input checked="" type="radio"/> Yes	No
Is there an internal well seal/J-Plug?	<input checked="" type="radio"/> Yes	No
Has there been physical damage to the well?	Yes	<input checked="" type="radio"/> No
Does sounding depth match completed depth ⁽¹⁾ ?	<input checked="" type="radio"/> Yes	No
Is measuring point marked?	<input checked="" type="radio"/> Yes	No
Is the well clearly labeled?	<input checked="" type="radio"/> Yes	No
Flush mount - Is it secure from runoff?	NA Yes	No

Other Comments _____

(1) If sounding depth is within 0.5 feet of the previous sounding depth then check yes (previous depth 18.95 TOR)

Recommendations

Well needs to be redeveloped	<input checked="" type="radio"/> Yes	<input checked="" type="radio"/> No
Well needs to be re-surveyed.	Yes	<input checked="" type="radio"/> No
Well needs to be repaired.	Yes	<input checked="" type="radio"/> No
Well needs to be replaced.	Yes	<input checked="" type="radio"/> No
Well needs to be properly abandoned.	Yes	<input checked="" type="radio"/> No
Action necessary.	<input checked="" type="radio"/> Yes CB	<input checked="" type="radio"/> No

Comments

Inspected by: MC/ CB
 Date of Inspection: 8-18-14
 Reviewed by: _____ (Print)
 _____ (Sign)

EPA Region 2 Superfund Well Assessment Checklist: MW25-6B

Facility Information

Site Name: Picatinny Arsenal, Area C
 Site Address: Morris County, New Jersey
 Site County: Morris
 Site State: New Jersey
 EPA Site ID Number: NJ3210020704
 Site Owner: U.S. Army
 EPA Project Manager: Bill Roach

Well Locational Information

State Well ID: 25-44329
 Well Tag ID: MW25-6B
 Well Installation date: 10-25-1993

	From Log	By GPS
Ground Surface Elevation	697.56	
Latitude		
Longitude		
Northing (State Plane)	760690.68	
Easting (State Plane)	2024379.71	

Cross streets (if applicable): Behind batting cage

GPS Instrument used: _____ Datum: _____
 Accuracy/Precision: _____

Well Construction Details

Type of well (Circle one) Flush Mount Stick up

Well lock/security type: pad lock 2402

Elevation (Top of inner Riser - TOR): 692.98

Surface (Stick up) casing material: metal Well riser material: PVC

Measuring/Reference Point: TOR? TOR ← Write in

Stick up Height (ags): 1.85 ft (as built) 1.85 (ft) ← As found

Inner Riser Height - TOR (ags): NR ft (as built) 1.3 (ft) ← As found

Difference; Stick up & TOR: 0.59 (ft) ← As found

Surface Casing diameter: 8 Inner Riser diameter: 4 inches

Well Depth (as installed): 75 ft (bgs)

Well Depth (as measured): 75.96 ft (TOR) ← As found

Screened interval (as installed): 65 - 75 ft (bgs)

Depth to water: 10.83 ft (TOR) ← As found

Date: 8-18-17 Time: 935

NOTE: 'ags' means above ground surface; positive if above, negative if below. 'bgs' means below ground surface.
 * 'NR' means no record. 'TOR' means Top Of inner Riser pipe.

EPA Region 2 Superfund Well Assessment Checklist: MW25-6B

Well Headspace Readings

PID/FID Reading taken inside top of casing (if applicable): 0 ppm

Multi-gas/CGI meter Readings taken (if applicable):

LEL: _____ % LEL
 O₂: _____ 40% Vol.
 CO: _____ ppm
 H₂S: _____ ppm

Do readings indicate unsafe conditions exist? Yes No

Well Condition

Is the concrete pad in good condition?	<input checked="" type="checkbox"/> Yes	No
Is the well surface casing in good condition?	<input checked="" type="checkbox"/> Yes	No
Is the surface casing vertical?	<input checked="" type="checkbox"/> Yes	No
Is there an internal well seal/J-Plug?	<input checked="" type="checkbox"/> Yes	No
Has there been physical damage to the well?	Yes	<input checked="" type="checkbox"/> No
Does sounding depth match completed depth ⁽¹⁾ ?	<input checked="" type="checkbox"/> Yes	No
Is measuring point marked?	<input checked="" type="checkbox"/> Yes	No
Is the well clearly labeled?	<input checked="" type="checkbox"/> Yes	No
Flush mount - Is it secure from runoff?	Yes	No <i>NA</i>

Other Comments _____

(1) If sounding depth is within 0.5 feet of the previous sounding depth then check yes (previous depth 76.05 TOR)

Recommendations

Well needs to be redeveloped	Yes	<input checked="" type="checkbox"/> No
Well needs to be re-surveyed.	Yes	<input checked="" type="checkbox"/> No
Well needs to be repaired.	Yes	<input checked="" type="checkbox"/> No
Well needs to be replaced.	Yes	<input checked="" type="checkbox"/> No
Well needs to be properly abandoned.	Yes	<input checked="" type="checkbox"/> No
Action necessary.	<i>CG</i> <input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> No

Comments

Inspected by: NC/CG
 Date of Inspection: 8-18-14
 Reviewed by: _____ (Print)
 _____ (Sign)

EPA Region 2 Superfund Well Assessment Checklist: MW-17

Facility Information

Site Name: Picatinny Arsenal, Area C
 Site Address: Morris County, New Jersey
 Site County: Morris
 Site State: New Jersey
 EPA Site ID Number: NJ3210020704
 Site Owner: U.S. Army
 EPA Project Manager: Bill Roach

Well Locational Information

State Well ID: unknown
 Well Tag ID: MW-17
 Well Installation date: January 1, 1982

	From Log	By GPS
Ground Surface Elevation	692.98	
Latitude		
Longitude		
Northing (State Plane)	759381.5481 (NAD 83)	
Easting (State Plane)	2023277.1502 (NAD 83)	

Cross streets (if applicable): Side road near Building 1132

GPS Instrument used: _____ Datum: _____
 Accuracy/Precision: _____

Well Construction Details

Type of well (Circle one) Flush Mount **Stick up**

Well lock/security type: Padlock 2402

Elevation (Top of inner Riser - TOR): 692.98

Surface (Stick up) casing material: metal Well riser material: PVC

Measuring/Reference Point: TOR? TOR ← Write in

Stick up Height (ags): 2.2 ft (as built) 2.25 (ft) ← As found

Inner Riser Height - TOR (ags): 1.96 ft (as built) 1.7 (ft) ← As found

Difference; Stick up & TOR: 0.55 (ft) ← As found

Surface Casing diameter: 8 Inner Riser diameter: 4 inches

Well Depth (as installed): 19 ft (bgs)

Well Depth (as measured): 21.00 ft (TOR) ← As found

Screened interval (as installed): 7 - 19 ft (bgs)

Depth to water: 8.81 ft (TOR) ← As found

Date: 8/18/14 Time: 1400

NOTE: 'ags' means above ground surface; positive if above, negative if below. 'bgs' means below ground surface. 'TOR' means Top Of inner Riser pipe.

EPA Region 2 Superfund Well Assessment Checklist: MW-17

Well Headspace Readings

PID/FID Reading taken inside top of casing (if applicable): 0.0 ppm

Multi-gas/CGI meter Readings taken (if applicable):

LEL: _____ % LEL
 O₂: _____ 40% Vol.
 CO: _____ ppm
 H₂S: _____ ppm

Do readings indicate unsafe conditions exist? Yes No

Well Condition

Is the concrete pad in good condition?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Is the well surface casing in good condition?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Is the surface casing vertical?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Is there an internal well seal/J-Plug?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Has there been physical damage to the well?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Does sounding depth match completed depth ⁽¹⁾ ?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Is measuring point marked?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Is the well clearly labeled?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Flush mount - Is it secure from runoff?	<u>NA</u> Yes	<input type="checkbox"/> No

Other Comments _____

(1) If sounding depth is within 0.5 feet of the previous sounding depth then check yes (previous depth 20.85 TOR)

Recommendations

Well needs to be redeveloped	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Well needs to be re-surveyed.	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Well needs to be repaired.	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Well needs to be replaced.	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Well needs to be properly abandoned.	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Action necessary.	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No

Comments

Inspected by: C. Goldsmith
 Date of Inspection: 8/18/14
 Reviewed by: _____ (Print)
 _____ (Sign)

EPA Region 2 Superfund Well Assessment Checklist: MW25-8

Facility Information

Site Name: Picatinny Arsenal, Area C
 Site Address: Morris County, New Jersey
 Site County: Morris
 Site State: New Jersey
 EPA Site ID Number: NJ3210020704
 Site Owner: U.S. Army
 EPA Project Manager: Bill Roach

Well Locational Information

State Well ID: 25-44543
 Well Tag ID: MW25-8
 Well Installation date: November 07, 1993

	From Log	By GPS
Ground Surface Elevation	688.24	
Latitude		
Longitude		
Northing (State Plane)	759627.73 (NAD 83)	
Easting (State Plane)	2023051.11 (NAD 83)	

Cross streets (if applicable): Enter ball field to lower burning ground, through broken gate on left, wells in wooded area.

GPS Instrument used: _____ Datum: _____
 Accuracy/Precision: _____

Well Construction Details

Type of well (Circle one) Flush Mount **Stick up**

Well lock/security type: pad lock 2402

Elevation (Top of inner Riser - TOR): 690.22

Surface (Stick up) casing material: metal Well riser material: PVC

Measuring/Reference Point: **TOR?** TOR ← Write in

Stick up Height (ags): 1.8 ft (as built) 1.85 (ft) ← As found

Inner Riser Height - TOR (ags): NR ft (as built) 1.45 (ft) ← As found

Difference; Stick up & TOR: 0.40 (ft) ← As found

Surface Casing diameter: 8 Inner Riser diameter: 4 inches

Well Depth (as installed): 30 ft (bgs)

Well Depth (as measured): 31.82 ft (TOR) ← As found

Screened interval (as installed): 20 - 30 ft (bgs)

Depth to water: 7.08 ft (TOR) ← As found

Date: 8/18/14 Time: 1:15

NOTE: 'ags' means above ground surface; positive if above, negative if below. 'bgs' means below ground surface.
 * 'NR' means no record. 'TOR' means Top Of inner Riser pipe.

EPA Region 2 Superfund Well Assessment Checklist: MW25-8

Well Headspace Readings

PID/FID Reading taken inside top of casing (if applicable): 0.0 ppm

Multi-gas/CGI meter Readings taken (if applicable):

LEL: _____ % LEL
 O₂: _____ 40% Vol.
 CO: _____ ppm
 H₂S: _____ ppm

Do readings indicate unsafe conditions exist? Yes No

Well Condition

Is the concrete pad in good condition?	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Is the well surface casing in good condition?	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Is the surface casing vertical?	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Is there an internal well seal/J-Plug?	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Has there been physical damage to the well?	<input type="radio"/> Yes	<input checked="" type="radio"/> No
Does sounding depth match completed depth ⁽¹⁾ ?	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Is measuring point marked?	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Is the well clearly labeled?	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Flush mount - Is it secure from runoff?	<u>NA</u> <input type="radio"/> Yes	<input type="radio"/> No

Other Comments _____

(1) If sounding depth is within 0.5 feet of the previous sounding depth then check yes (previous depth 31.7 TOR)

Recommendations

Well needs to be redeveloped	<input type="radio"/> Yes	<input checked="" type="radio"/> No
Well needs to be re-surveyed.	<input type="radio"/> Yes	<input checked="" type="radio"/> No
Well needs to be repaired.	<input type="radio"/> Yes	<input checked="" type="radio"/> No
Well needs to be replaced.	<input type="radio"/> Yes	<input checked="" type="radio"/> No
Well needs to be properly abandoned.	<input type="radio"/> Yes	<input checked="" type="radio"/> No
Action necessary.	<input type="radio"/> Yes	<input checked="" type="radio"/> No

Comments

Inspected by: C. Goldsmith
Date of Inspection: _____
Reviewed by: _____ (Print)
 _____ (Sign)

EPA Region 2 Superfund Well Assessment Checklist: DM19-1

Facility Information

Site Name: Picatinny Arsenal, Area C
 Site Address: Morris County, New Jersey
 Site County: Morris
 Site State: New Jersey
 EPA Site ID Number: NJ3210020704
 Site Owner: U.S. Army
 EPA Project Manager: Bill Roach

Well Locational Information

State Well ID: 25-30835
 Well Tag ID: DM19-1
 Well Installation date: 12-30-1988

	From Log	By GPS
Ground Surface Elevation	690.1	
Latitude		
Longitude		
Northing (State Plane)	762313.77 (NAD 1983)	
Easting (State Plane)	470093.91 (NAD 1983)	

Cross streets (if applicable): Southbrook Road near tower

GPS Instrument used: _____ Datum: _____
 Accuracy/Precision: _____

Well Construction Details

Type of well (Circle one) Flush Mount Stick up

Well lock/security type: pad lock 2402

Elevation (Top of inner Riser - TOR): 692.18

Surface (Stick up) casing material: metal Well riser material: PVC

Measuring/Reference Point: TOR? TDR ← Write in

Stick up Height (ags): 2.6 ft (as built) 2.6 (ft) ← As found

Inner Riser Height - TOR (ags): NR ft (as built) 1.8 (ft) ← As found

Difference; Stick up & TOR: ~~2.90~~ 0.8 (ft) ← As found

Surface Casing diameter: 6 Inner Riser diameter: 4 inches

Well Depth (as installed): 19.5 ft (bgs)

Well Depth (as measured): 21.90 ft (TOR) ← As found

Screened interval (as installed): 9.5 - 19.5 ft (bgs)

Depth to water: 8.03 ft (TOR) ← As found

Date: 8/18/14 Time: 1115

NOTE: 'ags' means above ground surface; positive if above, negative if below. 'bgs' means below ground surface.
 * 'NR' means no record. 'TOR' means Top Of inner Riser pipe.

EPA Region 2 Superfund Well Assessment Checklist: DM19-1

Well Headspace Readings

PID/FID Reading taken inside top of casing (if applicable): 0.0 ppm

Multi-gas/CGI meter Readings taken (if applicable):

LEL: _____ % LEL
 O₂: _____ 40% Vol.
 CO: _____ ppm
 H₂S: _____ ppm

Do readings indicate unsafe conditions exist? Yes No

Well Condition

Is the concrete pad in good condition?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Is the well surface casing in good condition?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Is the surface casing vertical?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Is there an internal well seal/J-Plug?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Has there been physical damage to the well?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Does sounding depth match completed depth ⁽¹⁾ ?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Is measuring point marked?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Is the well clearly labeled?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Flush mount - Is it secure from runoff?	<u>NA</u> <input type="checkbox"/> Yes	<input type="checkbox"/> No

Other Comments _____

(1) If sounding depth is within 0.5 feet of the previous sounding depth then check yes (previous depth 21.7 TOR)

Recommendations

Well needs to be redeveloped	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Well needs to be re-surveyed.	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Well needs to be repaired.	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Well needs to be replaced.	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Well needs to be properly abandoned.	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Action necessary.	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No

Comments

Inspected by: C. G. H Smith
 Date of Inspection: 2/18/14
 Reviewed by: _____ (Print)
 _____ (Sign)

EPA Region 2 Superfund Well Assessment Checklist: DM19-2

Facility Information

Site Name: Picatinny Arsenal, Area C
 Site Address: Morris County, New Jersey
 Site County: Morris
 Site State: New Jersey
 EPA Site ID Number: NJ3210020704
 Site Owner: U.S. Army
 EPA Project Manager: Bill Roach

Well Locational Information

State Well ID: 25-30836
 Well Tag ID: DM19-2
 Well Installation date: 01-4-1988

	From Log	By GPS
Ground Surface Elevation	690.9	
Latitude		
Longitude		
Northing (State Plane)	762549.29 (NAD 1983)	
Easting (State Plane)	470210.60 (NAD 1983)	

Cross streets (if applicable): Southbrook Road near tower

GPS Instrument used: _____ Datum: _____

Accuracy/Precision: _____

Well Construction Details

Type of well (Circle one) Flush Mount **Stick up**

Well lock/security type: pad lock 2402

Elevation (Top of inner Riser - TOR): 692.82

Surface (Stick up) casing material: metal Well riser material: PVC

Measuring/Reference Point: TOR? TOR ← Write in

Stick up Height (ags): 2.7 ft (as built) 2.6 (ft) ← As found

Inner Riser Height - TOR (ags): NR ft (as built) 2.1 (ft) ← As found

Difference; Stick up & TOR: 0.50 (ft) ← As found

Surface Casing diameter: 6 Inner Riser diameter: 4 inches

Well Depth (as installed): 19.5 ft (bgs)

Well Depth (as measured): 21.35 ft (TOR) ← As found

Screened interval (as installed): 9.5 - 19.5 ft (bgs)

Depth to water: 8.83 ft (TOR) ← As found

Date: 8/18/14 Time: 1130

NOTE: 'ags' means above ground surface; positive if above, negative if below. 'bgs' means below ground surface.
 * 'NR' means no record. 'TOR' means Top Of inner Riser pipe.

EPA Region 2 Superfund Well Assessment Checklist: DM19-2

Well Headspace Readings

PID/FID Reading taken inside top of casing (if applicable): 0-0 ppm

Multi-gas/CGI meter Readings taken (if applicable):

LEL: _____ % LEL
 O₂: _____ 40% Vol.
 CO: _____ ppm
 H₂S: _____ ppm

Do readings indicate unsafe conditions exist? Yes No

Well Condition

Is the concrete pad in good condition?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Is the well surface casing in good condition?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Is the surface casing vertical?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Is there an internal well seal/J-Plug?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Has there been physical damage to the well?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Does sounding depth match completed depth ⁽¹⁾ ?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Is measuring point marked?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Is the well clearly labeled?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Flush mount - Is it secure from runoff?	<u>NA</u> Yes	<input type="checkbox"/> No

Other Comments _____

(1) If sounding depth is within 0.5 feet of the previous sounding depth then check yes (previous depth 21.4 TOR)

Recommendations

Well needs to be redeveloped	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Well needs to be re-surveyed.	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Well needs to be repaired.	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Well needs to be replaced.	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Well needs to be properly abandoned.	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Action necessary.	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No

Comments

Inspected by: C. Goldsmith
 Date of Inspection: 8/18/14
 Reviewed by: _____ (Print)
 _____ (Sign)

EPA Region 2 Superfund Well Assessment Checklist: DM25-2

Facility Information

Site Name: Picatinny Arsenal, Area C
 Site Address: Morris County, New Jersey
 Site County: Morris
 Site State: New Jersey
 EPA Site ID Number: NJ3210020704
 Site Owner: U.S. Army
 EPA Project Manager: Bill Roach

Well Locational Information

State Well ID: 25-30844
 Well Tag ID: DM25-2
 Well Installation date: December 22, 1987

	From Log	By GPS
Ground Surface Elevation	692.8	
Latitude		
Longitude		
Northing (State Plane)	759847.19 (NAD 83)	
Easting (State Plane)	2022970.44 (NAD 83)	

Cross streets (if applicable): South Brook Rd near Building 44F

GPS Instrument used: _____ Datum: _____
 Accuracy/Precision: _____

Well Construction Details

Type of well (Circle one) Flush Mount **Stick up**

Well lock/security type: Padlock 2402

Elevation (Top of inner Riser - TOR): 694.99

Surface (Stick up) casing material: metal Well riser material: PVC

Measuring/Reference Point: **TOR?** TOR ← Write in

Stick up Height (ags): 2.2 ft (as built) 2.25 (ft) ← As found

Inner Riser Height - TOR (ags): NR ft (as built) 1.85 (ft) ← As found

Difference; Stick up & TOR: 0.40 (ft) ← As found

Surface Casing diameter: 6 Inner Riser diameter: 4 inches

Well Depth (as installed): 20.1 ft (bgs)

Well Depth (as measured): 21.85 ft (TOR) ← As found

Screened interval (as installed): 9.9 - 20.1 ft (bgs)

Depth to water: 11.87 ft (TOR) ← As found

Date: 8/8/14 Time: 1425

NOTE: 'ags' means above ground surface; positive if above, negative if below. 'bgs' means below ground surface.
 * 'NR' means no record. 'TOR' means Top Of inner Riser pipe.

EPA Region 2 Superfund Well Assessment Checklist: DM25-2

Well Headspace Readings

PID/FID Reading taken inside top of casing (if applicable): 0.0 ppm

Multi-gas/CGI meter Readings taken (if applicable):

LEL: _____ % LEL
 O₂: _____ 40% Vol.
 CO: _____ ppm
 H₂S: _____ ppm

Do readings indicate unsafe conditions exist? Yes No

Well Condition

Is the concrete pad in good condition?	<u>Yes</u>	No
Is the well surface casing in good condition?	<u>Yes</u>	No
Is the surface casing vertical?	<u>Yes</u>	No
Is there an internal well seal/J-Plug?	<u>Yes</u>	No
Has there been physical damage to the well?	Yes	<u>No</u>
Does sounding depth match completed depth ⁽¹⁾ ?	<u>Yes</u>	No
Is measuring point marked?	<u>Yes</u>	No
Is the well clearly labeled?	<u>Yes</u>	No
Flush mount - Is it secure from runoff?	<u>NA</u> Yes	No

Other Comments _____

(1) If sounding depth is within 0.5 feet of the previous sounding depth then check yes (previous depth 21.75 TOR)

Recommendations

Well needs to be redeveloped	Yes	<u>No</u>
Well needs to be re-surveyed.	Yes	<u>No</u>
Well needs to be repaired.	Yes	<u>No</u>
Well needs to be replaced.	Yes	<u>No</u>
Well needs to be properly abandoned.	Yes	<u>No</u>
Action necessary.	Yes	<u>No</u>

Comments

Inspected by: C. Goldsmith
 Date of Inspection: 8/18/14
 Reviewed by: _____ (Print)
 _____ (Sign)

EPA Region 2 Superfund Well Assessment Checklist: C1-B

Facility Information

Site Name: Picatinny Arsenal, Area C
 Site Address: Morris County, New Jersey
 Site County: Morris
 Site State: New Jersey
 EPA Site ID Number: NJ3210020704
 Site Owner: U.S. Army
 EPA Project Manager: Bill Roach

Well Locational Information

State Well ID: 25-33586
 Well Tag ID: C1-B
 Well Installation date: 09-29-1989

	From Log	By GPS
Ground Surface Elevation	691.4	
Latitude	405531	
Longitude	743434	
Northing (State Plane)		
Easting (State Plane)		

Cross streets (if applicable): Off of Shinkle Road in woods

GPS Instrument used: _____ Datum: _____
 Accuracy/Precision: _____

Well Construction Details

Type of well (Circle one) Flush Mount Stick up

Well lock/security type: pad lock 2402

Elevation (Top of inner Riser - TOR): 690.6

Surface (Stick up) casing material: metal Well riser material: PVC

Measuring/Reference Point: TOR? TOR ← Write in

Stick up Height (ags): 1.1 ft (as built) 1.15 (ft) ← As found

Inner Riser Height - TOR (ags): NR ft (as built) 1.05 (ft) ← As found

Difference; Stick up & TOR: 0.10 (ft) ← As found

Surface Casing diameter: 4 Inner Riser diameter: 2 inches

Well Depth (as installed): 22.3 ft (bgs)

Well Depth (as measured): 23.11 ft (TOR) ← As found

Screened interval (as installed): 12.3 - 22.3 ft (bgs)

Depth to water: 2.86 ft (TOR) ← As found

Date: 8/18/14 Time: 1350

NOTE: 'ags' means above ground surface; positive if above, negative if below. 'bgs' means below ground surface.
 * 'NR' means no record. 'TOR' means Top Of inner Riser pipe.

EPA Region 2 Superfund Well Assessment Checklist: C1-B

Well Headspace Readings

PID/FID Reading taken inside top of casing (if applicable): 0.0 ppm

Multi-gas/CGI meter Readings taken (if applicable):

LEL: _____ % LEL
 O₂: _____ 40% Vol.
 CO: _____ ppm
 H₂S: _____ ppm

Do readings indicate unsafe conditions exist? Yes No

Well Condition

Is the concrete pad in good condition?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Is the well surface casing in good condition?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Is the surface casing vertical?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Is there an internal well seal/J-Plug?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Has there been physical damage to the well?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Does sounding depth match completed depth ⁽¹⁾ ?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Is measuring point marked?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Is the well clearly labeled?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Flush mount - Is it secure from runoff?	<u>NA</u> Yes	<input type="checkbox"/> No

Other Comments _____

(1) If sounding depth is within 0.5 feet of the previous sounding depth then check yes (previous depth 23.05 TOR)

Recommendations

Well needs to be redeveloped	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Well needs to be re-surveyed.	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Well needs to be repaired.	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Well needs to be replaced.	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Well needs to be properly abandoned.	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Action necessary.	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No

Comments

Inspected by: C. Goldsmith
 Date of Inspection: 8/18/14
 Reviewed by: _____ (Print)
 _____ (Sign)

EPA Region 2 Superfund Well Assessment Checklist: MW 180-1

Facility Information

Site Name: Picatinny Arsenal, Area C
 Site Address: Morris County, New Jersey
 Site County: Morris
 Site State: New Jersey
 EPA Site ID Number: NJ3210020704
 Site Owner: U.S. Army
 EPA Project Manager: Bill Roach

Well Locational Information

State Well ID: 25-44124
 Well Tag ID: MW 180-1
 Well Installation date: October 20, 1993

	From Log	By GPS
Ground Surface Elevation	691.6	
Latitude		
Longitude		
Northing (State Plane)	761144.75 (NAD 83)	<i>Needs to be re-surveyed</i>
Easting (State Plane)	2023825.92 (NAD 83)	<i>Needs to be re-surveyed</i>

Cross streets (if applicable): Back of side road by skeet range next to LUC sign

GPS Instrument used: _____ Datum: _____
 Accuracy/Precision: _____

Well Construction Details

Type of well (Circle one) Flush Mount Stick up

Well lock/security type: Padlock 2402

Elevation (Top of inner Riser - TOR): ~~-693.72~~ *Needs to be surveyed*

Surface (Stick up) casing material: metal Well riser material: PVC

Measuring/Reference Point: TOR? TOR ← Write in

Stick up Height (ags): 1.8 ft (as built) 2.00 (ft) ← As found

Inner Riser Height - TOR (ags): NR ft (as built) 1.55 (ft) ← As found

Difference; Stick up & TOR: 0.45 (ft) ← As found

Surface Casing diameter: ~~6~~ 6 Inner Riser diameter: ~~2~~ 2 inches

Well Depth (as installed): 15 ft (bgs)

Well Depth (as measured): 19.1 ft (TOR) ← As found

Screened interval (as installed): 5 - 15 ft (bgs)

Depth to water: 11.06 ft (TOR) ← As found

Date: 9/19/14 Time: 1030

NOTE: 'ags' means above ground surface; positive if above, negative if below. 'bgs' means below ground surface.
 * 'NR' means no record. 'TOR' means Top Of inner Riser pipe.

EPA Region 2 Superfund Well Assessment Checklist: MW 180-1

Well Headspace Readings

PID/FID Reading taken inside top of casing (if applicable): 0.0 ppm

Multi-gas/CGI meter Readings taken (if applicable):

LEL: _____ % LEL
 O₂: _____ 40% Vol.
 CO: _____ ppm
 H₂S: _____ ppm

Do readings indicate unsafe conditions exist? Yes No

Well Condition

Is the concrete pad in good condition?	<input checked="" type="checkbox"/> Yes	No
Is the well surface casing in good condition?	<input checked="" type="checkbox"/> Yes	No
Is the surface casing vertical?	<input checked="" type="checkbox"/> Yes	No
Is there an internal well seal/J-Plug?	<input checked="" type="checkbox"/> Yes	No
Has there been physical damage to the well?	Yes	<input checked="" type="checkbox"/> No
Does sounding depth match completed depth ⁽¹⁾ ? <i>New well</i>	Yes	No
Is measuring point marked?	Yes	<input checked="" type="checkbox"/> No
Is the well clearly labeled?	<input checked="" type="checkbox"/> Yes	No
Flush mount - Is it secure from runoff? <i>NA</i>	Yes	No

Other Comments _____

(1) If sounding depth is within 0.5 feet of the previous sounding depth then check yes (previous depth 15.4 TOR)

Recommendations

Well needs to be redeveloped	Yes	<input checked="" type="checkbox"/> No
Well needs to be re-surveyed.	<input checked="" type="checkbox"/> Yes	No
Well needs to be repaired.	Yes	<input checked="" type="checkbox"/> No
Well needs to be replaced.	Yes	<input checked="" type="checkbox"/> No
Well needs to be properly abandoned.	Yes	<input checked="" type="checkbox"/> No
Action necessary.	<input checked="" type="checkbox"/> Yes	No

Comments

Well was abandoned and re-installed due to leak in lower burning ground. Well needs to be re-surveyed.

Inspected by: C. Goldsmith
 Date of Inspection: 9/18/14
 Reviewed by: _____ (Print)
 _____ (Sign)

EPA Region 2 Superfund Well Assessment Checklist: 1181-3

Facility Information

Site Name: Picatinny Arsenal, Area C
 Site Address: Morris County, New Jersey
 Site County: Morris
 Site State: New Jersey
 EPA Site ID Number: NJ3210020704
 Site Owner: U.S. Army
 EPA Project Manager: Bill Roach

Well Locational Information

State Well ID: 25-33581
 Well Tag ID: 1181-3
 Well Installation date: April 27, 1989

	From Log	By GPS
Ground Surface Elevation	688.5	
Latitude		
Longitude		
Northing (State Plane)	761265.34 (NAD 83)	<i>Needs to be surveyed</i>
Easting (State Plane)	469922.25 (NAD 83)	<i>Needs to be surveyed</i>

Cross streets (if applicable): Back of side road by skeet range next to LUC sign

GPS Instrument used: _____ Datum: _____
 Accuracy/Precision: _____

Well Construction Details

Type of well (Circle one) Flush Mount **Stick up**

Well lock/security type: Padlock 2402

Elevation (Top of inner Riser - TOR): ~~691.25~~ *Needs to be surveyed*

Surface (Stick up) casing material: metal Well riser material: PVC

Measuring/Reference Point: TOR? TOR ← Write in

Stick up Height (ags): 2.45 ft (as built) 2.40 (ft) ← As found

Inner Riser Height - TOR (ags): NR ft (as built) 2.10 (ft) ← As found

Difference; Stick up & TOR: 0.30 (ft) ← As found

Surface Casing diameter: 4 Inner Riser diameter: 2 inches

Well Depth (as installed): 22.5 ft (bgs)

Well Depth (as measured): 27.05 ft (TOR) ← As found

Screened interval (as installed): 12.5 - 22.5 ft (bgs)

Depth to water: 9.50 ft (TOR) ← As found

Date: 9/19/14 Time: 0900

NOTE: 'ags' means above ground surface; positive if above, negative if below. 'bgs' means below ground surface.
 * 'NR' means no record. 'TOR' means Top Of inner Riser pipe.

EPA Region 2 Superfund Well Assessment Checklist: 1181-3

Well Headspace Readings

PID/FID Reading taken inside top of casing (if applicable): 0.0 ppm

Multi-gas/CGI meter Readings taken (if applicable):

LEL: _____ % LEL
 O₂: _____ 40% Vol.
 CO: _____ ppm
 H₂S: _____ ppm

Do readings indicate unsafe conditions exist? Yes No

Well Condition

Is the concrete pad in good condition?	<input checked="" type="checkbox"/> Yes	No
Is the well surface casing in good condition?	<input checked="" type="checkbox"/> Yes	No
Is the surface casing vertical?	<input checked="" type="checkbox"/> Yes	No
Is there an internal well seal/J-Plug?	<input checked="" type="checkbox"/> Yes	No
Has there been physical damage to the well?	Yes	<input checked="" type="checkbox"/> No
Does sounding depth match completed depth ⁽¹⁾ ? <i>was re-installed</i>	Yes	No
Is measuring point marked?	Yes	<input checked="" type="checkbox"/> No
Is the well clearly labeled?	<input checked="" type="checkbox"/> Yes	No
Flush mount - Is it secure from runoff?	<i>NA</i> Yes	No

Other Comments _____

(1) If sounding depth is within 0.5 feet of the previous sounding depth then check yes (previous depth 24.87 TOR)

Recommendations

Well needs to be redeveloped	Yes	<input checked="" type="checkbox"/> No
Well needs to be re-surveyed.	<input checked="" type="checkbox"/> Yes	No
Well needs to be repaired.	Yes	<input checked="" type="checkbox"/> No
Well needs to be replaced.	Yes	<input checked="" type="checkbox"/> No
Well needs to be properly abandoned.	Yes	<input checked="" type="checkbox"/> No
Action necessary.	<input checked="" type="checkbox"/> Yes	No

Comments

*well was abandoned and re-installed due to work in lower bearing strata
 - well needs to be re-surveyed*

Inspected by: C. Goldsmith
 Date of Inspection: 9/19/14
 Reviewed by: _____ (Print)
 _____ (Sign)

APPENDIX B

PHOTOLOG

Picatinny Arsenal

Project: Area C Groundwater Long Term Monitoring

Location: Picatinny Arsenal, NJ

Project No.
03816003.0000

Photo No. 1

Description:

DM19-1



Picatinny Arsenal

Project: Area C Groundwater Long Term Monitoring

Location: Picatinny Arsenal, NJ

Project No.
03816003.0000

Photo No. 2

Description:

DM19-2



Picatinny Arsenal

Project: Area C Groundwater Long Term Monitoring

Location: Picatinny Arsenal, NJ

Project No.
03816003.0000

Photo No.3

Description:

C1-B



Picatinny Arsenal

Project: Area C Groundwater Long Term Monitoring

Location: Picatinny Arsenal, NJ

Project No.
03816003.0000

Photo No. 4

Description:

1181-3



Picatinny Arsenal

Project: Area C Groundwater Long Term Monitoring

Location: Picatinny Arsenal, NJ

Project No.
03816003.0000

Photo No. 5

Description:

MW-17



Picatinny Arsenal

Project: Area C Groundwater Long Term Monitoring

Location: Picatinny Arsenal, NJ

Project No.
03816003.0000

Photo No.6

Description:

DM25-2



Picatinny Arsenal

Project: Area C Groundwater Long Term Monitoring

Location: Picatinny Arsenal, NJ

Project No.
03816003.0000

Photo No. 7

Description:

MW25-6A



Picatinny Arsenal

Project: Area C Groundwater Long Term Monitoring

Location: Picatinny Arsenal, NJ

Project No.
03816003.0000

Photo No. 8

Description:

MW25-6B



Picatinny Arsenal

Project: Area C Groundwater Long Term Monitoring

Location: Picatinny Arsenal, NJ

Project No.
03816003.0000

Photo No. 9

Description:

MW180-1



Picatinny Arsenal

Project: Area C Groundwater Long Term Monitoring

Location: Picatinny Arsenal, NJ

Project No.
03816003.0000

Photo No. 10

Description:

MW25-8



Picatinny Arsenal

Project: Area C Groundwater Long Term Monitoring

Location: Picatinny Arsenal, NJ

Project No.
03816003.0000

Photo No. 11

Description:

SB1-1



Picatinny Arsenal

Project: Area C Groundwater Long Term Monitoring

Location: Picatinny Arsenal, NJ

Project No.
03816003.0000

Photo No. 12

Description:

SB1-2



Picatinny Arsenal

Project: Area C Groundwater Long Term Monitoring

Location: Picatinny Arsenal, NJ

Project No.
03816003.0000

Photo No. 13

Description:

SB1-3



Picatinny Arsenal

Project: Area C Groundwater Long Term Monitoring

Location: Picatinny Arsenal, NJ

Project No.
03816003.0000

Photo No. 14

Description:

SB1-5



Picatinny Arsenal

Project: Area C Groundwater Long Term Monitoring

Location: Picatinny Arsenal, NJ

Project No.
03816003.0000

Photo No. 15

Description:

SB1-6



Picatinny Arsenal

Project: Area C Groundwater Long Term Monitoring

Location: Picatinny Arsenal, NJ

Project No.
03816003.0000

Photo No. 16

Description:

SB1-7



Picatinny Arsenal

Project: Area C Groundwater Long Term Monitoring

Location: Picatinny Arsenal, NJ

Project No.
03816003.0000

Photo No. 17

Description:

SB2-3



Picatinny Arsenal

Project: Area C Groundwater Long Term Monitoring

Location: Picatinny Arsenal, NJ

Project No.
03816003.0000

Photo No. 18

Description:

SB3-1B



Picatinny Arsenal

Project: Area C Groundwater Long Term Monitoring

Location: Picatinny Arsenal, NJ

Project No.
03816003.0000

Photo No. 19

Description:

SB3-2



Picatinny Arsenal

Project: Area C Groundwater Long Term Monitoring

Location: Picatinny Arsenal, NJ

Project No.
03816003.0000

Photo No. 20

Description:

SB3-3



Picatinny Arsenal

Project: Area C Groundwater Long Term Monitoring

Location: Picatinny Arsenal, NJ

Project No.
03816003.0000

Photo No. 21

Description:

SB4-1: with cracked well pad



Picatinny Arsenal

Project: Area C Groundwater Long Term Monitoring

Location: Picatinny Arsenal, NJ

Project No.
03816003.0000

Photo No. 22

Description:

SB4-1: with repaired well pad



Picatinny Arsenal

Project: Area C Groundwater Long Term Monitoring	Location: Picatinny Arsenal, NJ	Project No. 03816003.0000
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Photo No. 23

Description:

SB4-2



Picatinny Arsenal

Project: Area C Groundwater Long Term Monitoring	Location: Picatinny Arsenal, NJ	Project No. 03816003.0000
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Photo No. 24

Description:

SB4-4



Picatinny Arsenal

Project: Area C Groundwater Long Term Monitoring

Location: Picatinny Arsenal, NJ

Project No.
03816003.0000

Photo No. 25

Description:

SB4-3: With damage well pad



Picatinny Arsenal

Project: Area C Groundwater Long Term Monitoring

Location: Picatinny Arsenal, NJ

Project No.
03816003.0000

Photo No. 26

Description:

SB4-3: Well pad repaired



Picatinny Arsenal

Project: Area C Groundwater Long Term Monitoring

Location: Picatinny Arsenal, NJ

Project No.
03816003.0000

Photo No. 27

Description:

SB2-2: With damaged well pad



Picatinny Arsenal

Project: Area C Groundwater Long Term Monitoring

Location: Picatinny Arsenal, NJ

Project No.
03816003.0000

Photo No. 28

Description:

SB2-2: After well pad repair



Picatinny Arsenal

Project: Area C Groundwater Long Term Monitoring

Location: Picatinny Arsenal, NJ

Project No.
03816003.0000

Photo No. 29

Description:

SB2-1A



Picatinny Arsenal

APPENDIX C

SAMPLING DATA SHEETS



Groundwater Sampling Form

Project No. 03816003.0000.00900 Well ID C-SB1-001 Date 8-19-14

Project Name/Location Picatinny Arsenal Area C Weather Sunny 70°-71°

Measuring Pt. Description TOR Screen Setting (ft-bmp) 83-93 Casing Diameter (in.) 4 Well Material PVC

Total Depth (ft-bmp) 94.50 Static Water Level (ft-bmp) 7.12 Water Column in Well 87.38 Gallons in Well 56.8

Calc. Gallons Purged Pump Intake (ft-bmp) 87 Purge Method: Bladder Sample Method Low flow

Gallons Purged MP Elevation Centrifugal Submersible Bladder Disp. Bailer Other Pump On/Off 948

Sample Time: Label 1035 Replicate/Code No. Other Other Pumped by Sampled by

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Liters Gallons Purged	pH	Cond. (µmhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (F)	Redox (mV)	Appearance	
											Color	Odor
955	0	200	17.15	5	5.61	0.833	49.9	7.34	13.47	209	clear	none
91000	5	200	7.15	1.8	5.60	0.810	39.0	7.66	13.36	224		
1005	10	200	7.15	2.5	5.61	0.810	35.7	6.60	13.38	226		
1010	15	200	7.15	3.5	5.63	0.810	33.4	6.49	13.25	230		
1015	20	200	7.15	4.5	5.64	0.809	29.5	6.55	13.17	232		
1020	25	200	7.15	5.5	5.64	0.808	25.9	6.41	13.16	234		
1025	30	200	7.15	6.5	5.64	0.810	26.2	6.41	13.25	234		
1030	35	200	7.15	7.5	5.66	0.811	25.4	6.31	13.18	234	↓	↓

Constituents Sampled	Container	Number	Preservative
Vinyl Chloride	40 mL VOA	3	HCL
Arsenic and Lead	500 mL Plastic	1	HNO3

Well Information

Well Location: 600D Well Locked at Arrival: Yes / No

Condition of Well: Good Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up Key Number To Well: 2402

NOTES:

Well Casing Volumes

Gallons/Foot	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	



ARCADIS

Groundwater Sampling Form

Project No. 03816003.0000.00900

Well ID C-SB1-2

Date 8-19-14

Project Name/Location Picatinny Arsenal Area C

Weather Sunny + 80°

Measuring Pt. Description TOR

Screen Setting (ft-bmp) 8-18

Casing Diameter (in.) 4

Well Material PVC

Total Depth (ft-bmp) 20.9

Static Water Level (ft-bmp) 7.44

Water Column in Well 13.55

Gallons in Well 8.8

Calc. Gallons Purged

Pump Intake (ft-bmp) 10

Purge Method:

Sample Method Low-flow

Gallons Purged

MP Elevation

Centrifugal Submersible Bladeless

Pump On/Off 900/945

Sample Time: Label 940

Replicate/Code No. Dup 002 (081914)

Disp. Bailor Other

Sampled by NC

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH	Cond. (µmhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°F)	Redox (mV)	Appearance	
											Color	Odor
905	5	250	7.62	.5	5.26	3.74	7.8	6.13	14.01	261	clear	none
910	10	250	7.65	1.75	5.33	3.76	3.8	5.65	13.74	249		
915	15	250	7.75	3.00	5.35	3.77	3.6	5.41	13.71	248		
920	20	250	7.75	4.25	5.35	3.78	5.1	5.24	13.72	249		
925	25	250	7.75	5.50	5.36	2.79	8.8	5.28	13.72	250		
930	30	250	7.75	6.75	5.37	3.79	8.8	5.08	13.70	246		
935	35	250	7.75	8.00	5.37	3.79	7.8	5.10	13.68	246	↓	↓

Constituents Sampled	Container	Number	Preservative
Vinyl Chloride	40 mL VOA	3	HCL
Arsenic + Lead	500 mL plastic	1	HNO3

Well Information

Well Location: _____

Condition of Well: _____

Well Completion: Flush Mount / Stick Up

Well Locked at Arrival: Yes / No

Well Locked at Departure: Yes / No

Key Number To Well: ~~2402~~ 2402

NOTES:

Well Casing Volumes

Gallons/Foot	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

Dup 002 (081914) @ → 1000



ARCADIS

Groundwater Sampling Form

Project No. 03816003.0000.00900

Well ID

SBI-3

Date

Page 1 of

8/19/14

Project Name/Location Picatinny Arsenal Area C

Weather

61°F / Sunny

Measuring Pt. Description

TOR

Screen Setting (ft-bmp)

29-34

Casing Diameter (in.)

4

Well Material

PVC
SS
Other

Total Depth (ft-bmp)

36.85

Static Water Level (ft-bmp)

7.93

Water Column in Well

29.92

Gallons in Well

18.8

Calc. Gallons Purged

Pump Intake (ft-bmp)

32

Purge Method:

Centrifugal
Submersible
Disp. Bailer
Other

Sample Method

Low flow

Gallons Purged

MP Elevation

Pump On/Off

9:10/1000

Sample Time: Label

955

Replicate/ Code No.

Sampled by

DP

Table with columns: Time, Minutes Elapsed, Rate (gpm), Depth to Water (ft), Gallons Purged, pH, Cond. (umhos), Turbidity (NTU), Dissolved Oxygen (mg/L), Temp. (°C), Redox (mV), Appearance (Color, Odor). Includes handwritten data for times 9:15 to 9:50.

Table with columns: Constituents Sampled, Container, Number, Preservative. Includes handwritten entries for Vinyl Chloride, Arsenic and lead.

Well Information section with fields for Well Location, Condition of Well, Well Completion, Well Locked at Arrival/Departure, and Key Number To Well.

NOTES:

Well Casing Volumes table with columns for Gallons/Foot and casing diameters (1", 1.25", 1.5", 2", 2.5", 3", 3.5", 4", 6").



Groundwater Sampling Form

Project No. 03816003.0000.00900

Well ID C-5B1-005

Date 8-19-14

Project Name/Location Picatinny Arsenal Area C

Weather Sunny 75°F

Measuring Pt. TOR Screen Setting (ft-bmp) 90-110

Casing Diameter (in.) 2

Well Material PVC

Total Depth (ft-bmp) 109.6 Static Water Level (ft-bmp) 23.5

Water Column in Well 86.1

Gallons in Well 13.8

Calc. Gallons Purged Pump Intake (ft-bmp) 100

Purge Method: Centrifugal

Sample Method Low Flow

Gallons Purged MP Elevation

Submersible 316 steel

Pump On/Off 1055/1150

Sample Time: Label 1145 Replicate/Code No.

Disp. Bailor Other

Sampled by WC

Table with 13 columns: Time, Minutes Elapsed, Rate (gpm), Depth to Water (ft) TOC, Gallons Purged, pH, Cond. (µmhos), Turbidity (NTU), Dissolved Oxygen (mg/L), Temp. (°C), Redox (mV), Appearance (Color, Odor). Rows contain data from 1100 to 1140.

Table with 4 columns: Constituents Sampled, Container, Number, Preservative. Rows include Vinyl Chloride, Arsenic + Lead, 40 mL VOA, 500 mL Plastic.

Well Information section with fields for Well Location, Condition of Well, Well Completion (Flush Mount), Well Locked at Arrival/Departure, and Key Number To Well.

NOTES section for handwritten notes.

Well Casing Volumes table with columns for Gallons/Foot and rows for casing diameters: 1", 1.25", 1.5", 2", 2.5", 3", 3.5", 4", 6".



ARCADIS

Groundwater Sampling Form

Project No. 03816003.0000.00900 Well ID SBI-6 Date 8/19/14

Project Name/Location Picatinny Arsenal Area C Weather 74°E / Sunny

Measuring Pt. TOR Screen 8-18 Casing 2 Well Material PVC

Description TOR Setting (ft-bmp) 8-18 Diameter (in) 2 Static Water Level (ft-bmp) 9.03 Water Column in Well 12.97 Gallons in Well 27

Total Depth (ft-bmp) 20.0 Pump Intake (ft-bmp) 13 Purge Method: Centrifugal

Calc. Gallons Purged MP Elevation Sample Method Low Flow

Gallons Purged Replicate/Code No. Pump On/Off 10:55/12:00

Sample Time: Label 1155 Other Bladder Pump Sampled by DJ

Table with 12 columns: Time, Minutes Elapsed, Rate (gpm), Depth to Water (ft), Gallons Purged, pH, Cond. (µmhos), Turbidity (NTU), Dissolved Oxygen (mg/L), Temp. (°C), Redox (mV), Appearance (Color, Odor). Contains 11 rows of handwritten data.

Table with 4 columns: Constituents Sampled, Container, Number, Preservative. Contains handwritten entries for Vinyl chloride and Arsenic and lead.

Well Information

Well Location, Condition of Well, Well Completion (Flush Mount / Stick Up), Well Locked at Arrival/Departure (Yes/No), Key Number To Well (2402).

NOTES:

Well Casing Volumes

Table with 2 columns: Gallons/Foot, Casing Diameter (1", 1.25", 1.5", 2", 2.5", 3", 3.5", 4", 6").



ARCADIS

Groundwater Sampling Form

Page 1 of Project No. 03816003.0000.00900Well ID SBI-7Date 8/19/14Project Name/Location Picatinny Arsenal Area CWeather 70° F SunnyMeasuring Pt. TOR
Description Screen Setting (ft-bmp) 9.5-19.5Casing Diameter (in.) 2Well Material PVC
 SS
 OtherTotal Depth (ft-bmp) 20.79Static Water Level (ft-bmp) 6.82Water Column in Well 13.97Gallons in Well 22Calc. Gallons Purged Pump Intake (ft-bmp) Purge Method: Sample Method Low FlowGallons Purged MP Elevation Centrifugal Pump On/Off 10:05/10:55Sample Time: Label 1050Replicate/Code No. Disp. Bailer Other Bladder PumpSampled by DP

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH	Cond (µmhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C) (°F)	Redox (mV)	Appearance	
											Color	Odor
10:10	5	250	6.82	1.25	6.37	0.849	63.5	7.54	12.30	201	clear	clean
10:15	10		6.85	2.5	6.34	0.846	61.7	7.24	12.05	205		
10:20	15		6.83	3.75	6.30	0.845	34.7	7.09	11.92	208		
10:25	20		6.87	5	6.28	0.845	13.7	7.07	11.97	211		
10:30	25		6.83	6.25	6.29	0.844	12.7	7.02	11.89	212		
10:35	30		6.86	7.5	6.27	0.845	6.9	6.98	11.90	213		
10:40	35		6.81	8.75	6.26	0.845	3.7	6.84	11.86	214		
10:45	40		6.83	10	6.26	0.844	0.1	7.14	11.82	214		

Constituents Sampled

Vinyl Chloride
Arsenic and lead

Container

40 ml
.5 ml

Number

3
1

Preservative

Ice
Ice

Well Information

Well Location: <u> </u>	Well Locked at Arrival: <input checked="" type="checkbox"/> Yes / <input type="checkbox"/> No
Condition of Well: <u> </u>	Well Locked at Departure: <input checked="" type="checkbox"/> Yes / <input type="checkbox"/> No
Well Completion: <u>Flush Mount</u> / <input checked="" type="checkbox"/> <u>Stick Up</u>	Key Number To Well: <u>2402</u>

NOTES:

Well Casing Volumes

Gallons/Foot	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	4" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	



ARCADIS

Groundwater Sampling Form

Page 1 of 1

Project No. 03816003.0000.00900

Well ID SB2-1A

Date 8-20-14

Project Name/Location Picatinny Arsenal Area C

Weather 8 Sun 175

Measuring Pt. Description TOR

Screen Setting (ft-bmp) 158-168

Casing Diameter (in.) 4

Well Material PVC, SS, Other

Total Depth (ft-bmp) 167.62

Static Water Level (ft-bmp) 18.18

Water Column in Well 149.45

Gallons in Well 97

Calc. Gallons Purged

Pump Intake (ft-bmp) 163

Purge Method: Centrifugal, Submersible, Disp. Bailor, Other

Sample Method 60 Flow

Gallons Purged

MP Elevation

Pump On/Off 1025

Sample Time: Label 1130

Replicate/Code No.

Sampled by NC

Liters

Table with columns: Time, Minutes Elapsed, Rate (gpm), Depth to Water (ft), Gallons Purged, pH, Cond. (umhos), Turbidity (NTU), Dissolved Oxygen (mg/L), Temp (C/F), Redox (mV), Appearance (Color, Odor). Rows include data from 1040 to 1125.

Table with columns: Constituents Sampled, Container, Number, Preservative. Includes handwritten entries for Vinyl Chloride, Arsenic + Lead, 40ml VOA, 500ml Plastic, 3, HCL, HNO3.

Well Information section with fields for Well Location, Condition of Well, Well Completion, Well Locked at Arrival/Departure, and Key Number To Well.

NOTES section with blank lines for handwritten notes.

Well Casing Volumes table with columns: Gallons/Foot, 1", 1.25", 1.5", 2", 2.5", 3", 3.5", 4", 6".



ARCADIS

Groundwater Sampling Form

Project No. 03816003.0000.00900 Well ID 5132-2 Date 8-20-14

Project Name/Location Picatinny Arsenal Area C Weather cloudy +70

Measuring Pt. Description TOR Screen Setting (ft-bmp) 25.35 Casing Diameter (in.) 4 Well Material PVC

Total Depth (ft-bmp) 37.33 Static Water Level (ft-bmp) 7.96 Water Column in Well 29.37 Gallons in Well 19

Calc. Gallons Purged Pump Intake (ft-bmp) MP Elevation Purge Method: Centrifugal Submersible Bladder

Gallons Purged Sample Method Low Flow Pump On/Off 90S Sample Time: Label 945 Replicate/Code No. Sampled by NC

Table with columns: Time, Minutes Elapsed, Rate (gpm), Depth to Water (ft), Gallons Purged, pH, Cond. (µmhos), Turbidity (NTU), Dissolved Oxygen (mg/L), Temp (°C), Redox (mV), Appearance (Color, Odor). Includes handwritten data for times 910-940.

Table with columns: Constituents Sampled, Container, Number, Preservative. Includes handwritten entries for Vinyl Chloride, Arsenic and Lead, 40 ml VOA, 500 ml plastic, 3, HCL, HNO3.

Well Information section with fields for Well Location, Condition of Well (GOOD), Well Completion (Flush Mount, Stick Up), Well Locked at Arrival/Departure (Yes/No), and Key Number To Well.

NOTES: MS/MSD

Well Casing Volumes table with columns: Gallons/Foot, 1", 1.25", 1.5", 2", 2.5", 3", 3.5", 4", 6".

MS/MSD



Groundwater Sampling Form

Project No. 03816003.0000.00900

Well ID SB2-3

Date 8/20/14

Page 1 of 1

Project Name/Location Picatinny Arsenal Area C

Weather partly cloudy

Measuring Pt. Description TOR

Screen Setting (ft-bmp) 243-253

Casing Diameter (in.) 4

Well Material PVC, SS, Other

Total Depth (ft-bmp) 252.08

Static Water Level (ft-bmp) 19.07

Water Column in Well 233.01

Gallons in Well 151

Calc. Gallons Purged

Pump Intake (ft-bmp)

Purge Method: Centrifugal, Submersible

Sample Method low flow

Gallons Purged

MP Elevation

Disp. Bailer Other

Pump On/Off 0925/

Sample Time: Label 1020

Replicate/ Code No.

Well wired w/ drop line

Sampled by CG

4 liter

Table with columns: Time, Minutes Elapsed, Rate (gpm), Depth to Water (ft), Gallons Purged, pH, Cond. (umhos), Turbidity (NTU), Dissolved Oxygen (mg/L), Temp. (°C), Redox (mV), Appearance (Color, Odor). Rows contain data from 0930 to 1015.

Table with columns: Constituents Sampled, Container, Number, Preservative. Rows include vinyl chloride, Arsenic, lead, 40 ml VOA, 500 ml plastic, 3, HCL, Nitric.

Well Information

Well Location, Condition of Well, Well Completion: Flush Mount / Stick Up, Well Locked at Arrival/Departure: Yes, Key Number To Well: 2402

NOTES:

Well Casing Volumes

Table with columns: Gallons/Foot, 1" = 0.04, 1.25" = 0.06, 1.5" = 0.09, 2" = 0.16, 2.5" = 0.26, 3" = 0.37, 3.5" = 0.50, 4" = 0.65, 6" = 1.47



Groundwater Sampling Form

Project No. 03816003.0000.00900

Well ID

SBJ-1B

Date

Page 1 of 1
8/20/14

Project Name/Location Picatinny Arsenal Area C

Weather

partly cloudy, dr

Measuring Pt. Description

TOR

Screen Setting (ft-bmp)

326-376

Casing Diameter (in.)

4

Well Material

PVC
 SS
 Other

Total Depth (ft-bmp)

332.2

Static Water Level (ft-bmp)

26.10

Water Column in Well

306.1

Gallons in Well

199

Calc. Gallons Purged

Pump Intake (ft-bmp)

330

Purge Method:

Centrifugal
Submersible

Sample Method

LOW FLOW

Gallons Purged

MP Elevation

Disp. Bailor
Other

Well Lined
w/diaphane

Pump On/Off

1400/

Sample Time: Label

MS5

Replicate/
Code No.

Sampled by CG

Liter

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH	Cond. (µmhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C) (°F)	Redox (mV)	Appearance	
											Color	Odor
1405	5	200	26.06	1	9.62	0.341	2.7	2.19	17.96	16	Clear	None
1410	10	200	26.06	2	9.57	0.325	2.3	1.77	16.76	-87		
1415	15	200	26.06	3	9.56	0.325	0.0	1.24	17.04	-140		
1420	20	200	26.06	4	9.67	0.330	0.0	1.02	16.76	-168		
1425	25	200	26.06	5	9.74	0.324	0.0	0.96	17.06	-175		
1430	30	200	26.06	6	9.79	0.337	0.0	1.02	17.28	-178		
1435	35	200	26.06	7	9.87	0.339	0.0	0.96	17.86	-183		
1440	40	200	26.06	8	9.92	0.335	0.0	0.82	17.86	-185		
1445	45	200	26.06	9	9.95	0.338	0.0	0.79	17.84	-186		
1450	50	200	26.06	10	9.96	0.338	0.0	0.76	17.92	-187		

Constituents Sampled	Container	Number	Preservative
Vinyl chloride	40 ml vial	3	HCL
Arsenic + lead	500 ml plastic	1	Nitric

Well Information

Well Location:	Well Locked at Arrival:	<input checked="" type="checkbox"/> Yes / <input type="checkbox"/> No
Condition of Well:	Well Locked at Departure:	<input checked="" type="checkbox"/> Yes / <input type="checkbox"/> No
Well Completion: Flush Mount <input checked="" type="checkbox"/> Stick Up	Key Number To Well:	2405

NOTES:

Well Casing Volumes

Gallons/Foot	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	



Groundwater Sampling Form

Project No. 03816003.0000.00900Well ID C-SB3-002Page 1 of 1Date 8-20-17Project Name/Location Picatunny Arsenal Area CWeather Sum 90Measuring Pt. Description TORScreen Setting (ft-bmp) 170-180Casing Diameter (in.) 4Well Material PVC
 SS
 OtherTotal Depth (ft-bmp) 180.3Static Water Level (ft-bmp) 25.97Water Column in Well 154.33Gallons in Well 153.7

Calc. Gallons Purged _____

Pump Intake (ft-bmp) 175Purge Method: BladderSample Method Low flow

Gallons Purged _____

MP Elevation _____

Centrifugal Submersible Disp. Bailer Other Pump On/Off 1335/1440Sample Time: Label 1435

Replicate/Code No. _____

Sampled by MC

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH	Cond. (µmhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C) (°F)	Redox (mV)	Appearance	
											Color	Odor
1340	5	200	26.06	1.00	7.66	0.172	0.0	2.36	21.58	133	clear	none
1345	10	200	26.06	2.00	7.74	0.169	0.0	1.58	20.11	120		
1350	15	200	26.06	3.00	7.72	0.168	0.0	1.42	19.73	108		
1355	20	200	26.06	4.00	7.77	0.167	0.0	1.31	19.16	96		
1400	25	200	26.06	5.00	7.74	0.177	0.0	1.37	18.55	84		
1405	30	200	26.06	6.00	7.75	0.176	0.0	1.38	16.72	83		
1410	35	200	26.06	7.00	7.75	0.175	0.0	1.33	16.52	81		
1415	40	200	26.06	8.00	7.79	0.175	0.0	1.31	16.65	80		
1420	45	200	26.06	9.00	7.79	0.174	0.0	1.25	16.88	81		
1425	50	200	26.06	10.00	7.80	0.174	0.0	1.22	16.81	80		
1430	60	200	26.06	11.00	7.80	0.175	0.0	1.18	16.80	81		

Constituents Sampled	Container	Number	Preservative
Vinyl Chloride	40mL VOA	3	HCL
Arsenic + Lead	500mL Plastic	1	HNO3

Well Information			
Well Location: _____	Well Locked at Arrival: <u>Yes</u> / No		
Condition of Well: _____	Well Locked at Departure: <u>Yes</u> / No		
Well Completion: <u>Flush Mount</u> / <u>Stick Up</u>	Key Number To Well: <u>2461</u>		

NOTES: _____

Well Casing Volumes					
Gallons/Foot	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	



ARCADIS

Groundwater Sampling Form

Project No. 03816003.0000.00900 Well ID C-SB3-003 Date 8-20-14

Project Name/Location Picatinny Arsenal Area C Weather Sunny ☉

Measuring Pt. Description TOR Screen Setting (ft-bmp) 27.34 Casing Diameter (in.) 4 Well Material PVC

Total Depth (ft-bmp) 33.15 Static Water Level (ft-bmp) 17.20 Water Column in Well 15.95 Gallons in Well 10.4

Calc. Gallons Purged Pump Intake (ft-bmp) 26 Purge Method: Centrifugal

Gallons Purged MP Elevation Sample Method Low flow

Sample Time: Label 14005 Replicate/ Code No. Other Bleeder pump Pump On/Off 1320/1410 Sampled by MC

Table with 13 columns: Time, Minutes Elapsed, Rate (gpm), Depth to Water (ft), Gallons Purged, pH, Cond. (umhos), Turbidity (NTU), Dissolved Oxygen (mg/L), Temp (°C), Redox (mV), Appearance (Color, Odor). Rows contain data from 1325 to 1400.

Table with 4 columns: Constituents Sampled, Container, Number, Preservative. Rows include Vinyl Chloride and Arsenic + Lead.

Well Information

Well Location, Condition of Well, Well Completion (Flush Mount / Stick Up), Well Locked at Arrival/Departure (Yes/No), Key Number To Well (242)

NOTES:

Well Casing Volumes

Table with 2 rows and 6 columns showing Gallons/Foot for casing diameters: 1", 1.25", 1.5", 2", 2.5", 3", 3.5", 4", 6".



ARCADIS

Groundwater Sampling Form

Project No. 03816003.0000.00900

Well ID SB4-1

Date 8/21/14

Page 1 of 1

Project Name/Location Picatinny Arsenal Area C

Weather mostly sunny/rf

Measuring Pt. Description TOR

Screen Setting (ft-bmp) 369-379

Casing Diameter (in.) 4

Well Material [X] PVC [] SS [] Other

Total Depth (ft-bmp) 382.3

Static Water Level (ft-bmp) 37.55

Water Column in Well 344.75

Gallons in Well 224

Calc. Gallons Purged

Pump Intake (ft-bmp)

Purge Method:

Centrifugal [] Submersible [] Disp. Bailor [] Other []

Sample Method low flow

Gallons Purged

MP Elevation

Pump On/Off 1000

Sample Time: Label 10SS

Replicate/Code No.

Sampled by [Signature] CB

liters

Well wired 4/loop line

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH	Cond. (µmhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C) (°F)	Redox (mV)	Appearance	
											Color	Odor
1025	5	250	32.66	1.25	9.75	0.280	1.8	6.52	12.62	-281	clear	None
1030	10	250	32.71	2.5	9.75	0.280	0.7	6.11	12.63	-298		
1035	15	250	32.71	3.75	8.72	0.173	0.8	5.02	12.61	-240		
1028	20	250	32.71	5	8.15	0.167	0.0	4.35	12.51	-190		
1025	25	250	32.71	6.25	8.12	0.166	0.0	4.27	12.58	-188		
1030	30	250	32.71	7.5	7.97	0.168	0.0	3.78	12.56	-178		
1035	35	250	32.71	8.75	7.87	0.168	0.0	3.29	12.60	-179		
1040	40	250	32.71	10	7.91	0.168	0.0	2.83	12.49	-181		
1045	45	250	32.71	11.25	7.89	0.169	0.0	2.76	12.51	-182		
1050	50	250	32.71	12.50	7.89	0.168	0.00	2.81	12.55	-181		

Constituents Sampled	Container	Number	Preservative
Vinyl chloride	40 ml vial	3	HCC
Acetone + lead	500 ml plastic	1	Nitric

Well Information

Well Location: _____ Well Locked at Arrival: (Yes) / No

Condition of Well: _____ Well Locked at Departure: (Yes) / No

Well Completion: Flush Mount / (Stick Up) Key Number To Well: 2402

NOTES:

Well Casing Volumes

Gallons/Foot	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	



Groundwater Sampling Form

Project No. 03816003.0000.00900

Well ID SB4-2

Page 1 of 1 Date 8-21-17

Project Name/Location Picatinny Arsenal Area C

Weather Sunny 70

Measuring Pt. Description TOR Screen Setting (ft-bmp) 26-46 Casing Diameter (in.) 4

Well Material PVC SS Other

Total Depth (ft-bmp) 45.77 Static Water Level (ft-bmp) 22.75 Water Column in Well 23.02

Gallons in Well 15

Calc. Gallons Purged Pump Intake (ft-bmp) MP Elevation Purge Method: Centrifugal Submersible

Sample Method Low Flow

Gallons Purged Sample Time: Label 925 Replicate/Code No.

Pump On/Off 840/930

Sampled by NC

Table with columns: Time, Minutes Elapsed, Rate (gpm), Depth to Water (ft), Gallons Purged, pH, Cond (umhos), Turbidity (NTU), Dissolved Oxygen (mg/L), Temp (°C), Redox (mV), Appearance (Color, Odor). Rows 845-920.

Table with columns: Constituents Sampled, Container, Number, Preservative. Rows: Vinyl Chloride, Arsenic lead.

Well Information section with fields for Well Location, Condition of Well, Well Completion, Well Locked at Arrival/Departure, Key Number To Well.

NOTES:

Well Casing Volumes table with columns: Gallons/Foot, 1", 1.25", 1.5", 2", 2.5", 3", 3.5", 4", 6".



ARCADIS

Groundwater Sampling Form

Project No. 03816003.0000.00900

Well ID

SB4-3

Date

Page 1 of 1
8-21-17

Project Name/Location Picatinny Arsenal Area C

Weather

Sunny 70

Measuring Pt. Description

TOR

Screen Setting (ft-bmp)

92-102

Casing Diameter (in.)

4

Well Material

PVC
SS
Other

Total Depth (ft-bmp)

100.2

Static Water Level (ft-bmp)

23.87

Water Column in Well

76.33

Gallons in Well

49.6

Calc. Gallons Purged

Pump Intake (ft-bmp)

97

Purge Method:

Centrifugal

Sample Method

Low Flow

Gallons Purged

MP Elevation

Submersible

Bladder

Pump On/Off

BSS/ASS

Sample Time: Label

950

Replicate/ Code No.

Disp. Bailor Other

Sampled by

NLC

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH	Cond. (µmhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°F)	Redox (mV)	Appearance	
											Color	Odor
900	5	250	23.90	1.00	7.12	0.733	78.0	4.87	12.82	4.47	Clear	None
905	10	250	23.90	2.25	6.93	0.758	51.0	6.22	11.82	-129		
910	15	250	23.90	3.50	6.90	0.760	36.4	5.52	11.78	-130		
915	20	250	23.90	4.75	6.89	0.760	31.0	4.95	11.70	-130		
920	25	250	23.90	6.00	6.90	0.759	29.6	4.07	11.67	-130		
925	30	250	23.90	7.25	6.88	0.759	16.7	4.00	11.57	-131		
930	35	250	23.90	8.50	6.91	0.759	15.6	3.45	11.64	-131		
935	40	250	23.90	9.75	6.91	0.758	12.3	3.06	11.59	-131		
940	45	250	23.90	11.0	6.91	0.757	7.0	2.58	11.59	-131		
945	50	250	23.90	12.25	6.91	0.757	6.9	2.48	11.61	-131		

Constituents Sampled	Container	Number	Preservative
Vial Chloride	40 mL vial	3	HCL
ARSENIC + Lead	500 mL Plastic	1	HNO3

Well Information

Well Location: _____ Well Locked at Arrival: Yes / No

Condition of Well: _____ Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up Key Number To Well: 2402

NOTES:

Well Casing Volumes

Gallons/Foot	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

ms/msd



Groundwater Sampling Form

Project No. 03816003.0000.00900 Well ID 504-4 Date 8/24/14 Page 1 of 1

Project Name/Location Picatunny Arsenal Area C Weather mostly sunny

Measuring Pt. TR Screen Setting (ft-bmp) 155-165 Casing Diameter (in.) 4 Well Material PVC SS Other

Total Depth (ft-bmp) 166.84 Static Water Level (ft-bmp) 38.95 Water Column in Well 129.89 Gallons in Well 84

Calc. Gallons Purged _____ Pump Intake (ft-bmp) 160 Purge Method: _____ Sample Method Lowflow

Gallons Purged _____ MP Elevation _____ Centrifugal _____ Submersible _____

Sample Time: Label 1130 Replicate/Code No. _____ Disp. Bailer Other RED bladder Pump Pump On/Off _____

Sampled by 1025/1135 NC

Lites

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH	Cond. (µmhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C) (°F)	Redox (mV)	Appearance	
											Color	Odor
1035	15	250	32.06	2.5	7.26	0.192	2.3	5.68	17.85	110	Clear	None
1040	15	250	32.06	3.75	6.17	0.195	1.8	3.34	17.55	182		
1045	20	250	32.06	5	6.11	0.197	0.0	1.98	17.73	258		
1050	25	250	32.06	6.25	7.92	0.197	0.0	2.23	17.82	285		
1055	20	250	32.06	7.5	7.77	0.197	0.0	1.73	17.82	201		
1100	35	250	32.06	8.75	7.70	0.197	0.0	1.57	17.97	296		
1105	40	250	32.06	10	7.66	0.202	0.0	0.74	17.97	296		
1110	45	250	32.06	11.25	7.65	0.204	0.0	0.68	19.62	307		
1115	50	250	32.06	12.50	7.64	0.197	0.0	0.71	18.58	317		
1120	55	250	32.06	13.75	7.62	0.196	0.0	0.68	18.30	320		
1125	60	250	32.06	15.00	7.62	0.196	0.0	0.66	18.15	322		

Constituents Sampled	Container	Number	Preservative
<u>Vinyl Chloride</u>	<u>40 ml vial</u>	<u>3</u>	<u>HCL</u>
<u>Acetone + Lead</u>	<u>500 ml plastic</u>	<u>1</u>	<u>Nitric</u>

Well Information

Well Location: _____ Well Locked at Arrival: Yes / No

Condition of Well: _____ Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up Key Number To Well: 2902

NOTES:

Well Casing Volumes

Gallons/Foot	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	



ARCADIS

Groundwater Sampling Form

Project No. 03816003 0000 00900

Well ID DM19-1

Date 8/18/14

Project Name/Location Picatinny Arsenal Area C

Weather 70° F / Sunny

Measuring Pt. TOR

Screen Setting (ft-bmp) 9.5-19.5

Casing Diameter (in.) 4

Well Material PVC, SS, Other

Total Depth (ft-bmp) 21.90, 8.03

Static Water Level (ft-bmp) 8.03

Water Column in Well 13.06

Gallons in Well 8.5

Calc. Gallons Purged

Pump Intake (ft-bmp) 14.5

Purge Method: Centrifugal, Submersible

Sample Method Low Flow

Gallons Purged

MP Elevation

Disp. Bailer Other

Pump On/Off 11:20 / 12:15

Sample Time: Label 12:05

Replicate/Code No.

Other CED Bladder Pump

Sampled by DP

Table with columns: Time, Minutes Elapsed, Rate (gpm), Depth to Water (ft), Gallons Purged, pH, Cond. (µmhos), Turbidity (NTU), Dissolved Oxygen (mg/L), Temp. (°C), Redox (mV), Appearance (Color, Odor). Contains 8 rows of data.

Table with columns: Constituents Sampled, Container, Number, Preservative. Contains 2 rows: Vinyl Chloride (40 ml, 3, Ice) and Arsenic (.5L, 1, Ice).

Well Information

Well Location, Condition of Well, Well Completion (Flush Mount / Stick Up), Well Locked at Arrival/Departure (Yes/No), Key Number To Well (2902).

NOTES:

Well Casing Volumes

Table with columns: Gallons/Foot, 1" = 0.04, 1.25" = 0.06, 1.5" = 0.09, 2" = 0.16, 2.5" = 0.26, 3" = 0.37, 3.5" = 0.50, 4" = 0.65, 5" = 1.47.



ARCADIS

Groundwater Sampling Form

Page 1 of 1

Project No. 03816003 0000 00900 Well ID C-Dm19-2 Date 8-15-14

Project Name/Location Picatinny Arsenal Area C Weather Sunny + 73°

Measuring Pt. TOR Screen Setting (ft-bmp) 9.5-19.5 Casing Diameter (in.) 4 Well Material PVC SS Other

Total Depth (ft-bmp) 21.35 Static Water Level (ft-bmp) 8.83 Water Column in Well 12.52 Gallons in Well 8

Calc. Gallons Purged _____ Pump Intake (ft-bmp) 15 Purge Method: Centrifugal Submersible Backflow Disp. Bailer Other _____ Sample Method Low flow

Gallons Purged _____ MP Elevation _____ Pump On/Off 1140/1225

Sample Time: Label 1220 Replicate/Code No. _____ Other _____ Sampled by N.C.

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH	Cond. (umhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C) (°F)	Redox (mV)	Appearance	
											Color	Odor
1145	5	250	9.18	1.0	7.34	0.364	0.4	1.26	14.55	-140	clear	none
1150	10	250 250	9.25	2.25	7.34	0.362	0.0	0.99	14.51	-142		
1155	15	250	9.30	3.50	7.45	0.358	0.54	0.70	15.01	-152		
1200	20	250	9.30	4.75	7.48	0.359	6.3	0.71	14.89	-153		
1205	25	250	9.30	6.0	7.49	0.357	5.5	0.61	15.32	-154		
1210	30	250	9.30	7.25	7.50	0.360	6.3	0.55	14.80	-155		
1215	35	250	9.30	8.50	7.50	0.358	6.2	0.55	14.70	-155		

Constituents Sampled	Container	Number	Preservative
Arsenic + Lead	500 mL Plastic	1	HNO3
Veg. - Vinyl Chloride	10 mL VOA	3	HCl

Well Information

Well Location: _____ Well Locked at Arrival: Yes / No

Condition of Well: _____ Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up Key Number To Well: 2402

NOTES:

Well Casing Volumes

Gallons/Foot	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	4" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	



ARCADIS

Groundwater Sampling Form

Project No. 03816003.0000.00900

Well ID DM25-2

Date 8/21/14

Project Name/Location Picatinny Arsenal Area C

Weather mostly sunny

Measuring Pt. Description TOR Screen Setting (ft-bmp) 9.9-20.1

Casing Diameter (in.) 4

Well Material [x] PVC [] SS [] Other

Total Depth (ft-bmp) 21.71 Static Water Level (ft-bmp) 11.92

Water Column in Well 9.79

Gallons in Well 6.4

Calc. Gallons Purged Pump Intake (ft-bmp) MP Elevation

Purge Method: Centrifugal [] Submersible [] Disp. Bailer [] Other QED Bladder Pump

Sample Method LOW FLOW

Gallons Purged

Pump On/Off 1330

Sample Time: Label 1420 Replicate/Code No.

Sampled by CG

Liters

Table with 12 columns: Time, Minutes Elapsed, Rate (gpm), Depth to Water (ft), Gallons Purged, pH, Cond. (umhos), Turbidity (NTU), Dissolved Oxygen (mg/L), Temp. (°C), Redox (mV), Appearance (Color, Odor). Rows show data from 1335 to 1425.

Table with 4 columns: Constituents Sampled, Container, Number, Preservative. Rows include Vinyl chloride (40 ml vial) and acetone (500 ml plastic).

Well Information

Well Location, Condition of Well, Well Completion (Flush Mount / Stick Up), Well Locked at Arrival/Departure (Yes/No), Key Number To Well: 2402

NOTES:

Well Casing Volumes

Table with 2 columns: Gallons/Foot, Diameter. Rows: 1"=0.04, 1.25"=0.06, 1.5"=0.09, 2"=0.16, 2.5"=0.26, 3"=0.37, 3.5"=0.50, 4"=0.65, 6"=1.47



Groundwater Sampling Form

Project No. 03816003.0000.00900 Well ID C-MW25-6A Date 8-18-14

Project Name/Location Picatinny Arsenal Area C Weather Sunny 70°

Measuring Pt. DR Screen Setting (ft-bmp) 10-20 Casing Diameter (in.) 4 Well Material PVC

Total Depth (ft-bmp) 19.12 Static Water Level (ft-bmp) 10.75 Water Column in Well 8.37 Gallons in Well 5.4

Calc. Gallons Purged _____ Pump Intake (ft-bmp) 15 Purge Method: Hand Sample Method Low flow

Gallons Purged _____ MP Elevation _____ Centrifugal _____ Submersible _____ Disp. Bailer _____ Other _____ Pump On/Off 1000/1050

Sample Time: Label 1045 Replicate/Code No. _____ Other _____ Sampled by MC

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Liters Gallons Purged	pH	Cond. (µmhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°F)	Redox (mV)	Appearance	
											Color	Odor
1005	60	250	10.86	5	7.57	0.834	0.0	1.43	12.18	62.0	clear	none
1010	75	250	10.86	10.0	7.56	0.834	0.0	1.25	12.17	52.0	↓	↓
1015	100	250	10.86	3.0	7.58	0.833	0.0	0.89	12.16	50.0		
1020	15	250	10.86	4.25	7.65	0.829	0.0	0.89	12.25	58.0		
1025	20	250	10.86	6.50	7.75	0.821	0.0	0.90	12.31	62.0		
1030	25	250	10.86	7.75	7.75	0.805	0.0	0.89	12.37	78.0		
1035	30	250	10.86	9.0	7.75	0.690	0.0	0.90	12.40	78.0		
1040	35	250	10.86	10.25	7.75	0.689	0.0	0.90	12.42	79.0		

Constituents Sampled	Container	Number	Preservative
Vinyl Chloride	40 ml WQA	3	HCL
Arsenic + Lead	500 ml plastic	1	Nitric

Well Information

Well Location: _____ Well Locked at Arrival: Yes / No

Condition of Well: _____ Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up Key Number To Well: 2702

NOTES:

Well Casing Volumes

Gallons/Foot	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

DUP001 - 1100



ARCADIS

Groundwater Sampling Form

Project No. 03816003.0000.00900

Well ID

C-mw-25-6B

Date

Page 1 of 1
8/18/14

Project Name/Location Picatinny Arsenal Area C

Weather

68°F / Sunny

Measuring Pt. Description

TOR

Screen Setting (ft-bmp)

65-75

Casing Diameter (in.)

4

Well Material

PVC
 SS
 Other

Total Depth (ft-bmp)

75.96

Static Water Level (ft-bmp)

10.83

Water Column in Well

65.13

Gallons in Well

42.3

Calc. Gallons Purged

Pump Intake (ft-bmp)

70

Purge Method:

Centrifugal
Submersible
Disp. Bailer
Other

Sample Method

LOW Flow

Gallons Purged

MP Elevation

Pump On/Off

9:49 / 10:35

Sample Time: Label

10:30

Replicate/ Code No.

GED Blender pump

Sampled by DP

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Liters	pH	Cond. (µmhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C) (°F)	Redox (mV)	Appearance	
				Gallons Purged							Color	Odor
9:55	5	250	10.76	1.25	9.21	0.757	15.5	4.85	12.72	29	CLEAR	NONE
10:00	10		11.43	2.5	9.01	0.757	9.1	2.60	12.24	16		
10:05	15		11.4	3.75	8.82	0.734	5.5	2.19	13.30	33		
10:10	20		11.34	5	8.84	0.733	0.6	1.90	12.93	35		
10:15	25		11.29	6.25	8.85	0.733	0.0	1.80	14.31	36		
10:20	30		11.2	7.5	8.85	0.733	0.0	1.99	14.80	37		
10:25	35	↓	11.19	8.75	8.86	0.734	0.0	1.69	15.09	35		

Constituents Sampled	Container	Number	Preservative
Vinyl chloride	40 ml	3	ICE
Arsenic, Lead, Nickel, Thallium	.5L	1	ICE

Well Information

Well Location: _____

Condition of Well: _____

Well Completion: Flush Mount / **Stick Up**

Well Locked at Arrival: Yes / No

Well Locked at Departure: Yes / No

Key Number To Well: 2482

NOTES:

Well Casing Volumes

Gallons/Foot	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	



Groundwater Sampling Form

Project No. 03816003.0000.00900 Well ID C-mw-017 Date 8-19-14

Project Name/Location Picatinny Arsenal Area C Weather Sunny 77°

Measuring Pt. Description TOR Screen Setting (ft-bmp) 7-19 Casing Diameter (in.) 4 Well Material PVC SS Other

Total Depth (ft-bmp) 21.06 Static Water Level (ft-bmp) 8.82 Water Column in Well 12.24 Gallons in Well 8

Calc. Gallons Purged _____ Pump Intake (ft-bmp) _____ Purge Method: _____
 Centrifugal _____
 Submersible skidder
 Disp. Bailer _____
 Other _____

Gallons Purged _____ MP Elevation _____ Sample Method 10ml/Can

Sample Time: Label 1410 Replicate/Code No. _____ Pump On/Off 1325/1415
 Sampled by _____

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft) TOC	Gallons Purged	pH	Cond. (µmhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp (°C) (°F)	Redox (mV)	Appearance	
											Color	Odor
1330	5	250	9.03	.5	6.32	0.132	7.4	7.38	13.45	132	clear	none
1335	10	250	9.52	1.75	5.42	0.116	0.0	4.76	11.78	186		
1340	15	200	9.75	2.75	5.16	0.114	0.14	4.58	11.68	208		
1345	20	260	9.97	3.75	4.99	0.115	2.3	4.42	11.46	227		
1350	25	280	10.06	4.75	4.95	0.115	4.3	4.39	11.45	235		
1355	30	280	10.14	5.75	4.95	0.116	6.1	4.28	11.43	239		
1400	35	280	10.18	6.75	4.95	0.116	6.3	4.27	11.43	239		
1405	40	200	10.23	7.75	4.95	0.116	6.4	7.27	11.42	239		

Constituents Sampled	Container	Number	Preservative
Lead	500mL plastic	1	HNO ₃

Well Information

Well Location: _____ Well Locked at Arrival: Yes / No

Condition of Well: _____ Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up Key Number To Well: 2402

NOTES:

Well Casing Volumes

Gallons/Foot	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	



ARCADIS

Groundwater Sampling Form

Project No. 03816003.0000.00900 Well ID MW25-8 Date 8-21-14

Project Name/Location Picalinny Arsenal Area C Weather Sunny 79

Measuring Pt. Description TOR Screen Setting (ft-bmp) 20-30 Casing Diameter (in.) 4 Well Material PVC

Total Depth (ft-bmp) 31.7 Static Water Level (ft-bmp) 7.16 Water Column in Well 24.54 Gallons in Well 16

Calc. Gallons Purged Pump Intake (ft-bmp) MP Elevation Purge Method: Centrifugal Submersible Disp. Bailer Other GED Bladder Pumps Sample Method Lowflow Pump On/Off 1320/1410 Sampled by NC

Table with 13 columns: Time, Minutes Elapsed, Rate (gpm), Depth to Water (ft), Gallons Purged, pH, Cond. (umhos), Turbidity (NTU), Dissolved Oxygen (mg/L), Temp. (°C), Redox (mV), Appearance (Color, Odor). Rows show data from 1325 to 1400.

Table with 4 columns: Constituents Sampled, Container, Number, Preservative. Row 1: Lead, 500mL plastic, 1, HNO3.

Well Information

Well Location: Well Locked at Arrival: Yes / No Well Locked at Departure: Yes / No Well Completion: Flush Mount / Stick Up Key Number To Well: 2402

NOTES:

Well Casing Volumes

Table with 2 rows of casing volume conversions: Gallons/Foot, 1" = 0.04, 1.25" = 0.06, 2" = 0.16, 2.5" = 0.26, 3" = 0.37, 3.5" = 0.50, 4" = 0.65, 6" = 1.47



ARCADIS

Groundwater Sampling Form

Page 1 of 1
Date 9/19/14

Project No. 03816003.0000 00900 Well ID MW180-1R

Project Name/Location Picatinny Arsenal Area C Weather

Measuring Pt. Description TOR Screen Setting (ft-bmp) 5-15 Casing Diameter (in.) 2 Well Material [X] PVC [] SS [] Other

Total Depth (ft-bmp) 19.1 Static Water Level (ft-bmp) 11.66 Water Column in Well 8.04 Gallons in Well 1.3

Calc. Gallons Purged Pump Intake (ft-bmp) MP Elevation Purge Method: Centrifugal [] Submersible []

Gallons Purged Sample Time: Label 1145 Replicate/Code No. Other [X] ED Bladder Pump Sample Method LOU F Pump On/Off 1040 Sampled by CB

Water

Table with 12 columns: Time, Minutes Elapsed, Rate (gpm), Depth to Water (ft), Gallons Purged, pH, Cond. (umhos), Turbidity (NTU), Dissolved Oxygen (mg/L), Temp. (°C), Redox (mV), Appearance (Color, Odor). Rows 1045 to 1140.

Table with 4 columns: Constituents Sampled, Container, Number, Preservative. Row: Arsenic, 500ml plastic, 1, Nitric.

Well Information

Well Location: Well Locked at Arrival: [X] Yes / No Condition of Well: Well Locked at Departure: [X] Yes / No Well Completion: Flush Mount / Stick Up Key Number To Well: 2402

NOTES: OC = 2.0' IC = 1.55'

Well Casing Volumes

Table with 2 rows and 6 columns: Gallons/Foot, 1" = 0.04, 1.5" = 0.09, 2.5" = 0.26, 3.5" = 0.50, 4" = 1.47, 1.25" = 0.06, 2" = 0.16, 3" = 0.37, 4" = 0.65



ARCADIS

Groundwater Sampling Form

Page 1 of 1

Project No. 03816003.0000.00900

Well ID 1181-3R

Date 9/9/14

Project Name/Location Picatinny Arsenal Area C

Weather Sunny ~75°F

Measuring Pt. Description TOR Screen Setting (ft-bmp)

Casing Diameter (in.) 2

Well Material X PVC SS Other

Total Depth (ft-bmp) 27.07 Static Water Level (ft-bmp) 9.50

Water Column in Well 17.57

Gallons in Well 2.8

Calc. Gallons Purged Pump Intake (ft-bmp) MP Elevation

Purge Method: Centrifugal Submersible

Sample Method Low Flow

Gallons Purged

Disp. Bailer Other

Pump On/Off 0905/

Sample Time: Label 1015 Replicate/Code No.

Other QED Blander Pump

Sampled by CG/NC

LTec

Table with 13 columns: Time, Minutes Elapsed, Rate (gpm), Depth to Water (ft), Gallons Purged, pH, Cond. (umhos), Turbidity (NTU), Dissolved Oxygen (mg/L), Temp. (°C), Redox (mv), Appearance (Color, Odor). Rows contain data from 0910 to 1010.

Table with 4 columns: Constituents Sampled, Container, Number, Preservative. Row 1: Arsenic, 500 ml plastic, 1, Nitric.

Well Information section with fields for Well Location, Condition of Well, Well Completion (Flush Mount / Stick Up), Well Locked at Arrival/Departure, and Key Number To Well (2402).

NOTES: OC = 2.4 IC = 2.1

Well Casing Volumes table with columns for Gallons/Foot and casing diameters (1", 1.25", 1.5", 2", 2.5", 3", 3.5", 4", 5").

APPENDIX D

LABORATORY DATA

(Provided on the enclosed CD)

APPENDIX E

DATA VALIDATION REPORT

Picatiny Arsenal Area C Data Review

DOVER, NEW JERSEY

Volatile and Metals Analyses

SDG # 280-59101, 280-59192, 280-59229, 280-59249 and 280-60236

Analyses Performed By:
Test America - Denver

Report: # 22436R
Review Level: Tier III
Project: 03816003.0000.00900

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) #s 280-59101, 280-59192, 280-59229, 280-59249 and 280-60236 for sampling from the Picatinny Arsenal site in Dover, New Jersey. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

SDG	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis					
						VOC	SVOC	EXP	TPH	MET	MISC
280-59101	C-MW25-06A(081814)	59101-1	Water	08/18/14		X				X	
	C-MW25-06B(081814)	59101-2	Water	08/18/14		X				X	
	C-DUP-001(081814)	59101-3	Water	08/18/14	C-MW25-06A(081814)	X				X	
	C-DM19-001(081814)	59101-4	Water	08/18/14		X				X	
	C-DM19-002(081814)	59101-5	Water	08/18/14						X	
	C-C1-B(081814)	59101-6	Water	08/18/14						X	
	FB001(081814)	59101-7	Water	08/18/14		X				X	
	TB1(081814)	59101-8	Water	08/18/14		X				X	
280-59192	C-SB1-003(081914)	59192-1	Water	08/19/14		X				X	
	C-SB1-001(081914)	59192-2	Water	08/19/14		X				X	
	C-SB1-002(081914)	59192-3	Water	08/19/14		X				X	
	C-DUP-002(081914)	59192-4	Water	08/19/14	C-SB1-002(081914)	X				X	
	C-SB1-005(081914)	59192-5	Water	08/19/14		X				X	
	C-SB1-006(081914)	59192-6	Water	08/19/14		X				X	
	C-SB1-007(081914)	59192-7	Water	08/19/14		X				X	
	C-MW-017(081914)	59192-8	Water	08/19/14						X	
	FB002(081914)	59192-9	Water	08/19/14		X				X	
	TB2(081914)	59192-10	Water	08/19/14		X				X	
280-59229	C-SB2-002(082014)	59229-1	Water	08/20/14		X				X	
	C-SB2-003(082014)	59229-2	Water	08/20/14		X				X	
	C-SB2-001A(082014)	59229-3	Water	08/20/14		X				X	
	C-SB3-003(082014)	59229-4	Water	08/20/14		X				X	
	C-SB3-002(082014)	59229-5	Water	08/20/14		X				X	
	C-SB3-01B(082014)	59229-6	Water	08/20/14		X				X	
	FB003(082014)	59229-7	Water	08/20/14		X				X	

SDG	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis					
						VOC	SVOC	EXP	TPH	MET	MISC
280-59229	TB3(082014)	59229-8	Water	08/20/14		X					
280-59249	C-SB4-003(082114)	59249-1	Water	08/21/14		X				X	
	C-SB4-002(082114)	59249-2	Water	08/21/14		X				X	
	C-SB4-001(082114)	59249-3	Water	08/21/14		X				X	
	C-SB4-004(082114)	59249-4	Water	08/21/14		X				X	
	C-MW25-008(082114)	59249-5	Water	08/21/14						X	
	C-DM25-002(082114)	59249-6	Water	08/21/14		X				X	
	FB004(082114)	59249-7	Water	08/21/14		X				X	
	TB4(082114)	59249-8	Water	08/21/14		X					
280-60236	FB 002(091914)	60236-1	Water	09/19/14						X	
	C-1181-3(091914)	60236-2	Water	09/19/14						X	
	C-MW180-1(191914)	60236-3	Water	09/19/14						X	

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

QA - Quality Assurance

ORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 8260. Data were reviewed in accordance with the "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review" (June 2008) and site-specific requirements defined in the Final Uniform Federal Policy-Quality Assurance Project Plan, Remedial Investigation for Military Munitions Response Program, Picatinny Arsenal (ARCADIS and WESTON, 2011).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
 - B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers
 - E The compound was quantitated above the calibration range.
 - D Concentration is based on a diluted sample analysis.
- Validation Qualifiers
 - J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
 - UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.
 - JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.
 - UB Compound considered non-detect at the listed value due to associated blank contamination.
 - N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.
 - R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in

mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

VOLATILE ORGANIC COMPOUND (VOC) ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 8260	Water	14 days from collection to analysis	Cool to <6 °C; preserved to a pH of less than 2 s.u.
	Soil	48 hours from collection to extraction and 14 days from extraction to analysis	Cool to <6 °C.

s.u. Standard units

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the MDL in the associated blanks; therefore detected sample results were not associated with blank contamination.

3. Mass Spectrometer Tuning

Mass spectrometer performance was acceptable and all analyses were performed within a 12-hour tune clock.

System performance and column resolution were acceptable.

4. Calibration

Satisfactory instrument calibration is established to insure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

4.1 Initial Calibration

The method specifies percent relative standard deviation (%RSD) and relative response factor (RRF) limits for select compounds only. A technical review of the data applies limits to all compounds with no exceptions.

All target compounds associated with the initial calibration standards must exhibit a %RSD less than the control limit (15%) or a correlation coefficient greater than 0.99 and an RRF value greater than control limit (0.05).

4.2 Continuing Calibration

All target compounds associated with the continuing calibration standard must exhibit a percent difference (%D) less than the control limit (20%) and RRF value greater than control limit (0.05).

All compounds associated with the calibrations were within the specified control limits.

5. Surrogates/System Monitoring Compounds

All samples to be analyzed for organic compounds are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. VOC analysis requires that all surrogates associated with the analysis exhibit recoveries within the laboratory-established acceptance limits.

All surrogate recoveries were within control limits.

6. Internal Standard Performance

Internal standard performance criteria insure that the GC/MS sensitivity and response are stable during every sample analysis. The criteria requires the internal standard compounds associated with the VOC exhibit area counts that are not greater than two times (+100%) or less than one-half (-50%) of the area counts of the associated continuing calibration standard.

All internal standard responses were within control limits.

7. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS/MSD performed on sample locations C-SB2-002(082014) and C-SB4-003(082114) exhibited acceptable recoveries and RPD between the MS/MSD recoveries.

8. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS/LCSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

All compounds associated with the LCS/LCSD analysis exhibited recoveries within the control limits.

9. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 40% for water matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
C-MW25-06A(081814)/C-DUP-001(081814)	Vinyl Chloride	0.4 U	0.4 U	AC
C-SB1-002(081914)/C-DUP-002(081914)				

AC Acceptable

The calculated RPDs between the parent sample and field duplicate were acceptable.

10. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR VOCs

VOCs: SW-846 8260	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X		X	
B. Equipment blanks		X		X	
C. Trip blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Laboratory Control Sample Duplicate(LCSD)		X		X	
LCS/LCSD Precision (RPD)		X		X	
Matrix Spike (MS)		X		X	
Matrix Spike Duplicate(MSD)		X		X	
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
Surrogate Spike Recoveries		X		X	
Dilution Factor		X		X	
Moisture Content	X				X
Tier III Validation					
System performance and column resolution		X		X	
Initial calibration %RSDs		X		X	
Continuing calibration RRFs		X		X	
Continuing calibration %Ds		X		X	
Instrument tune and performance check		X		X	
Ion abundance criteria for each instrument used		X		X	
Internal standard		X		X	
Compound identification and quantitation					
A. Reconstructed ion chromatograms		X		X	
B. Quantitation Reports		X		X	
C. RT of sample compounds within the established RT windows		X		X	
D. Transcription/calculation errors present		X		X	

VOCs: SW-846 8260	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
E. Reporting limits adjusted to reflect sample dilutions		X		X	

%RSD Relative standard deviation
 %R Percent recovery
 RPD Relative percent difference
 %D Percent difference

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to (United States Environmental Protection Agency) SW-846 Methods 6010 and 6020. Data were reviewed in accordance with the "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review" (January 2010) and site-specific requirements defined in the Final Uniform Federal Policy-Quality Assurance Project Plan, Remedial Investigation for Military Munitions Response Program, Picatinny Arsenal (ARCADIS and WESTON, 2011).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the contract-required detection limit (CRDL), but greater than or equal to the instrument detection limit (IDL).
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - UJ The analyte was not detected above the reported sample detection limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010 and 6020	Water	180 days from collection to analysis	Cool to <6 °C; preserved to a pH of less than 2.
	Soil	180 days from collection to analysis	Cool to <6 °C.

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore detected sample results were not associated with blank contamination.

4. Mass Spectrometer Tuning (SW-846 6020 analysis only)

The %RSD of the absolute signals for all analytes in the tuning solution must be less than 5% for each analyte and the instrument mass resolution must be within 0.1 amu (manufacturer's specifications the range of 6-210 amu).

Mass spectrometer performance and system performance was acceptable.

5. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

5.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 for all non-ICP analytes and all initial calibration verification standard recoveries were within control limits.

All initial and continuing calibration verification standard recoveries were within the control limit.

5.2 CRDL Check Standard

The CRDL check standard serves to verify the linearity of calibration of the analysis at the CRDL. The CRDL standard is not required for the analysis of aluminum (Al), barium (Ba), calcium (Ca), iron (Fe), magnesium (Mg), sodium (Na), and potassium (K). The criteria used to evaluate the CRDL standard analysis are presented below in the CRDL standards evaluation table.

All CRDL standard recoveries were within control limits.

5.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits.

5.4 Internal Standards

Internal standard performance criteria insure that the ICP/MS sensitivity and response are stable during every sample analysis. The criteria requires the internal standard analytes associated with the metals must exhibit a percent recovery within the established acceptance limits of 70% to 120%

All internal standard responses were within control limits.

6. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

6.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 80% to 120%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater. In instance where this is true, the data will not be qualified even if the percent recovery does not meet the control limits and the laboratory flag will be removed.

The MS/MSD performed on sample locations C-SB2-002(082014), C-SB4-003(082114) and C-1181-3(091914) exhibited acceptable recoveries and RPD between the MS/MSD recoveries.

6.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the CRDL. A control limit of 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the CRDL, a control limit of two times the CRDL is applied for soil matrices.

A laboratory duplicate was not included in the data package.

7. Field Duplicate Analysis

Field duplicate analysis is used to assess the precision and accuracy of the field sampling procedures and analytical method. A control limit of 30% for water matrices and 40% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices or three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
C-MW25-06A(081814)/C-DUP-001(081814)	Lead	5.0 U	5.0 U	AC
	Arsenic	1.6 J	1.9 J	AC
C-SB1-002(081914)/C-DUP-002(081914)	Lead	86	73	16.4%
	Arsenic	0.69 J	0.63 J	AC

AC Acceptable

The calculated RPDs between the parent sample and field duplicate were acceptable.

8. Laboratory Control Sample Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

9. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 50 times the MDL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

Although the laboratory performed the serial dilutions on sample locations C-SB2-002(082014), C-SB4-003(082114) and C-1181-3(091914), none of the associated sample exhibited concentrations greater than 50 times the MDL in the undiluted sample. Therefore, the sample results were not evaluated for serial dilution.

10. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR METALS

METALS; EPA 6010/6020	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP)/ICP/MS					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R		X		X	
Matrix Spike Duplicate (MSD) %R		X		X	
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
ICP Serial Dilution		X		X	
Reporting Limit Verification		X		X	
Raw Data		X		X	
Tier III Validation					
Internal Standards		X		X	
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
Instrument tune and performance check		X		X	
CRDL Standard		X		X	
ICP Interference Check		X		X	
Transcription/calculation errors present		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

VALIDATION PERFORMED BY: Rachelle Borne

SIGNATURE: 

DATE: October 7, 2014

PEER REVIEW: Dennis Capria

DATE: October 7, 2014

**CHAIN OF CUSTODY/
CORRECTED SAMPLE ANALYSIS DATA SHEETS**



TestAmerica

Temperatures on Receipt 3.9 + 0
#026

Chain of Custody Record

280-59192 Chain of Custody

Drinking Water? Yes No THE LEADER IN ENVIRONMENTAL TESTING

Chain of Custody Number
161995

Date
8/19/14

Page
1 of 1

Project Manager
LISA SZEGEDI

Client
ARCADIS

Address
17-17 ROUTE 208 NORTH
FAIR LAWN
PLANTATION ARSENALS (NJ)
NJ 07410

Telephone Number (Area Code)/Fax Number
201-797-7400

Site Contact
CHARL GARDNER

Carrier/Waybill Number
03816063.0000.00900

Sample I.D. No. and Description
(Containers for each sample may be combined on one line)

Sample I.D. No. and Description	Date	Time	Matrix				Containers & Preservatives				Analysis (Attach list if more space is needed)	Special Instructions/ Conditions of Receipt		
			Air	Soil	Sed	Unpres.	H2SO4	HNO3	HCl	NaOH			ZnAc	NaOH
C-SB1-003 (081914)	8-19-14	955	X				X	X						
C-SB1-001 (081914)	8-19-14	1035	X				X	X						
C-SB1-002 (081914)	8-19-14	940	X				X	X						
C-DUP-002 (081914)	8-19-14	1100	X				X	X						
C-SB1-005 (081914)	8-19-14	1145	X				X	X						
C-SB1-006 (081914)	8-19-14	1155	X				X	X						
C-SB1-007 (081914)	8-19-14	1050	X				X	X						
C-MW-017 (081914)	8-19-14	1410	X				X	X						
F0002 (081914)	8-19-14	1500	X				X	X						
T02 (081914)	8-19-14	800	X				X	X						

Special Instructions/ Conditions of Receipt
Vinyl chloride
Arsenic and Lead
LEAD

Sample Disposal
Return To Client Unknown Poison B Skin Irritant Flammable Non-Hazard

QC Requirements (Specify)
Disposal By Lab Archive For Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required
24 Hours 48 Hours 7 Days 14 Days 21 Days Other Standard

1. Relinquished By
Date: 8/19/14 Time: 1700

2. Relinquished By
Date: 8/19/14 Time: 1010

3. Relinquished By
Date: _____ Time: _____

Comments
ARSENIC WILL BE ANALYZED VIA GOTO OTHER METALS WILL BE ANALYZED VIA GOTO
DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

Chain of Custody Record

TAL-4124-280 (0506)

Sampler ID

Temperature on Receipt 1.4 to 19-C
 IR-C 7/22/14-19
 Drinking Water? Yes No

TestAme
 THE LEADER IN ENVIRONM



280-59249 Chain of Custody

Client: Accedis Project Manager: Liza Szegedi Date: 8/21/14 Chain of Custody Number: 152635

Address: 17-17 Route 208 N Telephone Number (Area Code)/Fax Number: 201-797-7400 Lab Number: 1 of 1

City: Faic Lash State: NJ Zip Code: 07410 Site Contact: Chris Goldsmith Lab Contact: Eileen Welter

Project Name and Location (State): 02816003 0000.00900 Carrier/Waybill Number: _____

Contract/Purchase Order/Quote No. _____

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix					Containers & Preservatives					Analysis (Attach list if more space is needed)	Special Instructions/ Conditions of Receipt		
			Air	Aqueous	Sed.	Soil	Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH				
<u>C-SB4-003(082114)</u>	<u>8/21/14</u>	<u>0950</u>	X					X	X	X	X	X	X	X		
<u>C-SB4-003(082114)-MS</u>	<u>8/21/14</u>	<u>0950</u>	X					X	X	X	X	X	X	X		
<u>C-SB4-003(082114)-MSB</u>	<u>8/21/14</u>	<u>0950</u>	X					X	X	X	X	X	X	X		
<u>C-SB4-002(082114)</u>	<u>8/21/14</u>	<u>0925</u>	X					X	X	X	X	X	X	X		
<u>C-SB4-001(082114)</u>	<u>8/21/14</u>	<u>1055</u>	X					X	X	X	X	X	X	X		
<u>C-SB4-004(082114)</u>	<u>8/21/14</u>	<u>1130</u>	X					X	X	X	X	X	X	X		
<u>C-MW25-008(082114)</u>	<u>8/21/14</u>	<u>1405</u>	X					X	X	X	X	X	X	X		
<u>C-DM 25-002(082114)</u>	<u>8/21/14</u>	<u>1300</u>	X					X	X	X	X	X	X	X		
<u>FB 004(082114)</u>	<u>8/21/14</u>	<u>1300</u>	X					X	X	X	X	X	X	X		
<u>TB4(082114)</u>	<u>8/21/14</u>	<u>-</u>	X					X	X	X	X	X	X	X		
	<u>8/21/14</u>															

Possible Hazard Identification
 Non-Hazard Flammable Skin Irritant Poison B Unknown Return To Client Disposal By Lab Archive For _____ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required
 24 Hours 48 Hours 7 Days 14 Days 21 Days Other: Standard

1. Relinquished By: Chris Goldsmith Date: 8/21/14 Time: 1800
 2. Relinquished By: _____ Date: _____ Time: _____
 3. Relinquished By: _____ Date: _____ Time: _____

1. Received By: Liza Szegedi Date: 8/21/14 Time: 10:00
 2. Received By: _____ Date: _____ Time: _____
 3. Received By: _____ Date: _____ Time: _____

Comments: arsenic will be analyzed via 6020 other metals will be analyzed via 6010

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy



280-60236 Chain of Custody

Client Information Client Contact: <i>Lisa Szegedi</i> Company: ARCADIS U.S., Inc. Address: 17-17 Route 208 North City: Fair Lawn State, Zip: NJ, 07410 Phone: 201-398-4328 (Tel) Email: <i>lisa.szegedi@arcadis-us.com</i> Project Name: US Army Garrison Picatinny GW Site: <i>Picatinny</i>		Lab PM: <i>Walker, Elaine M</i> E-Mail: <i>elaine.walker@testamericainc.com</i>		Carrier Tracking No(s): Page: <i>1</i> of <i>1</i> Job #:							
Due Date Requested: TAT Requested (days): PO #: <i>03816003.0000.00900</i> WO #:		Analysis Requested									
Sample Identification <i>FB 005 (091914)</i> <i>C-1181-3(091914)</i> <i>C- MW180-1(091914)</i>		Sample Date <i>9/19/14</i> <i>9/19/14</i> <i>9/19/14</i>	Sample Time <i>0900</i> <i>1015</i> <i>1145</i>	Sample Type (C=Comp, G=grab) <i>G</i> <i>G</i> <i>G</i>	Matrix (W=water, S=solid, O=wastewater, ST=ISSUES, AS=AS) <i>GW</i> <i>GW</i> <i>GW</i>	Field Filtered Sample (Yes or No) <input checked="" type="checkbox"/> A <input checked="" type="checkbox"/> D <input checked="" type="checkbox"/> D	VOCs - Vinyl Chloride <input checked="" type="checkbox"/> A <input checked="" type="checkbox"/> D <input checked="" type="checkbox"/> D	Arsenic <input checked="" type="checkbox"/> X <input checked="" type="checkbox"/> X <input checked="" type="checkbox"/> X	Lead <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Total Number of Containers <input checked="" type="checkbox"/> X	Special Instructions/Note: Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:
Possible Hazard Identification <input checked="" type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Polson B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months									
Deliverable Requested: I, II, III, IV, Other (specify)		Special Instructions/QC Requirements: <i>10 day TAT</i>									
Empty Kit Relinquished by:		Method of Shipment: <i>Fed Ex</i>									
Relinquished by: <i>[Signature]</i>		Date/Time: <i>9/19/14 1800</i>		Received by: <i>Mungasoto</i>							
Relinquished by:		Date/Time:		Received by:							
Relinquished by:		Date/Time:		Received by:							
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No		Cooler Temperature(s) °C and Other Remarks:									

Transferred to ms 18 TWR 11 ~ 9/29/14

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59101-1

Client Sample ID: C-MW25-06A(081814)

Lab Sample ID: 280-59101-1

Date Sampled: 08/18/2014 1045

Client Matrix: Water

Date Received: 08/19/2014 1030

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-241012	Instrument ID:	VMS_P
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	P4535.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	08/28/2014 1235			Final Weight/Volume:	20 mL
Prep Date:	08/28/2014 1235				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Vinyl chloride	0.40	U	0.10	1.5

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	96		70 - 120
4-Bromofluorobenzene (Surr)	98		75 - 120
Dibromofluoromethane (Surr)	101		85 - 115
Toluene-d8 (Surr)	101		85 - 120

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59101-1

Client Sample ID: C-MW25-06B(081814)

Lab Sample ID: 280-59101-2

Date Sampled: 08/18/2014 1030

Client Matrix: Water

Date Received: 08/19/2014 1030

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-241012	Instrument ID:	VMS_P
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	P4536.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	08/28/2014 1256			Final Weight/Volume:	20 mL
Prep Date:	08/28/2014 1256				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Vinyl chloride	0.40	U	0.10	1.5

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	96		70 - 120
4-Bromofluorobenzene (Surr)	102		75 - 120
Dibromofluoromethane (Surr)	97		85 - 115
Toluene-d8 (Surr)	98		85 - 120

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59101-1

Client Sample ID: C-DUP001(081814)

Lab Sample ID: 280-59101-3FD
Client Matrix: Water

Date Sampled: 08/18/2014 1100
Date Received: 08/19/2014 1030

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-241012	Instrument ID:	VMS_P
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	P4537.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	08/28/2014 1315			Final Weight/Volume:	20 mL
Prep Date:	08/28/2014 1315				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Vinyl chloride	0.40	U	0.10	1.5

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	97		70 - 120
4-Bromofluorobenzene (Surr)	104		75 - 120
Dibromofluoromethane (Surr)	99		85 - 115
Toluene-d8 (Surr)	97		85 - 120

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59101-1

Client Sample ID: C-DM19-001(081814)

Lab Sample ID: 280-59101-4

Date Sampled: 08/18/2014 1205

Client Matrix: Water

Date Received: 08/19/2014 1030

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-241012	Instrument ID:	VMS_P
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	P4538.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	08/28/2014 1335			Final Weight/Volume:	20 mL
Prep Date:	08/28/2014 1335				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Vinyl chloride	15		0.10	1.5

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	95		70 - 120
4-Bromofluorobenzene (Surr)	101		75 - 120
Dibromofluoromethane (Surr)	97		85 - 115
Toluene-d8 (Surr)	100		85 - 120

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59101-1

Client Sample ID: FB001(081814)

Lab Sample ID: 280-59101-7FB

Date Sampled: 08/18/2014 1500

Client Matrix: Water

Date Received: 08/19/2014 1030

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-241012	Instrument ID:	VMS_P
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	P4539.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	08/28/2014 1354			Final Weight/Volume:	20 mL
Prep Date:	08/28/2014 1354				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Vinyl chloride	0.40	U	0.10	1.5

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	94		70 - 120
4-Bromofluorobenzene (Surr)	100		75 - 120
Dibromofluoromethane (Surr)	93		85 - 115
Toluene-d8 (Surr)	96		85 - 120

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59101-1

Client Sample ID: TB1(081814)

Lab Sample ID: 280-59101-8TB

Date Sampled: 08/18/2014 0800

Client Matrix: Water

Date Received: 08/19/2014 1030

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-241012	Instrument ID:	VMS_P
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	P4540.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	08/28/2014 1413			Final Weight/Volume:	20 mL
Prep Date:	08/28/2014 1413				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Vinyl chloride	0.40	U	0.10	1.5

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	98		70 - 120
4-Bromofluorobenzene (Surr)	101		75 - 120
Dibromofluoromethane (Surr)	98		85 - 115
Toluene-d8 (Surr)	99		85 - 120

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59101-1

Client Sample ID: C-MW25-06A(081814)

Lab Sample ID: 280-59101-1
Client Matrix: Water

Date Sampled: 08/18/2014 1045
Date Received: 08/19/2014 1030

6010B Metals (ICP)

Analysis Method: 6010B Analysis Batch: 280-240787 Instrument ID: MT_025
Prep Method: 3010A Prep Batch: 280-240170 Lab File ID: 25B082614.asc
Dilution: 1.0 Initial Weight/Volume: 50 mL
Analysis Date: 08/26/2014 1527 Final Weight/Volume: 50 mL
Prep Date: 08/25/2014 0900

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Lead	5.0	U	2.6	15

6020 Metals (ICP/MS)

Analysis Method: 6020 Analysis Batch: 280-240596 Instrument ID: MT_024
Prep Method: 3020A Prep Batch: 280-240155 Lab File ID: 233SMPL.D
Dilution: 1.0 Initial Weight/Volume: 50 mL
Analysis Date: 08/26/2014 0637 Final Weight/Volume: 50 mL
Prep Date: 08/25/2014 0900

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Arsenic	1.6	J	0.33	5.0

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59101-1

Client Sample ID: C-MW25-06B(081814)

Lab Sample ID: 280-59101-2
Client Matrix: Water

Date Sampled: 08/18/2014 1030
Date Received: 08/19/2014 1030

6010B Metals (ICP)

Analysis Method: 6010B Analysis Batch: 280-240787 Instrument ID: MT_025
Prep Method: 3010A Prep Batch: 280-240170 Lab File ID: 25B082614.asc
Dilution: 1.0 Initial Weight/Volume: 50 mL
Analysis Date: 08/26/2014 1540 Final Weight/Volume: 50 mL
Prep Date: 08/25/2014 0900

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Lead	5.0	U	2.6	15

6020 Metals (ICP/MS)

Analysis Method: 6020 Analysis Batch: 280-240596 Instrument ID: MT_024
Prep Method: 3020A Prep Batch: 280-240155 Lab File ID: 234AREF.D
Dilution: 1.0 Initial Weight/Volume: 50 mL
Analysis Date: 08/26/2014 0640 Final Weight/Volume: 50 mL
Prep Date: 08/25/2014 0900

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Arsenic	1.6	J	0.33	5.0

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59101-1

Client Sample ID: C-DUP001(081814)

Lab Sample ID: 280-59101-3FD
Client Matrix: Water

Date Sampled: 08/18/2014 1100
Date Received: 08/19/2014 1030

6010B Metals (ICP)

Analysis Method: 6010B Analysis Batch: 280-240787 Instrument ID: MT_025
Prep Method: 3010A Prep Batch: 280-240170 Lab File ID: 25B082614.asc
Dilution: 1.0 Initial Weight/Volume: 50 mL
Analysis Date: 08/26/2014 1542 Final Weight/Volume: 50 mL
Prep Date: 08/25/2014 0900

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Lead	5.0	U	2.6	15

6020 Metals (ICP/MS)

Analysis Method: 6020 Analysis Batch: 280-240596 Instrument ID: MT_024
Prep Method: 3020A Prep Batch: 280-240155 Lab File ID: 241SMPL.D
Dilution: 1.0 Initial Weight/Volume: 50 mL
Analysis Date: 08/26/2014 0702 Final Weight/Volume: 50 mL
Prep Date: 08/25/2014 0900

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Arsenic	1.9	J	0.33	5.0

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59101-1

Client Sample ID: C-DM19-001(081814)

Lab Sample ID: 280-59101-4
Client Matrix: Water

Date Sampled: 08/18/2014 1205
Date Received: 08/19/2014 1030

6020 Metals (ICP/MS)

Analysis Method:	6020	Analysis Batch:	280-240596	Instrument ID:	MT_024
Prep Method:	3020A	Prep Batch:	280-240155	Lab File ID:	242SMPL.D
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	08/26/2014 0705			Final Weight/Volume:	50 mL
Prep Date:	08/25/2014 0900				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Arsenic	4.8	J	0.33	5.0

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59101-1

Client Sample ID: C-DM19-002(081814)

Lab Sample ID: 280-59101-5

Date Sampled: 08/18/2014 1220

Client Matrix: Water

Date Received: 08/19/2014 1030

6020 Metals (ICP/MS)

Analysis Method:	6020	Analysis Batch:	280-240596	Instrument ID:	MT_024
Prep Method:	3020A	Prep Batch:	280-240155	Lab File ID:	243SMPL.D
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	08/26/2014 0708			Final Weight/Volume:	50 mL
Prep Date:	08/25/2014 0900				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Arsenic	87		0.33	5.0

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59101-1

Client Sample ID: C-C1-B(081814)

Lab Sample ID: 280-59101-6

Date Sampled: 08/18/2014 1440

Client Matrix: Water

Date Received: 08/19/2014 1030

6020 Metals (ICP/MS)

Analysis Method: 6020

Analysis Batch: 280-240596

Instrument ID: MT_024

Prep Method: 3020A

Prep Batch: 280-240155

Lab File ID: 244SMPL.D

Dilution: 1.0

Initial Weight/Volume: 50 mL

Analysis Date: 08/26/2014 0711

Final Weight/Volume: 50 mL

Prep Date: 08/25/2014 0900

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Arsenic	20		0.33	5.0

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59101-1

Client Sample ID: FB001(081814)

Lab Sample ID: 280-59101-7FB

Date Sampled: 08/18/2014 1500

Client Matrix: Water

Date Received: 08/19/2014 1030

6010B Metals (ICP)

Analysis Method: 6010B Analysis Batch: 280-240787 Instrument ID: MT_025
Prep Method: 3010A Prep Batch: 280-240170 Lab File ID: 25B082614.asc
Dilution: 1.0 Initial Weight/Volume: 50 mL
Analysis Date: 08/26/2014 1545 Final Weight/Volume: 50 mL
Prep Date: 08/25/2014 0900

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Lead	5.0	U	2.6	15

6020 Metals (ICP/MS)

Analysis Method: 6020 Analysis Batch: 280-240596 Instrument ID: MT_024
Prep Method: 3020A Prep Batch: 280-240155 Lab File ID: 245SMPL.D
Dilution: 1.0 Initial Weight/Volume: 50 mL
Analysis Date: 08/26/2014 0714 Final Weight/Volume: 50 mL
Prep Date: 08/25/2014 0900

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Arsenic	1.0	U	0.33	5.0

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59192-1

Client Sample ID: C-SB1-003(081914)

Lab Sample ID: 280-59192-1

Date Sampled: 08/19/2014 0955

Client Matrix: Water

Date Received: 08/20/2014 1010

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-241393	Instrument ID:	VMS_Q
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	Q8950.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	08/30/2014 1707			Final Weight/Volume:	20 mL
Prep Date:	08/30/2014 1707				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Vinyl chloride	0.40	U	0.10	1.5

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	102		70 - 120
4-Bromofluorobenzene (Surr)	95		75 - 120
Dibromofluoromethane (Surr)	97		85 - 115
Toluene-d8 (Surr)	97		85 - 120

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59192-1

Client Sample ID: C-SB1-001(081914)

Lab Sample ID: 280-59192-2

Date Sampled: 08/19/2014 1035

Client Matrix: Water

Date Received: 08/20/2014 1010

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-241393	Instrument ID:	VMS_Q
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	Q8951.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	08/30/2014 1727			Final Weight/Volume:	20 mL
Prep Date:	08/30/2014 1727				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Vinyl chloride	0.40	U	0.10	1.5

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	101		70 - 120
4-Bromofluorobenzene (Surr)	94		75 - 120
Dibromofluoromethane (Surr)	98		85 - 115
Toluene-d8 (Surr)	96		85 - 120

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59192-1

Client Sample ID: C-SB1-002(081914)

Lab Sample ID: 280-59192-3

Date Sampled: 08/19/2014 0940

Client Matrix: Water

Date Received: 08/20/2014 1010

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-241393	Instrument ID:	VMS_Q
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	Q8952.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	08/30/2014 1747			Final Weight/Volume:	20 mL
Prep Date:	08/30/2014 1747				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Vinyl chloride	0.40	U	0.10	1.5

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	102		70 - 120
4-Bromofluorobenzene (Surr)	94		75 - 120
Dibromofluoromethane (Surr)	97		85 - 115
Toluene-d8 (Surr)	94		85 - 120

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59192-1

Client Sample ID: C-DUP-002(081914)

Lab Sample ID: 280-59192-4FD

Date Sampled: 08/19/2014 1100

Client Matrix: Water

Date Received: 08/20/2014 1010

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-241393	Instrument ID:	VMS_Q
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	Q8953.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	08/30/2014 1807			Final Weight/Volume:	20 mL
Prep Date:	08/30/2014 1807				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Vinyl chloride	0.40	U	0.10	1.5

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	98		70 - 120
4-Bromofluorobenzene (Surr)	92		75 - 120
Dibromofluoromethane (Surr)	94		85 - 115
Toluene-d8 (Surr)	90		85 - 120

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59192-1

Client Sample ID: C-SB1-005(081914)

Lab Sample ID: 280-59192-5

Date Sampled: 08/19/2014 1145

Client Matrix: Water

Date Received: 08/20/2014 1010

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-241393	Instrument ID:	VMS_Q
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	Q8954.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	08/30/2014 1827			Final Weight/Volume:	20 mL
Prep Date:	08/30/2014 1827				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Vinyl chloride	0.40	U	0.10	1.5

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	98		70 - 120
4-Bromofluorobenzene (Surr)	90		75 - 120
Dibromofluoromethane (Surr)	93		85 - 115
Toluene-d8 (Surr)	89		85 - 120

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59192-1

Client Sample ID: C-SB1-006(081914)

Lab Sample ID: 280-59192-6

Date Sampled: 08/19/2014 1155

Client Matrix: Water

Date Received: 08/20/2014 1010

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-241393	Instrument ID:	VMS_Q
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	Q8955.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	08/30/2014 1847			Final Weight/Volume:	20 mL
Prep Date:	08/30/2014 1847				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Vinyl chloride	0.40	U	0.10	1.5

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	95		70 - 120
4-Bromofluorobenzene (Surr)	87		75 - 120
Dibromofluoromethane (Surr)	90		85 - 115
Toluene-d8 (Surr)	87		85 - 120

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59192-1

Client Sample ID: C-SB1-007(081914)

Lab Sample ID: 280-59192-7

Date Sampled: 08/19/2014 1050

Client Matrix: Water

Date Received: 08/20/2014 1010

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-241392	Instrument ID:	VMS_P
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	P4662.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	08/30/2014 1928			Final Weight/Volume:	20 mL
Prep Date:	08/30/2014 1928				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Vinyl chloride	0.40	U	0.10	1.5

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	89		70 - 120
4-Bromofluorobenzene (Surr)	96		75 - 120
Dibromofluoromethane (Surr)	91		85 - 115
Toluene-d8 (Surr)	91		85 - 120

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59192-1

Client Sample ID: FB002(081914)

Lab Sample ID: 280-59192-9

Date Sampled: 08/19/2014 1500

Client Matrix: Water

Date Received: 08/20/2014 1010

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-241392	Instrument ID:	VMS_P
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	P4663.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	08/30/2014 1948			Final Weight/Volume:	20 mL
Prep Date:	08/30/2014 1948				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Vinyl chloride	0.40	U	0.10	1.5

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	90		70 - 120
4-Bromofluorobenzene (Surr)	96		75 - 120
Dibromofluoromethane (Surr)	93		85 - 115
Toluene-d8 (Surr)	93		85 - 120

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59192-1

Client Sample ID: TB2(081914)

Lab Sample ID: 280-59192-10TB

Date Sampled: 08/19/2014 0800

Client Matrix: Water

Date Received: 08/20/2014 1010

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-241392	Instrument ID:	VMS_P
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	P4664.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	08/30/2014 2008			Final Weight/Volume:	20 mL
Prep Date:	08/30/2014 2008				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Vinyl chloride	0.40	U	0.10	1.5

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	90		70 - 120
4-Bromofluorobenzene (Surr)	94		75 - 120
Dibromofluoromethane (Surr)	94		85 - 115
Toluene-d8 (Surr)	91		85 - 120

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59192-1

Client Sample ID: C-SB1-003(081914)

Lab Sample ID: 280-59192-1

Date Sampled: 08/19/2014 0955

Client Matrix: Water

Date Received: 08/20/2014 1010

6010B Metals (ICP)

Analysis Method: 6010B Analysis Batch: 280-241229 Instrument ID: MT_026
Prep Method: 3010A Prep Batch: 280-240530 Lab File ID: 26b082814.asc
Dilution: 1.0 Initial Weight/Volume: 50 mL
Analysis Date: 08/28/2014 1337 Final Weight/Volume: 50 mL
Prep Date: 08/27/2014 0900

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Lead	5.6	J	2.6	15

6020 Metals (ICP/MS)

Analysis Method: 6020 Analysis Batch: 280-241016 Instrument ID: MT_024
Prep Method: 3020A Prep Batch: 280-240652 Lab File ID: 131SMPL.D
Dilution: 1.0 Initial Weight/Volume: 50 mL
Analysis Date: 08/28/2014 0320 Final Weight/Volume: 50 mL
Prep Date: 08/27/2014 1430

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Arsenic	1.0	U	0.33	5.0

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59192-1

Client Sample ID: C-SB1-001(081914)

Lab Sample ID: 280-59192-2

Date Sampled: 08/19/2014 1035

Client Matrix: Water

Date Received: 08/20/2014 1010

6010B Metals (ICP)

Analysis Method: 6010B Analysis Batch: 280-241229 Instrument ID: MT_026
Prep Method: 3010A Prep Batch: 280-240530 Lab File ID: 26b082814.asc
Dilution: 1.0 Initial Weight/Volume: 50 mL
Analysis Date: 08/28/2014 1339 Final Weight/Volume: 50 mL
Prep Date: 08/27/2014 0900

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Lead	42		2.6	15

6020 Metals (ICP/MS)

Analysis Method: 6020 Analysis Batch: 280-241016 Instrument ID: MT_024
Prep Method: 3020A Prep Batch: 280-240652 Lab File ID: 132SMPL.D
Dilution: 1.0 Initial Weight/Volume: 50 mL
Analysis Date: 08/28/2014 0323 Final Weight/Volume: 50 mL
Prep Date: 08/27/2014 1430

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Arsenic	1.0	U	0.33	5.0

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59192-1

Client Sample ID: C-SB1-002(081914)

Lab Sample ID: 280-59192-3
Client Matrix: Water

Date Sampled: 08/19/2014 0940
Date Received: 08/20/2014 1010

6010B Metals (ICP)

Analysis Method: 6010B Analysis Batch: 280-241229 Instrument ID: MT_026
Prep Method: 3010A Prep Batch: 280-240530 Lab File ID: 26b082814.asc
Dilution: 1.0 Initial Weight/Volume: 50 mL
Analysis Date: 08/28/2014 1342 Final Weight/Volume: 50 mL
Prep Date: 08/27/2014 0900

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Lead	86		2.6	15

6020 Metals (ICP/MS)

Analysis Method: 6020 Analysis Batch: 280-241016 Instrument ID: MT_024
Prep Method: 3020A Prep Batch: 280-240652 Lab File ID: 133SMPL.D
Dilution: 1.0 Initial Weight/Volume: 50 mL
Analysis Date: 08/28/2014 0326 Final Weight/Volume: 50 mL
Prep Date: 08/27/2014 1430

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Arsenic	0.69	J	0.33	5.0

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59192-1

Client Sample ID: C-DUP-002(081914)

Lab Sample ID: 280-59192-4FD
Client Matrix: Water

Date Sampled: 08/19/2014 1100
Date Received: 08/20/2014 1010

6010B Metals (ICP)

Analysis Method: 6010B Analysis Batch: 280-241229 Instrument ID: MT_026
Prep Method: 3010A Prep Batch: 280-240530 Lab File ID: 26b082814.asc
Dilution: 1.0 Initial Weight/Volume: 50 mL
Analysis Date: 08/28/2014 1345 Final Weight/Volume: 50 mL
Prep Date: 08/27/2014 0900

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Lead	73		2.6	15

6020 Metals (ICP/MS)

Analysis Method: 6020 Analysis Batch: 280-241016 Instrument ID: MT_024
Prep Method: 3020A Prep Batch: 280-240652 Lab File ID: 134SMPL.D
Dilution: 1.0 Initial Weight/Volume: 50 mL
Analysis Date: 08/28/2014 0329 Final Weight/Volume: 50 mL
Prep Date: 08/27/2014 1430

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Arsenic	0.63	J	0.33	5.0

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59192-1

Client Sample ID: C-SB1-005(081914)

Lab Sample ID: 280-59192-5
Client Matrix: Water

Date Sampled: 08/19/2014 1145
Date Received: 08/20/2014 1010

6010B Metals (ICP)

Analysis Method: 6010B Analysis Batch: 280-241229 Instrument ID: MT_026
Prep Method: 3010A Prep Batch: 280-240530 Lab File ID: 26b082814.asc
Dilution: 1.0 Initial Weight/Volume: 50 mL
Analysis Date: 08/28/2014 1348 Final Weight/Volume: 50 mL
Prep Date: 08/27/2014 0900

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Lead	5.0	U	2.6	15

6020 Metals (ICP/MS)

Analysis Method: 6020 Analysis Batch: 280-241016 Instrument ID: MT_024
Prep Method: 3020A Prep Batch: 280-240652 Lab File ID: 135SMPL.D
Dilution: 1.0 Initial Weight/Volume: 50 mL
Analysis Date: 08/28/2014 0332 Final Weight/Volume: 50 mL
Prep Date: 08/27/2014 1430

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Arsenic	0.36	J	0.33	5.0

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59192-1

Client Sample ID: C-SB1-006(081914)

Lab Sample ID: 280-59192-6
Client Matrix: Water

Date Sampled: 08/19/2014 1155
Date Received: 08/20/2014 1010

6010B Metals (ICP)

Analysis Method: 6010B Analysis Batch: 280-241229 Instrument ID: MT_026
Prep Method: 3010A Prep Batch: 280-240530 Lab File ID: 26b082814.asc
Dilution: 1.0 Initial Weight/Volume: 50 mL
Analysis Date: 08/28/2014 1350 Final Weight/Volume: 50 mL
Prep Date: 08/27/2014 0900

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Lead	5.0	U	2.6	15

6020 Metals (ICP/MS)

Analysis Method: 6020 Analysis Batch: 280-241016 Instrument ID: MT_024
Prep Method: 3020A Prep Batch: 280-240652 Lab File ID: 136SMPL.D
Dilution: 1.0 Initial Weight/Volume: 50 mL
Analysis Date: 08/28/2014 0335 Final Weight/Volume: 50 mL
Prep Date: 08/27/2014 1430

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Arsenic	0.48	J	0.33	5.0

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59192-1

Client Sample ID: C-SB1-007(081914)

Lab Sample ID: 280-59192-7
Client Matrix: Water

Date Sampled: 08/19/2014 1050
Date Received: 08/20/2014 1010

6010B Metals (ICP)

Analysis Method: 6010B Analysis Batch: 280-241229 Instrument ID: MT_026
Prep Method: 3010A Prep Batch: 280-240530 Lab File ID: 26b082814.asc
Dilution: 1.0 Initial Weight/Volume: 50 mL
Analysis Date: 08/28/2014 1353 Final Weight/Volume: 50 mL
Prep Date: 08/27/2014 0900

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Lead	5.0	U	2.6	15

6020 Metals (ICP/MS)

Analysis Method: 6020 Analysis Batch: 280-241016 Instrument ID: MT_024
Prep Method: 3020A Prep Batch: 280-240652 Lab File ID: 139SMPL.D
Dilution: 1.0 Initial Weight/Volume: 50 mL
Analysis Date: 08/28/2014 0345 Final Weight/Volume: 50 mL
Prep Date: 08/27/2014 1430

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Arsenic	1.0	U	0.33	5.0

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59192-1

Client Sample ID: C-MW-017(081914)

Lab Sample ID: 280-59192-8

Date Sampled: 08/19/2014 1410

Client Matrix: Water

Date Received: 08/20/2014 1010

6010B Metals (ICP)

Analysis Method:	6010B	Analysis Batch:	280-241229	Instrument ID:	MT_026
Prep Method:	3010A	Prep Batch:	280-240530	Lab File ID:	26b082814.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	08/28/2014 1356			Final Weight/Volume:	50 mL
Prep Date:	08/27/2014 0900				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Lead	5.0	U	2.6	15

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59192-1

Client Sample ID: FB002(081914)

Lab Sample ID: 280-59192-9

Date Sampled: 08/19/2014 1500

Client Matrix: Water

Date Received: 08/20/2014 1010

6010B Metals (ICP)

Analysis Method: 6010B Analysis Batch: 280-241229 Instrument ID: MT_026
Prep Method: 3010A Prep Batch: 280-240530 Lab File ID: 26b082814.asc
Dilution: 1.0 Initial Weight/Volume: 50 mL
Analysis Date: 08/28/2014 1409 Final Weight/Volume: 50 mL
Prep Date: 08/27/2014 0900

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Lead	5.0	U	2.6	15

6020 Metals (ICP/MS)

Analysis Method: 6020 Analysis Batch: 280-241016 Instrument ID: MT_024
Prep Method: 3020A Prep Batch: 280-240652 Lab File ID: 140SMPL.D
Dilution: 1.0 Initial Weight/Volume: 50 mL
Analysis Date: 08/28/2014 0348 Final Weight/Volume: 50 mL
Prep Date: 08/27/2014 1430

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Arsenic	1.0	U	0.33	5.0

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59229-1

Client Sample ID: C-SB2-002(082014)

Lab Sample ID: 280-59229-1

Date Sampled: 08/20/2014 0945

Client Matrix: Water

Date Received: 08/21/2014 1000

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-241598	Instrument ID:	VMS_Z
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	Z0169.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	09/03/2014 1339			Final Weight/Volume:	20 mL
Prep Date:	09/03/2014 1339				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Vinyl chloride	0.40	U	0.10	1.5

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	85		70 - 120
4-Bromofluorobenzene (Surr)	114		75 - 120
Dibromofluoromethane (Surr)	105		85 - 115
Toluene-d8 (Surr)	94		85 - 120

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59229-1

Client Sample ID: C-SB2-003(082014)

Lab Sample ID: 280-59229-2

Date Sampled: 08/20/2014 1020

Client Matrix: Water

Date Received: 08/21/2014 1000

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-241598	Instrument ID:	VMS_Z
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	Z0172.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	09/03/2014 1450			Final Weight/Volume:	20 mL
Prep Date:	09/03/2014 1450				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Vinyl chloride	0.40	U	0.10	1.5

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	84		70 - 120
4-Bromofluorobenzene (Surr)	113		75 - 120
Dibromofluoromethane (Surr)	104		85 - 115
Toluene-d8 (Surr)	95		85 - 120

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59229-1

Client Sample ID: C-SB2-01A(082014)

Lab Sample ID: 280-59229-3

Date Sampled: 08/20/2014 1130

Client Matrix: Water

Date Received: 08/21/2014 1000

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-241598	Instrument ID:	VMS_Z
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	Z0173.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	09/03/2014 1513			Final Weight/Volume:	20 mL
Prep Date:	09/03/2014 1513				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Vinyl chloride	0.40	U	0.10	1.5

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	86		70 - 120
4-Bromofluorobenzene (Surr)	111		75 - 120
Dibromofluoromethane (Surr)	106		85 - 115
Toluene-d8 (Surr)	92		85 - 120

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59229-1

Client Sample ID: C-SB3-003(082014)

Lab Sample ID: 280-59229-4

Date Sampled: 08/20/2014 1405

Client Matrix: Water

Date Received: 08/21/2014 1000

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-241450	Instrument ID:	VMS_P
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	P4695.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	09/02/2014 1731			Final Weight/Volume:	20 mL
Prep Date:	09/02/2014 1731				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Vinyl chloride	0.40	U	0.10	1.5

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	99		70 - 120
4-Bromofluorobenzene (Surr)	97		75 - 120
Dibromofluoromethane (Surr)	102		85 - 115
Toluene-d8 (Surr)	96		85 - 120

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59229-1

Client Sample ID: C-SB3-002(082014)

Lab Sample ID: 280-59229-5

Date Sampled: 08/20/2014 1435

Client Matrix: Water

Date Received: 08/21/2014 1000

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-241450	Instrument ID:	VMS_P
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	P4696.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	09/02/2014 1750			Final Weight/Volume:	20 mL
Prep Date:	09/02/2014 1750				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Vinyl chloride	0.40	U	0.10	1.5

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	103		70 - 120
4-Bromofluorobenzene (Surr)	99		75 - 120
Dibromofluoromethane (Surr)	102		85 - 115
Toluene-d8 (Surr)	94		85 - 120

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59229-1

Client Sample ID: C-SB3-01B(082014)

Lab Sample ID: 280-59229-6

Date Sampled: 08/20/2014 1455

Client Matrix: Water

Date Received: 08/21/2014 1000

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-241450	Instrument ID:	VMS_P
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	P4697.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	09/02/2014 1809			Final Weight/Volume:	20 mL
Prep Date:	09/02/2014 1809				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Vinyl chloride	0.40	U	0.10	1.5

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	106		70 - 120
4-Bromofluorobenzene (Surr)	97		75 - 120
Dibromofluoromethane (Surr)	104		85 - 115
Toluene-d8 (Surr)	94		85 - 120

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59229-1

Client Sample ID: FB003(082014)

Lab Sample ID: 280-59229-7FB

Date Sampled: 08/20/2014 1530

Client Matrix: Water

Date Received: 08/21/2014 1000

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-241450	Instrument ID:	VMS_P
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	P4698.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	09/02/2014 1829			Final Weight/Volume:	20 mL
Prep Date:	09/02/2014 1829				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Vinyl chloride	0.40	U	0.10	1.5

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	100		70 - 120
4-Bromofluorobenzene (Surr)	98		75 - 120
Dibromofluoromethane (Surr)	102		85 - 115
Toluene-d8 (Surr)	96		85 - 120

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59229-1

Client Sample ID: TB3(082014)

Lab Sample ID: 280-59229-8TB

Date Sampled: 08/20/2014 0945

Client Matrix: Water

Date Received: 08/21/2014 1000

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-241598	Instrument ID:	VMS_Z
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	Z0174.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	09/03/2014 1537			Final Weight/Volume:	20 mL
Prep Date:	09/03/2014 1537				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Vinyl chloride	0.40	U	0.10	1.5

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	84		70 - 120
4-Bromofluorobenzene (Surr)	112		75 - 120
Dibromofluoromethane (Surr)	106		85 - 115
Toluene-d8 (Surr)	94		85 - 120

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59229-1

Client Sample ID: C-SB2-002(082014)

Lab Sample ID: 280-59229-1
Client Matrix: Water

Date Sampled: 08/20/2014 0945
Date Received: 08/21/2014 1000

6010B Metals (ICP)

Analysis Method: 6010B Analysis Batch: 280-241229 Instrument ID: MT_026
Prep Method: 3010A Prep Batch: 280-240530 Lab File ID: 26b082814.asc
Dilution: 1.0 Initial Weight/Volume: 50 mL
Analysis Date: 08/28/2014 1412 Final Weight/Volume: 50 mL
Prep Date: 08/27/2014 0900

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Lead	5.0	U J	2.6	15

6020 Metals (ICP/MS)

Analysis Method: 6020 Analysis Batch: 280-241016 Instrument ID: MT_024
Prep Method: 3020A Prep Batch: 280-240652 Lab File ID: 141AREF.D
Dilution: 1.0 Initial Weight/Volume: 50 mL
Analysis Date: 08/28/2014 0351 Final Weight/Volume: 50 mL
Prep Date: 08/27/2014 1430

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Arsenic	4.8	J	0.33	5.0

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59229-1

Client Sample ID: C-SB2-003(082014)

Lab Sample ID: 280-59229-2
Client Matrix: Water

Date Sampled: 08/20/2014 1020
Date Received: 08/21/2014 1000

6010B Metals (ICP)

Analysis Method: 6010B Analysis Batch: 280-241229 Instrument ID: MT_026
Prep Method: 3010A Prep Batch: 280-240530 Lab File ID: 26b082814.asc
Dilution: 1.0 Initial Weight/Volume: 50 mL
Analysis Date: 08/28/2014 1436 Final Weight/Volume: 50 mL
Prep Date: 08/27/2014 0900

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Lead	5.0	U	2.6	15

6020 Metals (ICP/MS)

Analysis Method: 6020 Analysis Batch: 280-241016 Instrument ID: MT_024
Prep Method: 3020A Prep Batch: 280-240652 Lab File ID: 148SMPL.D
Dilution: 1.0 Initial Weight/Volume: 50 mL
Analysis Date: 08/28/2014 0413 Final Weight/Volume: 50 mL
Prep Date: 08/27/2014 1430

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Arsenic	1.0	U	0.33	5.0

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59229-1

Client Sample ID: C-SB2-01A(082014)

Lab Sample ID: 280-59229-3
Client Matrix: Water

Date Sampled: 08/20/2014 1130
Date Received: 08/21/2014 1000

6010B Metals (ICP)

Analysis Method: 6010B Analysis Batch: 280-241229 Instrument ID: MT_026
Prep Method: 3010A Prep Batch: 280-240530 Lab File ID: 26b082814.asc
Dilution: 1.0 Initial Weight/Volume: 50 mL
Analysis Date: 08/28/2014 1439 Final Weight/Volume: 50 mL
Prep Date: 08/27/2014 0900

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Lead	14	J	2.6	15

6020 Metals (ICP/MS)

Analysis Method: 6020 Analysis Batch: 280-241016 Instrument ID: MT_024
Prep Method: 3020A Prep Batch: 280-240652 Lab File ID: 149SMPL.D
Dilution: 1.0 Initial Weight/Volume: 50 mL
Analysis Date: 08/28/2014 0416 Final Weight/Volume: 50 mL
Prep Date: 08/27/2014 1430

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Arsenic	1.1	J	0.33	5.0

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59229-1

Client Sample ID: C-SB3-003(082014)

Lab Sample ID: 280-59229-4
Client Matrix: Water

Date Sampled: 08/20/2014 1405
Date Received: 08/21/2014 1000

6010B Metals (ICP)

Analysis Method: 6010B Analysis Batch: 280-241229 Instrument ID: MT_026
Prep Method: 3010A Prep Batch: 280-240530 Lab File ID: 26b082814.asc
Dilution: 1.0 Initial Weight/Volume: 50 mL
Analysis Date: 08/28/2014 1442 Final Weight/Volume: 50 mL
Prep Date: 08/27/2014 0900

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Lead	4.6	J	2.6	15

6020 Metals (ICP/MS)

Analysis Method: 6020 Analysis Batch: 280-241016 Instrument ID: MT_024
Prep Method: 3020A Prep Batch: 280-240652 Lab File ID: 150SMPL.D
Dilution: 1.0 Initial Weight/Volume: 50 mL
Analysis Date: 08/28/2014 0419 Final Weight/Volume: 50 mL
Prep Date: 08/27/2014 1430

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Arsenic	0.65	J	0.33	5.0

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59229-1

Client Sample ID: C-SB3-002(082014)

Lab Sample ID: 280-59229-5

Date Sampled: 08/20/2014 1435

Client Matrix: Water

Date Received: 08/21/2014 1000

6010B Metals (ICP)

Analysis Method: 6010B Analysis Batch: 280-241229 Instrument ID: MT_026
Prep Method: 3010A Prep Batch: 280-240530 Lab File ID: 26b082814.asc
Dilution: 1.0 Initial Weight/Volume: 50 mL
Analysis Date: 08/28/2014 1444 Final Weight/Volume: 50 mL
Prep Date: 08/27/2014 0900

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Lead	5.0	U	2.6	15

6020 Metals (ICP/MS)

Analysis Method: 6020 Analysis Batch: 280-241016 Instrument ID: MT_024
Prep Method: 3020A Prep Batch: 280-240652 Lab File ID: 151SMPL.D
Dilution: 1.0 Initial Weight/Volume: 50 mL
Analysis Date: 08/28/2014 0422 Final Weight/Volume: 50 mL
Prep Date: 08/27/2014 1430

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Arsenic	0.95	J	0.33	5.0

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59229-1

Client Sample ID: C-SB3-01B(082014)

Lab Sample ID: 280-59229-6
Client Matrix: Water

Date Sampled: 08/20/2014 1455
Date Received: 08/21/2014 1000

6010B Metals (ICP)

Analysis Method: 6010B Analysis Batch: 280-241229 Instrument ID: MT_026
Prep Method: 3010A Prep Batch: 280-240530 Lab File ID: 26b082814.asc
Dilution: 1.0 Initial Weight/Volume: 50 mL
Analysis Date: 08/28/2014 1447 Final Weight/Volume: 50 mL
Prep Date: 08/27/2014 0900

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Lead	5.0	U	2.6	15

6020 Metals (ICP/MS)

Analysis Method: 6020 Analysis Batch: 280-241016 Instrument ID: MT_024
Prep Method: 3020A Prep Batch: 280-240652 Lab File ID: 152SMPL.D
Dilution: 1.0 Initial Weight/Volume: 50 mL
Analysis Date: 08/28/2014 0425 Final Weight/Volume: 50 mL
Prep Date: 08/27/2014 1430

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Arsenic	1.2	J	0.33	5.0

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59229-1

Client Sample ID: FB003(082014)

Lab Sample ID: 280-59229-7FB

Date Sampled: 08/20/2014 1530

Client Matrix: Water

Date Received: 08/21/2014 1000

6010B Metals (ICP)

Analysis Method: 6010B Analysis Batch: 280-241229 Instrument ID: MT_026
Prep Method: 3010A Prep Batch: 280-240530 Lab File ID: 26b082814.asc
Dilution: 1.0 Initial Weight/Volume: 50 mL
Analysis Date: 08/28/2014 1450 Final Weight/Volume: 50 mL
Prep Date: 08/27/2014 0900

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Lead	5.0	U	2.6	15

6020 Metals (ICP/MS)

Analysis Method: 6020 Analysis Batch: 280-241016 Instrument ID: MT_024
Prep Method: 3020A Prep Batch: 280-240652 Lab File ID: 153SMPL.D
Dilution: 1.0 Initial Weight/Volume: 50 mL
Analysis Date: 08/28/2014 0428 Final Weight/Volume: 50 mL
Prep Date: 08/27/2014 1430

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Arsenic	1.0	U	0.33	5.0

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59249-1

Client Sample ID: C-SB4-003(082114)

Lab Sample ID: 280-59249-1

Date Sampled: 08/21/2014 0950

Client Matrix: Water

Date Received: 08/22/2014 1000

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-241623	Instrument ID:	VMS_H
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	H3855.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	09/03/2014 1358			Final Weight/Volume:	20 mL
Prep Date:	09/03/2014 1358				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Vinyl chloride	0.40	U	0.10	1.5

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	92		70 - 120
4-Bromofluorobenzene (Surr)	93		75 - 120
Dibromofluoromethane (Surr)	98		85 - 115
Toluene-d8 (Surr)	95		85 - 120

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59249-1

Client Sample ID: C-SB4-002(082114)

Lab Sample ID: 280-59249-2

Date Sampled: 08/21/2014 0925

Client Matrix: Water

Date Received: 08/22/2014 1000

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-241623	Instrument ID:	VMS_H
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	H3858.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	09/03/2014 1503			Final Weight/Volume:	20 mL
Prep Date:	09/03/2014 1503				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Vinyl chloride	0.40	U	0.10	1.5

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	93		70 - 120
4-Bromofluorobenzene (Surr)	98		75 - 120
Dibromofluoromethane (Surr)	99		85 - 115
Toluene-d8 (Surr)	101		85 - 120

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59249-1

Client Sample ID: C-SB4-001(082114)

Lab Sample ID: 280-59249-3

Date Sampled: 08/21/2014 1055

Client Matrix: Water

Date Received: 08/22/2014 1000

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-241623	Instrument ID:	VMS_H
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	H3859.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	09/03/2014 1525			Final Weight/Volume:	20 mL
Prep Date:	09/03/2014 1525				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Vinyl chloride	0.40	U	0.10	1.5

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	92		70 - 120
4-Bromofluorobenzene (Surr)	95		75 - 120
Dibromofluoromethane (Surr)	100		85 - 115
Toluene-d8 (Surr)	100		85 - 120

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59249-1

Client Sample ID: C-SB4-004(082114)

Lab Sample ID: 280-59249-4

Date Sampled: 08/21/2014 1130

Client Matrix: Water

Date Received: 08/22/2014 1000

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-241623	Instrument ID:	VMS_H
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	H3860.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	09/03/2014 1547			Final Weight/Volume:	20 mL
Prep Date:	09/03/2014 1547				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Vinyl chloride	0.40	U	0.10	1.5

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	95		70 - 120
4-Bromofluorobenzene (Surr)	96		75 - 120
Dibromofluoromethane (Surr)	97		85 - 115
Toluene-d8 (Surr)	99		85 - 120

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59249-1

Client Sample ID: C-DM25-002(082114)

Lab Sample ID: 280-59249-6

Date Sampled: 08/21/2014 1430

Client Matrix: Water

Date Received: 08/22/2014 1000

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-241623	Instrument ID:	VMS_H
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	H3861.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	09/03/2014 1608			Final Weight/Volume:	20 mL
Prep Date:	09/03/2014 1608				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Vinyl chloride	0.92	J	0.10	1.5

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	90		70 - 120
4-Bromofluorobenzene (Surr)	93		75 - 120
Dibromofluoromethane (Surr)	94		85 - 115
Toluene-d8 (Surr)	97		85 - 120

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59249-1

Client Sample ID: FB004(082114)

Lab Sample ID: 280-59249-7FB

Date Sampled: 08/21/2014 1300

Client Matrix: Water

Date Received: 08/22/2014 1000

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-241623	Instrument ID:	VMS_H
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	H3862.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	09/03/2014 1630			Final Weight/Volume:	20 mL
Prep Date:	09/03/2014 1630				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Vinyl chloride	0.40	U	0.10	1.5

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	89		70 - 120
4-Bromofluorobenzene (Surr)	92		75 - 120
Dibromofluoromethane (Surr)	95		85 - 115
Toluene-d8 (Surr)	99		85 - 120

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59249-1

Client Sample ID: TB4(082114)

Lab Sample ID: 280-59249-8TB

Date Sampled: 08/21/2014 0000

Client Matrix: Water

Date Received: 08/22/2014 1000

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-241582	Instrument ID:	VMS_Z
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	Z0134.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	09/02/2014 2349			Final Weight/Volume:	20 mL
Prep Date:	09/02/2014 2349				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Vinyl chloride	0.40	U	0.10	1.5

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	76		70 - 120
4-Bromofluorobenzene (Surr)	107		75 - 120
Dibromofluoromethane (Surr)	98		85 - 115
Toluene-d8 (Surr)	90		85 - 120

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59249-1

Client Sample ID: C-SB4-003(082114)

Lab Sample ID: 280-59249-1

Date Sampled: 08/21/2014 0950

Client Matrix: Water

Date Received: 08/22/2014 1000

6010B Metals (ICP)

Analysis Method: 6010B Analysis Batch: 280-241229 Instrument ID: MT_026
Prep Method: 3010A Prep Batch: 280-240662 Lab File ID: 26b082814.asc
Dilution: 1.0 Initial Weight/Volume: 50 mL
Analysis Date: 08/28/2014 1508 Final Weight/Volume: 50 mL
Prep Date: 08/27/2014 1430

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Lead	5.0	U	2.6	15

6020 Metals (ICP/MS)

Analysis Method: 6020 Analysis Batch: 280-241016 Instrument ID: MT_024
Prep Method: 3020A Prep Batch: 280-240656 Lab File ID: 210AREF.D
Dilution: 1.0 Initial Weight/Volume: 50 mL
Analysis Date: 08/28/2014 0724 Final Weight/Volume: 50 mL
Prep Date: 08/27/2014 1430

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Arsenic	2.3	J	0.33	5.0

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59249-1

Client Sample ID: C-SB4-002(082114)

Lab Sample ID: 280-59249-2

Date Sampled: 08/21/2014 0925

Client Matrix: Water

Date Received: 08/22/2014 1000

6010B Metals (ICP)

Analysis Method:	6010B	Analysis Batch:	280-241229	Instrument ID:	MT_026
Prep Method:	3010A	Prep Batch:	280-240662	Lab File ID:	26b082814.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	08/28/2014 1531			Final Weight/Volume:	50 mL
Prep Date:	08/27/2014 1430				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Lead	5.0	U	2.6	15

6020 Metals (ICP/MS)

Analysis Method:	6020	Analysis Batch:	280-241016	Instrument ID:	MT_024
Prep Method:	3020A	Prep Batch:	280-240656	Lab File ID:	217SMPL.D
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	08/28/2014 0746			Final Weight/Volume:	50 mL
Prep Date:	08/27/2014 1430				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Arsenic	1.0	U	0.33	5.0

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59249-1

Client Sample ID: C-SB4-001(082114)

Lab Sample ID: 280-59249-3

Date Sampled: 08/21/2014 1055

Client Matrix: Water

Date Received: 08/22/2014 1000

6010B Metals (ICP)

Analysis Method: 6010B Analysis Batch: 280-241229 Instrument ID: MT_026
Prep Method: 3010A Prep Batch: 280-240662 Lab File ID: 26b082814.asc
Dilution: 1.0 Initial Weight/Volume: 50 mL
Analysis Date: 08/28/2014 1534 Final Weight/Volume: 50 mL
Prep Date: 08/27/2014 1430

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Lead	5.0	U	2.6	15

6020 Metals (ICP/MS)

Analysis Method: 6020 Analysis Batch: 280-241016 Instrument ID: MT_024
Prep Method: 3020A Prep Batch: 280-240656 Lab File ID: 218SMPL.D
Dilution: 1.0 Initial Weight/Volume: 50 mL
Analysis Date: 08/28/2014 0749 Final Weight/Volume: 50 mL
Prep Date: 08/27/2014 1430

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Arsenic	1.0	U	0.33	5.0

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59249-1

Client Sample ID: C-SB4-004(082114)

Lab Sample ID: 280-59249-4

Date Sampled: 08/21/2014 1130

Client Matrix: Water

Date Received: 08/22/2014 1000

6010B Metals (ICP)

Analysis Method:	6010B	Analysis Batch:	280-241229	Instrument ID:	MT_026
Prep Method:	3010A	Prep Batch:	280-240662	Lab File ID:	26b082814.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	08/28/2014 1536			Final Weight/Volume:	50 mL
Prep Date:	08/27/2014 1430				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Lead	5.0	U	2.6	15

6020 Metals (ICP/MS)

Analysis Method:	6020	Analysis Batch:	280-241016	Instrument ID:	MT_024
Prep Method:	3020A	Prep Batch:	280-240656	Lab File ID:	219SMPL.D
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	08/28/2014 0752			Final Weight/Volume:	50 mL
Prep Date:	08/27/2014 1430				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Arsenic	1.5	J	0.33	5.0

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59249-1

Client Sample ID: C-MW25-008(082114)

Lab Sample ID: 280-59249-5

Date Sampled: 08/21/2014 1405

Client Matrix: Water

Date Received: 08/22/2014 1000

6020 Metals (ICP/MS)

Analysis Method:	6020	Analysis Batch:	280-241016	Instrument ID:	MT_024
Prep Method:	3020A	Prep Batch:	280-240656	Lab File ID:	220SMPL.D
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	08/28/2014 0755			Final Weight/Volume:	50 mL
Prep Date:	08/27/2014 1430				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Arsenic	10		0.33	5.0

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59249-1

Client Sample ID: C-DM25-002(082114)

Lab Sample ID: 280-59249-6

Date Sampled: 08/21/2014 1430

Client Matrix: Water

Date Received: 08/22/2014 1000

6020 Metals (ICP/MS)

Analysis Method:	6020	Analysis Batch:	280-241016	Instrument ID:	MT_024
Prep Method:	3020A	Prep Batch:	280-240656	Lab File ID:	221SMPL.D
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	08/28/2014 0758			Final Weight/Volume:	50 mL
Prep Date:	08/27/2014 1430				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Arsenic	4.4	J	0.33	5.0

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-59249-1

Client Sample ID: FB004(082114)

Lab Sample ID: 280-59249-7FB

Client Matrix: Water

Date Sampled: 08/21/2014 1300

Date Received: 08/22/2014 1000

6010B Metals (ICP)

Analysis Method: 6010B Analysis Batch: 280-241229 Instrument ID: MT_026
Prep Method: 3010A Prep Batch: 280-240662 Lab File ID: 26b082814.asc
Dilution: 1.0 Initial Weight/Volume: 50 mL
Analysis Date: 08/28/2014 1539 Final Weight/Volume: 50 mL
Prep Date: 08/27/2014 1430

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Lead	5.0	U	2.6	15

6020 Metals (ICP/MS)

Analysis Method: 6020 Analysis Batch: 280-241016 Instrument ID: MT_024
Prep Method: 3020A Prep Batch: 280-240656 Lab File ID: 222SMPL.D
Dilution: 1.0 Initial Weight/Volume: 50 mL
Analysis Date: 08/28/2014 0801 Final Weight/Volume: 50 mL
Prep Date: 08/27/2014 1430

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Arsenic	1.0	U	0.33	5.0

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-60236-1

Client Sample ID: FB 005 (091914)

Lab Sample ID: 280-60236-1

Date Sampled: 09/19/2014 0900

Client Matrix: Water

Date Received: 09/20/2014 0940

6020 Metals (ICP/MS)

Analysis Method:	6020	Analysis Batch:	280-244994	Instrument ID:	MT_077
Prep Method:	3020A	Prep Batch:	280-244518	Lab File ID:	030SMPL.d
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	09/25/2014 1324			Final Weight/Volume:	50 mL
Prep Date:	09/24/2014 1445				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Arsenic	1.0	U	0.33	5.0

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-60236-1

Client Sample ID: C-1181-3 (091914)

Lab Sample ID: 280-60236-2

Date Sampled: 09/19/2014 1015

Client Matrix: Water

Date Received: 09/20/2014 0940

6020 Metals (ICP/MS)

Analysis Method:	6020	Analysis Batch:	280-244994	Instrument ID:	MT_077
Prep Method:	3020A	Prep Batch:	280-244518	Lab File ID:	031SMPL.d
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	09/25/2014 1328			Final Weight/Volume:	50 mL
Prep Date:	09/24/2014 1445				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Arsenic	3.6	J	0.33	5.0

Analytical Data

Client: ARCADIS U.S., Inc.

Job Number: 280-60236-1

Client Sample ID: C- MW180-1 (091914)

Lab Sample ID: 280-60236-3

Date Sampled: 09/19/2014 1145

Client Matrix: Water

Date Received: 09/20/2014 0940

6020 Metals (ICP/MS)

Analysis Method:	6020	Analysis Batch:	280-244994	Instrument ID:	MT_077
Prep Method:	3020A	Prep Batch:	280-244518	Lab File ID:	036SMPL.d
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	09/25/2014 1348			Final Weight/Volume:	50 mL
Prep Date:	09/24/2014 1445				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Arsenic	1.8	J	0.33	5.0
