



Final
May 2015

FISCAL YEAR 2014 LONG-TERM MONITORING/ LONG-TERM OPERATIONS REPORT

ENVIRONMENTAL REMEDIATION SERVICES
Contract W9128F-09-D-0052 Task Order CK01

HOLSTON ARMY AMMUNITION PLANT

KINGSPORT, TENNESSEE

U.S. Army Corps of Engineers

Mobile District



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**Fiscal Year 2014 Long-Term Monitoring/Long-Term Operations Report for
Holston Army Ammunition Plant, Kingsport, Tennessee, EPA ID No. TN521-002-0421
May 2015**

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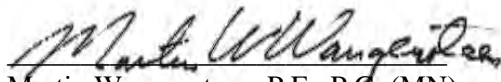
**CONTRACT W9128F-09-D-0052
TASK ORDER CK01**

**FINAL
FISCAL YEAR 2014
LONG-TERM MONITORING/
LONG-TERM OPERATIONS
REPORT**

**HOLSTON ARMY AMMUNITION PLANT
KINGSPORT, TENNESSEE**

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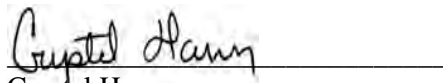
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ACRONYMS

AMSL	above mean sea level
AOC	area of concern
AOC-GW	Area of Concern – Site-Wide Groundwater
ASTM	American Society for Testing and Materials
Bay West.....	Bay West LLC
BTEX.....	benzene, toluene, ethylbenzene, and xylenes
CAO	Corrective Action Order
cm.....	centimeter
COC	contaminant of concern
DCQCR.....	Daily Chemical Quality Control Contractor Report
DNT	dinitrotoluene
DNX.....	hexahydro-1,3-dinitroso-5-nitro-1,3,5-triazine
DO.....	dissolved oxygen
DQSR.....	Data Quality Summary Report
EPA.....	U.S. Environmental Protection Agency
ft.....	feet
FWO.....	Field Work Order
gal.....	gallon
GWPS	groundwater protection standard
HMX	octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
hr	hour
HSAAP	Holston Army Ammunition Plant
IWTP.....	industrial wastewater treatment plant
LCS	laboratory control sample
LHA	lifetime health advisory
LOQ	level of quantitation
LTM.....	long-term monitoring
LTO.....	long-term operations
LUCIP	Land Use Control Implementation Plan
µg/L.....	micrograms per liter
MCL.....	maximum contaminant level
mL/min.....	milliliter per minute
MNA	monitored natural attenuation
MNX	hexahydro-1-nitroso-3,5-dinitro-1,3,5-triazine
MS.....	matrix spike
MSD.....	matrix spike duplicate
ORP.....	oxidation-reduction potential
%	percent
PAH	polyaromatic hydrocarbon
PCB	polychlorinated biphenyl
QC.....	quality control
RCRA.....	Resource Conservation and Recovery Act
RDX.....	hexahydro-1,3,5-trinitro-1,3,5-triazine
RFI.....	RCRA facility investigation
RPD.....	relative percent difference
RSL	regional screening level
SAP	Sampling and Analysis Plan



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SVOC..... semivolatile organic compound
SWMU solid waste management unit
TDEC Tennessee Department of Environment and Conservation
TNT..... trinitrotoluene
TNX hexahydro-1,3,5-trinitroso-1,3,5-triazine
TWP temporary well point
VOC..... volatile organic compound
WWII World War II
yd³ cubic yard



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EXECUTIVE SUMMARY

This report documents the results of the 2014 Site-Wide Long-Term Monitoring/Long-Term Operations (LTM/LTO) Program at the Holston Army Ammunition Plant (HSAAP), Kingsport, Tennessee (U.S. Environmental Protection Agency [EPA] Identification Number TN521-002-0421). The results presented herein were prepared by Bay West LLC (Bay West) and Leidos under performance-based contract W9128F-09-D-0052, Task Order CK01, with the U.S. Army Corps of Engineers, Mobile District. This report was prepared consistent with the Resource Conservation and Recovery Act and other federal or state regulations that govern environmental restoration activities at HSAAP.

Groundwater monitoring conducted in 2014 comprised the tenth year of LTM under the performance-based contracts. The 2014 LTM/LTO Program focused on the implementation of LTM specified in the final remedy for Area of Concern – Site-Wide Groundwater (AOC-GW), which is outlined in the Final *Corrective Measures Report for AOC-GW, Site-Wide Groundwater (HSAAP-33), Holston Army Ammunition Plant, Kingsport, Tennessee* (Bay West and SAIC 2007c) and updated in the Corrective Action Order (CAO) Modification that went into effect on January 24, 2013 (TDEC 2013). In addition, surface water monitoring was added to the LTM/LTO Program based on the CAO Modification. Specific monitoring objectives included the following:

- Continued monitoring of contaminant trends and groundwater quality conditions (benzene, methylene chloride, and naphthalene) downgradient of Area A legacy sources.
- Semivolatile organic compounds (bis[2-ethylhexyl]phthalate, dibenzofuran, fluorene, 2-methylnaphthalene, naphthalene, and n-nitrosodiphenylamine) and Resource Conservation and Recovery Act metals (arsenic and lead) concentration trends and monitoring for evidence of migration in wells downgradient of solid waste management units (SWMUs) 19/29 (wells MW-48, MW-114, MW-115, and MW-116) and background monitoring well MW-55.
- Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX); arsenic; and chromium concentration trends in boundary well MW-68, located at the downgradient boundary of SWMU 20.
- Evaluation of mercury concentration trends in well MW-70, located downgradient of SWMU 18.
- Monitoring of groundwater quality for chlordane, dieldrin, and bromacil following completed soil source removal actions at pesticide-contaminated areas (SWMU 88 and SWMUs 77/78/86/87).
- Evaluation of explosives concentration trends (e.g., 2,4-dinitrotoluene [DNT]; 2,6-DNT; 2,4,6-trinitrotoluene [TNT]; 2-amino-4,6-DNT; 4-amino-2,6-DNT; nitroglycerin; and RDX) in the Area B explosives production area (MW-99).
- Continued monitoring for evidence of target analyte (2,4-DNT; 2,6-DNT; 2,4,6-TNT; 2-amino-4,6-DNT; 4-amino-2,6-DNT; nitroglycerin, and RDX) contaminant migration at wells located along the downgradient boundary of the Area B production area.
- Evaluation of degradation and attenuation of RDX at specified monitoring locations (MW-68 and MW-99).
- Monitoring for evidence of benzene, toluene, ethylbenzene, and xylenes (BTEX) contaminant releases to groundwater at SWMU 50 (Burning Ground; boundary well STMW-15).
- Collecting Holston River surface water samples to monitor for potential impacts to the Holston River from groundwater discharge.

The 2014 LTM/LTO Program included Spring 2014 (wet season) and Fall 2014 (dry season) sampling events at a total of 27 groundwater monitoring wells located throughout HSAAP. In addition, during the



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Spring 2014 event, three surface water samples were collected. Sampling activities were conducted in accordance with Field Work Orders prepared as addenda to approved site-wide project work plans. All detected analytes in groundwater are compared to the maximum contaminant level (MCL). If no MCL is available for a detected analyte, the EPA regional screening level (RSL) is used as the screening criterion. Bromacil does not have an MCL or EPA RSL; therefore, the EPA lifetime health advisory (LHA) is used as the screening criterion. Per the CAO Modification that went into effect on January 24, 2013, target analytes detected in boundary wells also are compared to CAO Modification-listed groundwater protection standards (GWPSs) (Table G-3 of the CAO Modification, as provided in Appendix C). For surface water, target analytes are screened against the lowest water quality criteria, as listed in Table G-3 of the CAO Modification.

The 2014 sampling yielded sufficient data to assess the current groundwater conditions in the vicinity of the SWMUs and areas of concern listed below and showed that there is no evidence that groundwater discharge is impacting the Holston River.

The following is a summary of the 2014 LTM sampling results:

- Area A – SWMU 96:
 - None of the target analytes were detected in Area A – SWMU 96 boundary monitoring wells during either the Spring or Fall 2014 LTM events. None of the target analytes in these wells have been detected above screening criteria for over 3 years.
- Area B Landfill Area – SWMUs 19/29:
 - During the Spring 2014 sampling event, target analytes arsenic, 2-methylnaphthalene, bis(2-ethylhexyl)phthalate, dibenzofuran, and naphthalene were detected at interior source area monitoring well MW-48 above screening criteria. In Fall 2014, bis(2-ethylhexyl)phthalate and dibenzofuran were detected above screening criteria in MW-48.
 - In boundary monitoring well MW-115, bis(2-ethylhexyl)phthalate was the only target analyte detected above screening criteria during the Spring 2014 sampling event; however, it was not detected at a concentration above GWPSs. No target analytes were detected in MW-115 above screening criteria or GWPSs during the Fall 2014 sampling event.
 - No target analytes were detected in boundary wells MW-114 or MW-116 or upgradient well MW-55 above screening criteria or GWPSs during either LTM sampling event.
- Area B Landfill Area – SWMU 20:
 - Target analytes arsenic and total chromium were not detected in MW-68 above screening criteria or GWPSs. Neither of these metals has been detected above screening criteria for over 3 years.
 - The explosive RDX was detected in both 2014 sampling events at MW-68 at concentrations of 14 micrograms per liter ($\mu\text{g/L}$) and 84J $\mu\text{g/L}$ in the spring and fall, respectively. Although both RDX detections exceeded the EPA RSL (0.61 $\mu\text{g/L}$), none of the detections exceeded the GWPS of 1,037 $\mu\text{g/L}$. RDX concentrations at MW-68 exhibit a high degree of event-to-event variability.
 - Hexahydro-1-nitroso-3,5-dinitro-1,3,5-triazine is the only primary RDX degradation parameter detected in MW-68 during the Spring 2014 sampling event.
- Area B Production and Shop Area – SWMU 18:
 - Mercury was detected in MW-70 at a concentration of 2.0 $\mu\text{g/L}$; the same concentration as the MCL. Statistical trend analysis indicates a statistically significant declining trend at the 90 percent (%) confidence level.



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- Area B Production and Shop Area – SWMUs 77/78/86/87 and SWMU 88 (Pesticides Areas):
 - Dieldrin was detected above its EPA RSL (0.0015 µg/L) at MW-73 at a concentration of 0.58 µg/L and at MW-75 at a concentration of 0.091 µg/L. Dieldrin was not detected in MW-86 during the Spring 2014 sampling event.
 - Total chlordane was detected at MW-75 at a concentration of 0.49J µg/L and in MW-73 at a concentration of 0.246 µg/L. The 2014 total chlordane results for these wells are below the MCL of 2 µg/L. Total chlordane was not detected in MW-86 during the Spring 2014 sampling event.
 - Bromacil was detected in MW-86 at a concentration of 38J µg/L, which is less than the EPA LHA of 70 µg/L. The Spring 2014 sampling event represents the fifth year that the bromacil results in MW-86 are below screening criteria. In Spring 2014, bromacil was detected in MW-75 at a concentration (0.52J µg/L) below the LHA and was not detected in monitoring well MW-73.
- Area B Production and Shop Area – Explosives Production Area:
 - RDX was detected at a concentration of 670J µg/L, which exceeds the EPA RSL (0.61 µg/L). Statistical trend analysis currently indicates no significant trend in RDX concentrations in MW-99; however, concentrations of RDX have been decreasing since April 2011, which may be due in part to demolition of Building H8 and associated soil excavation.
 - None of the other CAO Modification-listed target analyte explosives were detected above screening criteria.
 - All three of the nitroso degradation intermediates of RDX were detected in MW-99 during the 2014 LTM event. The occurrence of these compounds is positive evidence of active anaerobic microbial transformation processes.
- Area B Production and Shop Area – Boundary Wells:
 - No target analyte explosives, including RDX, were detected in boundary wells above screening criteria.
 - No BTEX compounds were detected in STMW-15.
- Holston River Surface Water: Surface water samples were analyzed for all CAO Modification-listed target analytes. The following is a summary of the 2014 LTM results:
 - RDX was not detected in the Holston River at the upgradient surface water sample location SW-01. Downgradient of the industrial wastewater treatment plant (IWTP) discharge point (surface water sample location SW-02), RDX was detected at a concentration of 300 µg/L. At the location downgradient of HSAAP (SW-03), RDX was detected at a concentration of 15 µg/L. While the RDX concentrations at SW-02 and SW-03 exceed the lowest water quality criterion of 0.61 µg/L (the EPA RSL), the downstream concentration (SW-03) is 20 times lower than the concentration downgradient of the IWTP discharge (SW-02). Therefore, there is no evidence that groundwater discharge from Area B is contributing to the elevated RDX concentrations reported in the Holston River but, rather, they are the result of upstream permitted HSAAP discharges. Note that the grab surface water samples are intended to determine potential impact to surface water from groundwater. These samples are not representative of Holston surface water. Surface water sample SW-02 is likely too close to the IWTP to allow for proper mixing. The Tennessee Department of Environment and Conservation-required methodology of collecting a cross-sectional mixed surface water sample would be needed to characterize the surface water.



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- No other target analytes were detected in surface water above screening criteria.
- Results of the surface water sampling indicate that there is no impact to the Holston River water quality as a result of groundwater discharge.

Due to limited data, statistical analysis of surface water concentration trends cannot be conducted at this time; however, a comparison of the Fall 2013 and the Spring 2014 surface water sample results is provided in Chapter 4.0.

The LTM/LTO Program includes inspections and maintenance activities associated with landfill caps, periodic coal tar removal, and the groundwater monitoring network. Eight landfill cap inspections and two Land Use Control Implementation Plan (LUCIP) inspections were conducted in 2014 by Bay West and Leidos. In addition, HSAAP conducted landfill inspection and LUCIP inspections at 10 other sites. In 2014, coal tar removal was conducted at SWMUs 4, 96, and 103; sinkhole repairs were conducted at SWMU 20; debris removal was conducted at SWMUs 19/29; and landscaping repairs were conducted at SWMUs 20 and 26. Sinkholes were filled with gravel, clean clay, and topsoil until level with the ground surface, re-seeded, and covered with straw. One traffic bollard was repaired at monitoring well MW-68B, and weep holes were installed in the protective casing of any monitoring well identified not to have one during the Spring 2014 LTM event. No monitoring wells were abandoned in 2014.

LTM Recommendations

The following LTM recommendations are proposed:

- The 2015 LTM/LTO Program should continue as specified in the final remedy for AOC-GW, which is outlined in the Final Corrective Measures Report (Bay West and SAIC 2007c) and updated in the CAO Modification that went into effect on January 24, 2013. Recommended changes to the CAO Modification for 2016 and for future sampling are provided in Chapter 6.0.
- Annual Holston River surface water monitoring at three locations: upgradient of Area B, downgradient of the IWTP discharge, and downgradient of Area B. Per the CAO Modification, Holston River surface water sampling will be conducted in Fall 2015.
- Semiannual inspections of monitoring wells included in the LTM/LTO Program.
- Monitoring well maintenance as needed, including replacement of any wear-and-tear items (e.g., dedicated tubing) where necessary.

LTO Recommendations

The following LTO recommendations are proposed for Fiscal Year 2015:

- Continue semiannual inspections of the eight landfills and coal tar sites.
- Continue LUCIP inspections of the 10 sites.
- Maintain the landfill components (e.g., caps, drainage controls, vegetative covers, and signs) as needed.
- Remove coal tar, as needed, at coal tar sites SWMUs 4, 14, 26, 96, and 103.

Both the LTM and LTO activities continue to protect human health and the environment by preventing exposure to contaminated materials. The groundwater LTM program is providing confirmation that contaminants are not migrating. The landfill inspections are identifying repairs needed to maintain the integrity of the caps. The land use control inspections are monitoring for unauthorized excavation at sites where waste remains in-place.



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1.0 INTRODUCTION AND PURPOSE

This report documents the results of the 2014 Site-Wide Long-Term Monitoring/Long-Term Operations (LTM/LTO) Program at the Holston Army Ammunition Plant (HSAAP), Kingsport, Tennessee (U.S. Environmental Protection Agency [EPA] Identification Number TN521-002-0421). The results presented herein were prepared by Bay West LLC (Bay West) and Leidos under performance-based contract W9128F-09-D-0052, Task Order CK01, with the U.S. Army Corps of Engineers, Mobile District. This report was prepared consistent with the Resource Conservation and Recovery Act (RCRA) and other federal or state regulations that govern environmental restoration activities at HSAAP.

The LTM component of the program included groundwater monitoring for performance assessment of corrective actions for Area of Concern – Site-Wide Groundwater (AOC-GW) that address groundwater plumes associated with the HSAAP production areas and other solid waste management units (SWMUs), such as landfills. The objectives for AOC-GW LTM are further outlined in Chapter 3.0. Monitoring also was performed to evaluate long-term contaminant trends, migration patterns, and degradation of explosives in groundwater. Per the Corrective Action Order (CAO) Modification that went into effect on January 24, 2013 (TDEC 2013), surface water sampling of the Holston River also was conducted as part of the LTM component of the program.

The LTO component of the program included inspections and maintenance activities associated with landfill caps, periodic coal tar removal, and the groundwater monitoring network.



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**2.0 HOLSTON ARMY AMMUNITION PLANT BACKGROUND
INFORMATION**

2.1 SITE DESCRIPTION

HSAAP consists of two plant areas referred to as Area A and Area B (Figure 2-1). Area A is located within the city of Kingsport in Sullivan County, Tennessee, on State Route 93. Area B is located in Hawkins County about 4 miles west of downtown Kingsport, Tennessee, on U.S. Route 11W. Area A and Area B are linked by a fenced interplant railroad that is approximately 3.7 miles long (Figure 2-1). Industrial wastewater and weak acetic acid are conveyed between the two areas by above- and below-ground piping that is located along the interplant railroad (USACHPPM 2000). Government-acquired easements for this corridor total approximately 86 acres. Area A, which is the smaller of the two areas, is approximately 112 acres. Area B is approximately 5,913 acres and contains the explosives production area. The detailed site history, mission, and plant status have been presented in many previous reports (USACHPPM 2002a, 2002b, 2003a, 2003b, 2004a, 2004b, 2004c) and are not repeated in this report.

Area A of HSAAP is located within a heavily industrialized area of Kingsport adjacent to several private-sector, commercial industrial facilities. The nearest residential community is 0.2 miles from Area B of the plant. During most of the history of HSAAP, the region around Area B has been residential and agricultural in nature with limited commercial development. Since the early 1980s, residential and commercial developments have increased significantly around Area B, particularly around Route 11W. Residential developments abut the northeast and northwest plant boundaries of Area B. Highway 11W separates Area B from the majority of residential and commercial areas that are located in the Church Hill and Mount Carmel communities. The Sullivan Gardens Community is separated from the southern boundary of Area B by sections of the Holston River Mountain, Bays Mountain, and Bays Mountain Park (USACHPPM 1997).

2.2 TOPOGRAPHY AND GEOLOGY

HSAAP is located in the Tennessee section of the Valley and Ridge physiographic province. The province is characterized by folded and faulted strata that form variable-sized ridges and valleys (USATHAMA 1980). Area A lies within the floodplain of the South Fork of the Holston River. The Holston River roughly bisects Area B from northeast to southwest and is flanked by a narrow floodplain on the south and somewhat broader floodplain on the north. Elevations range from 2,200 feet (ft) above mean sea level (AMSL) at the Holston River Mountain in the southwestern corner of the Installation in Area B to 1,200 ft AMSL along the Holston River on the western border of the Installation.

Area A and most of the developed portions of Area B (e.g., shop area, nitric acid area, and explosives production area) are located on terraces and the floodplain of the Holston River. The southern half of the plant production area is located within the 500-year floodplain of the Holston River. Karst topography occurs in the northwestern portion of Area B, and resistant sandstone ridges underlie the Holston River Mountain along the southern facility boundary south of the Holston River.

The bedrock geology of the Valley and Ridge province includes Pre-Cambrian to Pennsylvanian sandstones, shales, limestones, and dolomites. Structural features of the Valley and Ridge province include complex folds and overlapping thrust faults. Resistant sandstones and dolomites commonly uphold the ridges, while the valleys contain less-resistant shale and limestone.

The major bedrock formations that underlie HSAAP are the Ordovician-age Mascot Dolomite, Lenoir Limestone, Blockhouse Shale, and the Sevier Shale (Figure 2-2). The Sevier Shale underlies all of Area A. The Blockhouse Shale and Sevier Shale underlie most of Area B (Brent 1993; Helton, no date).



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These shale units are very similar in appearance. The northern boundary of Area B is underlain by a band of the Mascot Dolomite and Lenoir Limestone (Brent 1993; Helton, no date). The Bays Formation underlies the southern boundary of Area B along the north flank of the Holston River Mountain. The Bays Formation is a white to light yellow sandstone with interbedded shale. Quaternary sediment makes up the Holston River floodplain alluvium and terrace deposits (USA-EHA 1980).

The major bedrock structural features near HSAAP are the Bays Mountain Synclinorium and the Cliffs Fault. Seismic activity in the northeast region of Tennessee is moderate to small based on the U.S. Geological Survey National Seismic Mapping Project.

2.3 HYDROGEOLOGIC FRAMEWORK

2.3.1 Groundwater

Groundwater underlying HSAAP is present in both the alluvium and the sedimentary bedrock. In the alluvium, groundwater most commonly occurs under unconfined conditions; although, it can occur in confined conditions in the presence of fine sediment layers. Groundwater also moves through the alluvium along streams and rivers, through sediments deposited as river terraces, and residuum of weathered material that overlies most of the bedrock. In the aquifers of the Valley and Ridge province, groundwater is stored in and moves through fractures, bedding planes, and solution openings of the rocks (USGS 1995). In some carbonate bedrock formations, these structural features become enlarged as solution channels and develop into sinkholes, where they intercept the ground surface.

Groundwater that occurs in the alluvial and terrace deposits in Area B is hydraulically connected to the groundwater that occurs in the uppermost fractured and weathered zone of the underlying shale and carbonate rocks (USACHPPM 2003a, 2003b). At HSAAP, sinkholes are observed in the Mascot Dolomite along the northern border of Area B. Groundwater flow within the Sevier Shale, underlying the majority of both areas of HSAAP, is restricted to fractures, some of which may be solutionally enlarged where calcareous zones are present. The upper portion of the formation produces sufficient groundwater for domestic water supply, with about 50 percent (%) of domestic water wells completed in the Sevier Shale, thus obtaining sufficient flow for at least domestic uses within the upper 50 ft (DeBuchanne and Richardson 1956). Production rates of up to 150 gallon (gal) per minute have been recorded for some wells installed in the formation; higher-yielding wells typically are located adjacent to major rivers and streams. Field data show that, although fractures are present at depth, they are usually sealed by calcium carbonate from circulating groundwater. Even where a fault contact is only 50 to 75 ft below the surface, the shale is usually tightly sealed with secondary calcite. If the desired quantity of groundwater has not been obtained within the first 300 ft, it is generally not worthwhile to drill deeper (DeBuchanne and Richardson 1956).

The depth to groundwater can vary substantially throughout the facility, with shallower depths occurring at lower ground surface elevations, such as areas near surface water drainage ways, streams, and rivers. In the Area B explosives production area, the average depth to groundwater is approximately 9 ft below ground surface (USACHPPM 2004c). The general groundwater flow direction beneath both Areas A and B is toward the Holston River, which is a regional hydraulic boundary. Localized groundwater flow vectors in the Area B explosives production area can be to the southwest, south, or southeast, depending on the specific location relative to the Holston River (USACHPPM 2004c).

Groundwater flow rates can vary substantially in the unconsolidated material due to heterogeneity (e.g., clay to gravelly and coarse sand) and local groundwater gradients throughout the facility. Based on water levels and slug tests performed during the 2003 Site-Wide Groundwater RCRA Facility Investigations (RFIs), groundwater flow velocities in the unconsolidated material were calculated to range between 2 and 73 ft/year (USACHPPM 2003a, 2003b). Groundwater flow velocities in the unweathered shale bedrock interval were not calculated during previous RFI phases; however, maximum purge rates for



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bedrock wells were at least as great as, or higher than, those for unconsolidated zones. Vertical hydraulic gradients within the Area B explosives production area are neutral to upward, which serve to limit downward migration and dispersal of contaminants into the deeper unweathered bedrock zones and to encourage flow along permeable pathways within the unconsolidated/weathered bedrock contact zone (Bay West and SAIC 2007a).

2.3.2 Surface Water

Area A is located adjacent to the South Fork of the Holston River, which flows in a northwest direction past this area (Figure 2-1). The river continues to flow for another 3.5 miles in a northwest/west direction before it joins the North Fork of the Holston River, approximately 0.5 miles northeast of Area B. These two forks join to form the Holston River at Holston River Mile 142.2. The Holston River flows south for approximately 1 mile, then gradually changes flow direction to the west, where it flows through Area B. In Area A, surface water drains into the South Fork of the Holston River via Mad Branch, which drains over 1,000 acres, including other industrial areas upstream of Area A. Drainage in Area B, south of the Holston River, originates in the Holston River/Bays Mountain area and flows north and west toward the river via Parker Creek and an unnamed creek. The surface drainage on the north side of the Holston River in Area B reaches the Holston River via Arnett Branch, its tributaries, and several natural or manmade drainage ways that are located throughout the industrial area (USATHAMA 1980). Flooding in the area was a problem until the Tennessee Valley Authority constructed dams on the river and its tributaries. Flow in the South Fork of the Holston River is regulated by Fort Patrick Henry Dam, located about 5 miles upstream of Area A.

2.4 HISTORICAL SITE-WIDE GROUNDWATER CONTAMINATION SUMMARY – 2001 THROUGH 2013

2.4.1 Area A

As part of the historical Site-Wide Groundwater RFI, monitoring wells MW-22, MW-42, MW-1401, MW-103, MW-104, MW-105, MW-106, and MW-107 within Area A were sampled in June 2001 and January 2002 for explosives, volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), metals, herbicides, pesticides, and polychlorinated biphenyls (PCBs; USACHPPM 2002a). In the RFI, explosives were the primary contaminants of concern (COCs) across the site, but none were found in the groundwater at Area A. SVOCs were of potential concern at Area A due to historic disposal and spillage of coal tar and coal tar liquor; however, no SVOCs were detected in these particular wells during the two sampling events. In addition, no herbicides, pesticides, or PCBs were detected. One VOC, chloroform, was detected in well MW-106 above its risk-based screening criterion reported in the RFI.

During the 2003 phase of the historical Site-Wide Groundwater RFI, including the July 2002 and January 2003 sampling events, analyses were conducted only for VOCs and SVOCs (USACHPPM 2003a, 2003b). The 2003 phase of sampling indicated the presence of only chloromethane and chloroform; chloroform exceeded its risk-based screening criterion used in the RFI in well MW-106 on a consistent basis. The presence of chloroform was attributed to the proximity of a large potable water storage tank near the well and potential leakage of public supply potable chlorinated water. Removal of Area A from the site-wide groundwater monitoring effort was recommended at this time due to the absence of site-wide COCs. Area A groundwater was not analyzed during the February 2004 phase of the Site-Wide Groundwater RFI.

Monitoring of four wells at SWMU 96 (Gas Producer Coal Tar Storage Tanks) under the 2005 and 2006 LTM/LTO Program indicated the presence of benzene, toluene, ethylbenzene, and xylenes (BTEX) and a few SVOCs in groundwater. Only benzene was detected consistently above its risk-based screening criterion in two wells. However, since 2008, benzene has not been detected in monitoring wells MW-104, MW-105, MW-106, and MW-107 at Area A. Since 2008, chloroform is the only VOC detected above its



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risk-based screening criterion; however, chloroform concentrations did not exceed the maximum contaminant level (MCL). In addition, chloroform is not a target analyte per the CAO Modification that went into effect on January 24, 2013 (TDEC 2013). Sporadic detections of bis(2-ethylhexyl)phthalate, naphthalene, and methylene chloride also occurred above their respective risk-based screening criteria between 2005 and 2006. Since 2008, periodic detections of SVOCs (primarily polyaromatic hydrocarbons [PAHs]) have been detected above risk-based screening criteria; however, these PAHs are not target analytes per the CAO Modification that went into effect on January 24, 2013.

2.4.2 Area B – Maintenance and Production Areas

Groundwater in the maintenance and production areas was sampled during five events between January 2001 and February 2004 as part of the historical Site-Wide Groundwater RFI. Analyses were conducted for explosives, VOCs, SVOCs, metals, herbicides, pesticides, and PCBs at various wells depending on the location and operational history of adjacent source areas (USACHPPM 2002a). Figure 3-1 illustrates the locations of SWMUs within Area B.

The explosive hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX) was detected in groundwater in 20% of all sampled Area B monitoring wells between 2001 and 2004, many with concentrations exceeding its risk-based screening criterion (EPA regional screening level [RSL] of 0.61 micrograms per liter [$\mu\text{g/L}$]). The maximum RDX values occurred at well MW-99 (Building H8 vicinity), with historical concentrations as high as 2,200 $\mu\text{g/L}$. Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX) was detected in eight wells, with the highest concentration also occurring at MW-99; however, all concentrations were below the EPA RSL of 1,800 $\mu\text{g/L}$. Explosives were not detected in the bedrock wells, and no VOCs or SVOCs of significance were detected. Mercury was consistently detected in groundwater downgradient of SWMU 18 (Closed Sanitary Landfill well MW-70) above its risk-based screening criterion (EPA lifetime health advisory [LHA] of 2 $\mu\text{g/L}$). Pesticides and herbicides were detected in groundwater at SWMUs 77/78/86/87 (Pesticide Areas at Building 148 well MW-73). The pesticides dieldrin and chlordane (total) were detected above their respective risk-based screening criteria of 0.0042 and 0.19 $\mu\text{g/L}$; no other pesticides or herbicides exceeded their risk-based screening criteria. Fuel-related contaminants (e.g., BTEX constituents) occurred in groundwater in the vicinity of the Building 105 Fuel Station (referred to as Area of Concern [AOC]-C) above risk-based screening criteria but below site-specific cleanup levels established consistent with Tennessee Department of Environment and Conservation (TDEC) underground storage tank rules.

A site-wide groundwater interim measures investigation of the production area at Area B was conducted in May and June of 2003, which included the installation of 50 temporary well points (TWPs) (USACHPPM 2004a). The investigation evaluated the extent of explosives contamination at Area B and found that RDX concentrations had remained consistently high at MW-99. RDX persisted at several wells throughout the site, as well as in samples collected from TWPs installed during the investigation. HMX also was detected across Area B, with the highest concentration found at MW-99. In addition, low concentrations of 2,4-dinitrotoluene (DNT) and 2,4,6-trinitrotoluene (TNT) were detected in several of the TWPs, with only one detection of 2,4,6-TNT above the screening criterion (EPA LHA of 2 $\mu\text{g/L}$).

An addendum to the interim measures investigation (USACHPPM 2004c) was completed in March and April of 2004 to continue to map the extent of RDX contamination in the Area B production area. This phase of the interim measures investigation included the installation and sampling of 49 additional TWPs and sampling of previously installed TWPs and selected monitoring wells. RDX was detected in 5 of 12 wells sampled and in 51 of 86 TWPs. HMX was detected in many of the same locations as RDX, including 5 of 12 wells sampled and 40 of 86 TWPs sampled, but at lesser concentrations. The MW-99/Building H8 vicinity was again confirmed to have the highest RDX detections. The TWP monitoring results indicated that RDX was present in groundwater near multiple former and current production buildings. The conceptual model for contaminant fate and transport did not indicate a large



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single plume, but rather many smaller areas of contamination associated with multiple points of release (e.g., buildings, sumps and associated pipelines, and waste management units) over time. The interim measures investigation confirmed that shale bedrock is typically very shallow throughout the production area. The interim measures investigation also identified the southernmost reaches of several surface ditches as potential groundwater discharge zones; although, evaluation of the amount of discharge could not be quantified due to the high volumes of non-contact cooling water that flow almost continuously through many of the ditches.

An additional phase of the historical site-wide groundwater RFI was conducted in late 2005 and 2006, which included the installation of new permanent and temporary monitoring wells to further bound and delineate the extent of contamination in the Area B explosives production area (Bay West and SAIC 2007a). This RFI phase indicated that explosives have not migrated beyond the production area and further documented that groundwater is not a source of explosives to surface water ditches within the production area. Sampling of boundary wells since 2008 confirms that groundwater is not a source of explosives to surface water.

2.4.3 Area B – Landfill Area

During the 2002 phase of the historical Site-Wide Groundwater RFI, several wells in the westernmost portion of Area B were sampled, including SWMU 20 (Rock Quarry Landfill), SWMUs 19/29 (Construction/Demolition Landfill and Sedimentation Basin), SWMU 17 (Closed Sanitary Landfill), SWMU 25 (Area B Tar Burial Site), and SWMU 21 (Rock Dam Landfill; see Figure 3-1). This portion of Area B is collectively referred to as the Landfill Areas for the purposes of this report. Analytes included explosives, VOCs, SVOCs, and metals.

RDX was detected above its risk-based screening criterion in the bedrock wells in the vicinity of SWMU 20 (well MW-68) in both the June 2001 and the January 2002 sampling events. No VOCs of significance were detected, but the SVOC bis(2-ethylhexyl)phthalate was detected in two wells near SWMUs 19/29 and SWMU 17 (upgradient well MW-55 and downgradient well MW-48, respectively). Detections of bis(2-ethylhexyl)phthalate ranged from about 15 to 25 µg/L and exceeded its risk-based screening criterion used in the RFI (EPA RSL of 4.8 µg/L). Bis(2-ethylhexyl)phthalate was not detected during later sampling events. During the 2003 and 2004 phases of the historical Site-Wide Groundwater RFI, the explosive RDX continued to be detected in well MW-68 at SWMU 20, and a downward trend was noted.

Since 2004, site-specific RFIs have been completed for SWMUs 19/29, SWMU 20, and SWMU 25 (Bay West and SAIC 2006a, 2005c, 2006b, 2006c). These investigations documented that the extent of migration of explosives and metals contaminants at SWMU 20 and SVOC and VOC contaminants near SWMUs 19/29 is limited. The SWMU 25 RFI documented the absence of coal tar-related contaminants in soil adjacent to SWMU 25. An AOC-GW RFI Addendum, consisting of installation and sampling of a well downgradient of SWMU 25, documented the absence of coal tar-related SVOCs and metals above risk-based screening criteria in groundwater downgradient of this site (Bay West and SAIC 2007b). In 2013, a coal tar removal action was completed at SWMU 25.

Between 2008 and 2013, RDX continued to exceed risk-based screening criteria in MW-68; however, concentrations of RDX did not exceed groundwater protection standards (GWPSs). SVOCs were primarily detected in monitoring wells MW-48 and MW-115 at low estimated concentrations; however, occasionally, some of the PAHs exceeded risk-based screening criteria. Since 2008, arsenic is often detected above the MCL in monitoring well MW-48; however, in 2013, arsenic concentrations did not exceed the MCL in MW-48.



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3.0 2014 SITE-WIDE MONITORING

3.1 2014 MONITORING OBJECTIVES AND LOCATIONS

3.1.1 Groundwater

Groundwater monitoring conducted in 2014 comprised the tenth year of LTM under performance-based contracts. The 2014 LTM/LTO Program objectives, as delineated in the Final *Corrective Measures Report for AOC-GW, Site-Wide Groundwater (HSAAP-33), Holston Army Ammunition Plant, Kingsport, Tennessee* (Bay West and SAIC 2007c) and as further refined in the CAO Modification that went into effect on January 24, 2013 (TDEC 2013), included the following:

- Continued trending of key contaminants at specific SWMUs (e.g., landfills) and within the Area B explosives production area.
- Monitoring for key contaminants at boundary wells located along the downgradient perimeter of the Area B explosives production area.
- Monitoring for key contaminants at boundary wells located along the downgradient perimeter of Area A.
- Collecting data to evaluate degradation and attenuation of explosives at specified monitoring locations in Area B.

Specific areas of focus for 2014 groundwater monitoring included the following:

- Continued monitoring of contaminant trends and groundwater quality conditions (benzene, methylene chloride, and naphthalene) downgradient of Area A legacy sources.
- SVOC (bis[2-ethylhexyl]phthalate, dibenzofuran, fluorene, 2-methylnaphthalene, naphthalene, and n-nitrosodiphenylamine) and RCRA metals (arsenic and lead) concentration trends and monitoring for evidence of migration in wells downgradient of SWMUs 19/29 (wells MW-48, MW-114, MW-115, and MW-116) and background monitoring well MW-55.
- RDX, arsenic, and chromium concentration trends in well MW-68, located at the downgradient boundary of SWMU 20.
- Evaluation of mercury concentration trends in well MW-70, located downgradient of SWMU 18.
- Monitoring of groundwater quality for chlordane, dieldrin, and bromacil following completed soil source removal actions at pesticide-contaminated areas (SWMU 88 and SWMUs 77/78/86/87).
- Evaluation of explosives concentration trends (e.g., 2,4-DNT; 2,6-DNT; 2,4,6-TNT; 2-amino-4,6-DNT; 4-amino-2,6-DNT; nitroglycerin; and RDX) in the Area B explosives production area (MW-99).
- Continued monitoring for evidence of explosives contaminant migration (e.g., 2,4-DNT; 2,6-DNT; 2,4,6-TNT; 2-amino-4,6-DNT; 4-amino-2,6-DNT; nitroglycerin; and RDX) at wells located along the downgradient boundary of the Area B explosives production area.
- Evaluation of degradation and attenuation of RDX at the SWMU 20 boundary well (MW-68) and the Area B explosives production area (MW-99).
- Monitoring for evidence of BTEX contaminant releases to groundwater at SWMU 50 (Burning Ground; boundary well STMW-15).



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3.1.2 Surface Water

Per the CAO Modification that went into effect on January 24, 2013, Holston River surface water sampling was conducted as part of the 2014 LTM/LTO Program. The primary objective of the surface water sampling was to determine if there are any target analytes in groundwater potentially discharging to the Holston River and impacting the river quality.

Specific areas of focus for 2014 surface water monitoring included the following:

- Monitoring of contaminant trends and surface water quality conditions for specific VOCs, SVOCs, RCRA metals, pesticides, bromacil, and explosives.
- Samples were collected upgradient of Area B, downgradient of the industrial wastewater treatment plant (IWTP) discharge, and downgradient of Area B in Spring 2014.

3.1.3 Sampling Locations

Locations and analytes for each monitoring event were established in the Final Corrective Measures Report (Bay West and SAIC 2007c). Field Work Orders (FWOs) were distributed to the Army and TDEC approximately 30 days prior to each sampling event for informational purposes. Formal Army and TDEC approval of FWOs is not required under the Facility Action Plan; however, comments or suggestions were considered when establishing monitoring objectives.

Table 3-1 presents the groundwater and surface water monitoring locations for the Spring and Fall 2014 LTM sampling events. Figures 3-1 and 3-2 illustrate the locations of Area B and Area A monitoring wells, respectively, sampled during 2014. Figure 3-3 illustrates the surface water sampling locations sampled in Spring 2014. Appendix A contains 2014 groundwater and surface water sampling logs, monitoring well inspection forms, and a summary of the water level measurements collected during the groundwater sampling events. Appendix B contains the analytical laboratory data packages and associated data validation records. Groundwater and surface water samples were collected from all locations as planned in the 2014 FWOs.

3.2 FIELD SAMPLING METHODS

Groundwater and surface water sampling was conducted in accordance with procedures specified in the approved *Site Sampling and Analysis Plan, Holston Army Ammunition Plant, Kingsport, Tennessee* (Bay West and SAIC 2005a). The sections below summarize the sampling protocols used during the 2014 LTM/LTO Program.

3.2.1 Monitoring Well Purging and Sampling

Prior to purging and sampling an existing monitoring well, the integrity of the well was checked. The well was visually inspected and its condition documented on a well inspection form during each sampling event. Copies of well inspection forms are found in Appendix A.4. Upon completion of the inspection, the water level was measured at each well to the nearest 0.01 ft with a battery-powered water level indicator, as described in Section 5.3.3.1 of the Site Sampling and Analysis Plan (SAP; Bay West and SAIC 2005a) (Appendix A.1).

Once the water level was measured, an initial measurement of field parameters, consisting of pH, temperature, conductivity, turbidity, oxidation-reduction potential (ORP), and dissolved oxygen (DO), was conducted. After initial measurement of field parameters, purging of each monitoring well commenced. Purging of monitoring wells was accomplished using one of two methods: (1) micropurging using a bladder pump and flow cell for measuring water quality parameters where conditions allowed, or (2) conventional purging with a Teflon® bailer. A Horiba U-22 or U-52 meter was used to measure water quality parameters for purging with a bladder pump.



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Table 3-1. HSAAP Spring and Fall 2014 LTM Locations

Area	Source Unit	Location	Parameter	Spring	Fall
Area A	SWMU 96	MW-104	VOCs: <ul style="list-style-type: none"> • benzene • methylene chloride SVOCs: <ul style="list-style-type: none"> • naphthalene 	X	X
		MW-105	VOCs: <ul style="list-style-type: none"> • benzene • methylene chloride SVOCs: <ul style="list-style-type: none"> • naphthalene 	X	X
		MW-106	VOCs: <ul style="list-style-type: none"> • benzene • methylene chloride SVOCs: <ul style="list-style-type: none"> • naphthalene 	X	X
		MW-107	VOCs: <ul style="list-style-type: none"> • benzene • methylene chloride SVOCs: <ul style="list-style-type: none"> • naphthalene 	X	X
Area B Landfill Areas	Upgradient	MW-55	SVOCs: <ul style="list-style-type: none"> • bis(2-ethylhexyl)phthalate • dibenzofuran • fluorene • 2-methylnaphthalene • naphthalene • n-nitrosodiphenylamine RCRA metals: <ul style="list-style-type: none"> • arsenic • chromium (total) • lead 	X	
	SWMUs 19/29	MW-48	SVOCs: <ul style="list-style-type: none"> • bis(2-ethylhexyl)phthalate • dibenzofuran • fluorene • 2-methylnaphthalene • naphthalene • n-nitrosodiphenylamine RCRA metals: <ul style="list-style-type: none"> • arsenic • lead 	X	X



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Table 3-1. HSAAP Spring and Fall 2014 LTM Locations (continued)

Area	Source Unit	Location	Parameter	Spring	Fall
Area B Landfill Areas (continued)	SWMUs 19/29 (continued)	MW-114	SVOCs: <ul style="list-style-type: none"> • bis(2-ethylhexyl)phthalate • dibenzofuran • fluorene • 2-methylnaphthalene • naphthalene • n-nitrosodiphenylamine RCRA metals: <ul style="list-style-type: none"> • arsenic • lead 	X	X
		MW-115	SVOCs: <ul style="list-style-type: none"> • bis(2-ethylhexyl)phthalate • dibenzofuran • fluorene • 2-methylnaphthalene • naphthalene • n-nitrosodiphenylamine RCRA metals: <ul style="list-style-type: none"> • arsenic • lead 	X	X
		MW-116	SVOCs: <ul style="list-style-type: none"> • bis(2-ethylhexyl)phthalate • dibenzofuran • fluorene • 2-methylnaphthalene • naphthalene • n-nitrosodiphenylamine RCRA metals: <ul style="list-style-type: none"> • arsenic • lead 	X	X
	SWMU 20	MW-68	RDX MNA ^a : <ul style="list-style-type: none"> • DNX • MNX • TNX RCRA metals: <ul style="list-style-type: none"> • arsenic • chromium (total) 	X	X



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Table 3-1. HSAAP Spring and Fall 2014 LTM Locations (continued)

Area		Source Unit	Location	Parameter	Spring	Fall
Area B Explosives Production and Shop Areas	Installation Boundary Near Holston River	Explosives Production Area SWMUs and AOCs	GM-12	Explosives: <ul style="list-style-type: none"> • 2,4-dinitrotoluene • 2,6-dinitrotoluene • 2,4,6-trinitrotoluene • 2-amino-4,6-dinitrotoluene • 4-amino-2,6-dinitrotoluene • nitroglycerin • RDX 	X	
			GM-14	Explosives: <ul style="list-style-type: none"> • 2,4-dinitrotoluene • 2,6-dinitrotoluene • 2,4,6-trinitrotoluene • 2-amino-4,6-dinitrotoluene • 4-amino-2,6-dinitrotoluene • nitroglycerin • RDX 	X	
			MW-11	Explosives: <ul style="list-style-type: none"> • 2,4-dinitrotoluene • 2,6-dinitrotoluene • 2,4,6-trinitrotoluene • 2-amino-4,6-dinitrotoluene • 4-amino-2,6-dinitrotoluene • nitroglycerin • RDX 	X	
			MW-11B	Explosives: <ul style="list-style-type: none"> • 2,4-dinitrotoluene • 2,6-dinitrotoluene • 2,4,6-trinitrotoluene • 2-amino-4,6-dinitrotoluene • 4-amino-2,6-dinitrotoluene • nitroglycerin • RDX 	X	
			MW-91	Explosives: <ul style="list-style-type: none"> • 2,4-dinitrotoluene • 2,6-dinitrotoluene • 2,4,6-trinitrotoluene • 2-amino-4,6-dinitrotoluene • 4-amino-2,6-dinitrotoluene • nitroglycerin • RDX 	X	



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Table 3-1. HSAAP Spring and Fall 2014 LTM Locations (continued)

Area		Source Unit	Location	Parameter	Spring	Fall
Area B Explosives Production and Shop Areas (continued)	Installation Boundary Near Holston River (continued)	Explosives Production Area SWMUs and AOCs (continued)	MW-91B	Explosives: <ul style="list-style-type: none"> • 2,4-dinitrotoluene • 2,6-dinitrotoluene • 2,4,6-trinitrotoluene • 2-amino-4,6-dinitrotoluene • 4-amino-2,6-dinitrotoluene • nitroglycerin • RDX 	X	
			MW-101	Explosives: <ul style="list-style-type: none"> • 2,4-dinitrotoluene • 2,6-dinitrotoluene • 2,4,6-trinitrotoluene • 2-amino-4,6-dinitrotoluene • 4-amino-2,6-dinitrotoluene • nitroglycerin • RDX 	X	
			MW-101B	Explosives: <ul style="list-style-type: none"> • 2,4-dinitrotoluene • 2,6-dinitrotoluene • 2,4,6-trinitrotoluene • 2-amino-4,6-dinitrotoluene • 4-amino-2,6-dinitrotoluene • nitroglycerin • RDX 	X	
			MW-102	Explosives: <ul style="list-style-type: none"> • 2,4-dinitrotoluene • 2,6-dinitrotoluene • 2,4,6-trinitrotoluene • 2-amino-4,6-dinitrotoluene • 4-amino-2,6-dinitrotoluene • nitroglycerin • RDX 	X	



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Table 3-1. HSAAP Spring and Fall 2014 LTM Locations (continued)

Area	Source Unit	Location	Parameter	Spring	Fall
Area B Explosives Production and Shop Areas (continued)	Explosives Production Area SWMUs and AOCs (continued)	MW-102B	Explosives: <ul style="list-style-type: none"> • 2,4-dinitrotoluene • 2,6-dinitrotoluene • 2,4,6-trinitrotoluene • 2-amino-4,6-dinitrotoluene • 4-amino-2,6-dinitrotoluene • nitroglycerin • RDX 	X	
		MW-S1A	Explosives: <ul style="list-style-type: none"> • 2,4-dinitrotoluene • 2,6-dinitrotoluene • 2,4,6-trinitrotoluene • 2-amino-4,6-dinitrotoluene • 4-amino-2,6-dinitrotoluene • nitroglycerin • RDX 	X	
	SWMU 50	STMW-15	Explosives: <ul style="list-style-type: none"> • 2,4-dinitrotoluene • 2,6-dinitrotoluene • 2,4,6-trinitrotoluene • 2-amino-4,6-dinitrotoluene • 4-amino-2,6-dinitrotoluene • nitroglycerin • RDX BTEX: <ul style="list-style-type: none"> • benzene • toluene • ethylbenzene • xylenes 	X	
	Explosives Production Area	MW-99		Explosives: <ul style="list-style-type: none"> • 2,4-dinitrotoluene • 2,6-dinitrotoluene • 2,4,6-trinitrotoluene • 2-amino-4,6-dinitrotoluene • 4-amino-2,6-dinitrotoluene • nitroglycerin • RDX MNA ^a : <ul style="list-style-type: none"> • DNX • MNX • TNX 	X
SWMU 18		MW-70	Mercury	X	



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Table 3-1. HSAAP Spring and Fall 2014 LTM Locations (continued)

Area		Source Unit	Location	Parameter	Spring	Fall
Area B Explosives Production and Shop Areas (continued)	Interior Source Area Trending/ Corrective Measures Performance (continued)	SWMUs 77/78/86/87	MW-73	Pesticides: <ul style="list-style-type: none"> • alpha-chlordane • gamma-chlordane • dieldrin Bromacil	X	
			MW-75	Pesticides: <ul style="list-style-type: none"> • alpha-chlordane • gamma-chlordane • dieldrin Bromacil	X	
		SWMU 88	MW-86	Pesticides: <ul style="list-style-type: none"> • alpha-chlordane • gamma-chlordane • dieldrin Bromacil	X	
Holston River	Upgradient of Area B	SW-01	VOCs: <ul style="list-style-type: none"> • benzene • methylene chloride SVOCs: <ul style="list-style-type: none"> • bis(2-ethylhexyl)phthalate • dibenzofuran • fluorene • 2-methylnaphthalene • naphthalene • n-nitrosodiphenylamine RCRA metals: <ul style="list-style-type: none"> • arsenic • chromium (total) • lead • mercury Pesticides: <ul style="list-style-type: none"> • alpha-chlordane • gamma-chlordane • dieldrin Bromacil Explosives: <ul style="list-style-type: none"> • 2,4-dinitrotoluene • 2,6-dinitrotoluene • 2,4,6-trinitrotoluene • 2-amino-4,6-dinitrotoluene • 4-amino-2,6-dinitrotoluene • nitroglycerin • RDX 	X		



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Table 3-1. HSAAP Spring and Fall 2014 LTM Locations (continued)

Area	Source Unit	Location	Parameter	Spring	Fall
Holston River (continued)	Downgradient of the IWTP Discharge at Area B	SW-02	VOCs: <ul style="list-style-type: none"> • benzene • methylene chloride SVOCs: <ul style="list-style-type: none"> • bis(2-ethylhexyl)phthalate • dibenzofuran • fluorene • 2-methylnaphthalene • naphthalene • n-nitrosodiphenylamine RCRA metals: <ul style="list-style-type: none"> • arsenic • chromium (total) • lead • mercury Pesticides: <ul style="list-style-type: none"> • alpha-chlordane • gamma-chlordane • dieldrin Bromacil Explosives: <ul style="list-style-type: none"> • 2,4-dinitrotoluene • 2,6-dinitrotoluene • 2,4,6-trinitrotoluene • 2-amino-4,6-dinitrotoluene • 4-amino-2,6-dinitrotoluene • nitroglycerin • RDX 	X	



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Table 3-1. HSAAP Spring and Fall 2014 LTM Locations (continued)

Area	Source Unit	Location	Parameter	Spring	Fall
Holston River (continued)	Downgradient of Area B	SW-03	VOCs: <ul style="list-style-type: none"> • benzene • methylene chloride SVOCs: <ul style="list-style-type: none"> • bis(2-ethylhexyl)phthalate • dibenzofuran • fluorene • 2-methylnaphthalene • naphthalene • n-nitrosodiphenylamine RCRA metals: <ul style="list-style-type: none"> • arsenic • chromium (total) • lead • mercury Pesticides: <ul style="list-style-type: none"> • alpha-chlordane • gamma-chlordane • dieldrin Bromacil Explosives: <ul style="list-style-type: none"> • 2,4-dinitrotoluene • 2,6-dinitrotoluene • 2,4,6-trinitrotoluene • 2-amino-4,6-dinitrotoluene • 4-amino-2,6-dinitrotoluene • nitroglycerin • RDX 	X	

^aMNA analysis performed on an annual basis at this well (spring event only).

AOC = Area of concern.

BTEX = Benzene, toluene, ethylbenzene, and xylenes.

DNX = Hexahydro-1,3-dinitroso-5-nitro-1,3,5-triazine.

HSAAP = Holston Army Ammunition Plant.

IWTP = Industrial wastewater treatment plant.

LTM = Long-term monitoring.

MNA = Monitored natural attenuation (RDX degradation intermediates: hexahydro-1,3-dinitroso-5-nitro-1,3,5-triazine; hexahydro-1-nitroso-3,5-dinitro-1,3,5-triazine; and hexahydro-1,3,5-trinitroso-1,3,5-triazine, annual only).

MXN = Hexahydro-1-nitroso-3,5-dinitro-1,3,5-triazine.

RCRA = Resource Conservation and Recovery Act.

RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine.

SVOC = Semivolatile organic compound.

SWMU = Solid waste management unit.

TNX = Hexahydro-1,3,5-trinitroso-1,3,5-triazine.

VOC = Volatile organic compound.



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Where micropurging methods were employed, purging was conducted until a minimum of two pump and tubing volumes were removed, or until pH, conductivity, DO, and temperature reached equilibrium, as described in Section 5.3.4.2 of the Site SAP (Bay West and SAIC 2005a). For some wells, minimal drawdown could not be achieved even by reducing pump rates to below 40 milliliters per minute (mL/min). In these cases, conventional purging was performed using a Teflon® bailer, and the wells were purged to dryness. If a monitoring well was purged to dryness, sampling was delayed for a time period of up to 24 hours (hr) to allow for recharge.

For wells purged using micropurge methods, samples were collected by filling pre-preserved (as applicable) sample containers from the discharge line of the bladder pump immediately upon completion of purging. When a bailer was used for groundwater sampling, the samples were collected by slowly pouring groundwater from the bailer into pre-preserved (as applicable) sample containers.

Immediately after collection of samples, bottle label information was added, and each sample container was placed into a sealable plastic bag and placed in an ice-filled cooler to ensure preservation.

3.2.2 Surface Water Sampling

Surface water sampling was conducted using the dipper sampling method, as described in Section 5.6.2.1 of the Site SAP (Bay West and SAIC 2005a). Before beginning sampling, the telescoping handle was extended to the appropriate length. The dipper was then slowly submerged into the water so that minimal disturbance of the sample could be achieved. Prior to filling the sample containers, water quality parameters, including pH, temperature, conductivity, turbidity, ORP, and DO, were collected using a Horiba U-22 meter. After measurement of the water quality parameters, the dipper was refilled, and the surface water samples were collected by slowly pouring the water from the dipper into pre-preserved (as applicable) sample containers.

Immediately after collection of samples, bottle label information was added, and each sample container was placed into a sealable plastic bag and placed in an ice-filled cooler to ensure preservation.

3.2.3 Sample Chain-of-Custody, Packaging and Shipping, and Documentation

Sample chain-of-custody, packaging and shipping, and sample documentation were performed in accordance with specifications in Chapter 6.0 of the Site SAP. The 2014 chain-of-custody forms are contained on the compact disc located in Appendix B.

3.3 LABORATORY METHODS

Groundwater samples were analyzed for target analytes according to the LTM Plan presented in the Corrective Measures Report (Bay West and SAIC 2007c) and the CAO Modification that went into effect on January 24, 2013. These include explosives (including RDX), VOCs, SVOCs, RCRA metals, pesticides, bromacil, and selected monitored natural attenuation (MNA) parameters. The MNA parameter group is RDX first-stage degradation compounds (hexahydro-1,3-dinitroso-5-nitro-1,3,5-triazine [DNX]; hexahydro-1-nitroso-3,5-dinitro-1,3,5-triazine [MNX]; and hexahydro-1,3,5-trinitroso-1,3,5-triazine [TNX]). Surface water samples were analyzed for a variety of parameters according to the CAO Modification that went into effect on January 24, 2013. Analytes for surface water include select explosives (including RDX), VOCs, SVOCs, RCRA metals, pesticides, and bromacil. The laboratory methods used to analyze samples are listed in Table 3-2.

3.4 QUALITY ASSURANCE/QUALITY CONTROL

Five different types of field quality control (QC) samples were collected or used during performance of the sampling activities: field duplicates, rinsate blanks, source water samples (potable water), matrix spike/matrix spike duplicates (MS/MSD), and trip blanks. Duplicate samples were collected along with both groundwater and surface water samples. The total number of duplicates was a minimum of 10% of the entire sample population. The QC duplicates were analyzed for the same analytes as the grab samples at the same location.



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Table 3-2. Laboratory Methods for 2014 HSAAP LTM

Analysis		Laboratory Methods
<i>Groundwater</i>		
Volatile Organics		EPA SW-846 8260B
Semivolatile Organics		EPA SW-846 8270C and 8270C SIM
Explosives		EPA SW-846 8330B
RCRA Metals		EPA SW-846 6020 and EPA SW-846 7470A (mercury only)
Pesticides		EPA SW-846 8081B
Bromacil		EPA SW-846 8141B
MNA Parameters	RDX First-Stage Degradation Compounds	EPA SW-846 8330B (DNX, MNX, and TNX only)
TCLP Analysis (IDW only)	TCLP Herbicides	EPA SW-846 8151A
	TCLP Metals	EPA SW-846 6010B and EPA SW-846 7470A (mercury only)
	TCLP Pesticides	EPA SW-846 8081B
	TCLP Semivolatiles	EPA SW-846 8270C
	TCLP Volatiles	EPA SW-846 8260B
<i>Surface Water</i>		
Volatile Organics		EPA SW-846 8260B
Semivolatile Organics		EPA SW-846 8270C
Explosives		EPA SW-846 8330B
RCRA Metals		EPA SW-846 6020, and EPA SW-846 7470A (mercury only)
Pesticides		EPA SW-846 8081B
Bromacil		EPA SW-846 8141B

DNX = Hexahydro-1,3-dinitroso-5-nitro-1,3,5-triazine.
EPA = U.S. Environmental Protection Agency.
HSAAP = Holston Army Ammunition Plant.
IDW = Investigation-derived waste.
LTM = Long-term monitoring.
MNA = Monitored natural attenuation.

MNX = Hexahydro-1-nitroso-3,5-dinitro-1,3,5-triazine.
RCRA = Resource Conservation and Recovery Act.
RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine.
SIM = Selected ion monitoring.
TCLP = Toxicity Characteristic Leaching Procedure.
TNX = Hexahydro-1,3,5-trinitroso-1,3,5-triazine.

During the decontamination of sampling equipment used for sample collection, QC rinsate blanks were collected from the sampling equipment used. Each of these blanks was collected after decontamination of the sampling device(s). The blanks were collected by pouring American Society for Testing and Materials (ASTM) Type I or equivalent water over and into the device and collecting the water directly into appropriate sample containers. Sample containers designated for VOC analysis were filled so that no headspace was present. The total number of rinsate blanks collected represented approximately 5% of the entire sample population. The QC rinsate blank sample was analyzed for the same parameters as the next grab sample collected. One field blank sample (potable water) was collected to analyze the water used for decontamination of sampling equipment to determine procedural contamination at the site that may contribute to sample contamination. The field blank sample was analyzed for all parameters being investigated across the site.

The MS/MSD samples were submitted to test the laboratory accuracy and precision. The MS sample indicated the appropriateness of the method for the matrix by measuring the recovery or accuracy, and the MSD sample was a second aliquot of the same sample with known quantities of compounds added. When compared to the MS, the MSD sample was used to determine precision.

Trip blanks used for the project consisted of sealed containers of ASTM Type I or equivalent water provided by the laboratory. One trip blank was placed into each cooler used to store groundwater sample containers designated for VOC analysis. The trip blank remained in the cooler until groundwater



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sampling at the site was completed and was shipped off-site within the cooler for chemical analysis by the contracted laboratory.

Daily Chemical Quality Control Contractor Reports (DCQCRs) were prepared, signed, and dated by the site supervisor. These reports summarized the activities performed at the site, the daily weather conditions, samples collected and times, results of field measurements, field calibrations, any deviations from the project objectives, and any communications with government or site personnel. All DCQCRs are maintained in the project file.

3.5 DATA VERIFICATION, VALIDATION, AND MANAGEMENT

As described in Chapter 10.0 of the *Site Quality Assurance Project Plan, Holston Army Ammunition Plant, Kingsport, Tennessee* (Bay West and SAIC 2005b), all samples from this investigation were sent to a National Environmental Laboratory Accreditation Program-accredited laboratory (TestAmerica Laboratories, Inc.) for analysis. Upon completion of analysis, the laboratory prepared analytical and QC documentation, and an analytical data package was submitted for each sample. Appendix B contains copies of 2014 LTM laboratory data packages. Upon receipt, analytical data were verified by Bay West and Leidos, and data packages were selected for full validation. A complete description of the data verification/validation process can be found in Section 10.2 of the Quality Assurance Project Plan (Bay West and SAIC 2005b). After verification and validation of the data, an evaluation of the data accuracy, precision, sensitivity, and completeness was performed and documented in Data Quality Summary Reports (DQSRs). Separate DQSRs for each semiannual monitoring event are provided below. Data validation checklists are contained in Appendix B.

3.5.1 Data Quality Summary Report – Spring 2014 Sampling Event

Samples were collected between April 8 and 16, 2014, from 27 monitoring wells and 3 surface water locations. Acceptable results were produced for all investigation sample analyses performed. Analyses included VOCs, SVOCs, explosives, pesticides, bromacil, and RCRA metals.

Analytical holding times were achieved within the data set, with the exception of the rinsate sample for mercury and PAHs analyses. Results for these analyses were qualified as estimated (UJ).

Some results were qualified as estimated (J or UJ) because initial calibration criteria were not met. Affected results include bromacil in 4 groundwater samples and the equipment rinsate; methylene chloride in 3 surface water samples, 2 trip blanks, and the source blank; and RDX in 11 groundwater samples, 1 surface water sample, and the rinsate and source blank samples. Results for bromacil in three surface water samples and the source blank were qualified as estimated (J or UJ) because the percent difference for the continuing calibration was not within criteria. All other initial and continuing calibration criteria were achieved.

Arsenic results in two groundwater samples, three surface water samples, and the source blank were qualified as undetected (U) due to low levels of arsenic detected in the method blank. Low levels of chromium and chloroform were detected in the source blank, resulting in the qualification of chromium results in three groundwater samples and chloroform in one groundwater sample as undetected (U). RDX also was detected in the source blank; however, the associated results were either non-detect or greater than the action level.

Seven explosives results in one groundwater sample and RDX in two groundwater samples were qualified as estimated (J or UJ) due to surrogate recoveries outside of control limits. Three PAH analytes were qualified as estimated in two groundwater samples because of low surrogate recoveries. All other organic surrogate compound recoveries were acceptable.



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Detected concentrations of bromacil in one groundwater sample, RDX in one groundwater sample, and DNX in two groundwater samples were qualified as estimated (J) due a high percent difference between the primary and confirmation column quantifications.

The bromacil result for one surface water sample was qualified as estimated (J) due to a high MS recovery. All other MS results were acceptable.

All internal standard recoveries and compound retention times were acceptable. All laboratory control sample (LCS) recoveries were acceptable.

Field duplicates were collected for every type of analysis performed. If a given analyte was not detected in both the regular and field duplicate sample, precision was considered acceptable. The relative percent difference (RPD) was calculated only when both samples were greater than five times the reporting level. When one or both sample values were between the reporting level and five times the reporting level, the absolute difference was evaluated. Field duplicate comparisons were acceptable, with the exception of bis(2-ethylhexyl)phthalate and dibenzofuran in the field duplicate pair collected at MW-048. The RPDs for these comparisons were 78% and 156%, respectively, which exceed the goal of 30% RPD. All absolute difference values were less than three times the associated reporting limit.

Information is considered acceptable except as noted, has an established confidence that allows utilization for the project objectives, and provides data for future needs.

3.5.2 Data Quality Summary Report – Fall 2014 Sampling Event

Groundwater samples were collected on October 15 and 16, 2014, from nine monitoring wells. Acceptable results were produced for all investigation sample analyses performed. Analyses included VOCs, SVOCs, explosives, and RCRA metals.

Analytical holding times were achieved for all analyses.

Non-detect results for bis(2-ethylhexyl)phthalate, dibenzofuran, and n-nitrosodiphenylamine in the source blank were qualified as estimated (UJ) due to low surrogate recoveries.

Lead results in two groundwater samples collected at MW-114 and MW-116 were qualified as undetected (U) due to low levels of lead detected in field blank CGWMW-SRC-0768-SB.

The RDX result for the sample collected at MW-068 was qualified as estimated (J) due to a high MS recovery and a surrogate retention time slightly outside the window.

All internal standard recoveries and compound retention times were acceptable. All initial and continuing calibration criteria were met. All LCS recoveries were acceptable.

Field duplicates were collected for every type of analysis performed. If a given analyte was not detected in both the regular and field duplicate sample, precision was considered acceptable. The RPD was calculated only when both samples were greater than five times the reporting level. When one or both sample values were between the reporting level and five times the reporting level, the absolute difference was evaluated. Field duplicate comparisons were acceptable, with the exception of lead in the field duplicate pair collected at MW-048. The RPD for this comparison was 64%, which exceeds the goal of 30% RPD. All absolute difference values were less than three times the associated reporting limit.

Information is considered acceptable except as noted, has an established confidence that allows utilization for the project objectives, and provides data for future needs.



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4.0 2014 SITE-WIDE MONITORING RESULTS

All target analytes in groundwater are compared to the MCL. If no MCL is available for a detected analyte, the EPA RSL is used as the screening criterion. Bromacil does not have an MCL or EPA RSL; therefore, the EPA LHA is used as the screening criterion. MCLs, RSLs, and LHAs used as screening criteria are listed in Table G-3 of the CAO Modification (Appendix C). If an analyte is not listed on Table G-3 of the CAO Modification, the most current MCL or RSL was used as the screening criterion (i.e., ethylbenzene, toluene, and xylenes at STMW-15). Per Appendix F (Section II.D) of the CAO Modification that went into effect on January 24, 2013 (TDEC 2013), target analytes detected in boundary wells also are compared to GWPSs (Table G-3 of the CAO Modification, as provided in Appendix C).

For surface water, target analytes are screened against the lowest water quality criteria, as listed in Table G-3 of the CAO Modification (Appendix C).

4.1 GROUNDWATER FLOW DIRECTIONS

Groundwater elevations measured during the Spring 2014 sampling event throughout HSAAP were used to develop a potentiometric map and to evaluate groundwater flow directions. Historical data show that potentiometric elevations tend to decrease in the dry season (e.g., fall sampling event); however, overall groundwater flow directions remain consistent throughout the year. Figure 4-1 illustrates the Spring 2014 potentiometric surface throughout Area B. The map represents the water table elevation within the unconsolidated overburden and the shallow bedrock.

Twenty-three Area B wells were monitored in Spring 2014 (Appendix A.1). Potentiometric data obtained during 2014 were compared to previous information to determine whether flow directions remained consistent with historical patterns. The 2014 data did not indicate any new or unusually different flow patterns relative to 2005 through 2013, and overall flow directions (e.g., toward the Holston River) were consistent during both sampling events. The difference in water levels between the Spring and Fall 2014 gauging events ranged between a 4.61-ft increase at MW-116 and a 9.12-ft decrease at MW-70 (Appendix A.1, Table A.1-1).

The general groundwater flow direction in Area B is south toward the Holston River. Slight variations in the overall flow direction to the southeast or southwest are observed depending on the location. However, data collected to date do not indicate any significant permutations in the overall groundwater flow direction. The groundwater gradients and flow directions indicate that the groundwater beneath Area B discharges to the Holston River or to the lower reaches of several drainage ditches that discharge into the Holston River (USACHPPM 2004b).

4.2 GROUNDWATER

4.2.1 Area A – SWMU 96

Four boundary wells at Area A – SWMU 96 (MW-104, MW-105, MW-106, and MW-107) were sampled semiannually for CAO Modification-listed target analytes (naphthalene, benzene, and methylene chloride) (Table 4-1). None of the target analytes for Area A – SWMU 96 were detected during either the Spring or Fall 2014 LTM sampling events. Benzene and methylene chloride have not been detected in any of the four monitoring wells since 2008. Naphthalene was detected in all four of these monitoring wells in 2010; however, none of the detections were above the EPA RSL for tap water, and naphthalene has not been detected in these monitoring wells since 2010.



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Table 4-1. Target Analyte Concentrations at Area A – SWMU 96 – 2014

					<i>Area A – SWMU 96</i>									
Location					Boundary		Boundary			Boundary		Boundary		
Well Classification					MW-104	MW-104	MW-105	MW-105	MW-105	MW-106	MW-106	MW-107	MW-107	MW-107
Station					Semiannual	Semiannual	Semiannual	Semiannual	Semiannual	Semiannual	Semiannual	Semiannual	Semiannual	Semiannual
Monitoring Frequency					CGWMW-104-0725-GW	CGWMW-104-0768-GW	CGWMW-105-0726-GW	CGWMW-105-0760-QA	CGWMW-105-0769-GW	CGWMW-106-0727-GW	CGWMW-106-0770-GW	CGWMW-107-0728-GW	CGWMW-107-0771-GW	CGWMW-107-0772-QA
Sample ID					04/08/14	10/16/14	04/09/14	04/09/14	10/16/14	04/09/14	10/16/14	04/09/14	10/16/14	10/16/14
Date Collected					Grab	Grab	Grab	Field Duplicate	Grab	Grab	Grab	Grab	Grab	Field Duplicate
Sample Type			Screening Criteria ^a	Source	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Media	Unit	GWPS ^a	(MCL/RSL)											
Target Analyte														
SVOCs														
Naphthalene	µg/L	238	0.14	RSL	0.0097 U	0.01 U	0.0097 U	0.0095 U	0.0099 U	0.01 U	0.0097 U	0.0096 U	0.0099 U	--
VOCs														
Benzene	µg/L	8,500	5	MCL	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Methylene chloride	µg/L	8,500	5	MCL	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U

^aGWPSs and screening criteria (MCLs and U.S. Environmental Protection Agency [EPA] RSLs for tap water) for target analytes are provided in Table G-3 of the Corrective Action Order Modification dated January 24, 2013.

-- = Not sampled for this analyte.

GWPS = Groundwater protection standard; use for comparison in boundary wells only.

ID = Identifier.

µg/L = Micrograms per liter.

MCL = Safe drinking water primary maximum contaminant level.

RSL = EPA regional screening level.

SVOC = Semivolatile organic compound.

SWMU = Solid waste management unit.

U = Analyte not detected.

VOC = Volatile organic compound.



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4.2.2 Area B Landfill Area – SWMUs 19/29 and Upgradient

The Spring and Fall 2014 sampling events included MW-48, MW-114, MW-115, and MW-116 in the SWMUs 19/29 vicinity. Each of these wells is located downgradient of SWMUs 19/29. MW-48 is located within a localized SVOC source area, downgradient from SWMUs 19/29, and has exhibited a high degree of variability in the concentrations and number of SVOC compounds detected over the course of its monitoring history. Monitoring wells MW-114, MW-115, and MW-116 are boundary wells for SWMUs 19/29. Monitoring well MW-55, which is located upgradient of SWMUs 19/29, was only sampled during the Spring 2014 event.

The five monitoring wells in the vicinity of SWMUs 19/29 were sampled for CAO Modification-listed target analytes for these SWMUs (arsenic, lead, bis[2-ethylhexyl]phthalate, dibenzofuran, fluorene, 2-methylnaphthalene, naphthalene, and n-nitrosodiphenylamine) (Table 4-2). In addition, MW-55 was sampled for total chromium (Table 4-3).

During the Spring 2014 sampling event, target analytes arsenic, 2-methylnaphthalene, bis(2-ethylhexyl)phthalate, dibenzofuran, and naphthalene were detected at interior source well MW-48 above screening criteria (Table 4-2). In Fall 2014, bis(2-ethylhexyl)phthalate and dibenzofuran were detected above screening criteria in MW-48 (Table 4-2). The Spring 2014 bis(2-ethylhexyl)phthalate detection was the highest result in monitoring well MW-48 since May of 2005. Dibenzofuran detections were within the range of concentrations from historical sampling events. The absorbent sock placed in well MW-48 to passively absorb contaminants was changed during both the spring and fall sampling events.

In boundary monitoring well MW-115, bis(2-ethylhexyl)phthalate was the only target analyte detected above screening criteria during the Spring 2014 sampling event. It was detected at a concentration of 7.2J $\mu\text{g/L}$, which exceeds the MCL of 6 $\mu\text{g/L}$. The Spring 2014 bis(2-ethylhexyl)phthalate detection was the highest result in monitoring well MW-115 since May of 2005. However, the single detection of bis(2-ethylhexyl)phthalate did not exceed the GWPS (10,200 $\mu\text{g/L}$). No target analytes, including bis(2-ethylhexyl)phthalate, were detected in MW-115 above screening criteria or GWPSs during the Fall 2014 sampling event.

None of the target analytes were detected in boundary wells MW-114 or MW-116 above screening criteria or GWPSs during either LTM sampling event (Table 4-2). In addition, none of the target analytes detected in MW-55 exceeded screening criteria during the Spring 2014 sampling event (Table 4-3).

4.2.3 Area B Landfill Area – SWMU 20

During the Spring and Fall 2014 sampling events, SWMU 20 boundary well MW-68 was sampled for CAO Modification-listed target analytes, including arsenic, total chromium, and RDX. In addition, RDX first-stage degradation products (DNX, MNX, and TNX) were collected at MW-68 in Spring 2014 only (Table 4-4).

Arsenic was not detected in MW-68 during the Spring and Fall 2014 sampling events (Table 4-4). Detections of arsenic at MW-68 have consistently occurred below the MCL of 10 $\mu\text{g/L}$ since September 2006 and are significantly below the CAO Modification-listed GWPS of 17,000 $\mu\text{g/L}$.

Total chromium was not detected in monitoring well MW-68 during the Spring 2014 sampling event. Total chromium was detected in MW-68 during the Fall 2014 sampling event at a concentration of 0.97J $\mu\text{g/L}$, which is less than the MCL of 100 $\mu\text{g/L}$ (Table 4-4). Detections of total chromium at MW-68 have consistently occurred below the MCL of 100 $\mu\text{g/L}$ since August 2004 and are significantly below the CAO Modification-listed GWPS of 18,700 $\mu\text{g/L}$.



Table 4-2. Target Analyte Concentrations at Area B Landfill Area – SWMUs 19/29 – 2014

					<i>Area B - Landfill Area – SWMUs 19/29</i>											
Location	Unit	GWPS ^a	Screening Criteria ^a (MCL/RSL)	Source	Interior/Source				Boundary		Boundary				Boundary	
Well Classification					MW-48	MW-48	MW-48	MW-48	MW-114	MW-114	MW-115	MW-115	MW-115	MW-115	MW-116	MW-116
Station					Semiannual	Semiannual	Semiannual	Semiannual	Semiannual	Semiannual	Semiannual	Semiannual	Semiannual	Semiannual	Semiannual	Semiannual
Monitoring Frequency					CGWMW-048-0730-GW	CGWMW-048-0761-QA	CGWMW-048-0774-GW	CGWMW-048-0775-QA	CGWMW-114-0731-GW	CGWMW-114-0777-GW	CGWMW-115-0732-GW	CGWMW-115 FIELD DUP	CGWMW-115-0778-GW	CGWMW-115-0779-QA	CGWMW-116-0733-GW	CGWMW-116-0781-GW
Sample ID					04/10/14	04/10/14	10/15/14	10/15/14	04/13/14	10/15/14	04/10/14	04/10/14	10/15/14	10/15/14	04/10/14	10/15/14
Date Collected					Grab	Field Duplicate	Grab	Field Duplicate	Grab	Grab	Grab	Field Duplicate	Grab	Field Duplicate	Grab	Grab
Sample Type					Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Media					Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Target Analyte	Unit	GWPS ^a	Screening Criteria ^a (MCL/RSL)	Source												
Metals																
Arsenic	µg/L	17,000	10	MCL	11 =	14 =	7.3 =	6.8 =	4.6 U	0.71 J	1 U	--	1 U	--	0.83 J	1.5 J
Lead	µg/L	4,250	15	MCL	5.2 =	6.5 =	5.8 =	3 =	0.98 J	0.5 U	0.5 U	--	0.5 U	--	0.56 J	1.4 U
SVOCs																
2-Methylnaphthalene	µg/L	45,900	27	RSL	350 J	260 J	17 J	--	0.0099 U	0.01 U	0.026 J	0.011 U	0.011 U	0.01 U	0.01 U	0.011 U
Bis(2-ethylhexyl)phthalate	µg/L	10,200	6	MCL	25 J	11 =	17 =	--	2.9 J	3.2 J	7.2 J	--	0.68 J	1 U	2.8 J	1 J
Dibenzofuran	µg/L	9,860	5.8	RSL	79 =	9.8 =	17 =	--	1 U	0.99 U	1 U	--	1 U	1 U	1 U	1 U
Fluorene	µg/L	374,000	220	RSL	160 J	130 J	17 J	--	0.02 U	0.02 U	0.019 U	0.021 U	0.021 U	0.02 U	0.021 U	0.021 U
Naphthalene	µg/L	238	0.14	RSL	14 J	11 J	0.0096 U	--	0.0099 U	0.01 U	0.0096 U	0.0096 J	0.011 U	0.01 U	0.0073 J	0.011 U
n-Nitrosodiphenylamine	µg/L	17,000	10	RSL	4.9 U	0.98 U	0.96 U	--	1 U	0.99 U	1 U	--	1 U	1 U	1 U	1 U

^aGWPSs and screening criteria (MCLs and U.S. Environmental Protection Agency [EPA] RSLs for tap water) for target analytes are provided in Table G-3 of the Corrective Action Order Modification dated January 24, 2013.

Bold values indicate detected concentrations that exceed screening criteria; however, no target analytes in boundary wells exceed GWPSs.

-- = Not sampled for this analyte.

"=" = Detected at the concentration shown.

GWPS = Groundwater protection standard; use for comparison in boundary wells only.

ID = Identifier.

J = Concentration is an estimated value.

µg/L = Micrograms per liter.

MCL = Safe drinking water primary maximum contaminant level.

RSL = EPA regional screening level.

SVOC = Semivolatile organic compound.

SWMU = Solid waste management unit.

U = Analyte not detected.



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Table 4-3. Target Analyte Concentrations at Area B Landfill Area – Upgradient – 2014

Location	Unit	Screening Criteria ^b (MCL/RSL)	Source	Area B - Landfill Area – Upgradient			
Well Classification				Upgradient			
Station				MW-55	MW-55		
Monitoring Frequency				Biennial ^a	Biennial ^a		
Sample ID				CGWMW-055-0729-GW	CGWMW-055-0760-QA		
Date Collected				04/15/14	04/15/14		
Sample Type				Grab	Field Duplicate		
Media				Groundwater	Groundwater		
Target Analyte							
Metals							
Arsenic	µg/L	10	MCL	0.34 J	1 U		
Chromium, total	µg/L	100	MCL	1.5 U	1.5 U		
Lead	µg/L	15	MCL	0.46 J	0.43 J		
SVOCs							
2-Methylnaphthalene	µg/L	27	RSL	0.0098 U	--		
Bis(2-ethylhexyl)phthalate	µg/L	6	MCL	1 U	--		
Dibenzofuran	µg/L	5.8	RSL	1 U	--		
Fluorene	µg/L	220	RSL	0.02 U	--		
Naphthalene	µg/L	0.14	RSL	0.0098 U	--		
n-Nitrosodiphenylamine	µg/L	10	RSL	1 U	--		

^aUpgradient monitoring well MW-55 is sampled on a biennial basis on even-numbered years.

^bScreening criteria (MCLs or U.S. Environmental Protection Agency [EPA] RSLs for tap water) for target analytes are provided in Table G-3 of the Corrective Action Order Modification dated January 24, 2013. The upgradient monitoring well is not compared to groundwater protection standards from the Corrective Action Order Modification.

-- = Not sampled for this analyte.

ID = Identifier.

J = Concentration is an estimated value.

µg/L = Micrograms per liter.

MCL = Safe drinking water primary maximum contaminant level.

RSL = EPA regional screening level.

SVOC = Semivolatile organic compound.

U = Analyte not detected.



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Table 4-4. Target Analyte Concentrations at Area B Landfill Area – SWMU 20 – 2014

Location	Unit	GWPS ^b	Screening Criteria ^b (MCL/RSL)	Source	Area B - Landfill Area – SWMU 20		
					Boundary		
Well Classification					MW-68	MW-68	MW-68
Station					Semiannual ^a	Semiannual ^a	Semiannual ^a
Monitoring Frequency					CGWMW-068-0734-GW	CGWMW-068-0782-GW	CGWMW-068-0783-QA
Sample ID					04/13/14	10/15/14	10/15/14
Date Collected					Grab	Grab	Field Duplicate
Sample Type					Groundwater	Groundwater	Groundwater
Media							
Target Analyte							
Metals							
Arsenic	µg/L	17,000	10	MCL	3.8 U	1 U	1 U
Chromium, total	µg/L	18,700	100	MCL	1.5 U	0.97 J	0.88 J
Explosives							
RDX	µg/L	1,037	0.61	RSL	14 =	84 J	84 =
Explosive Degradation Intermediates							
DNX	µg/L	NA	NA	--	0.1 U	--	--
MNX	µg/L	NA	NA	--	0.42 J	--	--
TNX	µg/L	NA	NA	--	0.1 U	--	--

^aAnalysis of degradation intermediates is conducted on an annual basis (spring event only).

^bGWPSs and screening criteria (MCLs and U.S. Environmental Protection Agency [EPA] RSLs for tap water) for target analytes are provided in Table G-3 of the Corrective Action Order Modification dated January 24, 2013.

Bold values indicate detected concentrations that exceed screening criteria; however, no target analytes in boundary wells exceed GWPSs.

-- = Not sampled for this analyte.

"=" = Detected at the concentration shown.

DNX = Hexahydro-1,3-dinitroso-5-nitro-1,3,5-triazine.

GWPS = Groundwater protection standard; use for comparison in boundary wells only.

ID = Identifier.

J = Concentration is an estimated value.

µg/L = Micrograms per liter.

MCL = Safe drinking water primary maximum contaminant level.

MNX = Hexahydro-1-nitroso-3,5-dinitro-1,3,5-triazine.

NA = Not applicable; screening criteria (EPA RSLs, MCLs, or GWPSs) are not established for this compound.

RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine.

RSL = EPA regional screening level.

SWMU = Solid waste management unit.

TNX = Hexahydro-1,3,5-trinitroso-1,3,5-triazine.

U = Analyte not detected.



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These metals data are consistent with RFI findings and previous LTM results and indicate that SWMU 20 does not appear to be a significant source of RCRA metals above risk-based criteria (Bay West and SAIC 2005c, 2006b).

The explosive RDX was detected at MW-68 at concentrations of 14 µg/L and 84J µg/L (84 µg/L in the corresponding field duplicate) in the spring and fall, respectively (Table 4-4). Although both RDX detections exceeded the EPA RSL (0.61 µg/L), none of the detections exceeded the GWPS of 1,037 µg/L. Trend analysis demonstrates that the RDX concentrations at MW-68 exhibit a high degree of event-to-event variability, as shown in Figure 4-2. Statistical trend analysis (Mann-Kendall U-Test) of the MW-68 RDX data set indicates no significant trend at either the 80% or 90% confidence level. MW-68, located at the downgradient edge of SWMU 20, also was sampled for primary RDX degradation parameters (DNX, MNX, and TNX) during the Spring 2014 sampling event (Table 4-4). One of the three nitroso degradation intermediates of RDX was detected in MW-68 during the 2014 LTM event: MNX at an estimated concentration of 0.42J µg/L. The occurrence of this compound is positive evidence of active anaerobic microbial transformation processes.

4.2.4 Area B Production and Shop Area – SWMU 18

One interior/source well (MW-70) at SWMU 18 was sampled in Spring 2014 for the CAO Modification-listed target analyte mercury (Table 4-5). Mercury was detected at 2.0 µg/L during the Spring 2014 sampling event. This result is at the same concentration as the MCL (2 µg/L) and shows a consistent declining trend in mercury concentrations in MW-70, specifically since April 2010 (Figure 4-3). In addition, statistical trend analysis (Mann-Kendall U-Test) of the MW-70 mercury data between 2000 and 2014 indicates a statistically significant declining trend at the 90% confidence level.

Table 4-5. Target Analyte Concentrations at Area B Production and Shop Area – SWMU 18 – 2014

				<i>Area B - Production and Shop Area – SWMU 18</i>	
Location				Interior/Source	
Well Classification				MW-70	MW-70
Station				Annual	Annual
Monitoring Frequency				CGWMW-070-0748- GW	CGWMW-070-0761- QA
Sample ID				04/11/14	04/11/14
Date Collected				Grab	Field Duplicate
Sample Type				Groundwater	Groundwater
Media					
Target Analyte	Unit	Screening Criteria ^a (MCL/RSL)	Source		
Metals					
Mercury	µg/L	2	MCL	2.0 =	1.9 =

^aThe MCL for the target analyte is provided in Table G-3 of the Corrective Action Order Modification dated January 24, 2013. Interior/source monitoring wells are not compared to groundwater protection standards from the Corrective Action Order Modification.

“=” = Detected at the concentration shown.

ID = Identifier.

µg/L = Micrograms per liter.

MCL = Safe drinking water primary maximum contaminant level.

RSL = Regional screening level.

SWMU = Solid waste management unit.



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4.2.5 Area B Production and Shop Area – SWMUs 77/78/86/87 and SWMU 88 (Pesticides Areas)

Two interior/source area wells at SWMUs 77/78/86/87 (MW-73 and MW-75) and one interior/source area well at SWMU 88 (MW-86) were sampled in Spring 2014 for CAO Modification-listed target analytes, including dieldrin, alpha- and gamma-chlordane, and bromacil (Table 4-6).

Dieldrin was detected above its EPA RSL (0.0015 µg/L) at MW-73 at a concentration of 0.58 µg/L (0.61 µg/L in the accompanying field duplicate). Dieldrin also was detected above its EPA RSL in MW-75 at a concentration of 0.091 µg/L. While the dieldrin concentrations in these two monitoring wells have been increasing since 2012, the results are within the range of historical sampling events since 2005 (Figure 4-4). Dieldrin was not detected in MW-86 during the Spring 2014 sampling event. This is the first time since 2005 that dieldrin was analyzed in MW-86.

Total chlordane was detected at MW-75 at a concentration of 0.49J µg/L (0.24J µg/L alpha-chlordane and 0.25 µg/L gamma-chlordane) and in MW-73 at a concentration of 0.246 µg/L (0.15 µg/L alpha-chlordane and 0.096 µg/L gamma-chlordane). The 2014 total chlordane results for these wells are below the MCL of 2 µg/L; however, the total chlordane detections are elevated relative to previous sampling results prior to 2013 (Figure 4-5). Total chlordane was not detected in MW-86 during the Spring 2014 sampling event. This is the first time since 2005 that chlordane was analyzed in MW-86.

Bromacil was detected in MW-86 at a concentration of 38J µg/L, which is less than the EPA LHA of 70 µg/L. The Spring 2014 sampling event represents the fifth year that the bromacil results in MW-86 are below screening criteria (Figure 4-6). In Spring 2014, bromacil was detected at a concentration of 0.52J µg/L in MW-75 and was not detected in monitoring well MW-73. The detection of bromacil in MW-75 was below the screening criterion (EPA LHA of 70 µg/L). This is the first time since 2006 that bromacil was analyzed in MW-73 and MW-75.

4.2.6 Area B Production and Shop Area – Explosives Production Area

Groundwater well MW-99 within the explosives production area was sampled in Spring 2014 for CAO Modification-listed target analytes (2,4-DNT; 2,6-DNT; 2,4,6-TNT; 2-amino-4,6-DNT; 4-amino-2,6-DNT; nitroglycerin; and RDX) and RDX first-stage degradation products (DNX, MNX, and TNX) (Table 4-7). The distribution of current and historical RDX detections in Area B is presented in Figure 4-7.

During the Spring 2014 sampling event, RDX was detected in MW-99 at a concentration of 670J µg/L (650J µg/L in the associated field duplicate), which exceeds the EPA RSL (0.61 µg/L). This is consistent with historical data for this well (Figure 4-7). RDX trend plots for MW-99 from the 2001 to 2014 period are presented in Figure 4-8. Statistical trend analysis (Mann-Kendall U-Test) of the MW-99 RDX data set currently indicates no significant trend at either the 80% or 90% confidence level; however, concentrations of RDX in MW-99 have decreased significantly since April 2013, which may be due, in part, to demolition of Building H8 and associated soil excavation.



Table 4-6. Target Analyte Concentrations at Area B Production and Shop Area – SWMUs 77/78/86/87/88 (Pesticides Areas) – 2014

Location	Well Classification	Station	Monitoring Frequency	Sample ID	Date Collected	Sample Type	Media	Target Analyte	Unit	Screening Criteria ^a (LHA/MCL/RSL)	Source	Area B - Production and Shop Area – SWMUs 77/78/86/87/88 (Pesticides Areas)				
												Interior/Source		Interior/Source		
												MW-73	MW-73	MW-75	MW-86	
												Annual	Annual	Annual	Annual	
												CGWMW-073-0749-GW	CGWMW-073-0760-QA	CGWMW-075-0750-GW	CGWMW-086-0751-GW	
												04/08/14	04/08/14	04/08/14	04/08/14	
												Grab	Field Duplicate	Grab	Grab	
												Groundwater	Groundwater	Groundwater	Groundwater	
Pesticides																
													1.9 UJ	1.9 UJ	0.52 J	38 J
													0.58 =	0.61 =	0.091 =	0.019 U
													0.15 =	0.15 =	0.24 J	0.019 U
													0.096 =	0.11 =	0.25 =	0.019 U
													0.246 =	0.26 =	0.49 J	0.038 U

^aScreening criteria (MCLs, U.S. Environmental Protection Agency [EPA] RSLs for tap water, and LHAs) for the target analytes are provided in Table G-3 of the Corrective Action Order Modification dated January 24, 2013. Interior/source monitoring wells are not compared to groundwater protection standards from the Corrective Action Order Modification.

Bold values indicate detected concentrations that exceed screening criteria.

-- = Not sampled for this analyte.

"=" = Detected at the concentration shown.

ID = Identifier.

J = Concentration is an estimated value.

LHA = Lifetime health advisory.

µg/L = Micrograms per liter.

MCL = Safe drinking water primary maximum contaminant level.

NA = Not applicable; screening criteria (EPA RSLs or MCLs) are not established for this compound.

RSL = EPA regional screening level.

SWMU = Solid waste management unit.

U or UJ = Analyte not detected.



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Table 4-7. Target Analyte Concentrations at Area B Production and Shop Area – Explosives Production Area – 2014

Location	Unit	Screening Criteria ^a (MCL/RSL)	Source	Area B Production and Shop Area – Explosives Production Area	
				Interior/Source	
Well Classification				MW-99	MW-99
Station				Annual	Annual
Monitoring Frequency				CGWMW-099-0747-GW	CGWMW-099-0761-QA
Sample ID				04/15/14	04/15/14
Date Collected				Grab	Field Duplicate
Sample Type				Groundwater	Groundwater
Media					
Target Analyte					
Explosives					
2,4-Dinitrotoluene	µg/L	0.2	RSL	0.1 U	0.1 U
2,6-Dinitrotoluene	µg/L	15	RSL	0.1 U	0.1 U
2,4,6-Trinitrotoluene	µg/L	2.2	RSL	0.1 U	0.1 U
2-Amino-4,6-Dinitrotoluene	µg/L	30	RSL	0.1 U	0.1 U
4-Amino-2,6-Dinitrotoluene	µg/L	30	RSL	0.07 J	0.063 J
Nitroglycerin	µg/L	1.5	RSL	0.51 U	0.51 U
RDX	µg/L	0.61	RSL	670 J	650 J
Explosive Degradation Intermediates					
DNX	µg/L	NA	--	1 J	0.96 J
MNX	µg/L	NA	--	4.5 =	4.2 =
TNX	µg/L	NA	--	0.56 =	0.52 =

^aScreening criteria (U.S. Environmental Protection Agency [EPA] RSLs for tap water) for the target analytes are provided in Table G-3 of the Corrective Action Order Modification dated January 24, 2013. Interior/source monitoring wells are not compared to groundwater protection standards from the Corrective Action Order Modification.

Bold values indicate detected concentrations that exceed screening criteria.

-- = Not sampled for this analyte.

"=" = Detected at the concentration shown.

DNX = Hexahydro-1,3-dinitroso-5-nitro-1,3,5-triazine.

ID = Identifier.

J = Concentration is an estimated value.

µg/L = Micrograms per liter.

MCL = Safe drinking water maximum contaminant level.

MNX = Hexahydro-1-nitroso-3,5-dinitro-1,3,5-triazine.

NA = Not applicable; screening criteria (EPA RSLs or MCLs) are not established for this compound.

RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine.

RSL = EPA regional screening level.

TNX = Hexahydro-1,3,5-trinitroso-1,3,5-triazine.

U = Analyte not detected.



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4-Amino-2,6-DNT is the only other target analyte detected in MW-99; however, this constituent was detected at a concentration below the EPA RSL screening criterion.

Groundwater monitoring well MW-99 also was sampled for primary RDX degradation parameters (Table 4-7) to evaluate biological attenuation of explosives. This well was selected based on historically consistent explosives detections. All three of the nitroso degradation intermediates of RDX were detected in MW-99 during the 2014 LTM event: DNX at a concentration of 1J $\mu\text{g/L}$, MNX at a concentration of 4.5 $\mu\text{g/L}$, and TNX at a concentration of 0.56 $\mu\text{g/L}$. The occurrence of these compounds is positive evidence of active anaerobic microbial transformation processes.

4.2.7 Area B Production and Shop Area – Boundary Wells

The boundary wells provide coverage of both unconsolidated and bedrock stratigraphic intervals downgradient of the explosives production area. Six unconsolidated boundary wells (MW-11, MW-91, MW-101, MW-102, MW-S1A, and STMW-15) and six bedrock boundary wells (GM-12, GM-14, MW-11B, MW-91B, MW101B, and MW-102B) located downgradient of the explosives production area and within the Holston River floodplain were sampled in Spring 2014.

All unconsolidated and bedrock boundary wells were sampled for CAO Modification-listed target analytes (2,4-DNT; 2,6-DNT; 2,4,6-TNT; 2-amino-4,6-DNT; 4-amino-2,6-DNT; nitroglycerin; and RDX) (Table 4-8). Additionally, STMW-15 was analyzed for BTEX (Table 4-8).

RDX was detected at 1 of the 12 boundary wells sampled: STMW-15 at a concentration of 0.44J $\mu\text{g/L}$. The single RDX detection observed at the boundary well did not exceed the EPA RSL of 0.61 $\mu\text{g/L}$ or the CAO Modification-listed GWPS of 1,037 $\mu\text{g/L}$. The distribution of current and historical RDX detections in Area B is presented in Figure 4-7. No other target analyte explosives were detected in the boundary wells.

No BTEX compounds were detected at STMW-15 located at the active burn area associated with SWMU 50.

4.3 SURFACE WATER

The Spring 2014 sampling event included Holston River surface water sampling of three locations. Per Appendix F (Section III.B) of the CAO Modification that went into effect on January 24, 2013 (TDEC 2013), surface water samples were analyzed for target analytes as listed on Table G-3 of the CAO Modification (as provided in Appendix C). The CAO-listed target analytes are arsenic; total chromium; lead; mercury; bromacil; alpha- and gamma-chlordane; dieldrin; benzene; methylene chloride; bis(2-ethylhexyl)phthalate; dibenzofuran; fluorene; 2-methylnaphthalene; naphthalene; n-nitrosodiphenylamine; 2,4-DNT; 2,6-DNT; 2,4,6-TNT; 2-amino-4,6-DNT; 4-amino-2,6-DNT; nitroglycerin; and RDX (Figure 4-9). Per the CAO Modification, the surface water sample results were reported to TDEC within 45 days of receiving the laboratory reports. The following is a summary of the surface water sampling results as provided to TDEC on June, 24, 2014.

The first surface water sample location (SW-01) was located upstream of HSAAP and the IWTP discharge point. The purpose of the upstream location is to determine if any analyte detected at the sample locations downstream of HSAAP may be attributed to an upstream source. The second surface water sample location (SW-02) is approximately 2,000 ft downstream of the IWTP discharge location and upgradient of the RDX production area. The final surface water sample location (SW-03) is downstream of Area B and downstream of any potential groundwater discharge from Area B. Note that the grab surface water samples are intended to determine potential impact to surface water from groundwater. These samples are not representative of Holston surface water. Surface water sample SW-02 is likely too close to the IWTP to allow for proper mixing. The TDEC-required methodology of collecting a cross-sectional mixed surface water sample would be needed to characterize the surface water.



Table 4-8. Target Analyte Concentrations at Area B Production and Shop Area – Boundary Wells – 2014

Location	Well Classification	Station	Monitoring Frequency	Sample ID	Date Collected	Sample Type	Media	Target Analyte	Unit	GWPS ^a	Screening Criteria ^a (MCL/RSL)	Source	Area B Production and Shop Area – Boundary Wells																
													Boundary	Boundary	Boundary	Boundary	Boundary	Boundary	Boundary	Boundary	Boundary	Boundary	Boundary	Boundary	Boundary	Boundary	Boundary	Boundary	
													GM-12	GM-14	MW-011	MW-011B	MW-91	MW-91B	MW-101	MW-101B	MW-101B	MW-102	MW-102B	MW-S1A	STMW-15	STMW-15			
													Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual		
													CGWMW-G12-0745-GW	CGWMW-G14-0746-GW	CGWMW-011-0737-GW	CGWMW-011B-0738-GW	CGWMW-091-0742-GW	CGWMW-091B-0743-GW	CGWMW-101-0735-GW	CGWMW-101B-0736-GW	CGWMW-101B-0760-QA	CGWMW-102-0739-GW	CGWMW-102B-0740-GW	CGWMW-S1A-0741-GW	CGWMW-S15-0744-GW	CGWMW-S15-0760-QA			
													04/16/14	04/12/14	04/12/14	04/12/14	04/13/14	04/13/14	04/08/14	04/08/14	04/08/14	04/12/14	04/12/14	04/12/14	04/12/14	04/16/14	04/16/14		
													Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Field Duplicate	Grab	Grab	Grab	Grab	Grab	Field Duplicate		
													Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater		
Explosives																													
2,4-Dinitrotoluene	µg/L	340	0.2	RSL	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	--	
2,6-Dinitrotoluene	µg/L	25,500	15	RSL	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	--
2,4,6-Trinitrotoluene	µg/L	3,740	2.2	RSL	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	--
2-Amino-4,6-Dinitrotoluene	µg/L	51,000	30	RSL	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	--
4-Amino-2,6-Dinitrotoluene	µg/L	51,000	30	RSL	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	--
Nitroglycerin	µg/L	2,550	1.5	RSL	0.51 U	0.52 UJ	0.52 U	0.51 U	0.51 U	0.51 U	0.51 U	0.51 U	0.51 U	0.51 U	0.51 U	0.51 U	0.51 U	0.51 U	0.51 U	0.51 U	0.51 U	0.51 U	0.51 U	0.51 U	0.51 U	0.51 U	0.51 U	0.51 U	--
RDX	µg/L	1,037	0.61	RSL	0.051 U	0.052 UJ	0.052 UJ	0.051 UJ	0.051 UJ	0.051 UJ	0.051 UJ	0.051 UJ	0.051 UJ	0.051 UJ	0.051 UJ	0.051 UJ	0.051 UJ	0.051 UJ	0.051 UJ	0.051 UJ	0.051 UJ	0.051 UJ	0.051 UJ	0.051 UJ	0.051 UJ	0.051 UJ	0.44 J	--	
BTEX^b																													
Benzene	µg/L	NA	5	MCL	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.2 U	0.2 U	
Ethylbenzene	µg/L	NA	700	MCL	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.2 U	0.2 U	
Toluene	µg/L	NA	1,000	MCL	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.4 U	0.4 U	
m+p-Xylene	µg/L	NA	10,000	MCL	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.8 U	0.8 U	
o-Xylene	µg/L	NA	10,000	MCL	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.4 U	0.4 U	
Total Xylenes	µg/L	NA	10,000	MCL	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.2 U	1.2 U	

^aGWPSs and screening criteria (MCLs and U.S. Environmental Protection Agency [EPA] RSLs for tap water) for target analytes in boundary wells are provided in Table G-3 of the Corrective Action Order Modification dated January 24, 2013.

^bNo GWPSs were developed for ethylbenzene, toluene, or xylenes in Table G-3 of the Corrective Action Order Modification dated January 24, 2013. In addition, no screening criteria are provided. Screening criteria used are the MCLs (January 2015 version).

-- = Not sampled for this analyte.

BTEX = Benzene, toluene, ethylbenzene, and xylenes.

GWPS = Groundwater protection standard.

ID = Identifier.

J = Concentration is an estimated value.

µg/L = Micrograms per liter.

MCL = Safe drinking water primary maximum contaminant level.

NA = Not applicable; screening criteria (EPA RSLs or MCLs) are not established for this compound.

RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine.

RSL = EPA regional screening level.

U or UJ = Analyte not detected.



Table 4-9. Target Analyte Surface Water Detections

Location	Station	Monitoring Frequency	Sample ID	Date Collected	Sample Type	Media	Target Analyte	Unit	Lowest Water Quality Criteria ^a	Source of Water Quality Criteria	Upgradient of Area B		Downgradient of Discharge			Downgradient of Area B	
											SW-01	SW-01	SW-02	SW-02	SW-02	SW-03	SW-03
											Annual	Annual	Annual	Annual	Annual	Annual	Annual
											CSWSW-001-0711-SW	CSWSW-001-0752-SW	CSWSW-002-0712-SW	CSWSW-002-0712-SW	CSWSW-002-0753-SW	CSWSW-003-0713-SW	CSWSW-003-0754-SW
											10/24/13	04/14/14	10/24/13	10/24/13	04/14/14	10/24/13	04/14/14
											Grab	Grab	Grab	Field Duplicate	Grab	Grab	Grab
											Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Metals																	
Arsenic								µg/L	10	MCL	2.7 J	2.9 U	2.1 J	--	3.2 U	3.1 J	3 U
Chromium, total								µg/L	11	TN – Fish and Aquatic Life – Continuous	16 J	0.71 J	16 J	--	1 J	16 J	1 J
Lead								µg/L	2.5	TN – Fish and Aquatic Life – Continuous	0.3 U	0.37 J	0.3 U	--	0.78 J	0.3 U	0.57 J
Mercury, elemental								µg/L	0.05	TN – Recreational Uses – Water and Organism	0.075 U	0.028 J	0.075 U	--	0.033 J	0.075 U	0.08 U
Pesticides																	
Bromacil								µg/L	70	EPA Lifetime Health Advisory	0.45 U	1.9 UJ	0.48 U	0.45 U	1.9 UJ	0.45 U	0.68 J
Chlordane, alpha ^b								µg/L	0.0043	TN – Fish and Aquatic Life - Continuous	0.038 U	0.02 U	0.039 U	0.038 U	0.02 U	0.038 U	0.019 U
Chlordane, gamma ^b								µg/L	0.0043	TN – Fish and Aquatic Life - Continuous	0.038 U	0.02 U	0.039 U	0.038 U	0.02 U	0.038 U	0.019 U
Dieldrin								µg/L	0.00052	TN – Recreational Uses – Water and Organism	0.038 U	0.02 U	0.039 U	0.038 U	0.02 U	0.038 U	0.019 U
VOCs																	
Benzene								µg/L	5	MCL	0.2 U	0.2 U	0.2 U	--	0.2 U	0.2 U	0.2 U
Methylene chloride								µg/L	5	MCL	0.3 UJ	0.8 UJ	0.3 UJ	--	0.8 UJ	0.3 UJ	0.8 UJ
SVOCs																	
Bis(2-ethylhexyl)phthalate								µg/L	6	MCL	2 U	0.97 U	2 U	--	1 U	1.9 U	0.99 U
Dibenzofuran								µg/L	5.8	RSL	0.15 U	0.97 U	0.15 U	--	1 U	0.15 U	0.99 U
Fluorene								µg/L	220	RSL	0.051 U	0.019 U	0.049 U	--	0.02 U	0.049 U	0.02 U
2-Methylnaphthalene								µg/L	27	RSL	0.031 U	0.0096 U	0.029 U	--	0.0098 U	0.029 U	0.01 U
Naphthalene								µg/L	0.14	RSL	0.041 U	0.0096 U	0.039 U	--	0.0098 U	0.039 U	0.01 U
N-Nitrosodiphenylamine								µg/L	10	RSL	0.26 U	0.97 U	0.25 U	--	1 U	0.24 U	0.99 U
Explosives																	
2,4-Dinitrotoluene								µg/L	0.2	RSL	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2,6-Dinitrotoluene								µg/L	15	RSL	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2,4,6-Trinitrotoluene								µg/L	2.2	RSL	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2-Amino-4,6-Dinitrotoluene								µg/L	30	RSL	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4-Amino-2,6-Dinitrotoluene								µg/L	30	RSL	0.1 U	0.1 U	0.1 U	0.1 U	0.17	0.1 U	0.1 U
Nitroglycerin								µg/L	1.5	RSL	0.52 U	0.52 U	0.52 U	0.51 U	0.51 U	0.52 U	0.52 U
RDX								µg/L	0.61	RSL	0.052 U	0.052 UJ	87	110	300	2.4	15

^a The lowest water quality criteria comes from Table G-3 of the CAO Modification dated January 24, 2013.
^b The lowest water quality criteria listed for alpha- and gamma-chlordane is for total chlordane.
Bold values indicate detected concentrations that exceeded the lowest water quality criteria.
 -- = Not sampled for this analyte.
 EPA = U.S. Environmental Protection Agency.
 ID = Identifier.
 J = Concentration is an estimated value.
 µg/L = Micrograms per liter.
 MCL = Safe drinking water primary maximum contaminant level.
 RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine.
 RSL = EPA regional screening level.
 SVOC = Semivolatile organic compound.
 TN = Tennessee General Water Quality Criteria (TDEC 2011).
 U or UJ = Analyte not detected.
 VOC = Volatile organic compound.



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Three metals (chromium, lead, and mercury), one pesticide (bromacil), and two explosives (4-amino-2,6-DNT and RDX) listed as target analytes on Table G-3 of the CAO Modification were detected in surface water samples collected in April 2014 (Table 4-9). Of these target analytes, only RDX detections exceeded the lowest water quality criteria listed on Table G-3 of the CAO Modification. None of the other target analytes listed on Table G-3 of the CAO Modification were detected in the three surface water samples during the Spring 2014 sampling event.

Total chromium was detected in all three surface water samples at concentrations of 0.71J $\mu\text{g/L}$ at SW-01, 1.0J $\mu\text{g/L}$ at SW-02, and 1.0J $\mu\text{g/L}$ at SW-03. Total chromium results were qualified as estimated (J) because the detected concentrations were below the level of quantitation (LOQ). None of the total chromium detections exceed the lowest water quality criterion of 11 $\mu\text{g/L}$ (i.e., Tennessee General Water Quality Criteria for Fish and Aquatic Life – Continuous), as identified on Table G-3 of the CAO Modification.

Lead was detected in all three surface water samples at concentrations of 0.37J $\mu\text{g/L}$ at SW-01, 0.78J $\mu\text{g/L}$ at SW-02, and 0.57J $\mu\text{g/L}$ at SW-03. Lead results were qualified as estimated (J) because the detected concentrations were below the LOQ. None of the lead detections exceed the lowest water quality criterion of 2.5 $\mu\text{g/L}$ (i.e., Tennessee General Water Quality Criteria for Fish and Aquatic Life – Continuous), as identified on Table G-3 of the CAO Modification.

Mercury was detected in two of three surface water samples at concentrations of 0.028J $\mu\text{g/L}$ at SW-01 and 0.033J $\mu\text{g/L}$ at SW-02. Mercury results were qualified as estimated (J) because the detected concentration was below the LOQ. None of the mercury detections exceed the lowest water quality criterion of 0.05 $\mu\text{g/L}$ (i.e., Tennessee General Water Quality Criteria for Recreational Uses – Water and Organism), as identified on Table G-3 of the CAO Modification.

Bromacil was detected in surface water sample SW-03 at a concentration of 0.68J $\mu\text{g/L}$. Bromacil was not detected in surface water samples from SW-01 and SW-02. Bromacil results were qualified as estimated (J) because of low MS recovery and a continuing calibration percent difference outside of acceptance criteria. The single bromacil detection does not exceed the lowest water quality criterion of 70 $\mu\text{g/L}$ (i.e., EPA LHA), as identified on Table G-3 of the CAO Modification.

The explosive 4-amino-2,6-DNT was detected in surface water sample SW-02 at a concentration of 0.17 $\mu\text{g/L}$. 4-Amino-2,6-DNT was not detected in surface water samples from SW-01 and SW-03. The single 4-amino-2,6-DNT detection does not exceed the lowest water quality criterion of 30 $\mu\text{g/L}$ (i.e., EPA RSL), as identified on Table G-3 of the CAO Modification.

RDX was not detected in the Holston River at upgradient surface water sample location SW-01. Downgradient of the IWTP discharge point (surface water sample location SW-02), RDX was detected at a concentration of 300 $\mu\text{g/L}$. At the location downgradient of HSAAP (SW-03), RDX was detected at a concentration of 15 $\mu\text{g/L}$. While the RDX concentrations at SW-02 and SW-03 exceed the lowest water quality criterion of 0.61 $\mu\text{g/L}$ (the EPA RSL) listed in Table G-3 of the CAO Modification, the downstream concentration (SW-03) is 20 times lower than the concentration downgradient of the IWTP discharge (SW-02). Therefore, there is no evidence that groundwater discharge from Area B is contributing to the elevated RDX concentrations reported in the Holston River but, rather, they are the result of upstream permitted HSAAP discharges. Further evidence to support this conclusion is that RDX was detected below the lowest water quality criterion (0.61 $\mu\text{g/L}$) in all boundary wells along the Holston River, except at MW-68 (RDX concentration of 14 $\mu\text{g/L}$ in Spring 2014 and 84 $\mu\text{g/L}$ in Fall 2014); however, RDX concentrations in MW-68 are below the CAO Modification-listed GWPS (1,037 $\mu\text{g/L}$). MW-68 is located approximately 3.5 miles downstream of surface water location SW-02 and approximately 1 mile upstream of surface water location SW-03. Statistical trend analysis (i.e., Mann Kendall U-Test) of the MW-68 RDX data set indicates no significant trend (increasing or decreasing) at either the 80% or 90% confidence level.



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Because RDX concentrations in groundwater at MW-68 are not increasing, there is no indication that there will be future impacts to the Holston River as a result of groundwater discharge in the vicinity of MW-68. No trend analyses have been conducted for the other boundary wells due to the limited number of RDX detections. Note that the grab surface water samples are intended to determine potential impact to surface water from groundwater. These samples are not representative of Holston surface water. Surface water sample SW-02 is likely too close to the IWTP to allow for proper mixing. The TDEC-required methodology of collecting a cross-sectional mixed surface water sample would be needed to characterize the surface water.

Results of the surface water sampling indicate that there is no impact to the Holston River water quality as a result of groundwater discharge. Due to limited data, statistical analysis of surface water concentration trends cannot be conducted at this time; however, a comparison of the Fall 2013 and the Spring 2014 surface water sample results is provided in Table 4-9. The next round of surface water sampling will be conducted in the Fall of 2015 in accordance with the CAO Modification that went into effect on January 24, 2013.

4.4 CONCLUSIONS FOR 2014 LONG-TERM MONITORING

The following is a summary of the 2014 LTM sampling events.

- Area A – SWMU 96: Four boundary wells at Area A – SWMU 96 (MW-104, MW-105, MW-106, and MW-107) were sampled in Spring and Fall 2014 for CAO Modification-listed target analytes, including benzene, methylene chloride, and naphthalene. The following is a summary of those results:
 - None of the target analytes were detected in Area A – SWMU 96 boundary monitoring wells during either the Spring or Fall 2014 LTM events. None of the target analytes in these wells have been detected above screening criteria for over 3 years.
- Area B Landfill Area – SWMUs 19/29: Interior source area monitoring well MW-48; boundary monitoring wells MW-114, MW-115, and MW-116; and upgradient monitoring well MW-55 were sampled for CAO Modification-listed target analytes (arsenic, lead, bis[2-ethylhexyl]phthalate, dibenzofuran, fluorene, 2-methylnaphthalene, naphthalene, and n-nitrosodiphenylamine) during both the Spring and Fall 2014 sampling events. MW-55 also was sampled for total chromium. The following is a summary of those results:
 - During the Spring 2014 sampling event, target analytes arsenic, 2-methylnaphthalene, bis(2-ethylhexyl)phthalate, dibenzofuran, and naphthalene were detected at interior source area monitoring well MW-48 above screening criteria. In Fall 2014, bis(2-ethylhexyl)phthalate and dibenzofuran were detected above screening criteria in MW-48.
 - In boundary monitoring well MW-115, bis(2-ethylhexyl)phthalate was the only target analyte detected above screening criteria during the Spring 2014 sampling event; however, it was not detected at concentration above GWPSs. No target analytes were detected in MW-115 above screening criteria or GWPSs during the Fall 2014 sampling event.
 - No target analytes were detected in boundary wells MW-114 or MW-116 or upgradient well MW-55 above screening criteria (MCLs or RSLs) or GWPSs during either LTM sampling event.



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- Area B Landfill Area – SWMU 20: Boundary monitoring well MW-68 was sampled for CAO Modification-listed target analytes (arsenic, total chromium, and RDX) during both the Spring and Fall 2014 sampling events. In addition, MW-68 was sampled for RDX degradation parameters (DNX, MNX, and TNX). The following is a summary of those results:
 - Target analytes arsenic and total chromium were not detected in MW-68 above screening criteria or GWPSs. Neither of these metals has been detected above screening criteria for over 3 years.
 - The explosive RDX was detected in both 2014 sampling events at MW-68 at concentrations of 14 µg/L and 84J µg/L in the spring and fall, respectively. Although both RDX detections exceeded the EPA RSL (0.61 µg/L), none of the detections exceeded the GWPS of 1,037 µg/L. Statistical trend analysis (Mann Kendall U-Test) of the MW-68 RDX data set indicates no significant trend at either the 80% or 90% confidence level and demonstrates that the RDX concentrations at MW-68 exhibit a high degree of event-to-event variability.
 - MNX is the only primary RDX degradation parameter detected in MW-68 during the Spring 2014 sampling event. The occurrence of these compounds is positive evidence of active anaerobic microbial transformation processes.
- Area B Production and Shop Area – SWMU 18: One interior/source well (MW-70) at SWMU 18 was sampled in Spring 2014 for the CAO Modification-listed target analyte mercury. The following is a summary of those results:
 - Mercury was detected at 2.0 µg/L, the same concentration as the MCL. Statistical trend analysis (Mann-Kendall U-Test) of the MW-70 mercury data between 2000 and 2014 indicates a statistically significant declining trend at the 90% confidence level.
- Area B Production and Shop Area – SWMUs 77/78/86/87 and SWMU 88 (Pesticides Areas): Two interior/source area wells at SWMUs 77/78/86/87 (MW-73 and MW-75) and one interior/source area well at SWMU 88 (MW-86) were sampled in Spring 2014 for CAO Modification-listed target analytes, including dieldrin, alpha- and gamma-chlordane, and bromacil. The following is a summary of those results:
 - Dieldrin was detected above its EPA RSL (0.0015 µg/L) at MW-73 at a concentration of 0.58 µg/L and at MW-75 at a concentration of 0.091 µg/L. Dieldrin was not detected in MW-86 during the Spring 2014 sampling event.
 - Total chlordane was detected at MW-75 at a concentration of 0.49J µg/L and in MW-73 at a concentration of 0.246 µg/L. The 2014 total chlordane results for these wells are below the MCL of 2 µg/L. Total chlordane was not detected in MW-86 during the Spring 2014 sampling event.
 - Bromacil was detected in MW-86 at a concentration of 38J µg/L, which is less than the EPA LHA of 70 µg/L. The Spring 2014 sampling event represents the fifth year that the bromacil results in MW-86 are below screening criteria. In Spring 2014, bromacil was detected in MW-75 at a concentration (0.52J µg/L) below the LHA and was not detected in monitoring well MW-73. This is the first time since 2006 that bromacil was analyzed in MW-73 and MW-75.



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- Area B Production and Shop Area – Explosives Production Area: Groundwater well MW-99 within the explosives production area was sampled in Spring 2014 for CAO Modification-listed target analytes (2,4-DNT; 2,6-DNT; 2,4,6-TNT; 2-amino-4,6-DNT; 4-amino-2,6-DNT; nitroglycerin; and RDX) and RDX first-stage degradation products (TNX, DNX, and MNX). The following is a summary of those results:
 - RDX was detected at a concentration of 670J $\mu\text{g/L}$, which exceeds the EPA RSL (0.61 $\mu\text{g/L}$). This is consistent with historical data for this well. Statistical trend analysis (Mann Kendall U Test) of the MW-99 RDX data set currently indicates no significant trend at either the 80% or 90% confidence level; however, concentrations of RDX in MW-99 have been decreasing since April 2008, which may be due, in part, to demolition of Building H8 and associated soil excavation.
 - With the exception of RDX, none of the CAO Modification-listed target analyte explosives were detected above screening criteria.
 - All three of the nitroso degradation intermediates of RDX were detected in MW-99 during the 2014 LTM event: DNX at a concentration of 1J $\mu\text{g/L}$, MNX at a concentration of 4.5 $\mu\text{g/L}$, and TNX at a concentration of 0.56 $\mu\text{g/L}$. The occurrence of these compounds is positive evidence of active anaerobic microbial transformation processes.
- Area B Production and Shop Area – Boundary Wells: All unconsolidated and bedrock boundary wells were sampled for CAO Modification-listed target analytes (2,4-DNT; 2,6-DNT; 2,4,6-TNT; 2-amino-4,6-DNT; 4-amino-2,6-DNT; nitroglycerin; and RDX) during the Spring 2014 sampling event. In addition, one boundary monitoring well downgradient of SWMU 50 (STMW-15) also was sampled for BTEX. The following is a summary of those results:
 - No target analyte explosives, including RDX, were detected in boundary wells above screening criteria.
 - No BTEX compounds were detected in STMW-15.
- Holston River Surface Water: Surface water samples were analyzed for all CAO Modification-listed target analytes (arsenic; total chromium; lead; mercury; dieldrin; alpha- and gamma-chlordane; bromacil; benzene; methylene chloride; bis[2-ethylhexyl]phthalate; dibenzofuran; fluorene; 2-methylnaphthalene; naphthalene; n-nitrosodiphenylamine; 2,4-DNT; 2,6-DNT; 2,4,6-TNT; 2-amino-4,6-DNT; 4-amino-2,6-DNT; nitroglycerin; and RDX). The following is a summary of the 2014 LTM results:
 - RDX was not detected in the Holston River at upgradient surface water sample location SW-01. Downgradient of the IWTP discharge point (surface water sample location SW-02), RDX was detected at a concentration of 300 $\mu\text{g/L}$. At the location downgradient of HSAAP (SW-03), RDX was detected at a concentration of 15 $\mu\text{g/L}$. While the RDX concentrations at SW-02 and SW-03 exceed the lowest water quality criterion of 0.61 $\mu\text{g/L}$ (the EPA RSL), the downstream concentration (SW-03) is 20 times lower than the concentration downgradient of the IWTP discharge (SW-02). Therefore, there is no evidence that groundwater discharge from Area B is contributing to the elevated RDX concentrations reported in the Holston River but, rather, they are the result of upstream permitted HSAAP discharges. Note that the grab surface water samples are intended to determine potential impact to surface water from groundwater. These samples are not representative of Holston surface water. Surface water sample SW-02 is likely too close to the IWTP to allow for proper mixing. The TDEC-required methodology of collecting a cross-sectional mixed surface water sample would be needed to characterize the surface water.



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- No other target analytes were detected in surface water above screening criteria.
- Results of the surface water sampling indicate that there is no impact to the Holston River water quality as a result of groundwater discharge.

Due to limited data, statistical analysis of surface water concentration trends cannot be conducted at this time; however, a comparison of the Fall 2013 and the Spring 2014 surface water sample results is provided in Table 4-9.



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5.0 2014 LONG-TERM OPERATIONS

5.1 LANDFILL CAP INSPECTIONS

The following landfills/coal tar sites (Figure 5-1) were inspected as part of the Fiscal Year 2014 LTO activities at HSAAP:

- SWMU 4, Coal Tar Tanks behind Building 8 (Figure 5-2) is the location of two above-ground coal tar tanks used to store coal tar for use as supplemental fuel in the Area A Building 8 boilers. The tanks and contaminated soil were removed in 1996. The contaminated soil and coal tar could not be completely removed due to adjacent buildings/structures and underground utilities.
- SWMU 14, Coal Tar Landfill 1 (Figure 5-3) was used to dispose of coal tar generated from the coal gasification plant and fly ash/cinders generated in the Area A and Area B boilers. The approximately 3-acre unit was closed in 1983, when it was capped with 2 ft of clay and a vegetative cover. Riprap was placed along the slope on the river side to control erosion.
- SWMU 18, Closed Sanitary Landfill (Figure 5-4) was used to dispose of empty pesticide containers, asbestos waste, fluorescent tubes, laboratory breakage (glass), light bulbs, cafeteria waste, oils, and cleaning agents. Wastes were disposed of by the trench method. The approximately 7-acre unit is capped with 2 ft of clay and is grass covered. TDEC acknowledged closure of the unit in May 1986.
- SWMUs 19/29, Construction Debris Landfill and Former Sedimentation Pond (Figure 5-5) comprise approximately 2 acres. SWMU 29 was the stormwater runoff sedimentation pond for the sanitary landfill (SWMU 17). SWMU 19, used for the disposal of uncontaminated construction debris, was built on top of SWMU 29. SWMU 19 was capped with clay and a vegetative cover.
- SWMU 20, Rock Quarry Landfill (Figure 5-6) was used for the disposal of demolition debris in the 1940s. This unit, an approximately 5-acre former rock quarry, was reportedly filled with 30 to 50 ft of waste material and capped with a 2-ft layer of clay and a vegetative cover. The unit was closed in 1983.
- SWMU 26, World War II (WWII) Coal Tar Site (Figure 5-7), an approximately 6-acre unit, was used to dispose of approximately 175 cubic yards (yd³) of coal tar during WWII. Coal tar was dumped down the railroad embankment and covered with clay and railroad ballast.
- SWMU 96, Producer Gas Building and Coal Tar Liquor Storage Tanks (Figure 5-8) was part of the Area A coal gas production area. The unit was closed in 1997. The Decanters and the Exhauster Building were demolished in 2004. Contaminated soil and coal tar were excavated at that time. The area was backfilled and a clay cap was installed. The area is approximately 110 ft long by 75 ft wide.
- SWMU 103, Coal Tar Site and Ditch at Gas Producer Building (Figure 5-9) is located along the north bank of the South Fork of the Holston River south of SWMU 4. It consists of a ditch that originally extended from the rear of Building 8 to the river. Currently, there is no visual evidence of the ditch with the exception of a culvert pipe located at the top of the riverbank. Coal tar was removed from the riverbank area in 2005. Two small areas of dense inert coal tar remain because it was impractical to remove the material. This area was inspected for the presence of coal tar only.

HSAAP completed landfill cap and Land Use Control Implementation Plan (LUCIP) inspections at following sites in the spring (May and June) and the fall (October, November, and December) of 2014:

- SWMU 3 – Catch Basins
- SWMU 24 – Building 200 Coal Tar and Fly Ash Landfill



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- SWMU 25 – Area B Tar Burial Site
- SWMU 27 – Sedimentation Pond for Coal Pile
- SWMU 37 – Nitric Acid Spill Pond
- SWMUs 38/39 – Fly Ash Landfill/Sodium Nitrate Ponds
- SWMU 44 – Former Burning Pads
- SWMU 47 – Burning Piles
- SWMU 56 – Existing Coal Pile
- AOC-N – Hydraulic Fluid Leak, G-2 Pump House at Building 404

5.1.1 Findings of the Landfill Cap Inspections

Landfill cap inspections were completed by Bay West in April and October 2014. All inspections included examining the caps for signs of settlement, sagging, fissures, erosion channels/gullies, and other damage. The vegetative covers were inspected for signs of deterioration or dead areas. Drainage controls, such as ditches, culverts, and outfall structures, where present, were examined to ensure they were intact and functioning. Fences, gates, and other structures were inspected for signs of damage. Signs were checked for legibility. The coal tar areas (SWMUs 4, 14, 26, 96, and 103) were inspected for signs of surficial coal tar seepage. Prior to the Spring and Fall 2014 inspections, all SWMU areas, with the exception of SWMU 20 in the fall, had been mowed to facilitate the inspection process.

The inspections included land use control inspections. The land use control inspections are performed to monitor the effectiveness of HSAAP's LUCIP. The inspections consisted of a visual examination of each area for signs of soil disturbance to confirm that no unauthorized excavation had taken place.

The inspection findings were documented on the Landfill Cap/Cover Inspection Report Form. The inspection reports are contained in Appendix D.1 and D.2. The inspection findings are summarized below:

- SWMU 4 – The sign is in good repair, accurate, and legible. There are no gates or fences associated with this SWMU. Small pieces of coal tar (2 to 5 centimeters [cm] in diameter) were observed at the north and east sides in the spring and at the east side in the fall. The LUCIP inspections did not indicate any evidence of unauthorized cap disturbance or excavation during either inspection.
- SWMU 14 – The sign is in good repair, accurate, and legible. The fence and gate are in acceptable condition. No erosion, excavation, or coal tar was observed during either inspection. The LUCIP inspections did not indicate any evidence of unauthorized cap disturbance or excavation.
- SWMU 18 – The sign is in good repair, accurate, and legible. There are no gates or fences associated with this SWMU. No settlement or erosion was observed during either inspection. The LUCIP inspections did not indicate any evidence of unauthorized cap disturbance or excavation.
- SWMUs 19/29 – The sign is in good repair, accurate, and legible. No fences or gates are associated with this SWMU. Pieces of asphalt were observed on the north and eastern sides of the landfill in the spring. The LUCIP inspections did not indicate any evidence of unauthorized excavation.



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- SWMU 20 – The sign is in good repair, accurate, and legible. No fences or gates are associated with this SWMU. The landfill had not been mown at the time of the fall inspection nor was it mown during a follow-up inspection completed by HSAAP on December 16, 2014. The following conditions were observed during the spring inspection:
 - The sinkhole repaired in 2013 had reopened.
 - Construction debris (roofing tar/asphalt, fibrous material, and metal sheeting) was noted on the east side of the landfill; the material appeared to have sloughed off the wall.
 - Area of bare soil and deep ruts near MW-68B.
 - Areas of bare vegetation were observed along the road to MW-68.

No repairs or issues were observed during the fall inspections. The LUCIP inspections did not indicate any evidence of unauthorized excavation.

- SWMU 26 – The sign is in good repair, accurate, and legible. There are no fences or gates associated with this SWMU. No coal tar was observed during either inspection. Bare areas were noted east of the road during both inspections. The LUCIP inspections did not indicate any evidence of unauthorized cap disturbance or excavation.
- SWMU 96 – The sign is in good repair, accurate, and legible. No gates or fences are associated with this SWMU. The area is covered with gravel with no vegetation. Small pieces (2 to 5 cm in diameter) of coal tar were observed during both inspections. Fence posts, other metal debris, and plastic debris were present on the SWMU during the fall inspection. There was a pile of soil and rocks present on the west side of the SWMU. While the spring LUCIP inspection did not indicate any evidence of unauthorized cap disturbance or excavation, there was a disturbed area present on the west side of the SWMU in the fall. HSAAP personnel indicated that a water line had been repaired. The HSAAP Environmental Manager was notified.
- SWMU 103 – The sign is in good repair, accurate, and legible. The fence associated with this SWMU also is in good repair. The riprap drainage ditch was observed to be in good condition during the April and October inspections. Small pieces of coal tar (2 to 7 cm) were near the property fence during both inspections. The LUCIP inspections did not indicate any evidence of unauthorized cap disturbance or excavation.

LUCIP inspections were performed in April and October at SWMUs 77/78/86/87 (Pesticide Areas near Building 148; see Figure 5-10) and SWMU 88 (WWII Pesticide Washdown Area; see Figure 5-11). The LUCIP inspections at these areas did not indicate any evidence of excavation or disturbance.

The inspections completed by HSAAP used the same inspection criteria as described above. The HSAAP Landfill Cap/Cover Inspection Report Forms can be found in Appendix D.3 and D.4.

5.2 LONG-TERM OPERATIONS MAINTENANCE ACTIVITIES

Landfill maintenance activities were completed in April, June, and October 2014. These activities included removal of coal tar at SWMUs 4, 96, and 103; sinkhole repairs at SWMU 20; re-vegetation at SWMUs 20 and 26; and removal of asphalt debris at SWMUs 19/29. Debris was removed from SWMU 96 in October. The repairs are discussed below.



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5.2.1 Coal Tar Removal

Coal tar was removed from SWMU 4 (spring – 0.5 gal; fall – 0.5 gal), SWMU 96 (spring – 0.5 gal; fall – 0.5 gal), and SWMU 103 (spring – 0.25 gal; fall – 0.1 gal). The coal tar was picked up, placed in garbage bags, and stored in a 55-gal drum located in Building 141. The drum was labeled with a non-hazardous waste label.

5.2.2 Sinkhole Repair/Debris Removal

The sinkhole at SWMU 20 was repaired in April. The hole was filled with approximately 30 gal of gravel. Clay from the on-site borrow pit was used to form the 2-ft-thick clay cap. Topsoil, seed, and straw were then placed over the area.

Asphalt debris at SWMUs 19/29 that could be picked up by hand was removed in April. The debris was placed in a landfill refuse receptacle.

In October, Bay West removed the metal and plastic debris and HSAAP removed the fence posts and soil/rock pile at SWMU 96.

5.2.3 Landscaping Repairs

Approximately 8 yd³ of topsoil was placed on the bare area near MW-68 at SWMU 20 in June. The area was re-seeded and straw was spread over the area. A silt fence was installed downgradient of the area to prevent silt from entering the outfall. The other bare areas at SWMUs 20 and 26 were repaired in April using seed and straw. A bare area was repaired at SWMU 26 in October using seed and straw.

5.3 MONITORING WELL MAINTENANCE AND ABANDONMENT

5.3.1 Monitoring Well Maintenance and Repairs

During the Spring and Fall inspection activities, the LTM wells were observed to be in good overall condition (Appendix A.4). However, during the Spring 2014 sampling event, one traffic bollard at monitoring well MW-68B had apparently been struck by a mower and knocked loose. The traffic bollard associated with MW-68B was repaired in June of 2014. In addition, monitoring wells where there were no observed weep holes during the Spring 2014 LTM event were re-inspected for weep holes in June of 2014. If no weep holes were observed, weep holes were installed.

5.3.2 Monitoring Well Plug and Abandonment

No monitoring wells were abandoned in 2014.



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6.0 RECOMMENDATIONS FOR 2014 SITE-WIDE LONG-TERM MONITORING/LONG-TERM OPERATIONS

The 2014 groundwater monitoring activities comprised the tenth year of the LTM/LTO Program. The 2014 activities also represented the sixth year of LTM/LTO as required by the approved Final Corrective Measures Report (Bay West and SAIC 2007c) and the second year of Holston River surface water sampling conducted under the LTM program per the CAO Modification dated January 24, 2013 (TDEC 2013). The 2014 monitoring focused on the following:

- Continued monitoring of contaminant trends and groundwater quality conditions (benzene, methylene chloride, and naphthalene) downgradient of Area A legacy sources.
- SVOC (bis[2-ethylhexyl]phthalate, dibenzofuran, fluorene, 2-methylnaphthalene, naphthalene, and n-nitrosodiphenylamine) and RCRA metals (arsenic and lead) concentration trends and monitoring for evidence of migration in wells downgradient of SWMUs 19/29 (wells MW-48, MW-114, MW-115, and MW-116) and background monitoring well MW-55.
- RDX, arsenic, and chromium concentration trends in boundary well MW-68, located at the downgradient boundary of SWMU 20.
- Evaluation of mercury concentration trends in well MW-70, located downgradient of SWMU 18.
- Monitoring of groundwater quality for chlordane, dieldrin, and bromacil following completed soil source removal actions at pesticide-contaminated areas (SWMU 88 and SWMUs 77/78/86/87).
- Evaluation of explosives concentration trends (e.g., 2,4-DNT; 2,6-DNT; 2,4,6-TNT; 2-amino-4,6-DNT; 4-amino-2,6-DNT; nitroglycerin; and RDX) in the Area B explosives production area (MW-99).
- Continued monitoring for evidence of target analyte (2,4-DNT; 2,6-DNT; 2,4,6-TNT; 2-amino-4,6-DNT; 4-amino-2,6-DNT; nitroglycerin; and RDX) contaminant migration at wells located along the downgradient boundary of the Area B production area.
- Evaluation of degradation and attenuation of RDX at specified monitoring locations.
- Monitoring for evidence of BTEX contaminant releases to groundwater at SWMU 50 (Burning Ground; boundary well STMW-15).
- Collecting Holston River surface water samples to monitor for potential impacts to the Holston River from groundwater discharge.

As described in Section 4.4, the 2014 sampling yielded sufficient data to assess the current groundwater conditions in the vicinity of the SWMUs and AOCs discussed above and showed that there is no evidence that groundwater discharge is impacting the Holston River.

The LTM/LTO Program includes inspections and maintenance activities associated with landfill caps, periodic coal tar removal, and the groundwater monitoring network. Eight landfill cap inspections and two LUCIP inspections were conducted in 2014 by Bay West and Leidos. In addition, HSAAP conducted landfill inspection and LUCIP inspections at 10 other sites. In 2014, coal tar removal was conducted at SWMUs 4, 96, and 103; sinkhole repairs were conducted at SWMU 20; debris removal was conducted at SWMUs 19/29; and landscaping repairs were conducted at SWMUs 20 and 26. Sinkholes were filled with gravel, clean clay, and topsoil until level with the ground surface, re-seeded, and covered with straw. One traffic bollard was repaired at monitoring well MW-68B, and weep holes were installed in the protective



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casing of any monitoring well identified not to have one during the Spring 2014 LTM event. No monitoring wells were abandoned in 2014.

LTM Recommendations

The following LTM recommendations are proposed:

- The 2015 LTM/LTO Program should continue as specified in the final remedy for AOC-GW, which is outlined in the Final Corrective Measures Report (Bay West and SAIC 2007c) and updated in the CAO Modification that went into effect on January 24, 2013. The 2015 LTM sampling schedule is presented in Table 6-1. Table 6-1 also provides recommended changes to the CAO-Modification for 2016 and additional future recommendations if certain conditions are met.
- Annual Holston River surface water monitoring at three locations: upgradient of Area B, downgradient of the IWTP discharge, and downgradient of Area B. Per the CAO Modification, Holston River surface water sampling will be conducted in Fall 2015.
- Semiannual inspections of monitoring wells included in the LTM/LTO Program.
- Monitoring well maintenance as needed, including replacement of any wear-and-tear items (e.g., dedicated tubing) where necessary.

LTO Recommendations

The following LTO recommendations are proposed for Fiscal Year 2015:

- Continue semiannual inspections of the eight landfills and coal tar sites.
- Continue LUCIP inspections of the 10 sites.
- Maintain the landfill components (e.g., caps, drainage controls, vegetative covers, and signs) as needed.
- Remove coal tar, as needed, at coal tar sites SWMUs 4, 14, 26, 96, and 103.

Both the LTM and LTO activities continue to protect human health and the environment by preventing exposure to contaminated materials. The groundwater LTM program is providing confirmation that contaminants are not migrating. The landfill inspections are identifying repairs needed to maintain the integrity of the caps. The land use control inspections are monitoring for unauthorized excavation at sites where waste remains in-place.



Table 6-1. HSAAP Spring and Fall 2015 LTM Sampling and Recommended Future CAO Modifications

Source Area	Source Unit	Sample Location	Sampling Frequency			Chemical Compound Class	Target Analyte	2016 CAO Modification Recommendations	Future CAO Modifications Recommendations					
			Semiannual (Spring and Fall)	Annual (Spring)	Biennial (Spring of even-numbered years)									
Area A	SWMU 96	MW-104	X			VOCs	Benzene	Revise sampling frequency to annual because these target analytes have not been detected above standards for more than 3 years. Monitoring cannot be eliminated because soil is likely in Area A above industrial standards	None anticipated at this time					
							Methylene chloride							
		SVOCs	Naphthalene											
		MW-105	X			VOCs	Benzene	Revise sampling frequency to annual because these target analytes have not been detected above standards for more than 3 years. Monitoring cannot be eliminated because soil is likely in Area A above industrial standards	None anticipated at this time					
							Methylene chloride							
		SVOCs	Naphthalene											
MW-106	X			VOCs	Benzene	Revise sampling frequency to annual because these target analytes have not been detected above standards for more than 3 years. Monitoring cannot be eliminated because soil is likely in Area A above industrial standards	None anticipated at this time							
					Methylene chloride									
SVOCs	Naphthalene													
MW-107	X			VOCs	Benzene	Revise sampling frequency to annual because these target analytes have not been detected above standards for more than 3 years. Monitoring cannot be eliminated because soil is likely in Area A above industrial standards	None anticipated at this time							
					Methylene chloride									
SVOCs	Naphthalene													
Area B Landfill Areas	Upgradient	MW-55			X	SVOCs	Bis(2-ethylhexyl)phthalate	None at this time	None anticipated at this time					
										Dibenzofuran				
										Fluorene				
												Eliminate fluorene monitoring because it has not been detected in downgradient wells above standards for more than 3 years. In addition, it has not been detected above standards in the upgradient well since 2005	--	
												2-Methylnaphthalene	None at this time	None anticipated at this time
											Naphthalene			
												n-Nitrosodiphenylamine	Eliminate n-nitrosodiphenylamine monitoring because it has not been detected in downgradient wells above standards for more than 3 years. In addition, it has not been detected above standards in the upgradient well since 2005	--
							Arsenic	None at this time	None anticipated at this time					
							Chromium (total)	Eliminate chromium monitoring because it has not been detected in downgradient wells above standards for more than 3 years. In addition, it has not been detected above standards in the upgradient well since 2005						
							Lead	Eliminate lead monitoring because it has not been detected in downgradient wells above standards for more than 3 years. In addition, it has not been detected above standards in the upgradient well since 2005		--				
	SWMUs 19/29	MW-48	X				SVOCs	Bis(2-ethylhexyl)phthalate	None at this time	None anticipated at this time				
									Dibenzofuran	None at this time	None anticipated at this time			
									Fluorene	Eliminate fluorene monitoring because it has not been detected above standards for more than 3 years	--			
									2-Methylnaphthalene	None at this time	None anticipated at this time			
								Naphthalene	None at this time	None anticipated at this time				
		n-Nitrosodiphenylamine	Eliminate n-nitrosodiphenylamine monitoring because it has not been detected above standards for more than 3 years	--										
							Arsenic	None at this time	None anticipated at this time					
						Lead	Eliminate lead monitoring because it has not been detected above standards for more than 3 years	--						
MW-114	X					SVOCs	Bis(2-ethylhexyl)phthalate	Eliminate monitoring because boundary well MW-115 is sufficient to monitor the SVOC source area and no target analytes has been detected in this monitoring well above screening criteria since 2005	--					
										Dibenzofuran				
										Fluorene				
										2-Methylnaphthalene				
										Naphthalene				
	n-Nitrosodiphenylamine													
						Arsenic								
						Lead								



Table 6-1. HSAAP Spring and Fall 2015 LTM Sampling and Recommended Future CAO Modifications (continued)

Source Area	Source Unit	Sample Location	Sampling Frequency			Chemical Compound Class	Target Analyte	2016 CAO Modification Recommendations	Future CAO Modifications Recommendations
			Semiannual (Spring and Fall)	Annual (Spring)	Biennial (Spring of even-numbered years)				
Area B Landfill Areas (continued)	SWMUs 19/29 (continued)	MW-115	X			SVOCs	Bis(2-ethylhexyl)phthalate	None at this time	None anticipated at this time
							Dibenzofuran	None at this time	None anticipated at this time
							Fluorene	Eliminate fluorene monitoring because it has not been detected above standards for more than 3 years	--
							2-Methylnaphthalene	None at this time	None anticipated at this time
							Naphthalene		
							n-Nitrosodiphenylamine	Eliminate n-nitrosodiphenylamine monitoring because it has not been detected above standards for more than 3 years	--
							Metals	Arsenic	None at this time
	Lead	Eliminate lead monitoring because it has not been detected above standards for more than 3 years	--						
	MW-116	X				SVOCs	Bis(2-ethylhexyl)phthalate	Eliminate monitoring because boundary well MW-115 is sufficient to monitor the SVOC source area and no target analytes has been detected in this monitoring well above screening criteria since 2005	--
							Dibenzofuran		
							Fluorene		
							2-Methylnaphthalene		
							Naphthalene		
							n-Nitrosodiphenylamine		
Metals							Arsenic		
Lead									
SWMU 20	MW-68	X			Explosives	RDX	None at this time	None anticipated at this time	
					RDX MNA ^a	DNX	None at this time. Note that these three constituents are not listed in Table G-3 of the CAO Modification; however, these constituents provide important information on degradation	None anticipated at this time	
						MNX			
						TNX			
					Metals	Arsenic	Eliminate arsenic monitoring because it has not been detected above standards for more than 3 years	--	
Chromium (total)	Eliminate total chromium monitoring because it has not been detected above standards for more than 3 years	--							
Area B Explosives Production and Shop Area	Boundary Wells	MW-101	X		Explosives	2,4-Dinitrotoluene	Eliminate 2,4-dinitrotoluene; 2,6-dinitrotoluene; 2,4,6-trinitrotoluene; 2-amino-4,6-dinitrotoluene; 4-amino-2,6-dinitrotoluene; and nitroglycerin monitoring because there have been three rounds of sampling with no screening criteria exceedances (2005 through 2007). These constituents also were not detected in 2014	--	
						2,6-Dinitrotoluene			
						2,4,6-Trinitrotoluene			
						2-Amino-4,6-dinitrotoluene			
						4-Amino-2,6-dinitrotoluene			
						Nitroglycerin			
						RDX			None at this time
	MW-101B	X			Explosives	2,4-Dinitrotoluene	None at this time	Eliminate 2,4-dinitrotoluene; 2,6-dinitrotoluene; 2,4,6-trinitrotoluene; 2-amino-4,6-dinitrotoluene; 4-amino-2,6-dinitrotoluene; and nitroglycerin monitoring after three biannual sampling events without exceedances	
						2,6-Dinitrotoluene			
						2,4,6-Trinitrotoluene			
						2-Amino-4,6-dinitrotoluene			
						4-Amino-2,6-dinitrotoluene			
						Nitroglycerin	None at this time	None anticipated at this time	
						RDX			
MW-11	X			Explosives	2,4-Dinitrotoluene	Eliminate 2,4-dinitrotoluene; 2,6-dinitrotoluene; 2,4,6-trinitrotoluene; 2-amino-4,6-dinitrotoluene; 4-amino-2,6-dinitrotoluene; and nitroglycerin monitoring because there have been three rounds of sampling with no screening criteria exceedances (2005 through 2007). These constituents also were not detected in 2014	--		
					2,6-Dinitrotoluene				
					2,4,6-Trinitrotoluene				
					2-Amino-4,6-dinitrotoluene				
					4-Amino-2,6-dinitrotoluene				
					Nitroglycerin				
					RDX			None at this time	None anticipated at this time



Table 6-1. HSAAP Spring and Fall 2015 LTM Sampling and Recommended Future CAO Modifications (continued)

Source Area	Source Unit	Sample Location	Sampling Frequency			Chemical Compound Class	Target Analyte	2016 CAO Modification Recommendations	Future CAO Modifications Recommendations	
			Semiannual (Spring and Fall)	Annual (Spring)	Biennial (Spring of even-numbered years)					
Area B Explosives Production and Shop Area (continued)	Boundary Wells (continued)	MW-11B			X	Explosives	2,4-Dinitrotoluene	None at this time	Eliminate 2,4-dinitrotoluene; 2,6-dinitrotoluene; 2,4,6-trinitrotoluene; 2-amino-4,6-dinitrotoluene; 4-amino-2,6-dinitrotoluene; and nitroglycerin monitoring after three biannual sampling events without exceedances	
							2,6-Dinitrotoluene			
							2,4,6-Trinitrotoluene			
							2-Amino-4,6-dinitrotoluene			
							4-Amino-2,6-dinitrotoluene			
							Nitroglycerin			
		RDX	None at this time	None anticipated at this time						
		MW-102		X			Explosives	2,4-Dinitrotoluene	Eliminate 2,4-dinitrotoluene; 2,6-dinitrotoluene; 2,4,6-trinitrotoluene; 2-amino-4,6-dinitrotoluene; 4-amino-2,6-dinitrotoluene; and nitroglycerin monitoring because there have been three rounds of sampling with no screening criteria exceedances (2005 through 2007). These constituents also were not detected in 2014	--
								2,6-Dinitrotoluene		
								2,4,6-Trinitrotoluene		
								2-Amino-4,6-dinitrotoluene		
								4-Amino-2,6-dinitrotoluene		
								Nitroglycerin		
		RDX	None at this time	None anticipated at this time						
		MW-102B				X	Explosives	2,4-Dinitrotoluene	None at this time	Eliminate 2,4-dinitrotoluene; 2,6-dinitrotoluene; 2,4,6-trinitrotoluene; 2-amino-4,6-dinitrotoluene; 4-amino-2,6-dinitrotoluene; and nitroglycerin monitoring after three biannual sampling events without exceedances
2,6-Dinitrotoluene										
2,4,6-Trinitrotoluene										
2-Amino-4,6-dinitrotoluene										
4-Amino-2,6-dinitrotoluene										
Nitroglycerin										
RDX	None at this time	None anticipated at this time								



Table 6-1. HSAAP Spring and Fall 2015 LTM Sampling and Recommended Future CAO Modifications (continued)

Source Area	Source Unit	Sample Location	Sampling Frequency			Chemical Compound Class	Target Analyte	2016 CAO Modification Recommendations	Future CAO Modifications Recommendations	
			Semiannual (Spring and Fall)	Annual (Spring)	Biennial (Spring of even-numbered years)					
Area B Explosives Production and Shop Area (continued)	Boundary Wells (continued)	MW-S1A		X		Explosives	2,4-Dinitrotoluene	Eliminate 2,4-dinitrotoluene; 2,6-dinitrotoluene; 2,4,6-trinitrotoluene; 2-amino-4,6-dinitrotoluene; 4-amino-2,6-dinitrotoluene; and nitroglycerin monitoring because there have been three rounds of sampling with no screening criteria exceedances (2005 through 2007). These constituents also were not detected in 2014	--	
							2,6-Dinitrotoluene			
							2,4,6-Trinitrotoluene			
							2-Amino-4,6-dinitrotoluene			
							4-Amino-2,6-dinitrotoluene			
							Nitroglycerin			
		RDX	None at this time	None anticipated at this time						
		MW-91		X			Explosives	2,4-Dinitrotoluene	Eliminate 2,4-dinitrotoluene; 2,6-dinitrotoluene; 2,4,6-trinitrotoluene; 2-amino-4,6-dinitrotoluene; 4-amino-2,6-dinitrotoluene; and nitroglycerin monitoring because there have been three rounds of sampling with no screening criteria exceedances (2005 through 2007). These constituents also were not detected in 2014	--
								2,6-Dinitrotoluene		
								2,4,6-Trinitrotoluene		
								2-Amino-4,6-dinitrotoluene		
								4-Amino-2,6-dinitrotoluene		
Nitroglycerin										
RDX	None at this time	None anticipated at this time								
MW-91B				X	Explosives	2,4-Dinitrotoluene	None at this time	Eliminate 2,4-dinitrotoluene; 2,6-dinitrotoluene; 2,4,6-trinitrotoluene; 2-amino-4,6-dinitrotoluene; 4-amino-2,6-dinitrotoluene; and nitroglycerin monitoring after three biannual sampling events without exceedances		
						2,6-Dinitrotoluene				
						2,4,6-Trinitrotoluene				
						2-Amino-4,6-dinitrotoluene				
						4-Amino-2,6-dinitrotoluene				
						Nitroglycerin				
RDX	None at this time	None anticipated at this time								



Table 6-1. HSAAP Spring and Fall 2015 LTM Sampling and Recommended Future CAO Modifications (continued)

Source Area	Source Unit	Sample Location	Sampling Frequency			Chemical Compound Class	Target Analyte	2016 CAO Modification Recommendations	Future CAO Modifications Recommendations	
			Semiannual (Spring and Fall)	Annual (Spring)	Biennial (Spring of even-numbered years)					
Area B Explosives Production and Shop Area (continued)	Boundary Wells (continued)	STMW-15		X		Explosives	2,4-Dinitrotoluene	Eliminate 2,4-dinitrotoluene; 2,6-dinitrotoluene; 2,4,6-trinitrotoluene; 2-amino-4,6-dinitrotoluene; 4-amino-2,6-dinitrotoluene; and nitroglycerin monitoring because there have been three rounds of sampling with no screening criteria exceedances (2005 through 2007). These constituents also were not detected in 2014	--	
							2,6-Dinitrotoluene			
							2,4,6-Trinitrotoluene			
							2-Amino-4,6-dinitrotoluene			
							4-Amino-2,6-dinitrotoluene			
							Nitroglycerin			
		RDX	None at this time	None anticipated at this time						
		BTEX					BTEX	Benzene	None at this time. Note that monitoring well STMW-15 is downgradient of the burning ground and has always been analyzed for BTEX on an annual basis since 2008	None anticipated at this time
								Toluene		
								Ethylbenzene		
		Xylenes								
		GM-12					Explosives	2,4-Dinitrotoluene	None at this time	Eliminate 2,4-dinitrotoluene; 2,6-dinitrotoluene; 2,4,6-trinitrotoluene; 2-amino-4,6-dinitrotoluene; 4-amino-2,6-dinitrotoluene; and nitroglycerin monitoring after three biennial sampling events without exceedances
								2,6-Dinitrotoluene		
								2,4,6-Trinitrotoluene		
								2-Amino-4,6-dinitrotoluene		
4-Amino-2,6-dinitrotoluene										
Nitroglycerin										
RDX	None at this time	None anticipated at this time								
GM-14					Explosives	2,4-Dinitrotoluene	Eliminate 2,4-dinitrotoluene; 2,6-dinitrotoluene; 2,4,6-trinitrotoluene; 2-amino-4,6-dinitrotoluene; 4-amino-2,6-dinitrotoluene; and nitroglycerin monitoring because there have been three rounds of sampling with no screening criteria exceedances (2005 through 2007). These constituents also were not detected in 2014	--		
						2,6-Dinitrotoluene				
						2,4,6-Trinitrotoluene				
						2-Amino-4,6-dinitrotoluene				
						4-Amino-2,6-dinitrotoluene				
						Nitroglycerin				
RDX	None at this time	None anticipated at this time								



Table 6-1. HSAAP Spring and Fall 2015 LTM Sampling and Recommended Future CAO Modifications (continued)

Source Area	Source Unit	Sample Location	Sampling Frequency			Chemical Compound Class	Target Analyte	2016 CAO Modification Recommendations	Future CAO Modifications Recommendations
			Semiannual (Spring and Fall)	Annual (Spring)	Biennial (Spring of even-numbered years)				
Area B Explosives Production and Shop Area (continued)	Explosives Production Area	MW-99		X		Explosives	2,4-Dinitrotoluene	Eliminate 2,4-dinitrotoluene; 2,6-dinitrotoluene; 2,4,6-trinitrotoluene; 2-amino-4,6-dinitrotoluene; 4-amino-2,6-dinitrotoluene; and nitroglycerin monitoring because there have been three rounds of sampling with no screening criteria exceedances (2005 through 2007). These constituents also were not detected in 2014	--
							2,6-Dinitrotoluene		
							2,4,6-Trinitrotoluene		
							2-Amino-4,6-dinitrotoluene		
							4-Amino-2,6-dinitrotoluene		
							Nitroglycerin		
	RDX	None at this time	None anticipated at this time						
	RDX MNA ^a	DNX	None at this time. Note that these three constituents are not listed in Table G-3 of the CAO Modification; however, these constituents provide important information on degradation	None anticipated at this time					
		MNX							
		TNX							
	SWMU 18	MW-70		X		Metals	Mercury	None at this time	Eliminate mercury monitoring once there are 3 years of data below standards
SWMUs 77/78/86/87	MW-73		X		Pesticides	alpha-Chlordane	Eliminate chlordane monitoring because it has not been detected above standards for more than 3 years. However, it is important to note that the concentrations of chlordane have generally been increasing since 2013	--	
						gamma-Chlordane			
						Dieldrin			None at this time
	MW-75		X		Pesticides	Bromacil	None at this time	Eliminate bromacil monitoring once there are 3 years of data below standards	
						alpha-Chlordane	Eliminate chlordane monitoring because it has not been detected above standards for more than 3 years. However, it is important to note that the concentrations of chlordane have generally been increasing since 2013	--	
						gamma-Chlordane			
Dieldrin	None at this time	None anticipated at this time							
Bromacil	None at this time	Eliminate bromacil monitoring once there are 3 years of data below standards							



Table 6-1. HSAAP Spring and Fall 2015 LTM Sampling and Recommended Future CAO Modifications (continued)

Source Area	Source Unit	Sample Location	Sampling Frequency			Chemical Compound Class	Target Analyte	2016 CAO Modification Recommendations	Future CAO Modifications Recommendations
			Semiannual (Spring and Fall)	Annual (Spring)	Biennial (Spring of even-numbered years)				
Area B Explosives Production and Shop Area (continued)	SWMU 88	MW-86		X	Pesticides	alpha-Chlordane	None at this time	Eliminate chlordane and dieldrin monitoring once there are 3 years of data below standards	
						gamma-Chlordane	None at this time		
						Dieldrin	None at this time		
						Bromacil	Eliminate bromacil monitoring because it has not been detected above standards for more than 3 years and displays a stable or decreasing trend		
Holston River	Upgradient of Area B	SW-01 ^d		X	VOCs	Benzene	Eliminate fluorene, n-nitrosodiphenylamine, total chromium, and lead monitoring in surface water because they will no longer be target analytes for groundwater	It is anticipated that bromacil; chlordane; mercury; 2,4-dinitrotoluene; 2,6-dinitrotoluene; 2,4,6-trinitrotoluene; 2-amino-4,6-dinitrotoluene; 4-amino-2,6-dinitrotoluene; and nitroglycerin will be eliminated from surface water sampling when they are eliminated as target analytes for groundwater	
					SVOCs	Methylene chloride			
						Bis(2-ethylhexyl)phthalate			
						Dibenzofuran			
						Fluorene			
						2-Methylnaphthalene			
						Naphthalene			
					Metals	n-Nitrosodiphenylamine			
						Arsenic			
						Chromium (total)			
						Lead			
					Pesticides	Mercury			
						alpha-Chlordane			
						gamma-Chlordane			
						Dieldrin			
					Explosives	Bromacil			
						2,4-Dinitrotoluene			
						2,6-Dinitrotoluene			
						2,4,6-Trinitrotoluene			
						2-Amino-4,6-dinitrotoluene			
4-Amino-2,6-dinitrotoluene									
Nitroglycerin									
RDX									



Table 6-1. HSAAP Spring and Fall 2015 LTM Sampling and Recommended Future CAO Modifications (continued)

Source Area	Source Unit	Sample Location	Sampling Frequency			Chemical Compound Class	Target Analyte	2016 CAO Modification Recommendations	Future CAO Modifications Recommendations
			Semiannua I (Spring and Fall)	Annual (Spring)	Biennial (Spring of even-numbered years)				
Holston River (continued)	Downgradient of the IWTP Discharge at Area B	SW-02 ^d		X		VOCs	Benzene	Eliminate fluorene, n-nitrosodiphenylamine, total chromium, and lead monitoring in surface water because they will no longer be target analytes for groundwater	It is anticipated that bromacil; chlordane; mercury; 2,4-dinitrotoluene; 2,6-dinitrotoluene; 2,4,6-trinitrotoluene; 2-amino-4,6-dinitrotoluene; 4-amino-2,6-dinitrotoluene; and nitroglycerin will be eliminated from surface water sampling when they are eliminated as target analytes for groundwater
							Methylene chloride		
						SVOCs	Bis(2-ethylhexyl)phthalate		
							Dibenzofuran		
							Fluorene		
							2-Methylnaphthalene		
							Naphthalene		
						Metals	n-Nitrosodiphenylamine		
							Arsenic		
							Chromium (total)		
							Lead		
						Pesticides	Mercury		
							alpha-Chlordane		
							gamma-Chlordane		
							Dieldrin		
						Explosives	Bromacil		
							2,4-Dinitrotoluene		
2,6-Dinitrotoluene									
2,4,6-Trinitrotoluene									
2-Amino-4,6-dinitrotoluene									
4-Amino-2,6-dinitrotoluene									
Nitroglycerin									
	RDX								



Table 6-1. HSAAP Spring and Fall 2015 LTM Sampling and Recommended Future CAO Modifications (continued)

Source Area	Source Unit	Sample Location	Sampling Frequency			Chemical Compound Class	Target Analyte	2016 CAO Modification Recommendations	Future CAO Modifications Recommendations
			Semiannual (Spring and Fall)	Annual (Spring)	Biennial (Spring of even-numbered years)				
Holston River (continued)	Downgradient of Area B	SW-03 ^d		X		VOCs	Benzene	Eliminate fluorene, n-nitrosodiphenylamine, total chromium, and lead monitoring in surface water because they will no longer be target analytes for groundwater	It is anticipated that bromacil; chlordane; mercury; 2,4-dinitrotoluene; 2,6-dinitrotoluene; 2,4,6-trinitrotoluene; 2-amino-4,6-dinitrotoluene; 4-amino-2,6-dinitrotoluene; and nitroglycerin will be eliminated from surface water sampling when they are eliminated as target analytes for groundwater
							Methylene chloride		
						SVOCs	Bis(2-ethylhexyl)phthalate		
							Dibenzofuran		
							Fluorene		
							2-Methylnaphthalene		
							Naphthalene		
						Metals	n-Nitrosodiphenylamine		
							Arsenic		
							Chromium (total)		
							Lead		
						Pesticides	Mercury		
							alpha-Chlordane		
							gamma-Chlordane		
							Dieldrin		
						Explosives	Bromacil		
							2,4-Dinitrotoluene		
2,6-Dinitrotoluene									
2,4,6-Trinitrotoluene									
2-Amino-4,6-dinitrotoluene									
4-Amino-2,6-dinitrotoluene									
	Nitroglycerin								
	RDX								

^a MNA analysis performed on an annual basis at this well (spring event only).

BTEX = Benzene, toluene, ethylbenzene, and xylenes.

CAO = Corrective Action Order.

DNX = Hexahydro-1,3-dinitroso-5-nitro-1,3,5-triazine.

HSAAP = Holston Army Ammunition Plant.

IWTP = Industrial wastewater treatment plant.

LTM = Long-term monitoring.

MNA = Monitored natural attenuation (RDX degradation intermediates: hexahydro-1,3-dinitroso-5-nitro-1,3,5-triazine; hexahydro-1-nitroso-3,5-dinitro-1,3,5-triazine; and hexahydro-1,3,5-trinitroso-1,3,5-triazine, annual spring event only).

MNX = Hexahydro-1-nitroso-3,5-dinitro-1,3,5-triazine.

RDX = Hexahydro-1,3,5-trinitroso-1,3,5-triazine.

SVOC = Semivolatile organic compound.

SWMU = Solid waste management unit.

TNX = Hexahydro-1,3,5-trinitroso-1,3,5-triazine.

VOC = Volatile organic compound.



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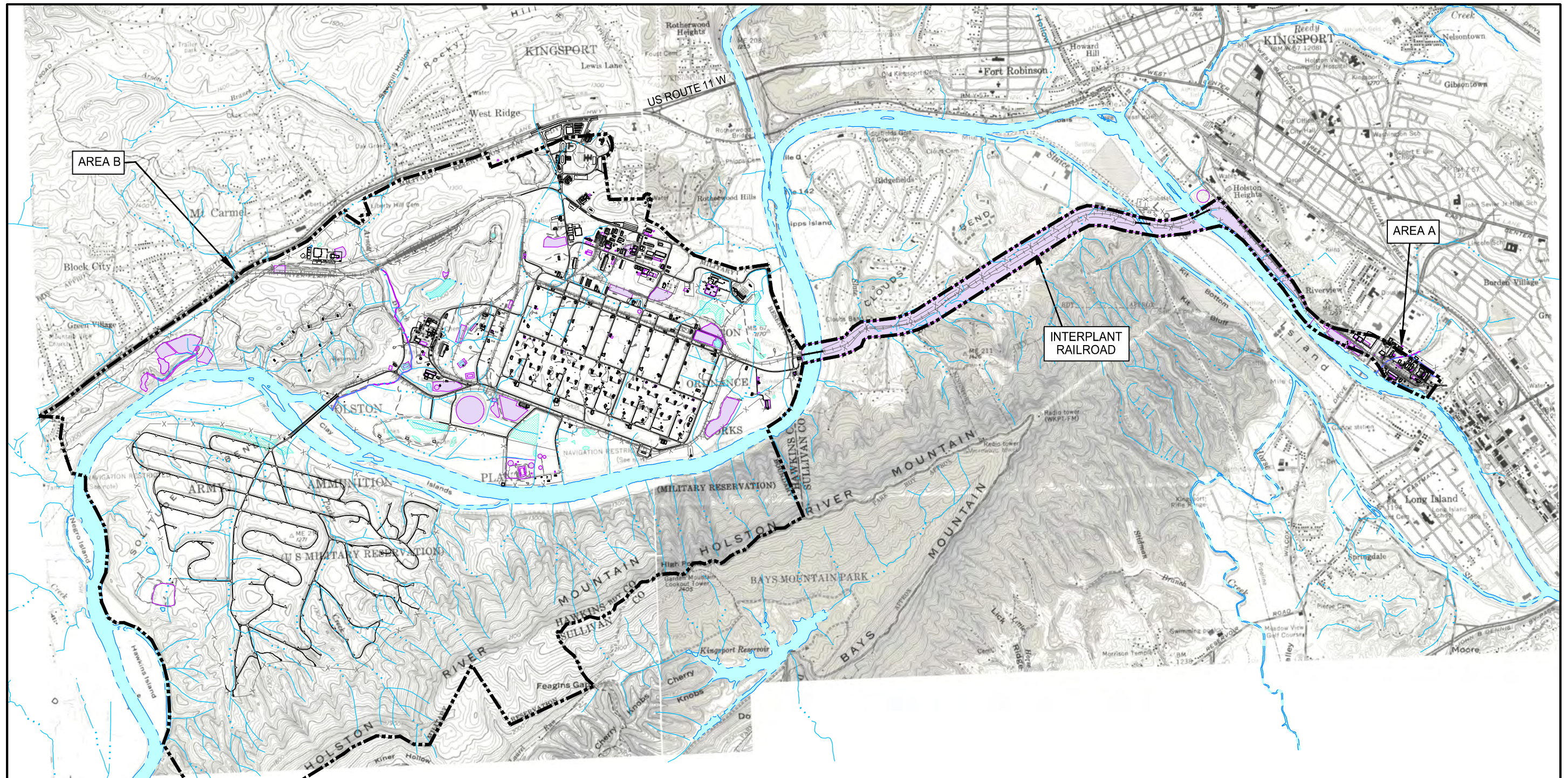
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FIGURES



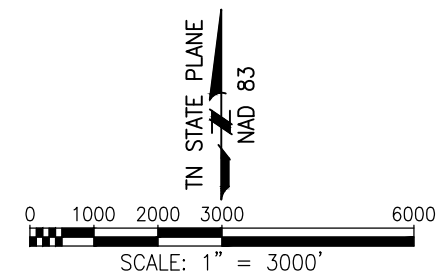
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	BUILDING
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	GRAVEL ROAD
	RAILROAD TRACKS
	FENCE LINE
	STREAM
	GROUND CONTOUR (100 FT. INT.)
	GROUND CONTOUR (20 FT. INT.)
	HSAAP SITE BOUNDARY

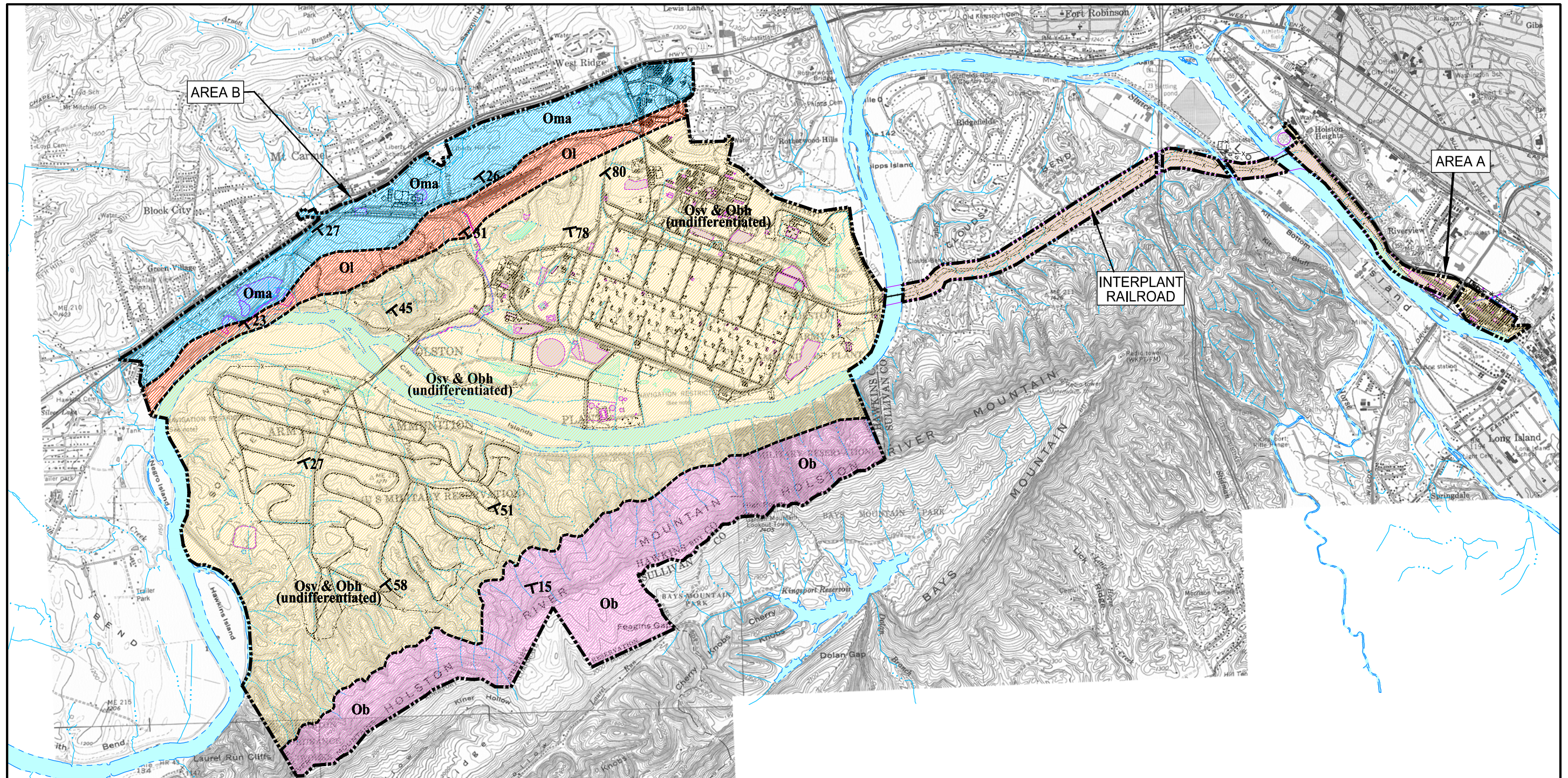


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FPRI ENVIRONMENTAL
REMEDATION SERVICES

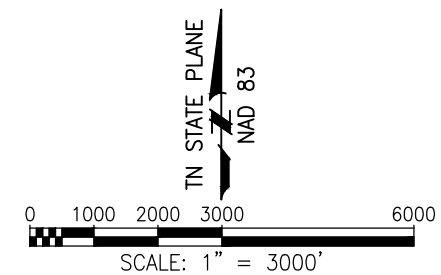

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Figure 2-1. Holston Army Ammunition Plant Site Map



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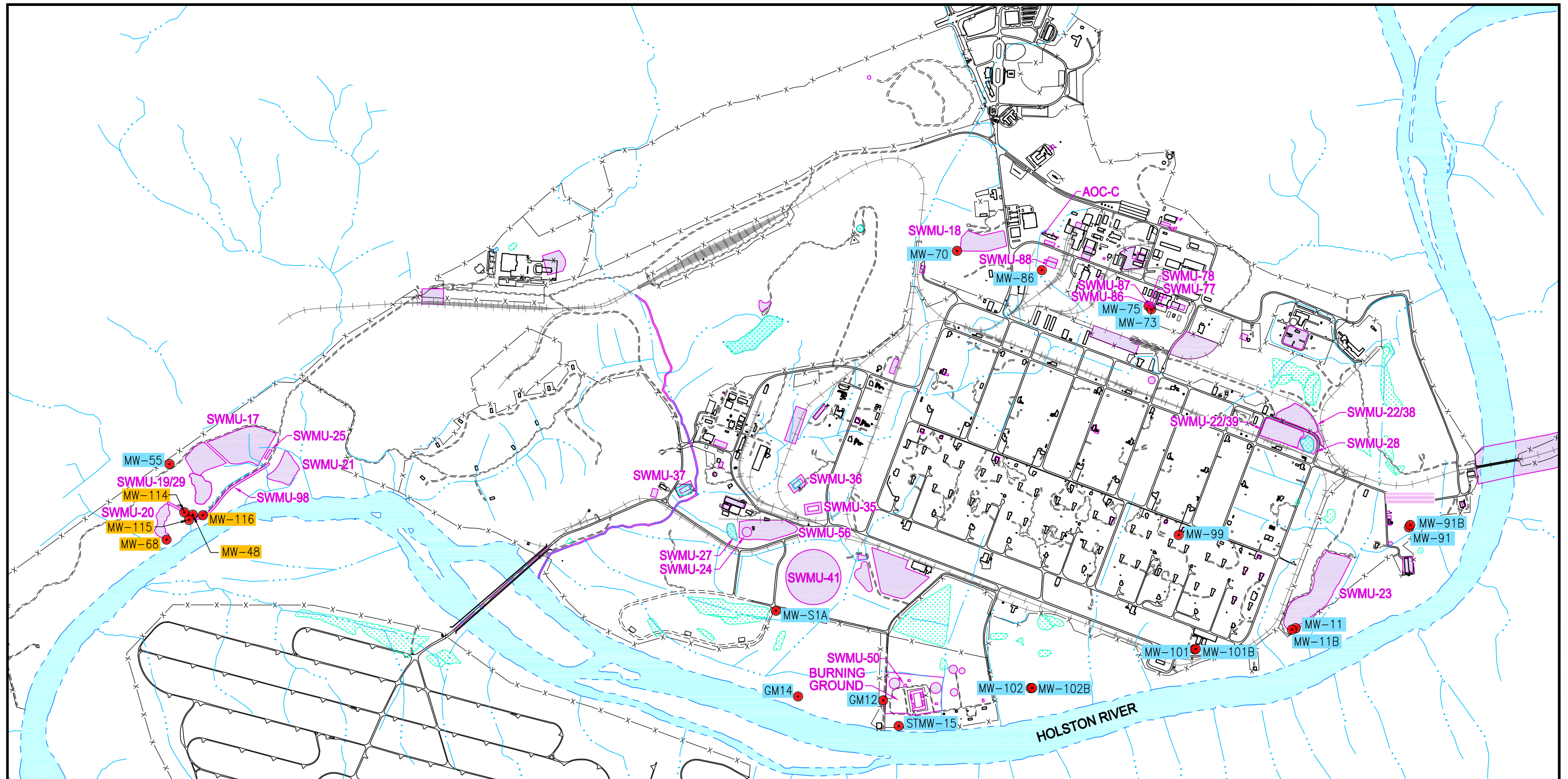
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SEVIER SHALE & BLOCKHOUSE SHALE
LENOIR LIMESTONE
MASCOT DOLOMITE
STRIKE AND DIP OF BEDS

**HOLSTON ARMY AMMUNITION PLANT
FPRI ENVIRONMENTAL
REMEDATION SERVICES**

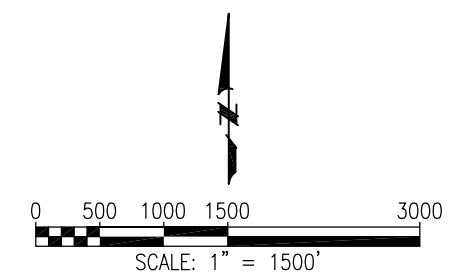

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Figure 2-2. Holston Army Ammunition Plant Bedrock Geology Map



LEGEND:

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RIVER, PONDS, RESERVOIRS
 INTERPLANT RAILROAD
 PROTECTIVE FENCELINE
LTM MONITORING WELL
 SOLID WASTE MANAGEMENT UNIT
 SAMPLED SPRING AND FALL 2014
 SAMPLED SPRING 2014 ONLY

**HOLSTON ARMY AMMUNITION PLANT
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REMEDIAL SERVICES**

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Figure 3-1. Holston Army Ammunition Plant Area B Fiscal Year 2014 Long-Term Monitoring Locations

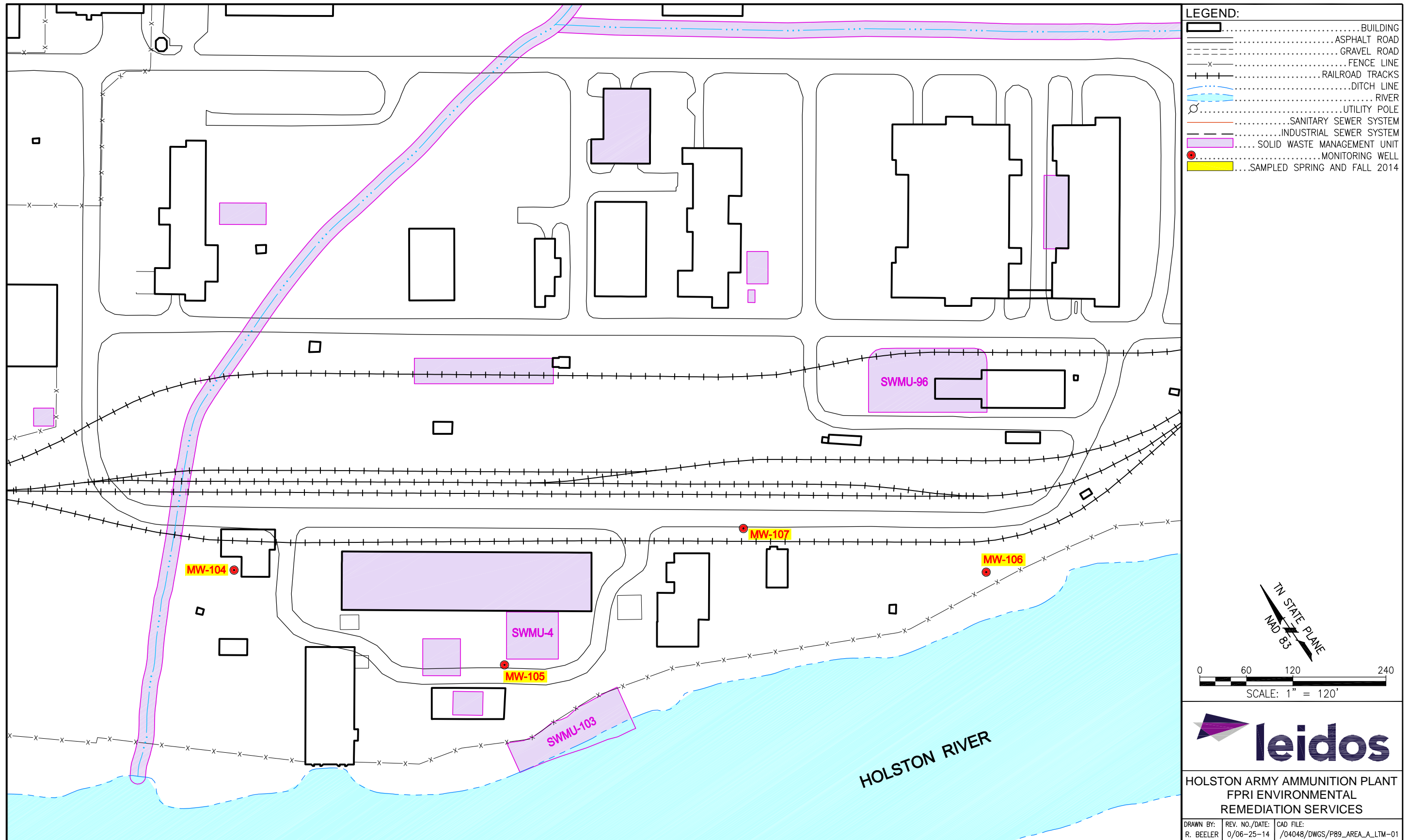


Figure 3-2. Holston Army Ammunition Plant Area A Fiscal Year 2014 Long-Term Monitoring Locations



Figure 3-3. Holston River Surface Water Sample Locations – Fall 2014

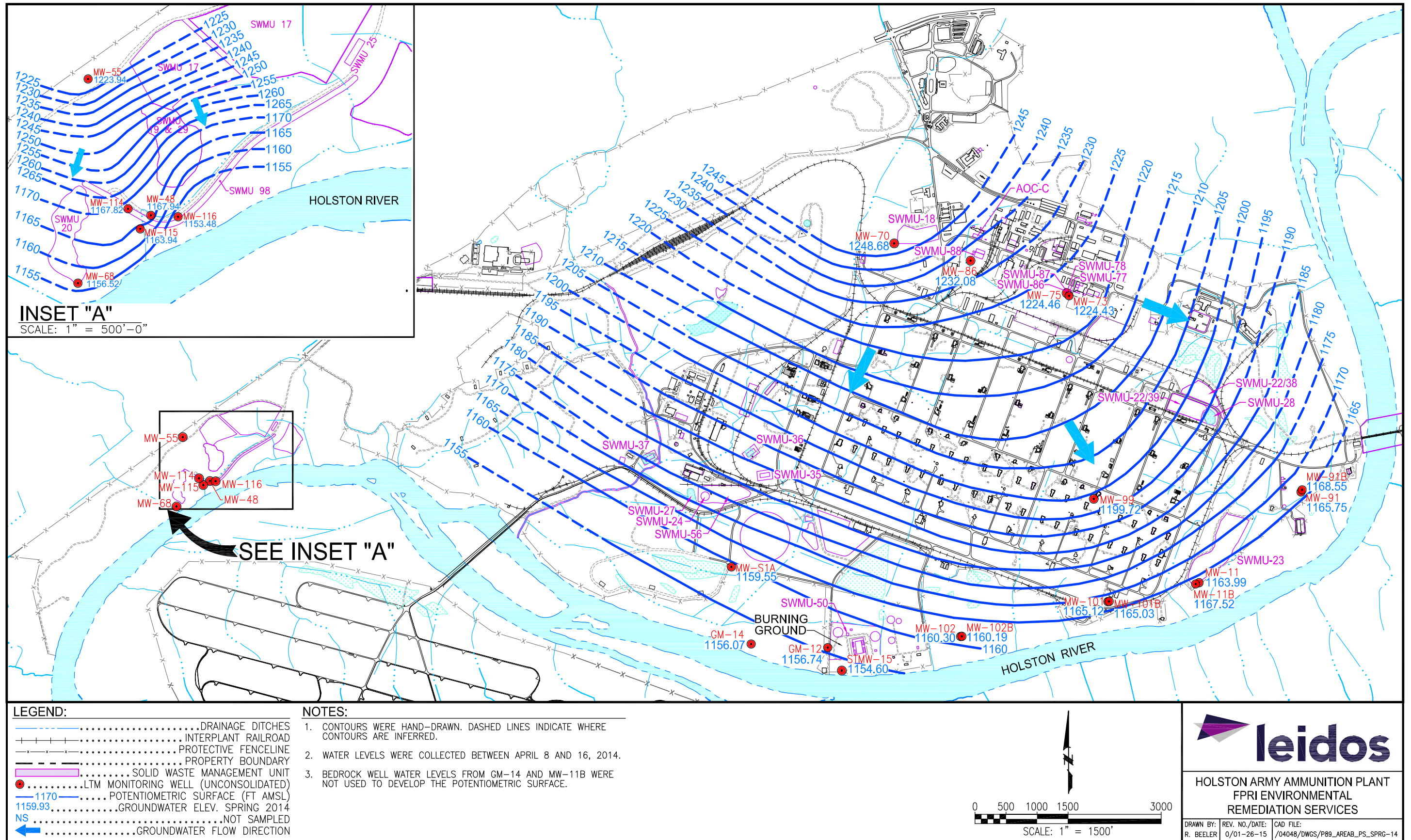
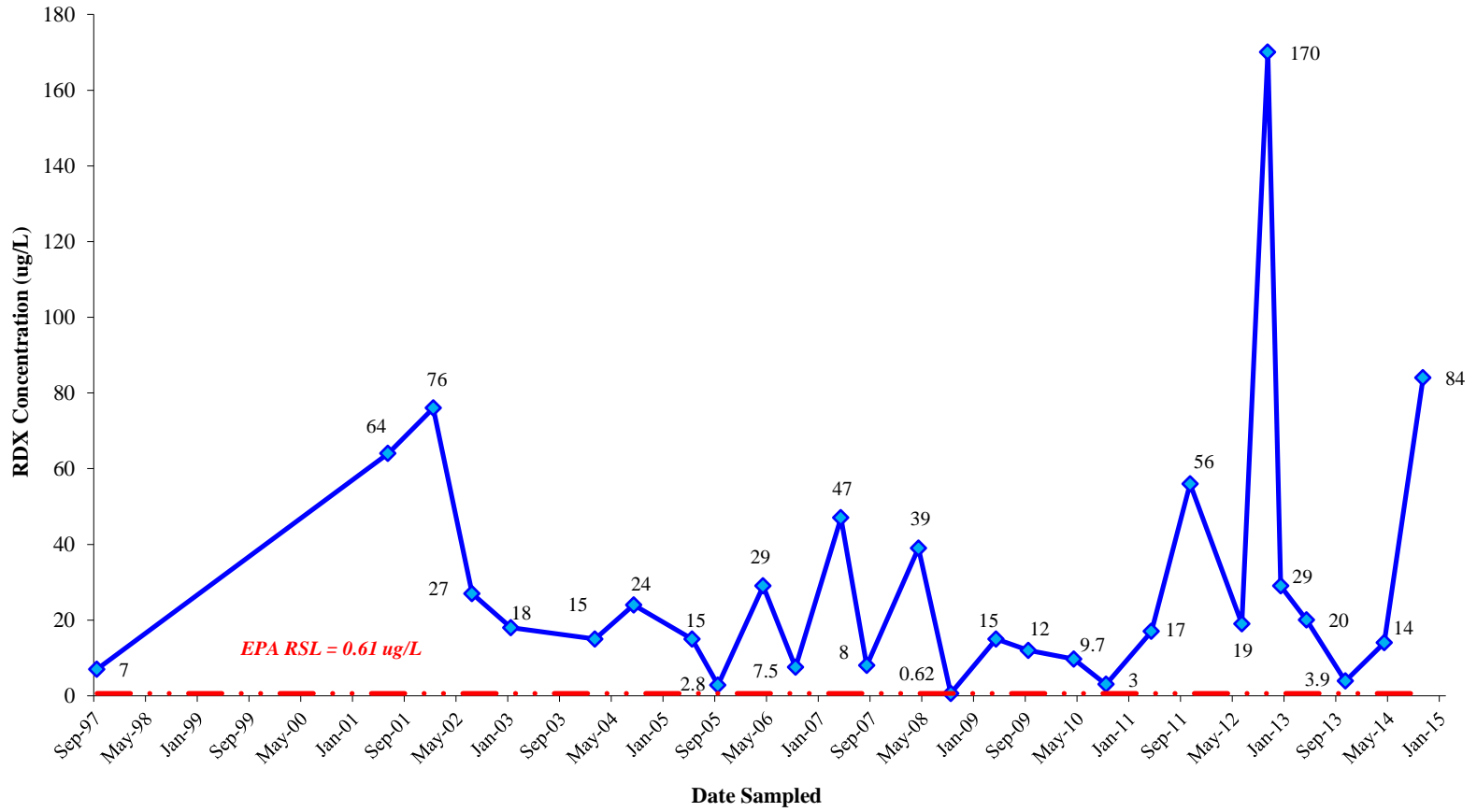


Figure 4-1. Potentiometric Map for Area B of the Holston Army Ammunition Plant, Spring 2014

Figure 4-2. RDX Concentration Trend in MW-68 at SWMU 20, 1997 - 2014



Note: The RDX MCL is not available; the RSL is 0.61 µg/L, and the CAO-listed GWPS is 1,037 µg/L.

Figure 4-3. Mercury Concentration Trend in MW-70 at SWMU 18, 2000 – 2014

70

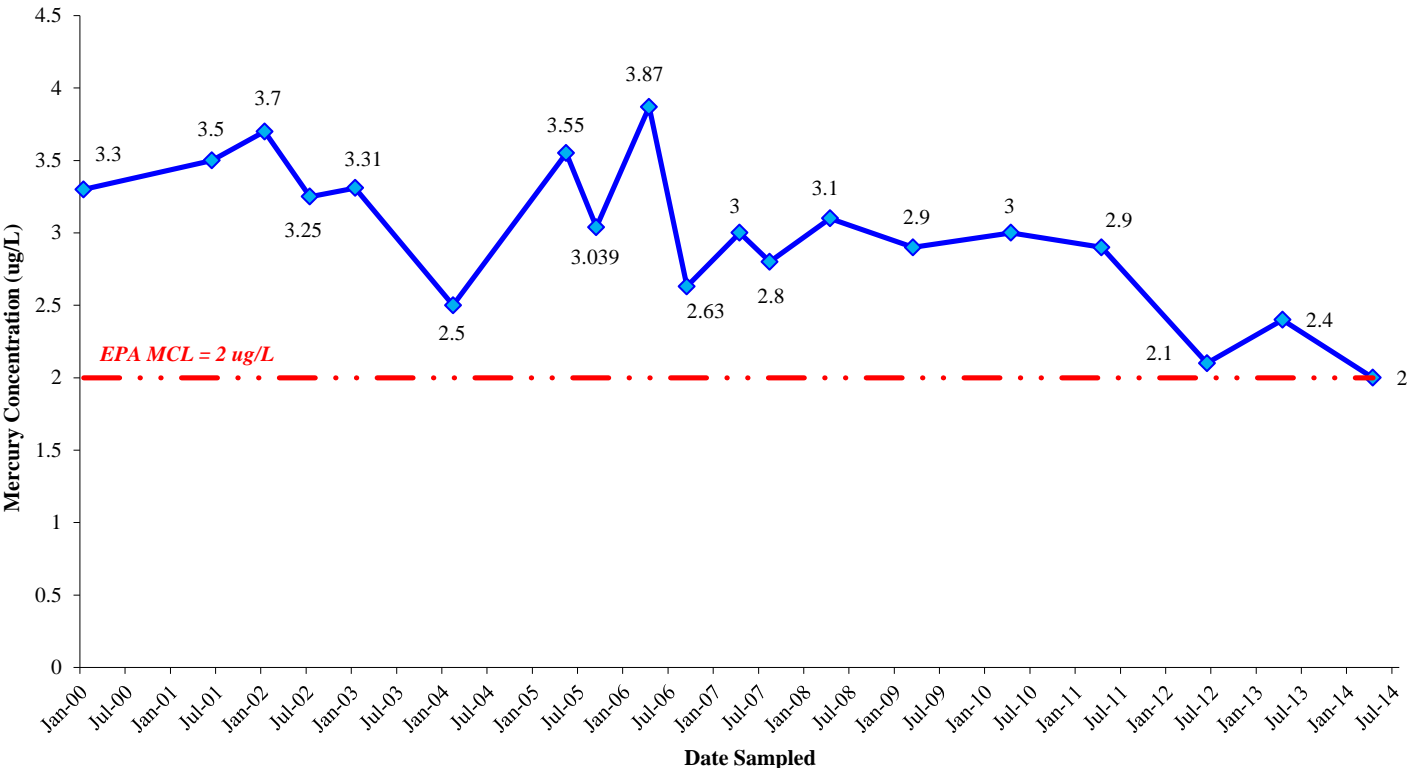
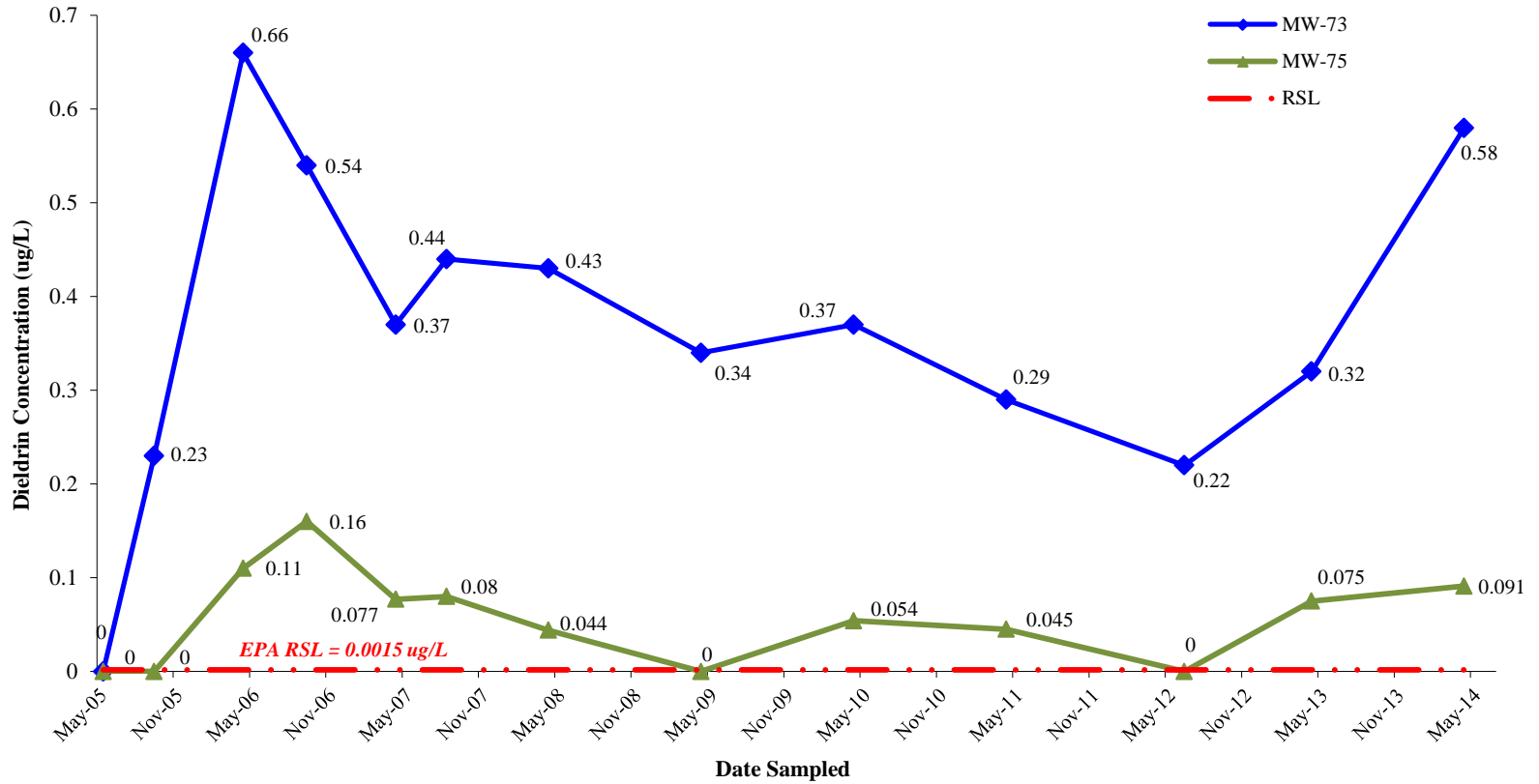
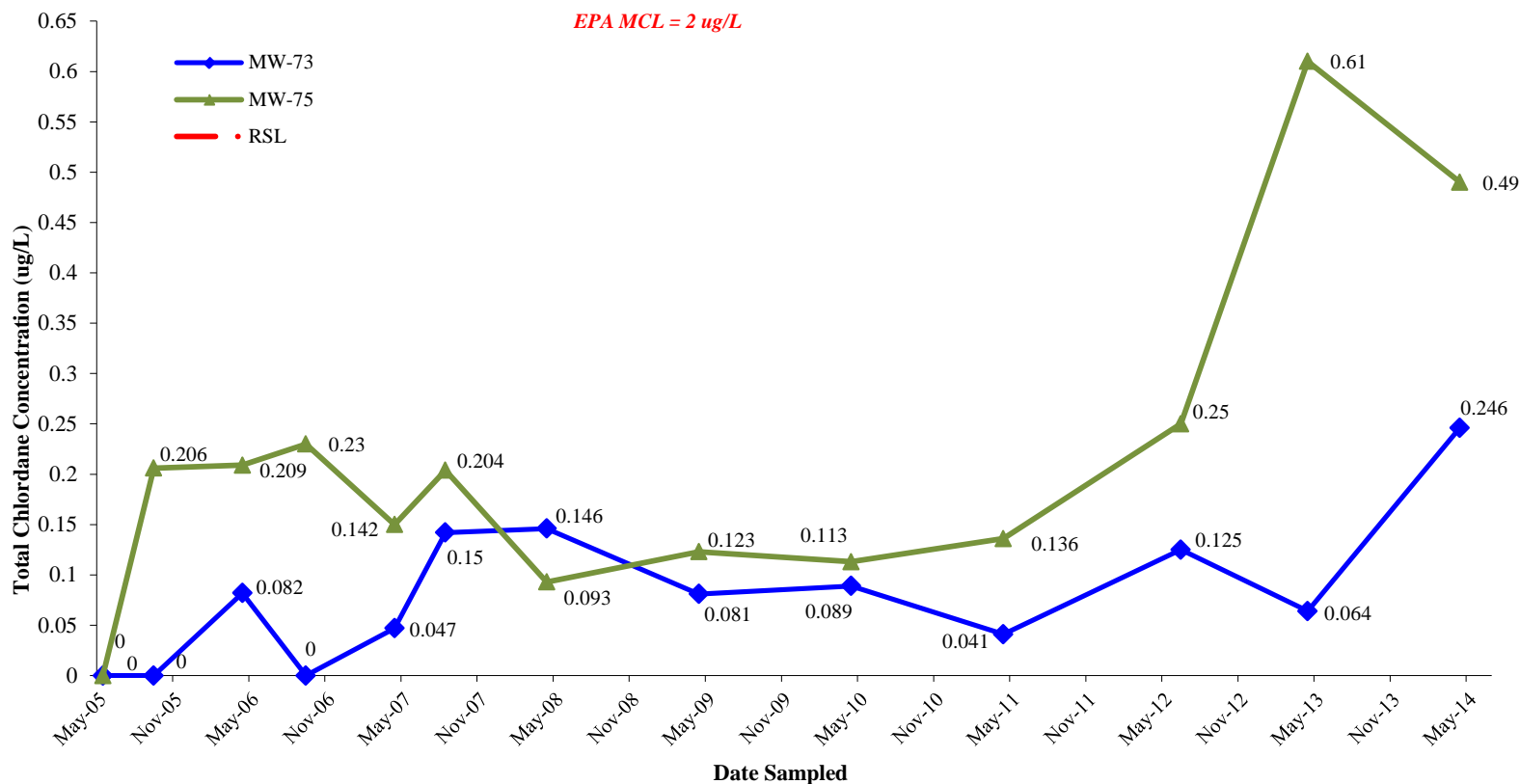


Figure 4-4. Dieldrin Concentration Trends in MW-73 and MW-75 at SWMUs 77/78/86/87, 2005 – 2014



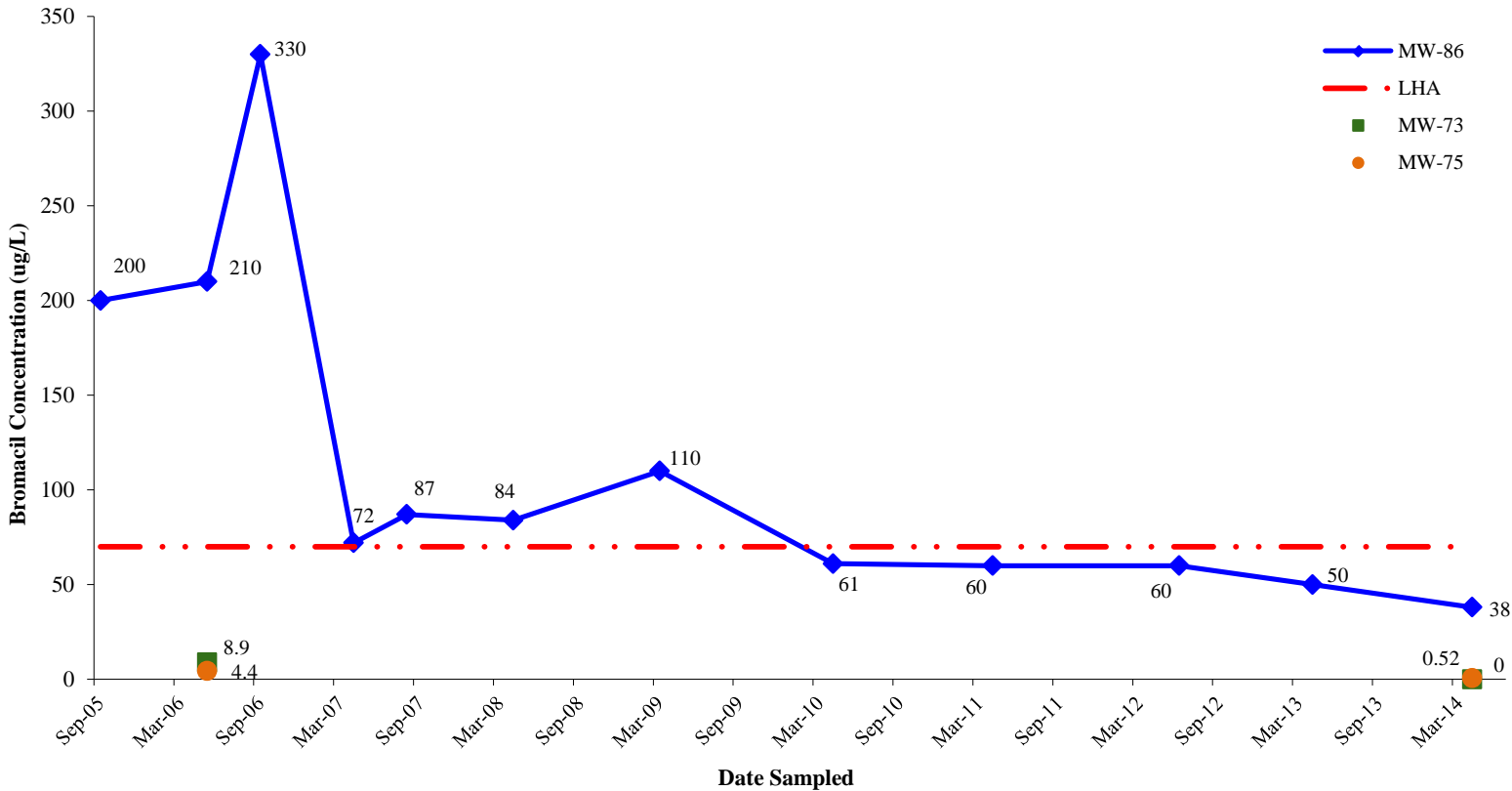
Note that dieldrin was not detected in MW-86 at SWMU 88 in Spring 2005 or Spring 2014.

Figure 4-5. Total Chlordane Concentration Trends in MW-73 and MW-75 at SWMUs 77/78/86/87, 2005 – 2014



Note that chlordane was not detected in MW-86 at SWMU 88 in Spring 2005 or Spring 2014.

Figure 4-6. Bromacil Concentration Trends in MW-86, MW-75, and MW-73 at SWMU 88 and SWMUs 77/78/86/87, 2005 – 2014





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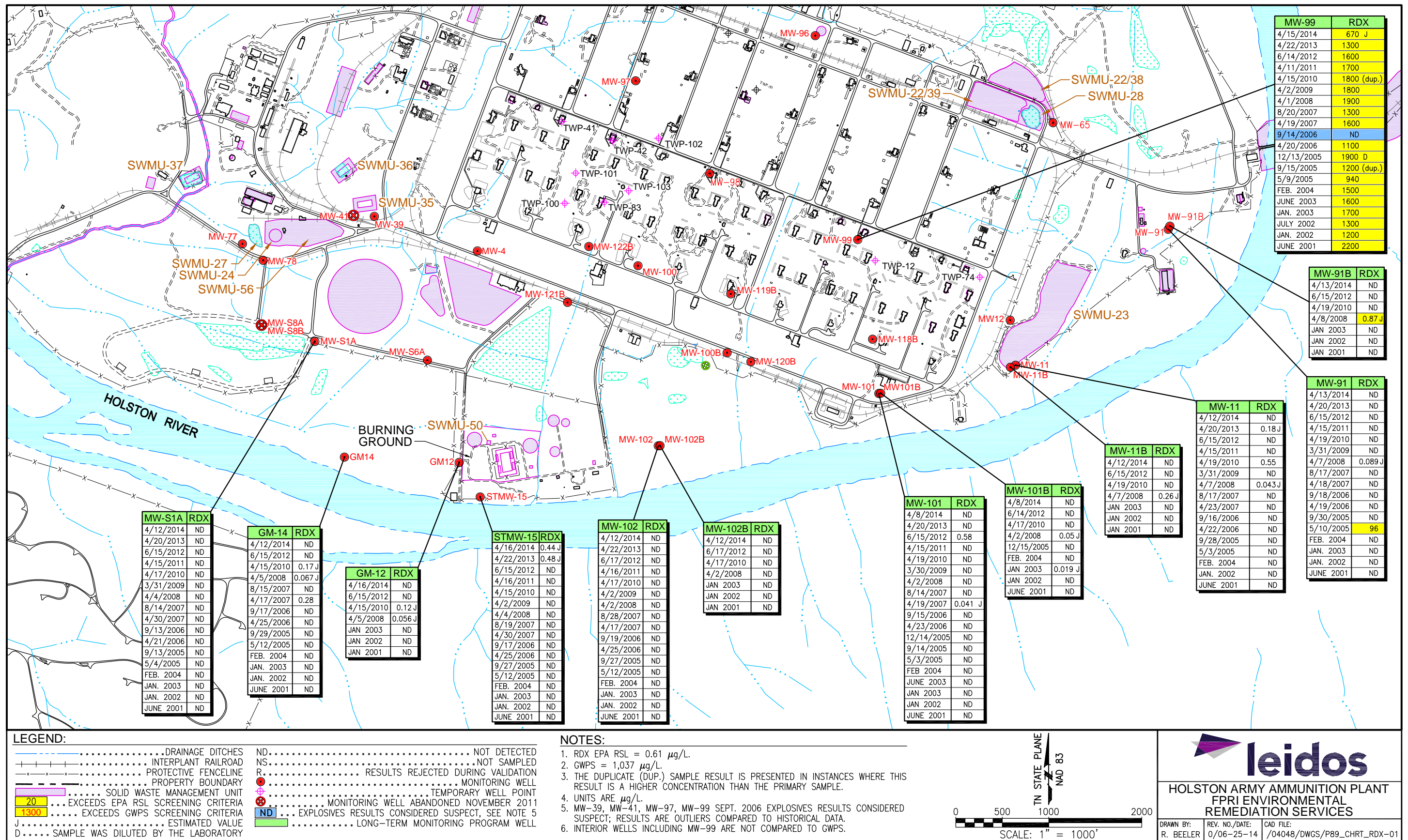
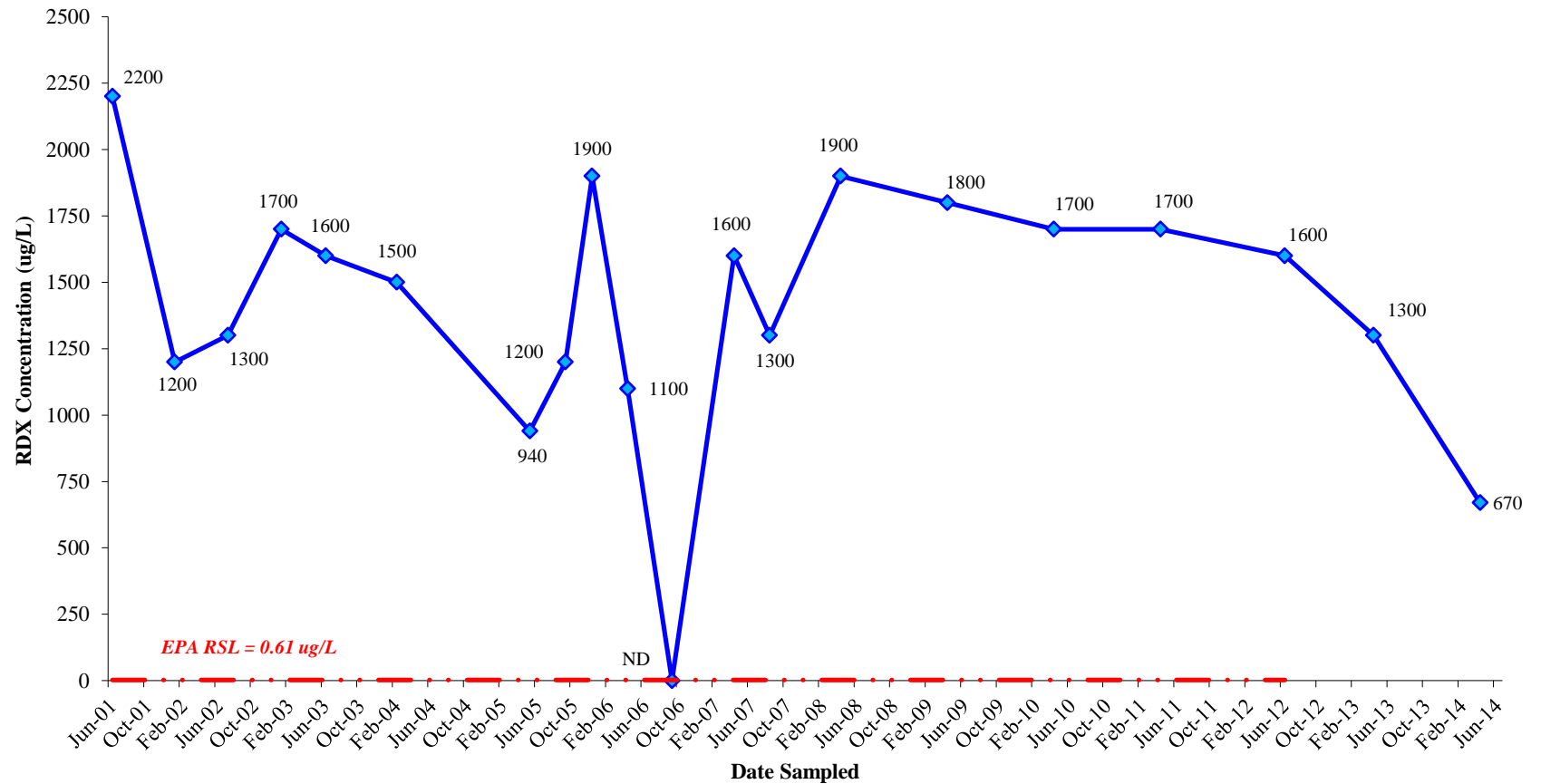
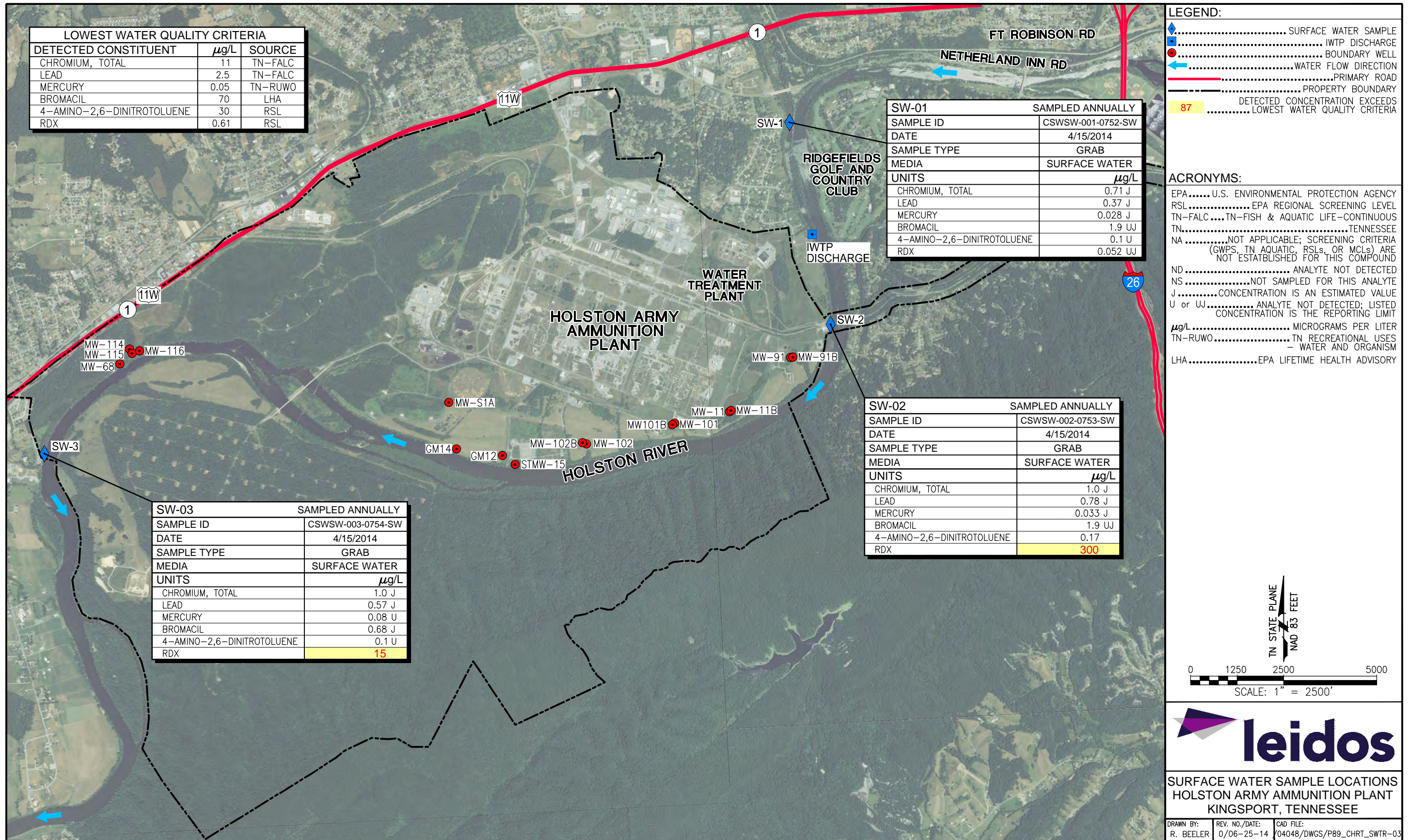


Figure 4-7. Distribution of RDX in the Area B Explosives Production Area, 2001 – 2014

Figure 4-8. RDX Concentration Trend in MW-99 in the Explosives Production Area, 2001 – 2014



Note: The September 2006 result is suspect; data are from a Sample Data Group with multiple results that are outliers compared to historical data. The September 2005 and April 2006 values are based on the sample duplicates, which had higher concentrations than the main samples.



LOWEST WATER QUALITY CRITERIA		
DETECTED CONSTITUENT	µg/L	SOURCE
CHROMIUM, TOTAL	11	TN-FALC
LEAD	2.5	TN-FALC
MERCURY	0.05	TN-RUWO
BROMACIL	70	LHA
4-AMINO-2,6-DINITROTOLUENE	30	RSL
RDX	0.61	RSL

SW-01		SAMPLED ANNUALLY	
SAMPLE ID	CSWSW-001-0752-SW	DATE	4/15/2014
SAMPLE TYPE	GRAB	MEDIA	SURFACE WATER
UNITS	µg/L	CHROMIUM, TOTAL	0.71 J
		LEAD	0.37 J
		MERCURY	0.028 J
		BROMACIL	1.9 UJ
		4-AMINO-2,6-DINITROTOLUENE	0.1 U
		RDX	0.052 UJ

SW-02		SAMPLED ANNUALLY	
SAMPLE ID	CSWSW-002-0753-SW	DATE	4/15/2014
SAMPLE TYPE	GRAB	MEDIA	SURFACE WATER
UNITS	µg/L	CHROMIUM, TOTAL	1.0 J
		LEAD	0.78 J
		MERCURY	0.033 J
		BROMACIL	1.9 UJ
		4-AMINO-2,6-DINITROTOLUENE	0.17
		RDX	300

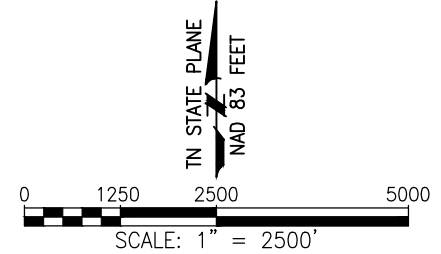
SW-03		SAMPLED ANNUALLY	
SAMPLE ID	CSWSW-003-0754-SW	DATE	4/15/2014
SAMPLE TYPE	GRAB	MEDIA	SURFACE WATER
UNITS	µg/L	CHROMIUM, TOTAL	1.0 J
		LEAD	0.57 J
		MERCURY	0.08 U
		BROMACIL	0.68 J
		4-AMINO-2,6-DINITROTOLUENE	0.1 U
		RDX	15

LEGEND:

- ◆ SURFACE WATER SAMPLE
- IWTP DISCHARGE
- BOUNDARY WELL
- ← WATER FLOW DIRECTION
- PRIMARY ROAD
- - - PROPERTY BOUNDARY
- 87 DETECTED CONCENTRATION EXCEEDS LOWEST WATER QUALITY CRITERIA

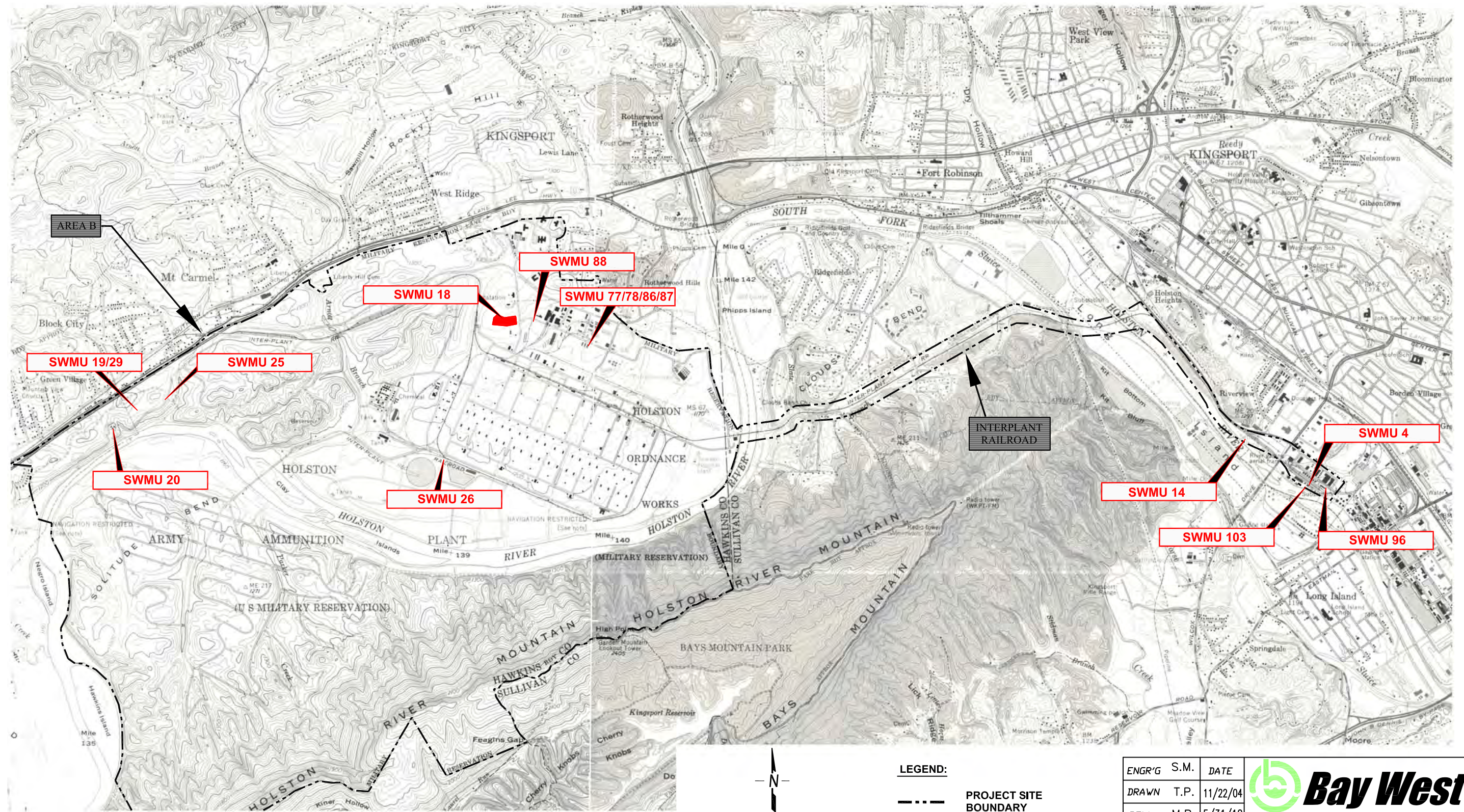
ACRONYMS:

EPA..... U.S. ENVIRONMENTAL PROTECTION AGENCY
RSL..... EPA REGIONAL SCREENING LEVEL
TN-FALC.... TN-FISH & AQUATIC LIFE-CONTINUOUS
TN..... TENNESSEE
NA..... NOT APPLICABLE; SCREENING CRITERIA (GWPS, TN AQUATIC, RSLs, OR MCLs) ARE NOT ESTABLISHED FOR THIS COMPOUND
ND..... ANALYTE NOT DETECTED
NS..... NOT SAMPLED FOR THIS ANALYTE
J..... CONCENTRATION IS AN ESTIMATED VALUE
U or UJ..... ANALYTE NOT DETECTED; LISTED CONCENTRATION IS THE REPORTING LIMIT
µg/L..... MICROGRAMS PER LITER
TN-RUWO..... TN RECREATIONAL USES - WATER AND ORGANISM
LHA..... EPA LIFETIME HEALTH ADVISORY

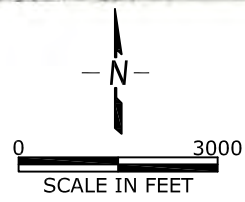


**SURFACE WATER SAMPLE LOCATIONS
HOLSTON ARMY AMMUNITION PLANT
KINGSPORT, TENNESSEE**

DRAWN BY: R. BEELER REV. NO./DATE: 0/06-25-14 CAD FILE: 04048/DWGS/P89_CHRT_SWTR-03



SOURCE:
 UNITED STATES ARMY
 CENTER FOR HEALTH PROMOTION
 AND PREVENTIVE MEDICINE
 ABERDEEN PROVING GROUND, MARYLAND



LEGEND:
 - - - - - PROJECT SITE BOUNDARY

Notes:
 - AOC-GW is plantwide.


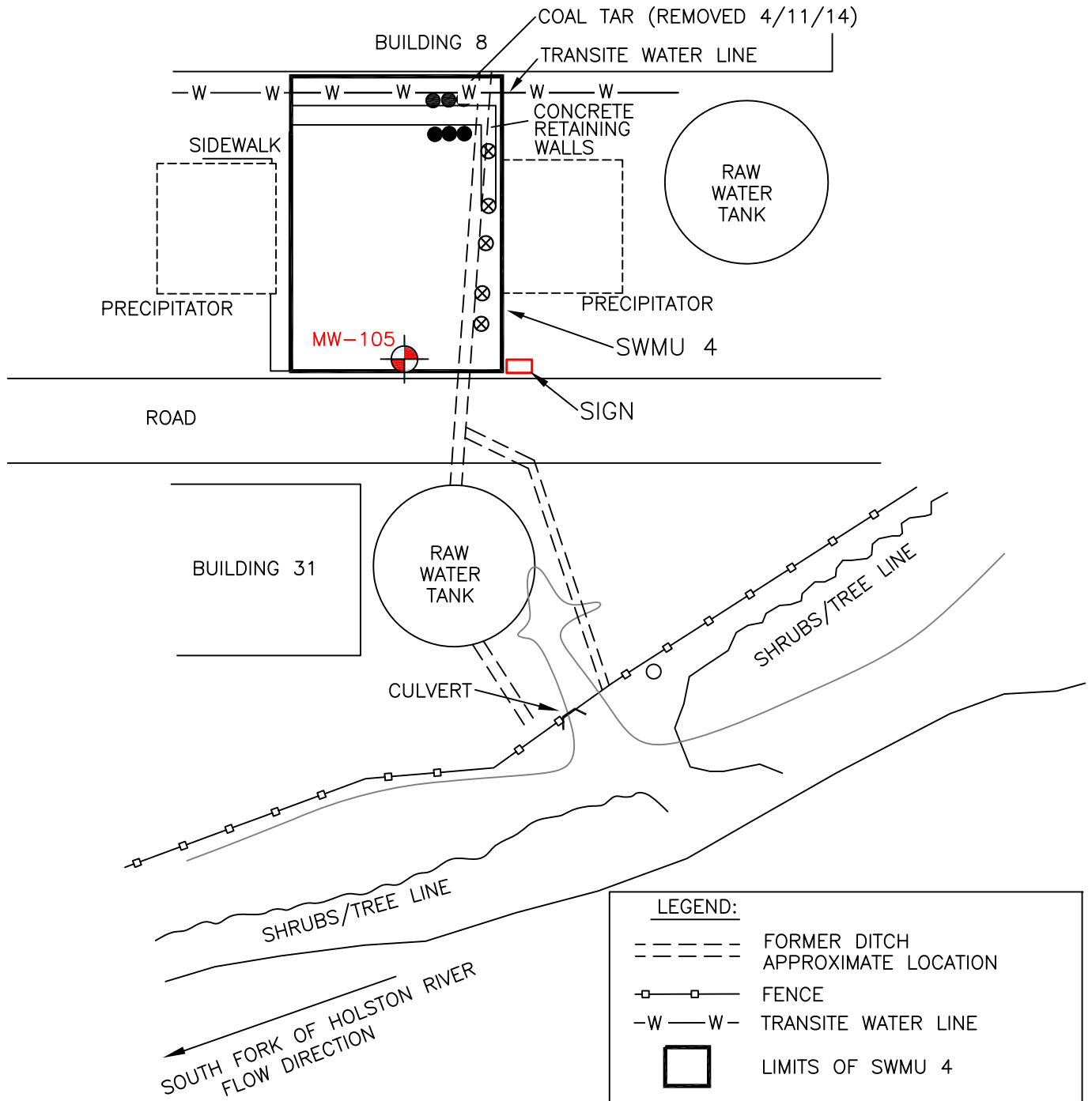
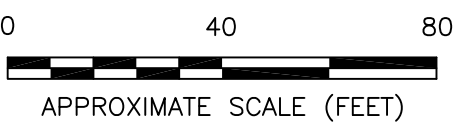
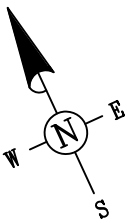
ENGR'G	S.M.	DATE	 Customer-Focused Environmental & Industrial Solutions
DRAWN	T.P.	11/22/04	
REV.	M.B.	5/31/12	
PROJECT NAME			HSAAP- KINGSFORT, TN
TITLE			HSAAP SITE FIGURE
DWG. NO.	SCALE	FIGURE #	
HAASP SITE FIGURE	1:36,000	5-1	

Figure 5-1. Landfills Inspected During 2014 Long-Term Operations Program




LEGEND:

- FORMER DITCH APPROXIMATE LOCATION
- FENCE
- W-W- TRANSITE WATER LINE
- LIMITS OF SWMU 4
- ⊗ COAL TAR REMOVAL AREA (10/17/14)
- COAL TAR REMOVAL AREA (04/14/14)
- SIGN
- ⊗ EXISTING MONITORING WELL



SOURCE:
US ARMY CENTER FOR HEALTH PROMOTION
AND PREVENTIVE MEDICINE
ABERDEEN PROVING GROUND, MARYLAND

ENGR'G	SM	DATE	 Bay West Customer-Focused Environmental & Industrial Solutions
DRAWN	KM	9/10/05	
REV.	SG	11/24/14	
PROJECT NAME		HSAAP – KINGSPORT, TN	
TITLE		SWMU 4 SITE MAP	
DWG. NO.	J120094	SCALE	1" = 40'
FIGURE #		5-2	

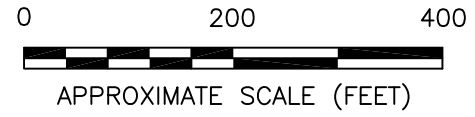
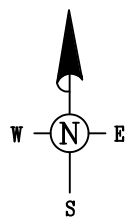



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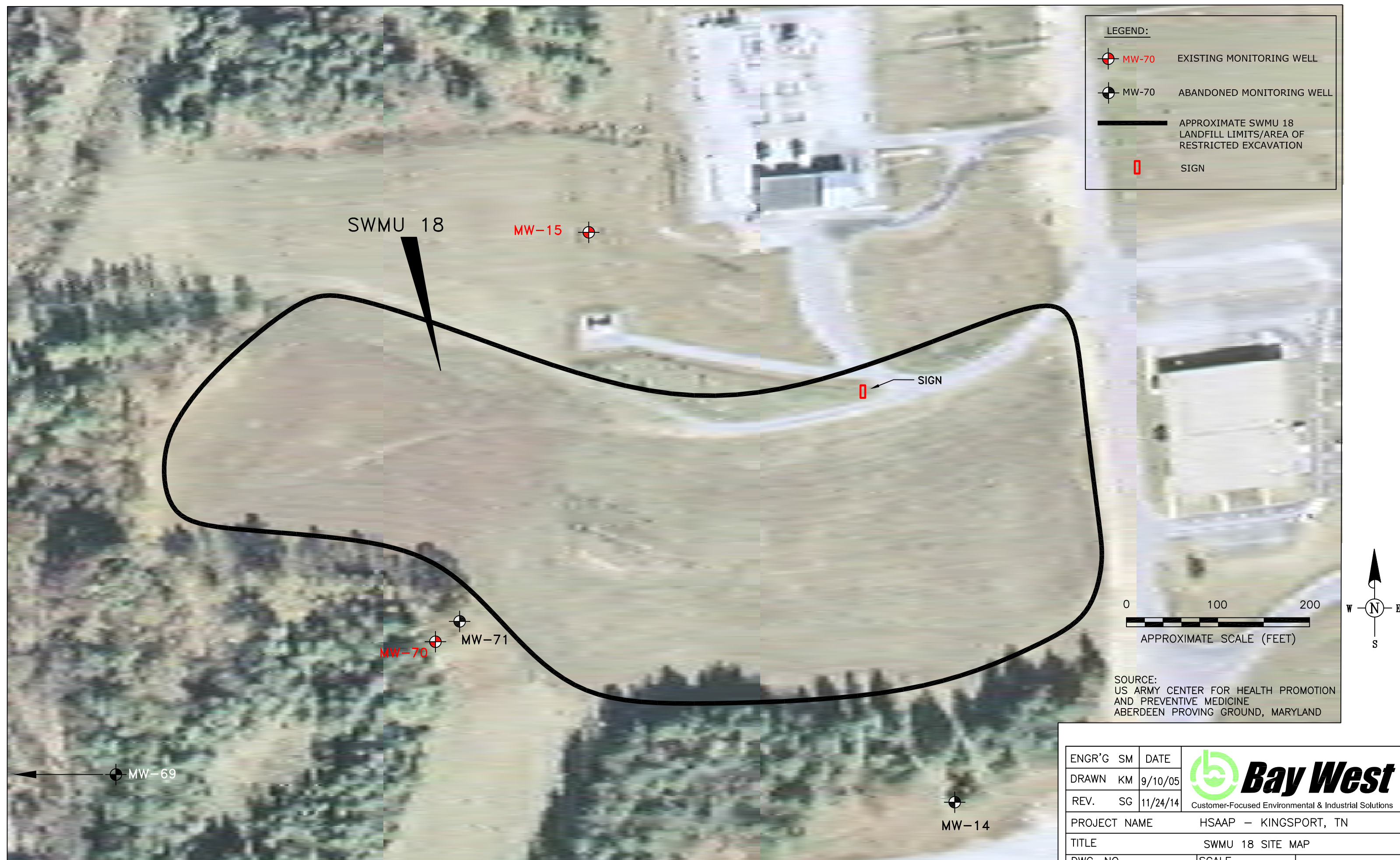
	APPROXIMATE SWMU 14 LANDFILL LIMITS
	GROUND SURFACE ELEVATION CONTOUR IN FEET
	ABANDONED MONITORING WELL
	HYDRANT
	SIGN
	LEAKING HYDRANT



ENGR'G	DATE	 Customer-Focused Environmental & Industrial Solutions
DRAWN SG	11/21/13	
REV. SG	11/24/14	
PROJECT NAME		HSAAP - KINGSPORT, TN
TITLE		SWMU 14 SITE MAP
DWG. NO.	J120094	SCALE 1" = 200' FIGURE # 5-3

SOURCE:
US ARMY CENTER FOR HEALTH PROMOTION
AND PREVENTIVE MEDICINE
ABERDEEN PROVING GROUND, MARYLAND

Figure 5-3. SWMU 14 (Coal Tar Landfill) Site Map




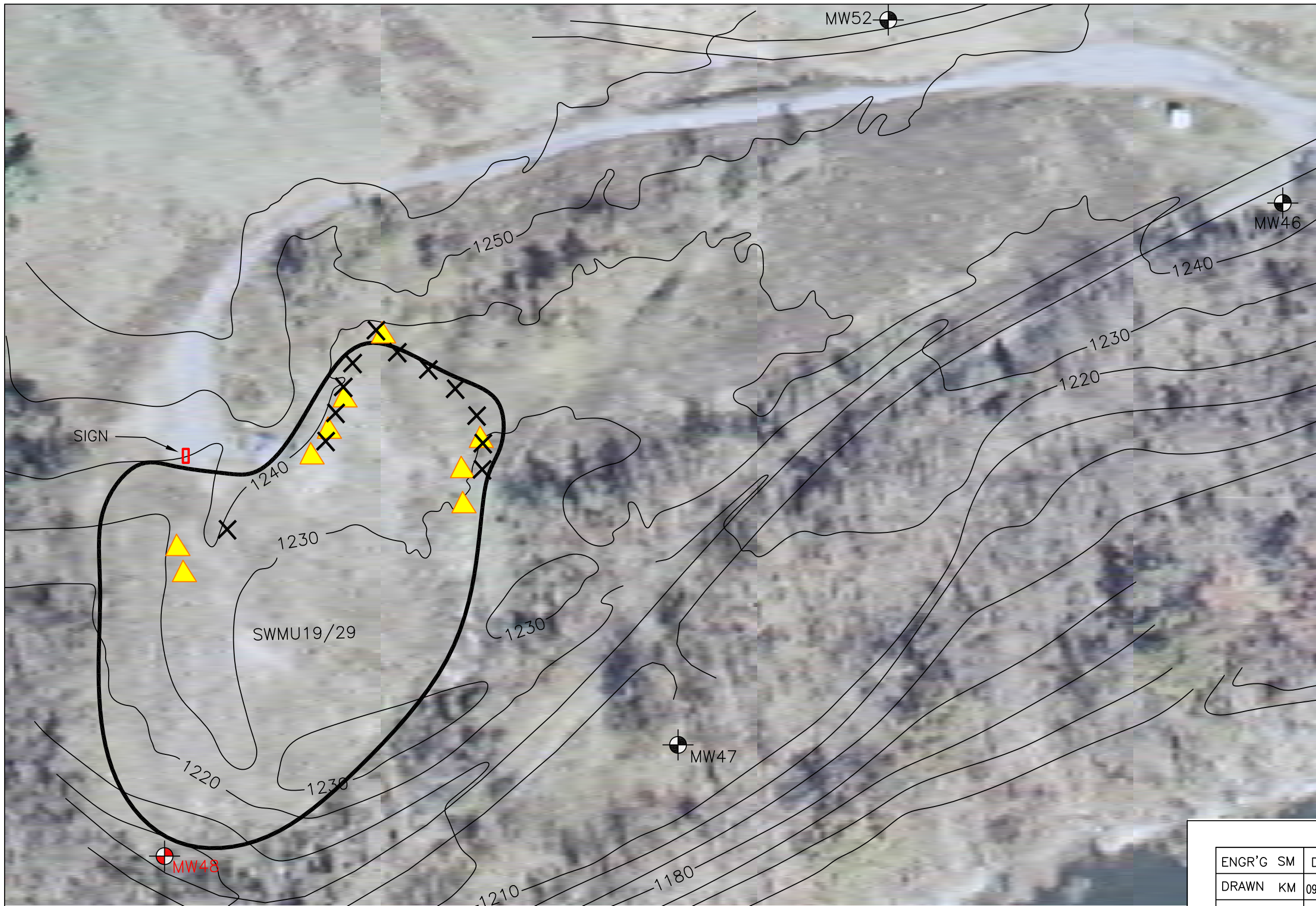






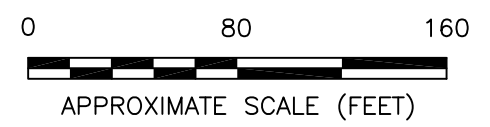
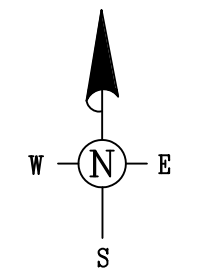
ENGR'G SM	DATE	 Bay West Customer-Focused Environmental & Industrial Solutions
DRAWN KM	9/10/05	
REV. SG	11/24/14	
PROJECT NAME		HSAAP - KINGSPORT, TN
TITLE		SWMU 18 SITE MAP
DWG. NO.	J120094	SCALE 1" = 200'
		FIGURE # 5-4

Figure 5-4. SWMU 18 (Closed Sanitary Landfill) Site Map




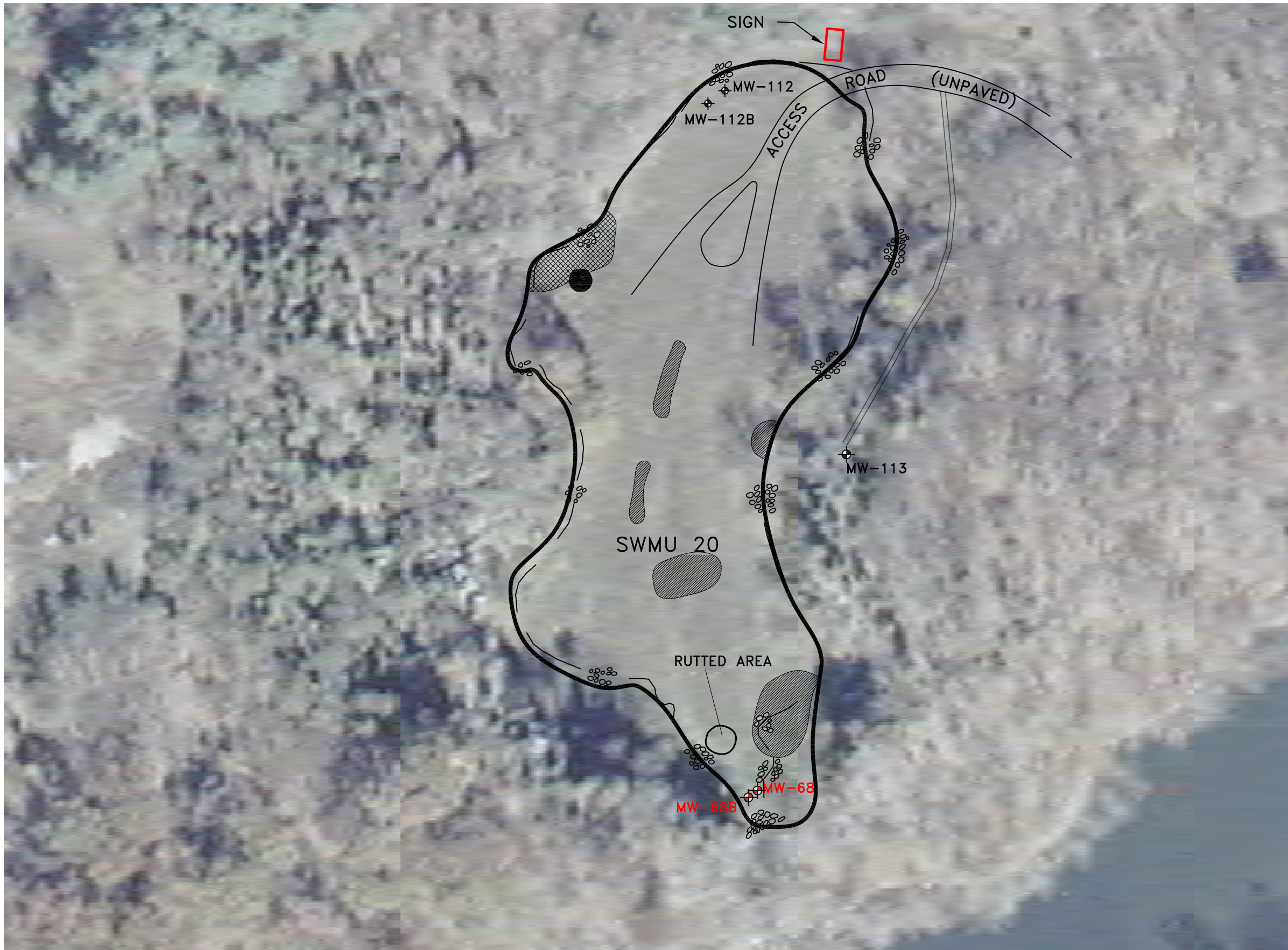
-  ABANDONED MONITORING WELL
-  EXISTING MONITORING WELL
-  SIGN
-  APPROXIMATE SWMU 19/29 LANDFILL LIMITS/ AREA OF RESTRICTED RESTRICTED EXCAVATION
-  AREAS OF BURIED/UNMOVEABLE PIECES OF ASPHALT
-  ASPHALT PIECES LOCATION - LOOSE PIECES PICKED UP ON 4/11/14



SOURCE:
 UNITED STATES ARMY CENTER FOR
 HEALTH PROMOTION AND PREVENTIVE MEDICINE
 ABERDEEN PROVING GROUND, MARYLAND

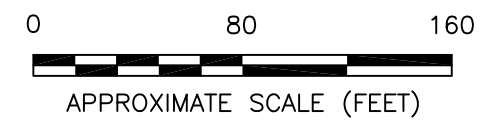
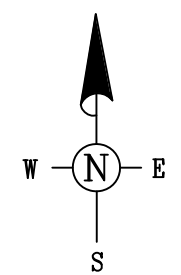
Figure 5-5. SWMUs 19/29 (Sedimentation Pond/Construction Debris Landfill) Site Map

ENGR'G SM	DATE	 Customer-Focused Environmental & Industrial Solutions
DRAWN KM	09/10/05	
REV. SG	11/24/14	
PROJECT NAME		HSAAP - KINGSPORT, TN
TITLE		SWMU 19/29 SITE MAP
DWG. NO.	SCALE	FIGURE #
J120094	1" = 80'	5-5



LEGEND:

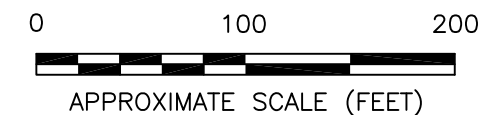
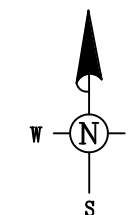
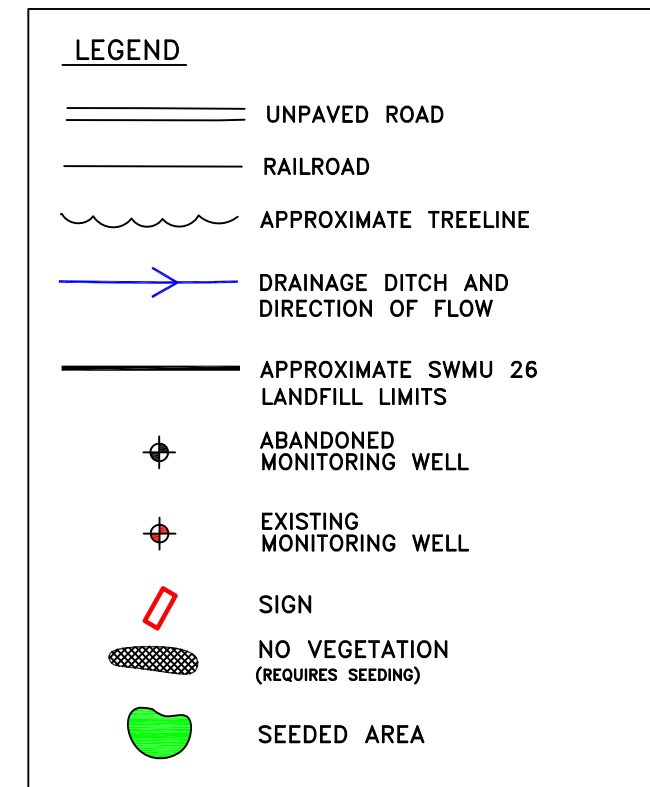
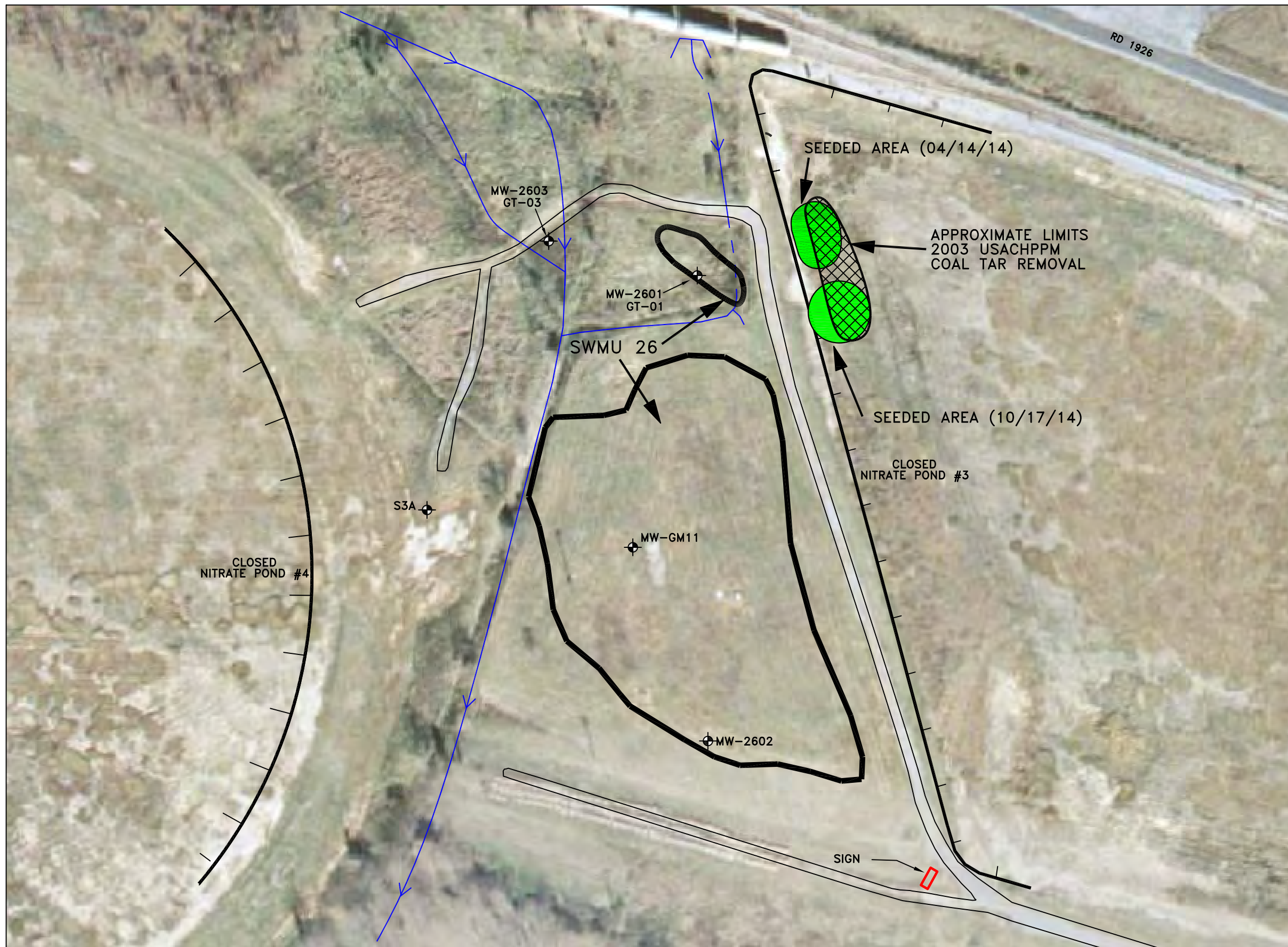
- APPROXIMATE SWMU 20 LANDFILL LIMITS
- ABANDONED MONITORING WELL
- EXISTING MONITORING WELL
- SURFACE DRAINAGE DITCH WITH RIPRAP
- PRIMITIVE ACCESS ROAD
- SIGN
- ROCK SLIDE (CLEARED EXCEPT LARGEST BOULDERS)
- SINK HOLE (REPAIRED ON 4/11/14)
- CONSTRUCTION DEBRIS
- AREAS SEED & STRAWED (REPAIRED ON 4/11/14)



ENGR'G SM	DATE	Bay West Customer-Focused Environmental & Industrial Solutions
DRAWN KM	09/10/05	
REV. SG	11/24/14	
PROJECT NAME		HSAAP -- KINGSPORT, TN
TITLE		SWMU 20 SITE MAP
DWG. NO.	J120094	SCALE 1" = 80'
		FIGURE # 5-6

SOURCE:
 UNITED STATES ARMY CENTER FOR
 HEALTH PROMOTION AND PREVENTIVE MEDICINE
 ABERDEEN PROVING GROUND, MARYLAND

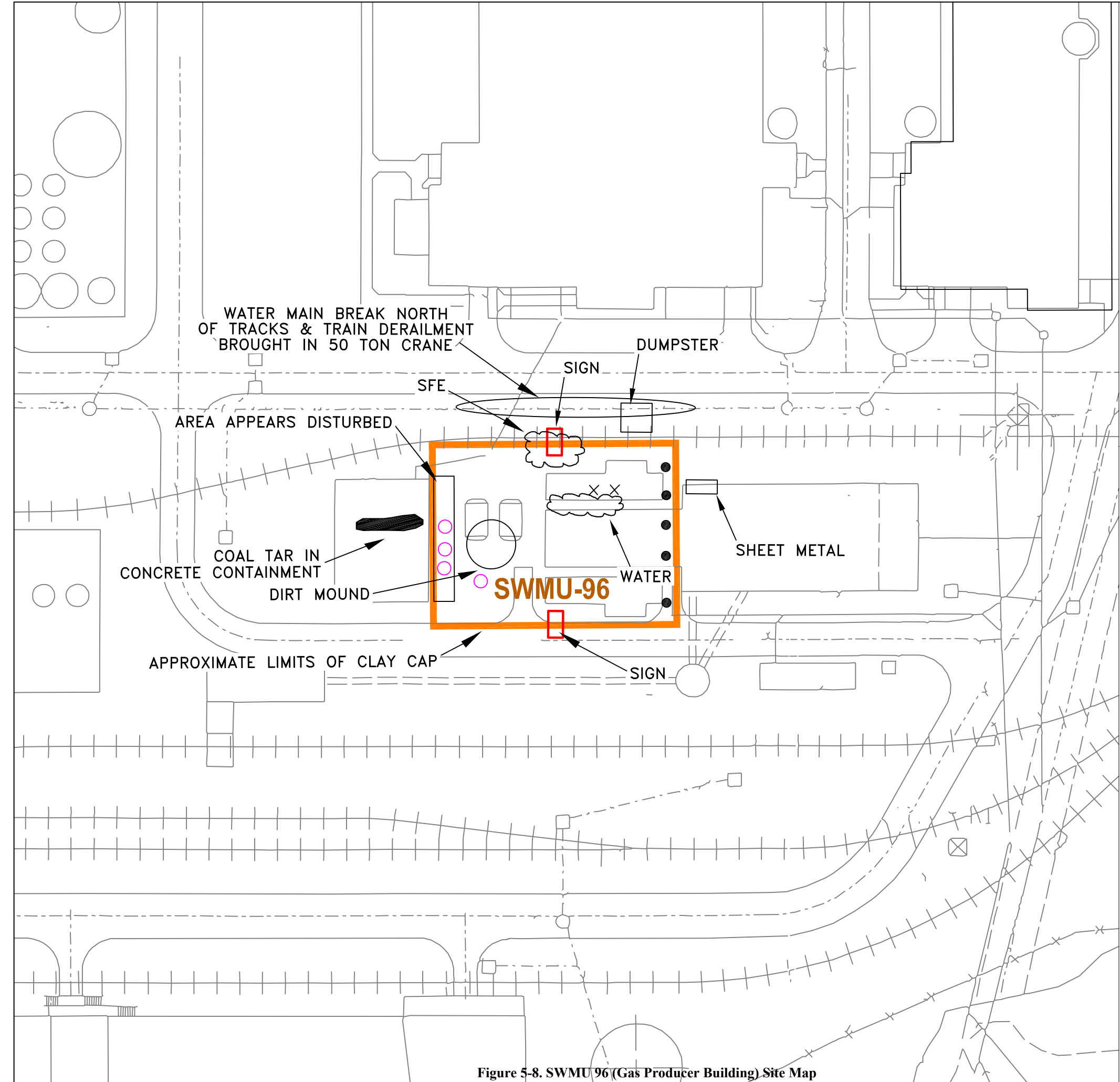
Figure 5-6. SWMU 20 (Rock Quarry Landfill) Site Map



ENGR'G SM	DATE	Bay West Customer-Focused Environmental & Industrial Solutions
DRAWN KM	09/10/05	
REV. SG	11/24/14	
PROJECT NAME		HSAAP - KINGSPORT, TN
TITLE		SWMU 26 SITE MAP
DWG. NO.	J120094	SCALE 1" = 80' FIGURE # 5-7

SOURCE:
US ARMY CENTER FOR HEALTH PROMOTION
AND PREVENTIVE MEDICINE
ABERDEEN PROVING GROUND, MARYLAND

Figure 5-7. SWMU 26 (World War II Coal Tar Site) Site Map




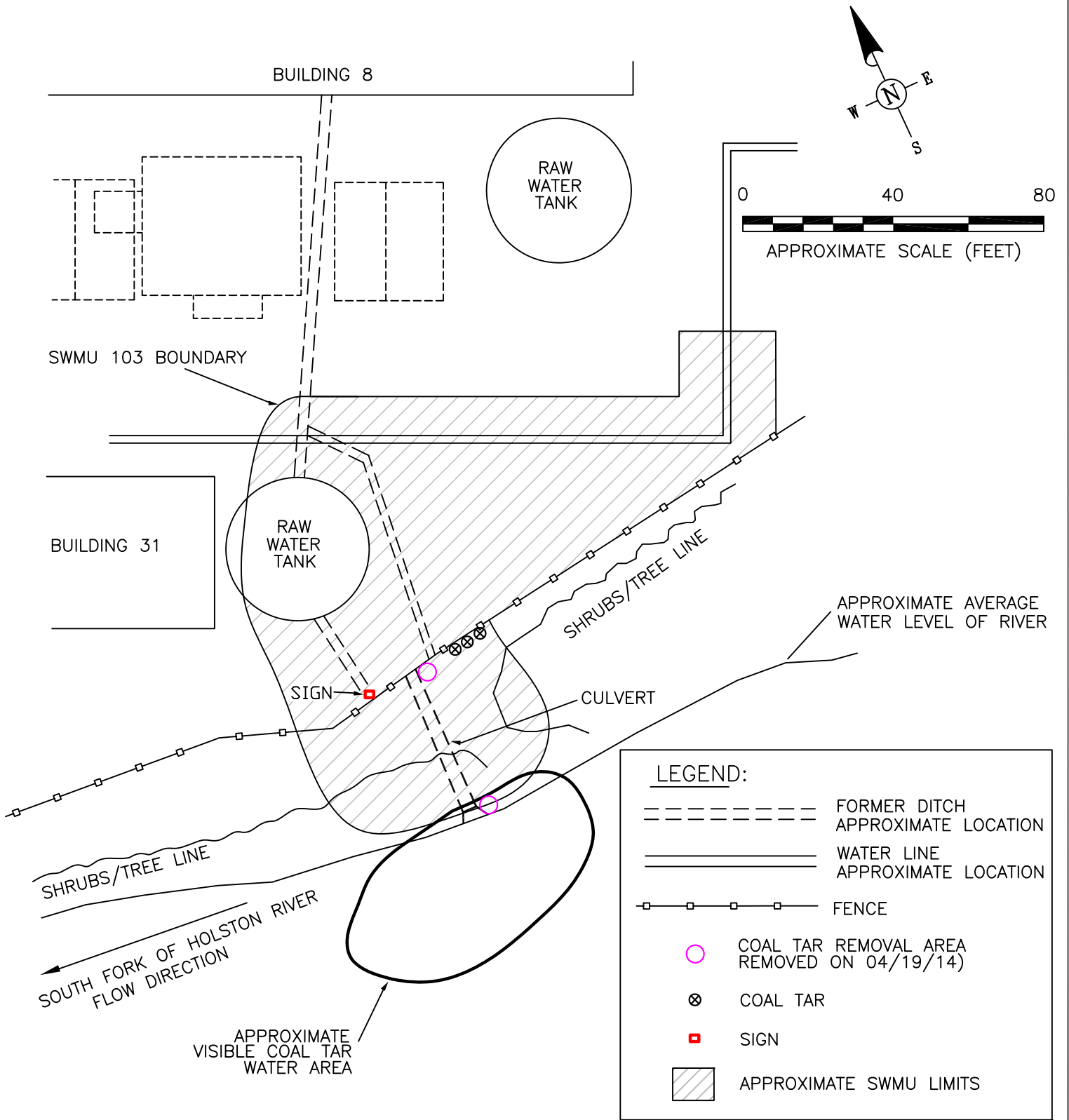
LEGEND:

- DRAINAGE DITCHES
- |-|- INTERPLANT RAILROAD
- x-x-x- PROTECTIVE FENCELINE
- - - - PROPERTY BOUNDARY
- APPROXIMATE SWMU 96 LANDFILL LIMITS
- SIGN
- FENCE POST
- × DEBRIS
- COAL TAR (REMOVED ON 04/09/14)

0 20 40 60 120
 APPROXIMATE SCALE (FEET)

Figure 5-8. SWMU 96 (Gas Producer Building) Site Map

ENGR'G SM	DATE	
DRAWN KM	04/06/05	
REV. SG	11/24/14	Customer-Focused Environmental & Industrial Solutions
PROJECT NAME		HSAAP - KINGSPORT, TN
TITLE		SWMU 96 SITE MAP
DWG. NO.	J120094	SCALE AS SHOWN
		FIGURE # 5-8



SOURCE:
 US ARMY CENTER FOR HEALTH PROMOTION
 AND PREVENTIVE MEDICINE
 ABERDEEN PROVING GROUND, MARYLAND

ENGR'G	SM	DATE
DRAWN	KM	04/06/05
REV.	SG	11/24/14



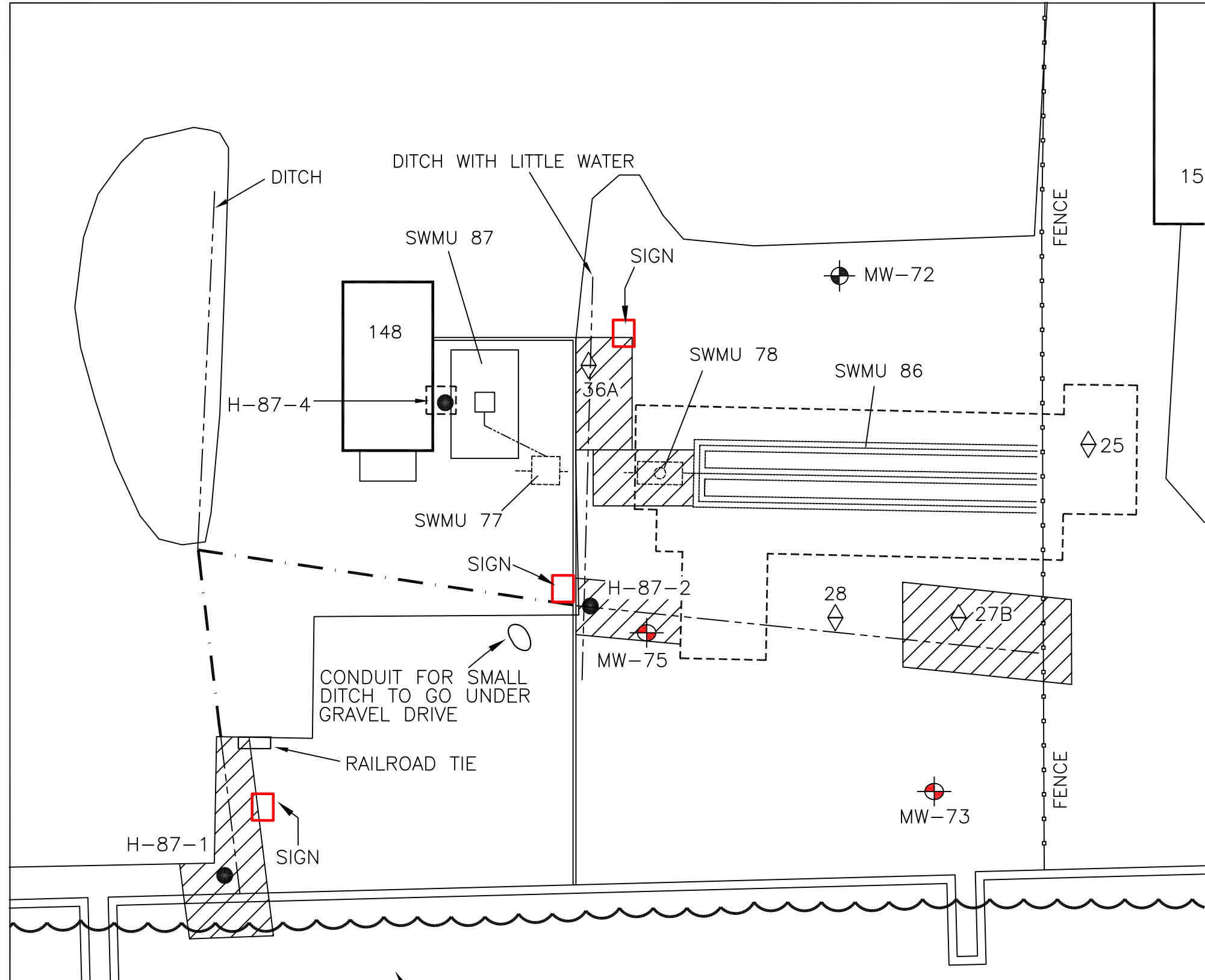
Bay West
 Customer-Focused Environmental & Industrial Solutions

PROJECT NAME	HSAAP – KINGSPORT, TN	
TITLE	SWMU 103 SITE MAP	
DWG. NO.	1120094	SCALE
Figure 5-9. SWMU 103 (Coal Tar Site, Ditch at Gas Producer Building) Site Map		FIGURE # 5-9



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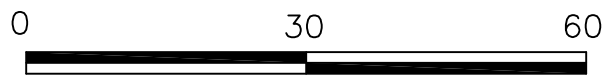


LEGEND:

- EXISTING MONITORING WELLS
- ABANDONED MONITORING WELLS
- MAY 1997 SURFACE SOIL SAMPLES LOCATION
- 2003 SOIL SAMPLE LOCATIONS
- LIMIT OF EXCAVATIONS
- AREA OF RESTRICTED EXCAVATION (SOIL ABOVE RESIDENTIAL PRGs)
- SIGN
- OPEN DITCH
- 10" PIPE

Based on photograph taken October 2000, survey Nov. '03, and references 3 and 4.

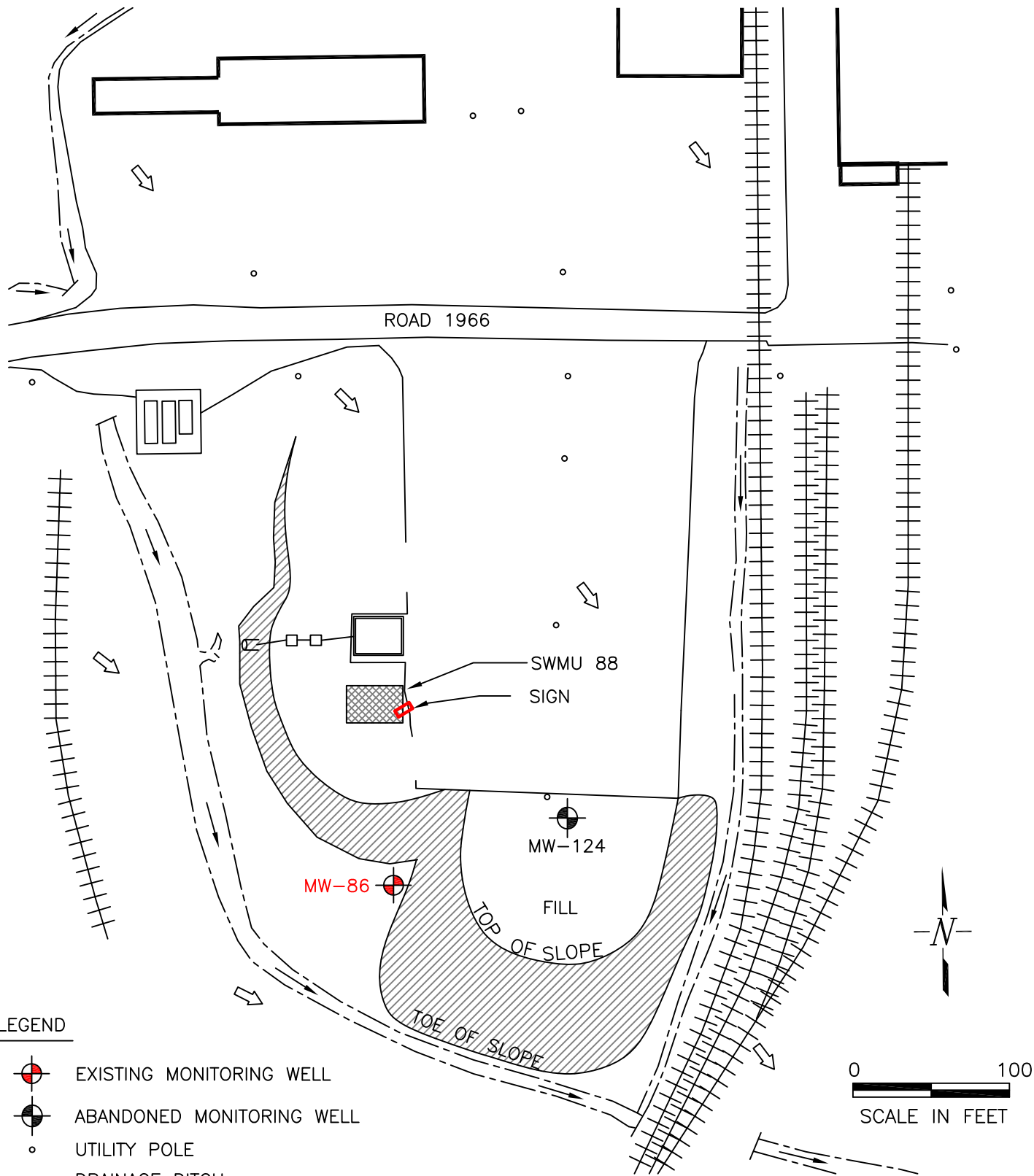
SOURCE:
 US ARMY CENTER FOR HEALTH PROMOTION
 AND PREVENTIVE MEDICINE
 ABERDEEN PROVING GROUND, MARYLAND
 FILE #6690SAMPS












SCALE IN FEET

Figure 5-10. SWMUs 77/78/86/87 (Pesticide Area) Site Map

ENGR'G	SM	DATE	 Bay West Customer-Focused Environmental & Industrial Solutions
DRAWN	TP	04/04/05	
REV.	SG	11/24/14	
PROJECT NAME		HSAAP - KINGSPORT, TN	
TITLE		SWMU 77/78/86/87 SITE MAP	
DWG. NO.	J120094	SCALE	1" = 30'
		FIGURE # 5-10	



LEGEND

-  EXISTING MONITORING WELL
-  ABANDONED MONITORING WELL
-  UTILITY POLE
-  DRAINAGE DITCH WITH FLOW DIRECTION
-  RAILROAD TRACK
-  LIMITS OF SWMU
-  FILL SLOPE
-  GROUND WATER FLOW DIRECTION
-  SIGN

SOURCE:
 UNITED STATES ARMY CENTER FOR
 HEALTH PROMOTION AND PREVENTIVE MEDICINE
 ABERDEEN PROVING GROUND, MARYLAND


ENGR'G SM	DATE	 Bay West Customer-Focused Environmental & Industrial Solutions
DRAWN KM	09/10/05	
REV. SG	11/24/14	
PROJECT NAME		HSAAP – KINGSPORT, TN
TITLE		SWMU 88 SITE MAP
DWG. NO.	SCALE	FIGURE #
1120094	1" = 100'	5-11

Figure 5-11. SWMU 88 (Pesticide Area) Site Map



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**APPENDIX A
GROUNDWATER PURGING AND SAMPLING LOGS**

- A.1 SUMMARY OF PRE-SAMPLING WATER LEVELS
- A.2 GROUNDWATER PURGING AND SAMPLING LOGS (SPRING AND FALL 2014)
- A.3 SURFACE WATER SAMPLING LOGS
- A.4 WELL INSPECTIONS (SPRING AND FALL 2014)



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**APPENDIX A.1
SUMMARY OF PRE-SAMPLING WATER LEVELS**



**FISCAL YEAR 2014 LONG-TERM MONITORING/
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Table A.1-1. Summary of 2014 Water Levels

Well ID	Location		Top of Casing Elevation (ft AMSL)	Spring 2014 Date	Depth to Water (ft BTOC)	Groundwater Elevation (ft AMSL)	Fall 2014 Date	Depth to Water (ft BTOC)	Groundwater Elevation (ft AMSL)	Groundwater Elevation Change Between Spring and Fall 2014 (ft)
	Plant Area	SWMU/Source Area								
GM-12	Area B	AOC-GW (downgradient of production area)	1,168.26	04/16/14	11.52	1,156.74	10/14/14	8.99	1159.27	2.53
GM-14	Area B	AOC-GW (downgradient of production area)	1,166.37	04/12/14	10.30	1,156.07	10/14/14	10.71	1155.66	-0.41
MW-11	Area B	AOC-GW (downgradient of production area)	1,168.69	04/12/14	4.70	1,163.99	10/17/14	4.25	1164.44	0.45
MW-11B	Area B	AOC-GW (downgradient of production area)	1,168.57	04/12/14	1.05	1,167.52	10/17/14	1.04	1167.53	0.01
MW-48	Area B	Landfill Area - SWMUs 19/29	1,200.52	04/10/14	32.58	1,167.94	10/15/14	30.97	1169.55	1.61
MW-55	Area B	Landfill Area - Upgradient	1,307.71	04/15/14	83.77	1,223.94	10/17/14	79.53	1228.18	4.24
MW-68	Area B	Landfill Area - SWMU 20	1,184.83	04/13/14	28.31	1,156.52	10/15/14	25.81	1159.02	2.5
MW-70	Area B	SWMU 18	1,275.10	04/11/14	26.42	1,248.68	10/17/14	35.63	1239.47	-9.21
MW-73	Area B	SWMUs 77/78/86/87	1,228.90	04/08/14	4.47	1,224.43	10/17/14	4.32	1224.58	0.15
MW-75	Area B	SWMUs 77/78/86/87	1,228.58	04/08/14	4.12	1,224.46	10/17/14	4.53	1224.05	-0.41
MW-86	Area B	SWMU 88	1,241.26	04/08/14	9.18	1,232.08	10/17/14	9.24	1232.02	-0.06
MW-91	Area B	AOC-GW (downgradient of production area)	1,171.57	04/13/14	4.82	1,166.75	10/17/14	3.74	1167.83	1.08
MW-91B	Area B	AOC-GW (downgradient of production area)	1,173.31	04/13/14	4.76	1,168.55	10/17/14	3.96	1169.35	0.8
MW-99	Area B	AOC-GW (production area)	1,209.22	04/15/14	9.50	1,199.72	10/14/14	8.80	1200.42	0.7
MW-101	Area B	AOC-GW (downgradient of production area)	1,177.17	04/08/14	12.05	1,165.12	10/14/14	11.99	1165.18	0.06
MW-101B	Area B	AOC-GW (downgradient of production area)	1,176.81	04/08/14	11.78	1,165.03	10/14/14	11.69	1165.12	0.09
MW-102	Area B	AOC-GW (downgradient of production area)	1,169.72	04/12/14	9.42	1,160.30	10/14/14	9.42	1160.3	0.00
MW-102B	Area B	AOC-GW (downgradient of production area)	1,169.49	04/12/14	9.30	1,160.19	10/14/14	9.56	1159.93	-0.26
MW-104	Area A	SWMU 96	1,199.40	04/09/14	8.06	1,191.34	10/16/14	8.10	1191.3	-0.04
MW-105	Area A	SWMU 96	1,200.08	04/09/14	9.75	1,190.33	10/16/14	9.84	1190.24	-0.09
MW-106	Area A	SWMU 96	1,201.00	04/09/14	12.86	1,188.14	10/16/14	12.65	1188.35	0.21
MW-107	Area A	SWMU 96	1,200.16	04/09/14	7.74	1,192.42	10/16/14	7.35	1192.81	0.39
MW-114	Area B	Landfill Area - SWMUs 19/29	1,197.67	04/13/14	29.85	1,167.82	10/15/14	25.82	1171.85	4.03
MW-115	Area B	Landfill Area - SWMUs 19/29	1,193.65	04/10/14	29.71	1,163.94	10/15/14	28.94	1164.71	0.77
MW-116	Area B	Landfill Area - SWMUs 19/29	1,207.50	04/10/14	54.02	1,153.48	10/15/14	49.41	1158.09	4.61
MW-S1A	Area B	AOC-GW (downgradient of production area)	1,164.71	04/12/14	5.16	1,159.55	10/14/14	4.88	1159.83	0.28
STMW-15	Area B	SWMU 50 (downgradient of production area)	1,168.39	04/16/14	13.79	1,154.60	10/14/14	13.96	1154.43	-0.17

AMSL = Above mean sea level.
AOC-GW = Area of Concern – Site-Wide Groundwater.
BTOC = Below top of casing.
ft = Feet.
ID = Identifier.
SWMU = Solid waste management unit.



**FISCAL YEAR 2014 LONG-TERM MONITORING/
LONG-TERM OPERATIONS REPORT**
Holston Army Ammunition Plant, Kingsport, Tennessee

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**FISCAL YEAR 2014 LONG-TERM MONITORING/
LONG-TERM OPERATIONS REPORT**
Holston Army Ammunition Plant, Kingsport, Tennessee

**APPENDIX A.2
GROUNDWATER PURGING AND SAMPLING LOGS
(SPRING AND FALL 2014)**



**FISCAL YEAR 2014 LONG-TERM MONITORING/
LONG-TERM OPERATIONS REPORT**
Holston Army Ammunition Plant, Kingsport, Tennessee

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**FISCAL YEAR 2014 LONG-TERM MONITORING/
LONG-TERM OPERATIONS REPORT**
Holston Army Ammunition Plant, Kingsport, Tennessee

SPRING 2014



**FISCAL YEAR 2014 LONG-TERM MONITORING/
LONG-TERM OPERATIONS REPORT**
Holston Army Ammunition Plant, Kingsport, Tennessee

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TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant DELIVERY ORDER NO: CK01

Date (mm/dd/yy): 04/16/14

Su M Tu (W) Th F Sa

PAGE 1 OF 2

Task Team Members:

Crystal Hahn - Lead

Hillary McGown - Bay West

Narrative (include time and location):

0750 Arrive at GNT12 location. PID = 0.0ppm, initial depth to water = 11.52 ft BTDC, total well depth = 73.60 ft BTDC, depth to water following pump placement = 11.10 ft BTDC.

0810 Begin purging.

0820 First parameter reading. Troubleshoot settings & fill Horiba Cycle = 11s fill, 9s discharge. Pressure = 40 psi, flow rate = 250 mL.

0835 Adjust pressure; I can hear the sound of water rushing inside PVC casing. Attempt to adjust cycle settings but water level drops. Keep cycle at 11/9. Adjust pressure to 35 psi; flow rate = 200 mL/min

0900 Water not discharging. Turn up pressure; disconnect Horiba & empty flow thru cell while adjusting settings. Pressure = 40 psi; flow rate = 100 mL/min

0945 Done purging. Well stable after 11.0 liters. collect

Daily Weather Conditions: A.M. 43°F, Full sun, low humid.; 0-5 MPH wind

P.M.

Recorded By Hillary McGown QA Checked By Dink Dyer 4-28-14

80

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant DELIVERY ORDER NO: CK01

Date (mm/dd/yy): 04/16/14

Su M Tu W Th F Sa

PAGE 2 OF 2

Task Team Members:

Crystal Hain-Lemos

Hilary McGown-Bay West

Narrative (include time and location):

1. CGWMMW-612-0745-6W for 24 positives = 21-lite
ambers.

1005 Done filling sample jars.

1015 Depart well location.

~~ADH~~
4-16-14

Daily Weather Conditions: A.M.

SEE PAGE 79

P.M.

Recorded By

Hilary McGown

QA Checked By

David Dyer 4-28-14

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

DATE (mm/dd/yy): 04/16/14

TIME: 07:50

WELL ID NUMBER: 6M-12

WELL LOCATION: Burning Grounds

DEPTH OF SCREENED INTERVAL (toc notch): 53.73 ft. to 73.73 ft.

INNER CASING: TYPE PVC ID: 2 inches

PURGE SAVER ID: N/A

WATER LEVEL INDICATOR ID: model/sensor # 01-1170

TURBIDITY ID: mfg # 30570003

DEPTH TO WATER: 11.52 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 53.73 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: ~64.0 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [] Bailer [X] Bladder Pump [] Pump Type PUMP ID: 10861

PURGE START TIME: 0810 PURGE END TIME: 0945

TOTAL VOLUME PURGED 11.0 liters

SITE CONDITIONS DURING PURGING: had trouble getting flow rate/discharge to stabilize and to get water level to stabilize

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: DO is very high -> therefore flow thru cell has large air space above outflow point. Pressure is not high enough to fill cell entirely.

S&A PLAN SAMPLING PROCEDURE FOLLOWED: YES [] NO IF NO, WHY WAS A DEVIATION NECESSARY:

RECORDED BY: [Signature] (Signature)

QA CHECKED BY: [Signature] 4-28-14 (Signature)

GROUND WATER MICRO PURGE LOG

WELL ID: GM-12

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

TIME	L REMOVED	PURGE RATE (mL/min)	ORP (mv)	TEMP (C)	pH (s.u.)	COND (mS/cm)	DO (mg/L)	TURBIDITY (NTU)	DEPTH TO WATER (FT BTOC)	COMMENTS
0820	2.5 1.25	250	29	12.08	7.58	0.469	9.26	15.8	11.74	
0825	3.75	250	29	10.57	8.03	0.472	8.28	16.9	11.86	
0830	5.0	250	18	12.16	8.18	0.442	7.53	18.8	11.86	
0835	6.0	200	7	12.60	8.24	0.443	7.73	20.3	11.86	
0840	7.0	200	16	11.46	8.27	0.444	8.61	29.8	11.61	
0845	water	not	discharging,	air	pressure	line	not	having	good	connection.
0855	7.75	150	28	11.18	8.25	0.426	8.66	41.4	12.10	
	water	not	discharging	against,	see	sample	log.		11.30	pm 4-16-14
0915	8.0	100	25	11.75	8.20	0.425	10.95	15.2	11.30	
0920	8.50	100	26	11.32	8.21	0.427	11.07	16.4	11.30	
0925	9.0	100	26	11.97	8.21	0.426	11.33	15.6	11.30	
0930	9.50	100	24	12.33	8.23	0.420	10.85	17.7	11.31	
0935	10.0	100	25	12.30	8.24	0.421	10.84	18.3	11.32	
0940	10.50	100	26	12.17	8.24	0.420	10.91	19.0	11.32	
0945	11.0	100	27	12.18	8.23	0.419	10.96	18.2	11.32	

1.25 L / 5 min
0945 collect sample

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

Date (mm/dd/yy): 04/17/14

Su M Tu W Th F (Sa)

PAGE 1 OF 1

Task Team Members:

Cristal Ann

Hillary McGowan

~~Cristal
4-11-14~~

Narrative (include time and location):

1200: Arrive at Gm-14. PID = 0.5 ppm

Initial WL = ^{4.50}~~11.30~~^{4.11.11}~~10.30~~ ft BTOC. Total

Depth = 48.00 ft BTOC

1205: Begin to set up pump

1215: Turn on pump

1223: Water level stable at 10.79 ft BTOC

75 mL/min 42 psi 16/14

1345: Collect sample CGWMW-G14-0746-6W for explosives.

1425 Turn off pump after collecting both samples

1427 Begin to pack up

1435 Depart Location

~~Cristal
4-12-14~~

Daily Weather Conditions: A.M. Sunny 60°

P.M. Sunny 70°

Recorded By Cristal Ann

QA Checked By Daniel Dwyer 4-28-14

GROUND WATER MICRO PURGE SHEET

DELIVERY ORDER NO: CK01

PROJECT NAME: Holston Army Ammunition Plant

DATE (mm/dd/yy): 04/12/14

WELL ID NUMBER: GM-14

DEPTH OF SCREENED INTERVAL (toc notch): 27.31 ft. to 47.31 ft.

INNER CASING: TYPE PVC ID: 2 inches

TIME: 12:00

WELL LOCATION: GM-14 Production Boundary

PURGE SAVER ID: NA

WATER LEVEL INDICATOR ID: 39082 Solinst

TURBIDITY ID: 81354

DEPTH TO WATER: 10.34 (ft BTOC) FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 27.31 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: 37.31 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [] Bailer [x] Bladder Pump [] Pump Type

PUMP ID: 15198

PURGE START TIME: 1205

PURGE END TIME: 1345

TOTAL VOLUME PURGED: 1.2 gal

SITE CONDITIONS DURING PURGING: No cows, grass low, sunny

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: None

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [x] YES [] NO IF NO, WHY WAS A DEVIATION NECESSARY:

RECORDED BY: Cynthia H... 4-12-14 (Signature)

QA CHECKED BY: Daniel D... 4-28-14 (Signature)

GROUND WATER MICRO PURGE LOG

WELL ID: GM-14

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

TIME	L REMOVED	PURGE RATE (mL/min)	ORP (mv)	TEMP (C)	pH (s.u.)	COND (mS/cm)	DO (mg/L)	TURBIDITY (NTU)	DEPTH TO WATER (FT BTOC)	COMMENTS
1230	375	75	244	13.12	7.97	0.374	7.27	948.0	10.82	
1235	750	75	228	13.08	7.95	0.368	7.32	930.0	10.83	Clean out cell
1240	1125	75	^{224.4} 215	13.61	7.95	0.364	9.12	790.0	10.83	
1245	1500	75	200	13.70	7.95	0.364	8.98	783.2	10.83	
1250	1875	75	184	13.78	7.94	0.363	8.60	760.0	10.84	Tuned down pressure to 40ps.
1255	2125	50	191	14.59	7.93	0.362	8.31	735.0	10.62	
1300	2375	50	204	15.12	7.95	0.375	9.58	623.0	10.61	Clean out cell.
1310	²⁰²⁵ 2825	50	185	14.58	7.95	0.384	7.78	814.0	10.61	Water slightly cloudy. Small black ^{small black} particulates
1315	3125	50	175	14.29	7.94	0.370	7.09	798.0	10.61	particulates Small black particulates
1320	3375	50	172	14.50	7.95	0.369	6.90	787.0	10.61	Cost too pump down any more or I won't be able to get water to the surface.
1325	3625	50	162	14.05	7.94	0.369	6.54	805.0	10.61	
1330	3875	50	157	14.04	7.94	0.369	6.20	809.0	10.61	
1335	4125	50	149	14.02	7.94	0.368	5.74	810.0	10.61	
1340	4375	50	144	13.99	7.94	0.368	5.70	812.0	10.61	
1345	4625	50	139	14.01	7.94	0.368	5.62	809.0	10.61	Collect Sample

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant DELIVERY ORDER NO: CK01

Date (mm/dd/yy): 04-12-14

Su M Tu W Th F Sa

PAGE 1 OF 1

Task Team Members:

Crystal Ham
Hillary McGowan

[Handwritten signature]

Narrative (include time and location):

1527. Arrive at MW-11. PID = 0.6 ppm
Initial water level = 4.70 ft BTOC. Total Depth =
^{CGR 4-12-14} 16. To 17.70ft BTOC. This well cannot be
low flow sampled because the water
level will not stabilize. Prepare to
bail

1535. Well purged dry after removing 2.5 gal
of water.

1538: Help Hillary set up on MW-11B.

1555: Arrive back and prepare to do well inspection

1600: Allowing well time to recharge as
help with MW-11B

1630 Collect sample CGMW-011-0737-GW
for explosives

1635 Complete sampling MW-11. Depart

Daily Weather Conditions: A.M. _____

P.M. Sunny 75°

Recorded By Crystal Ham 4-12-14 QA Checked By *[Signature]* 4-28-14

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

DATE (mm/dd/yy): 04-12-14

4-12-14
TIME: 12:15:27

WELL ID NUMBER: MW-11

WELL LOCATION: Product of Boundary

DEPTH OF SCREENED INTERVAL (to notch): 8.00 ft. to 18.00 ft.

INNER CASING: TYPE PVC ID: 2 inches

PURGE SAVER ID: NA

WATER LEVEL INDICATOR ID: 39082

TURBIDITY ID: NA

DEPTH TO WATER: 4.70 (ft BTOC) FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 8.00 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: NA FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: Bailer Bladder Pump Pump Type

PUMP ID: NA

PURGE START TIME: 1530

PURGE END TIME: 1535

TOTAL VOLUME PURGED: 2.5 gal

SITE CONDITIONS DURING PURGING: Ground dry.

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: None

S&A PLAN SAMPLING PROCEDURE FOLLOWED: YES NO IF NO, WHY WAS A DEVIATION NECESSARY:

RECORDED BY: Capt. J. H. [Signature] 4-12-14
(Signature)

QA CHECKED BY: [Signature] 4-28-14
(Signature)

GROUND WATER MICRO PURGE LOG

WELL ID: MW-11

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

TIME	L REMOVED	PURGE RATE (mL/min)	ORP (mv)	TEMP (C)	pH (s.u.)	COND (mS/cm)	DO (mg/L)	TURBIDITY (NTU)	DEPTH TO WATER (FT BTOC)	COMMENTS
										Monitoring well bailed dry. Cannot low flow
										Sample this well because water level will not stabilize.

CJS
4-12-14

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

Date (mm/dd/yy): 04/12/14

Su M Tu W Th F (Sa)

PAGE 1 OF 2

Task Team Members:

Crystal Hann-Cerdos

Hillary McGown-BayWest

Narrative (include time and location):

1255 Arrive at MW-11B. PID = 0.0 ppm. Initial depth to water = 1.05 ft BTDC (above ground sfc); total well depth = 264.10 (hard to feel bottom); depth to water following pump placement = 1.06 ft BTDC

1550 Begin purging well. Cycle set at 20s fill; 5 sec discharge; pressure set at 40 psi; flow rate = 200 mL/min (250) water is very brown & turbid looking. Purge until clearer before connecting to HoriBa.

1610 First parameter reading. Water still very brown & turbid looking.

1615 Turn pressure down to 30 psi = 200 mL/min

1620 Turn pressure down to 28 psi = 150 mL/min

1735 Done purging well. well stable after 15 liters. Collect [CGWMW-11B-0738-GW] for explosives (2 1-liter ampers)

1750 Done filling jars. Pack up equipment

Daily Weather Conditions: A.M.

P.M. ~80°F; clear skies, bright sun; mod-humid; 0.5 wind

Recorded By Hillary McGown

QA Checked By David Dyer 4-28-14

50

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant DELIVERY ORDER NO: CK01

Date (mm/dd/yy): 04/12/14

Su M Tu W Th F (Sa)

PAGE 2 OF 2

Task Team Members:

Crystal Hann - Leidos

Hilary McBrown - Bay West

Narrative (include time and location):

1755 Depart well location.

~~Area~~
4-12-14

Daily Weather Conditions: A.M.

P.M. ~80°F clear skies/bright sun/mod. humidity, 0-5 mph wind

Recorded By Hilary McBrown

QA Checked By

GROUND WATER MICRO PURGE SHEET

DELIVERY ORDER NO: CK01

PROJECT NAME: Holston Army Ammunition Plant

TIME: 15:25

DATE (mm/dd/yy): 04/2/14

WELL ID NUMBER: MW-11B

WELL LOCATION: Production Area / Boundary

DEPTH OF SCREENED INTERVAL (toc notch): 16.47ft. to 63.47ft.

INNER CASING: TYPE PVC ID: 2 inches 4 inches

PURGE SAVER ID: N/A

WATER LEVEL INDICATOR ID: model/sener# 01-1170

TURBIDITY ID: model# W-22XD; mfg # 3056003

DEPTH TO WATER: 1.05 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 16.47 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: 52.0 FT FROM MEASURE POINT

pull up to 48.0 ft

PURGE/SAMPLE METHOD: [] Bailer [x] Bladder Pump [] Pump Type

PUMP ID: 10861

PURGE START TIME: 1550

PURGE END TIME: 1735

TOTAL VOLUME PURGED: 15 liters

SITE CONDITIONS DURING PURGING: surface of water is bubbly/fizzy

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: well is very turbid; large chunks of red iron come up through tubing into flow through cell

S&A PLAN SAMPLING PROCEDURE FOLLOWED: YES [] NO IF NO, WHY WAS A DEVIATION NECESSARY:

RECORDED BY: [Signature] (Signature)

QA CHECKED BY: [Signature] 4-28-14 (Signature)

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant DELIVERY ORDER NO: CK01

Date (mm/dd/yy): 04/10/14

Su M Tu W Th F Sa PAGE 1 OF 2

Task Team Members:

Crystal Hann
H. Larry McGowan

~~_____~~
~~_____~~

Narrative (include time and location):

0805: Arrive at MW-48. PID = 3.0 ppm
Initial wd = 32.51 ft BTOC. Total depth = 68.40. ft BTOC. Removed sock.

0830 Prepare to bail dry This well will not stabilize.

0845: Left MW-48 to help H. Larry on MW-116.

0930 Arrive back at MW-48 to bail dry.

0953: Completed bailing MW-48 dry. Pumped 7.5 gal.

0955: Prepare to leave well to allow it to recharge.

1010: Decou water level meter.

1012: Depart MW-48 to allow it time to recharge.

1045: Collect sock sample after investigating MW-68. C.G.W.MW-048-Sock-0756 for SVOCs

Daily Weather Conditions: A.M. SUNNY 45°
P.M. _____

Recorded By Crystal Hann 4-10-14 QA Checked By Diavel Dugan 4-28-14

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TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

Date (mm/dd/yy): 04/10/14

Su M Tu W Th F Sa

PAGE 2 OF 2

Task Team Members:

Crystal Ham
H. Lang McGowan

~~col~~

Narrative (include time and location):

1050: Collect sample CGWMW-048-0730-GW for SVOCs + metals (mercury). Also, collect Field Duplicate CGWMW-048-0761-QA for metals + SVOCs.

1112: Complete collecting sample. Replaced sock

1115: Decon water level meter

1120: Depart location

~~col~~
4-10-14

Daily Weather Conditions: A.M. Sunny 60°

P.M.
Recorded By Crystal Ham 4-10-14 QA Checked By

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

DATE (mm/dd/yy): 04/10/14

TIME: 08 05

WELL ID NUMBER: MW-48

WELL LOCATION: Area B

DEPTH OF SCREENED INTERVAL (to notch): NA ft. to NA ft.

INNER CASING: TYPE PVC ID: 2 inches

PURGE SAVER ID: NA

WATER LEVEL INDICATOR ID: 39082 Solinst

TURBIDITY ID: 81354

DEPTH TO WATER: 32.51 (ft BTOL) FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: NA FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: NA FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: Bailor [] Bladder Pump [] Pump Type PUMP ID: NA

PURGE START TIME: 0930 PURGE END TIME: 0953

TOTAL VOLUME PURGED 7.5 gal

SITE CONDITIONS DURING PURGING: Grand dry.

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: Well in good condition. Water is fairly clear. Has sheen + odor.

S&A PLAN SAMPLING PROCEDURE FOLLOWED: YES [] NO IF NO, WHY WAS A DEVIATION NECESSARY:

RECORDED BY: Capt. J. L. ... 4-10-14 (Signature)

QA CHECKED BY: ... 4-28-14 (Signature)

GROUND WATER MICRO PURGE LOG

WELL ID: MW-48

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

TIME	L REMOVED	PURGE RATE (mL/min)	ORP (mv)	TEMP (C)	pH (s.u.)	COND (mS/cm)	DO (mg/L)	TURBIDITY (NTU)	DEPTH TO WATER (FT BTOC)	COMMENTS
	MW-48									bailed dry. This well will not stabilize when low flow sampling.

CAJ
4-10-14

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant DELIVERY ORDER NO: CK01

Date (mm/dd/yy): 04/15/14

Su M Tu W Th F Sa

PAGE 1 OF 2

Task Team Members:

Crystal Hann-Leidos

Hillary McGown-BayWest

Narrative (include time and location):

0940 Arrive at MW-55 location. PID=0.0ppm. Initial depth to water = 83.77 ft BTDC; total well depth = 119.10 ft BTDC (hard to feel); depth to water following pump placement = 83.15 ft BTDC.

1015 Begin purging MW-55.

1035 First parameter reading. TOOK some time to get water to surface, troubleshoot settings to get water level stable & fill Honda flow thru cell. Cycle = 40s fill, 20s discharge, pressure = 55 psi, flow rate = 50 mL/min.

1045 Adjust settings: cycle = 30s fill, 30s discharge, pressure = 55 psi; flow rate = 50 mL/min.

1250 Done purging, well stable after 6.70 liters. Collect CGWMW-055-0729-GW for SVOCs & REPA metals + mercury (2 1-liter ambers and 1 500 mL HNO₃ plastic). Also collect CGWMW-055-0760-QA for REPA metals + mercury (1 500 mL HNO₃ plastic).

Daily Weather Conditions: A.M. 24.5°F, rain/overcast, 5-10 MPH

P.M. ~40°F; snow, overcast, 5-10 MPH

Recorded By Hillary McGown QA Checked By Daniel Dyer 4-28-14

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TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant DELIVERY ORDER NO: CK01

Date (mm/dd/yy): 04/15/14

Su M Tu W Th F Sa

PAGE 2 OF 2

Task Team Members:

Crystal Hann-Leidos

Hilary McGown-BayWest

Narrative (include time and location):

1340 Don-filling sample jars.

1350 Depart well location.

~~HDM~~
4-15-14

Daily Weather Conditions: A.M. SEE PAGE 73
P.M.

Recorded By Hilary McGown QA Checked By

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

DATE (mm/dd/yy): 04/15/14

TIME: 09:40

WELL ID NUMBER: MW-55

WELL LOCATION: Background

DEPTH OF SCREENED INTERVAL (toc notch): 107.72ft. to 117.72ft.

INNER CASING: TYPE PVC ID: 2 inches

PURGE SAVER ID: N/A

WATER LEVEL INDICATOR ID: model/serial # 01-1170

TURBIDITY ID: mfg # 3052003

DEPTH TO WATER: 83.77 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 107.72 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: 112.70 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [] Bailor [X] Bladder Pump [] Pump Type PUMP ID: 10861

PURGE START TIME: 1015 PURGE END TIME: 1250

TOTAL VOLUME PURGED 6.70 liters

SITE CONDITIONS DURING PURGING: turbidity continually drops throughout purging.

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: hard to stabilize water level initially.

S&A PLAN SAMPLING PROCEDURE FOLLOWED: YES [] NO IF NO, WHY WAS A DEVIATION NECESSARY:

RECORDED BY: [Signature]

QA CHECKED BY: [Signature] 4-28-14

GROUND WATER MICRO PURGE LOG

WELL ID: MW-55

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

TIME	L REMOVED	PURGE RATE (mL/min)	ORP (mv)	TEMP (C)	pH (s.u.)	COND (mS/cm)	DO (mg/L)	TURBIDITY (NTU)	DEPTH TO WATER (FT BTOC)	COMMENTS
1035	0.20	50	306	9.71	6.95	0.523	5.66	109.0	84.0	
* 1040	0.45	50	298	9.49	7.21	0.516	5.04	111.0	11.0 84.05	
1050	0.70	50	297	9.55	7.22	0.520	6.50	124.0	84.06	
1055	0.95	50	296	9.50	7.21	0.534	4.20	138.0	84.06	
1100	1.20	50	295	9.30	7.21	0.552	4.02	165.0	84.06	
1110	1.70	50	295	9.25	7.14	0.584	4.12	163.0	84.06	clean out flow thru cell
1115	1.95	50	294	9.39	7.11	0.587	4.11	162.0	84.06	
1120	2.20	50	294	9.63	7.07	0.600	4.20	171.0	84.06	
* 1125	2.45	50	294	9.52	7.02	0.667	4.54	155.0	84.07	clean
1135	2.95	50	295	9.30	6.99	0.824	5.24	120.0	84.11	clean out flow thru cell
1140	3.20	50	294	9.43	7.00	0.827	5.21	106.0	84.11	
1145	3.45	50	293	9.36	6.99	0.835	5.24	97.7	84.11	
1150	3.70	50	293	9.37	6.99	0.840	5.26	88.3	84.11	
1155	3.95	50	293	9.20	6.99	0.857	5.31	87.6	84.11	
1200	4.20	50	293	8.90	7.00	0.868	5.35	83.3	84.11	

GROUND WATER MICRO PURGE LOG

WELL ID: MW-55

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

TIME	L REMOVED	PURGE RATE (mL/min)	ORP (mv)	TEMP (C)	pH (s.u.)	COND (mS/cm)	DO (mg/L)	TURBIDITY (NTU)	DEPTH TO WATER (FT BTWC)	COMMENTS
1205	4.45	50	292	8.64	7.00	0.878	5.38	78.9	84.12	
1210	4.70	50	292	8.52	7.00	0.879	5.44	50.5	84.12	
1215	4.95	50	291	8.66	7.01	0.877	5.38	52.8	84.12	
1220	5.20	50	291	8.33	7.01	0.880	5.40	42.4	84.13	
1225	5.45	50	290	8.42	7.00	0.884	5.36	38.1	84.13	
1230	5.70	50	290	8.34	7.01	0.876	5.41	35.4	84.14	
1235	5.95	50	289	8.48	7.01	0.878	5.45	33.0	84.14	
1240	6.20	50	288	8.60	7.01	0.876	5.37	31.5	84.15	
1245	6.45	50	287	8.89	7.01	0.866	5.45	32.9	84.15	
1250	6.70	50	287	8.76	7.01	0.869	5.43	32.2	84.16	
	Collect sample									

~~HP~~
4-15-14

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant DELIVERY ORDER NO: CK01

Date (mm/dd/yy): 04/10/14

Su M Tu W Th F Sa

PAGE 1 OF 1

Task Team Members:

Crystal Ham

Hillary Mc Gowen

~~_____~~
~~_____~~
~~_____~~

Narrative (include time and location):

1015: Arrive at MW-68 to check water level
We bail this well dry if there is less than 5 ft of water column because the water level will drop quickly and take 24 hours to recharge

1020: PID = 0.0 ppm. Initial wl = 28.06 ft BTOC
Approximately 15 ft of water column. Should be able to low flow sample this well. Total Depth = 43.31 ft BTOC.

1035: Depart location.

Note: Hillary completed this well

(2)
4-10-14

Daily Weather Conditions: A.M. Sunny 57°

P.M. _____

Recorded By Crystal Ham 4-10-14 QA Checked By David Dyer 4-28-14

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant DELIVERY ORDER NO: CK01

Date (mm/dd/yy): 04/13/14

(Su) M Tu W Th F Sa

PAGE 1 OF 1

Task Team Members:

Crystal Hann-Leidos

William McGown-BayWest

Narrative (include time and location):

1330 Arrive at MW-68 well location. PID=0.0 ppm. initial depth to water=28.31 ft BDC; total well depth=43.30 ft BDC; depth to water following pump placement=28.30 ft BDC.

1355 Begin purging.

1415 First parameter reading. Troubleshooting settings to achieve desired flow rate - water level is stable. Cycle = 15s fill; 15s discharge; Pressure = 10 psi; flow rate = 250 mL/min -> drops down to 200 mL/min.

1440 Done purging. Well stable after 5.75 liters. Collected

[CGWMW-068-0734-6W] for TNX, DNx, MNx (MNA);

PDX & ReRA metals + mercury = 3 1-liter ambers and 1

500 ml HNO3 plastic total.

1500 Done filling sample jars. Pack up equipment.

1515 Depart well location

~~WMA~~
4-13-14

Daily Weather Conditions: A.M.

P.M. ~80°F; bright sun; mod. humidity; 0-5 MPH wind

Recorded By William McGown

QA Checked By Daniel Dwyer 4-28-14

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

DATE (mm/dd/yy): 04/13/14

TIME: 13:30

WELL ID NUMBER: MW-68

WELL LOCATION: SWMU 20

DEPTH OF SCREENED INTERVAL (to notch): 23.57 ft. to 43.57 ft.

INNER CASING: TYPE PVC ID: 2 inches

PURGE SAVER ID: N/A

WATER LEVEL INDICATOR ID: model/genel# 01-1170

TURBIDITY ID: mfg # 3052003

DEPTH TO WATER: 28.31 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: ~~33.0~~ ⁴¹³⁻¹⁴ FT FROM MEASURE POINT → 23.57

DEPTH TO PUMP INTAKE: 330 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [] Bailer [X] Bladder Pump [] Pump Type

PUMP ID: dedicated

PURGE START TIME: 1355

PURGE END TIME: 1440

TOTAL VOLUME PURGED 5.75 liters

SITE CONDITIONS DURING PURGING: water is very clear; stabilizes quickly.

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: very little drawdown even while troubleshooting settings at a faster flow rate

S&A PLAN SAMPLING PROCEDURE FOLLOWED: YES [] NO IF NO, WHY WAS A DEVIATION NECESSARY:

RECORDED BY: [Signature]

QA CHECKED BY: [Signature] 4-28-14

GROUND WATER MICRO PURGE LOG

WELL ID: MW-68

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

TIME	L REMOVED	PURGE RATE (mL/min)	ORP (mv)	TEMP (C)	pH (s.u.)	COND (mS/cm)	DO (mg/L)	TURBIDITY (NTU)	DEPTH TO WATER (FT BTOC)	COMMENTS
1415	0.75	250	248	16.81	7.05	0.805	2.71	0.0	28.32	
1420	1.75	200	243	16.80	7.04	0.808	2.45	0.0	28.32	
1425	2.75	200	240	16.92	7.04	0.810	2.39	0.0	28.32	
1430	3.75	200	237	16.78	7.04	0.811	2.36	0.0	28.32	
1435	4.75	200	236	16.81	7.04	0.809	2.34	0.0	28.32	
1440	5.75	200	235	16.88	7.04	0.808	2.31	0.0	28.32	
	Collect sample									

~~ARM~~
4-13-14

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant DELIVERY ORDER NO: CK01

Date (mm/dd/yy): 04-11-14

Su M Tu W Th F Sa

PAGE 1 OF 1

Task Team Members:

Crystal Harris
Hillary McGowan

~~_____~~
~~_____~~
~~_____~~

Narrative (include time and location):

1435: Arrive at MW-70. PID = 0.0 ppm
Initial WL = ~~29.42~~^{26.42} ft BTOC. Total depth = 52.90 ft BTOC. Soft.

1440: Well has a dedicated pump. Begin to set up.

1446: Turn on pump

1500: Water level stabilized at ~~29~~^{26.72} ft BTOC
~~4-11-14~~ ~~20~~⁴⁰ psi. - 40/20. at 50ml/min
Difficult to stabilize.

1640 Collect CGWMW-070-0761 - QA Field
Duplicate for Mercury and CGWMW-070-0748-GW
for Mercury

1655 Turn off pump

1700 Depart location

~~_____~~
~~_____~~
csh
4-11-14

Daily Weather Conditions: A.M. Sunny 55°

P.M. Sunny 75°

Recorded By Crystal Harris

QA Checked By David Dwyer 4-28-14

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

DATE (mm/dd/yy): 04-11-14

TIME: 14:35

WELL ID NUMBER: MW-70

WELL LOCATION: Area B

DEPTH OF SCREENED INTERVAL (toc notch): 42.50 ft. to 52.50 ft.

INNER CASING: TYPE PVC ID: 2 inches

PURGE SAVER ID: NA

WATER LEVEL INDICATOR ID: 39082 Solinst

TURBIDITY ID: 81354

DEPTH TO WATER: 26.42 (ft BTOC) FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 42.50 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: 44.00 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [] Bailer [x] Bladder Pump [] Pump Type

PUMP ID: Dedicated Pump

PURGE START TIME: 1446

PURGE END TIME: 1640

TOTAL VOLUME PURGED 1.5 gal

SITE CONDITIONS DURING PURGING: Ground has dried up since doing the landfill inspection

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: Dedicated pump

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [x] YES [] NO IF NO, WHY WAS A DEVIATION NECESSARY:

RECORDED BY: Capt. H... 4-11-14 (Signature)

QA CHECKED BY: Daniel D... 4-28-14 (Signature)

GROUND WATER MICRO PURGE LOG

WELL ID: MW-70PROJECT NAME: Holston Army Ammunition PlantDELIVERY ORDER NO: CK01

TIME	M L REMOVED	PURGE RATE (mL/min)	ORP (mv)	TEMP (C)	pH (S.U.)	COND (mS/cm)	DO (mg/L)	TURBIDITY (NTU)	DEPTH TO WATER (FT BTOW)	COMMENTS
1510	1250	50	411	13.36	4.97	0.219	6.89	634.0	26.95	Water fairly clear.
1515	1500	50	424	13.36	4.94	0.196	3.00	539.0	26.95	
1520	1750	50	429	13.72	4.94	0.182	2.19	516.0	26.96	
1525	2000	50	436	13.79	4.90	0.171	1.73	444.0	26.97	
1530	2250	50	460	13.79	4.84	0.170	1.00	338.0	26.97	Clear out flow cell
1535	2500	50	483	13.42	4.83	0.142	2.46	262.0	26.97	
1540	2750	50	501	13.58	4.82	0.142	2.31	251.0	26.97	
1545	^{at 4-11-14} 3000	50	501	13.64	4.80	0.142	1.64	255.0	26.97	
1550	3250	50	503	13.62	4.80	0.142	0.85	236.0	26.97	
1555	^{at 4-11-14} 3500	50	514	13.59	4.79	0.142	0.67	188.0	26.97	
1600	3750	50	518	13.56	4.78	0.143	0.70	195.0	26.97	
1605	4000	50	523	13.64	4.78	0.142	0.85	217.0	26.97	
1610	4250	50	527	14.23	4.78	0.143	1.09	220.0	26.97	Clear out cell
620 1615	^{at 4-11-14} 4750	50	513	13.10	4.80	0.150	0.85	172.0	26.97	
1625	5000	50	525	13.58	4.78	0.148	0.88	174.0	26.97	

GROUND WATER MICRO PURGE LOG

WELL ID: MW-70

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

TIME	L REMOVED	PURGE RATE (mL/min)	ORP (mv)	TEMP (C)	pH (s.u.)	COND (mS/cm)	DO (mg/L)	TURBIDITY (NTU)	DEPTH TO WATER (FT BTOC)	COMMENTS
1630	5250	50	533	13.44	4.78	0.143	0.99	186.0	26.97	
1635	5500	50	537	13.46	4.78	0.143	1.00	194.0	26.97	
1640	5750	50	539	13.48	4.78	0.144	1.01	198.0	26.97	
		Collect	Sample							Water clear
END 4-11-03										

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant DELIVERY ORDER NO: CK01

Date (mm/dd/yy): 4/8/14

Su M Tu W Th F Sa

PAGE 1 OF 1

Task Team Members:

Crystal Hann-Leidos

Hillary McBrown - Bay West

Narrative (include time and location):

0830 Arrive at MW-73. initial water level = 4.47 ft BTDC; PID = 0.0 ppm
Total depth = 15.22 ft BTDC; depth to water after pump placement = 4.48 ft BTDC

0900 Begin purging MW-73. Cycle = 10s fill, 5s discharge. Pressure = 18 psi
Flow rate = 275 mL/min

0955 Done purging - well is stable after 13.75 Liters.

1000 Begin collecting [CGWMW-073-0749-GW] for pesticides and bromacil -
collect MS/MSD w/ same ID = 12 1 liter ambers

also collect field dup [CGWMW-073-0760-QA] for pesticides
and bromacil = 4 1 liter ambers

1005 = sample time on labels

1100 Done filling all 16 1-liter ambers. Pack up equipment.

1110 Depart MW-73 well location.

[Signature]
4-8-14

Daily Weather Conditions: A.M. ~ 50°F, overcast, 0-5 mph wind

P.M.

Recorded By Hillary McBrown

QA Checked By Dick Dyer 4-28-14

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

DATE (mm/dd/yy): 4/8/14

TIME: 08:30

WELL ID NUMBER: MW-73

WELL LOCATION: Area B

DEPTH OF SCREENED INTERVAL (toc notch): 14.5 ft. to 6.5 ft.

INNER CASING: TYPE PVC ID: 2 inches

PURGE SAVER ID: N/A 4/8/14 JDM

WATER LEVEL INDICATOR ID: ~~model # W-22XD; mfg # 1096006~~ model/sener #: 01-1170

TURBIDITY ID: model # W-22XD; mfg # 1096006

DEPTH TO WATER: 4.47 (ft BTOC) FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 6.50 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: 11.50 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [] Bailer [X] Bladder Pump [] Pump Type PUMP ID: 10861

PURGE START TIME: 0900 PURGE END TIME: 0955

TOTAL VOLUME PURGED 13.75

SITE CONDITIONS DURING PURGING: Nothing notable

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: first reading collected after purging to clear discharged water and let flow thru cell fill.

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [X] YES [] NO IF NO, WHY WAS A DEVIATION NECESSARY:

RECORDED BY: [Signature] (Signature)

QA CHECKED BY: [Signature] 4-28-14 (Signature)

GROUND WATER MICRO PURGE LOG

WELL ID: MW-073

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

TIME	L REMOVED	PURGE RATE (mL/min)	ORP (mv)	TEMP (C)	pH (s.u.)	COND (mS/cm)	DO (mg/L)	TURBIDITY (NTU)	DEPTH TO WATER (FT BTOC)	COMMENTS
0910	2.75	275	378	7.36	6.36	0.368	0.33	285.0	4.55	
0915	4.125	275	341	7.16	6.38	0.360	0.00	158.0	4.55	*pull probe out of cell to check DO probe
0925	5.50	275	303	7.17	6.36	0.345	0.00	75.0	4.55	
0930	6.875	275	280	7.14	6.39	0.345	0.00	47.4	4.55	
0935	8.25	275	272	7.15	6.40	0.344	0.00	47.9	4.55	
0940	9.625	275	260	7.17	6.39	0.342	0.00	40.5	4.55	
0945	11.0	275	255	7.18	6.37	0.344	0.00	38.5	4.57	
0950	12.375	275	247	7.21	6.39	0.342	0.00	37.7	4.57	
0955	13.75	275	241	7.22	6.38	0.342	0.00	37.1	4.57	
1000		Collect sample								
HDM 8-14										

2 *
minutes

1.375 ~~OL~~ / 5 min

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant DELIVERY ORDER NO: CK01

Date (mm/dd/yy): 04/08/14

Su M Tu W Th F Sa

PAGE 1 OF 1

Task Team Members:

Crystal Hann
Hillary McGown
~~_____~~
~~_____~~

CG

Narrative (include time and location):

0928: Arrive at MW-75 after helping Hillary
 Set up on her well.

0929: PID = 1.2 pp. Initial wd = 4.12 ft BToc
 Total Depth = 15.30 ft BToc

This well cannot be low flowed ^{ce 4/2/14} sampled
 because the water level continues to drop.

0932 Prepare to bail dry

0940 Well purged dry after removing
 approximately 3.25 gal of water. Will
 allow time to recharge

0950 Depart location

1040: Arrive back at MW-75.

1050: Collect sample CG WMW - 075 - 0750-GW
 for Pesticides and Bromacil.

1105: Depart location after helping Hillary load up at MW-73.

Daily Weather Conditions: A.M. Cloudy 55°

P.M. _____

Recorded By Crystal Hann 4-8-14 QA Checked By Dirk Dyer 4/28/14

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

DATE (mm/dd/yy): 04/08/14

TIME: 09:28

WELL ID NUMBER: MW-75

WELL LOCATION: Area B

DEPTH OF SCREENED INTERVAL (toc notch): 5.50 ft. to 15.50 ft.

INNER CASING: TYPE PVC ID: 2 inches

PURGE SAVER ID: NA

WATER LEVEL INDICATOR ID: 39082 Solinst

TURBIDITY ID: NA

DEPTH TO WATER: 4.12 ft bptoc FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 5.50 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: NA FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [x] Bailer [] Bladder Pump [] Pump Type PUMP ID: NA

PURGE START TIME: 0934 PURGE END TIME: 0940

TOTAL VOLUME PURGED: 3.25 gal

SITE CONDITIONS DURING PURGING: windy

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: Drainage Ditch wet in vicinity of monitoring well

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [x] YES [] NO IF NO, WHY WAS A DEVIATION NECESSARY:

RECORDED BY: Capt J. H. [Signature] 4-8-14 QA CHECKED BY: [Signature] 4-28-14

GROUND WATER MICRO PURGE LOG

WELL ID: Mw-75

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

TIME	L REMOVED	PURGE RATE (mL/min)	ORP (mv)	TEMP (C)	pH (s.u.)	COND (mS/cm)	DO (mg/L)	TURBIDITY (NTU)	DEPTH TO WATER (FT BTOC)	COMMENTS
	Monitoring									well is unable to be low flow sampled because water level won't stabilize. Bailed Dry.
	sampled									
	Bailed									

*ADP
4-8-14*

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant DELIVERY ORDER NO: CK01

Date (mm/dd/yy): 4-8-14

Su M (Tu) W Th F Sa

PAGE 1 OF 1

Task Team Members:

Crystal Harr

H. Mary Mc Gown

CSJ

Narrative (include time and location):

1020: Arrive at MW-86 after decomng the water level meter. PID = 0.0

Initial water level = 9.18 ft BTOC. Total depth = 19.60 ft BTOC.

1025: This well can not be low flow sampled because the water level won't stabilize.

Prepare to bail dry.

1035: Well purged dry after purging 2.5 gal. Will leave and allow well time to recharge.

1140: Collect CGWMW-086-0751-GW for pesticides and bromacil

1150: Depart location

CSJ
4-8-14

Daily Weather Conditions: A.M. Cloudy 55°

Recorded By ^{P.M.} *Crystal Harr* 4-8-14 QA Checked By *Daniel Dwyer* 4-28-14

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

DATE (mm/dd/yy): 04/08/14

TIME: 10:20

WELL ID NUMBER: Mw-86

WELL LOCATION: Area B

DEPTH OF SCREENED INTERVAL (toc notch): 9.91 ft. to 19.91 ft.

INNER CASING: TYPE PVC ID: 2 inches

PURGE SAVER ID: NA

WATER LEVEL INDICATOR ID: 39082 Solinst

TURBIDITY ID: NA

DEPTH TO WATER: 9.18 (ft BTOC) FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 9.91 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: — FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [x] Bailor [] Bladder Pump [] Pump Type PUMP ID: NA

PURGE START TIME: 1028 PURGE END TIME: 1035

TOTAL VOLUME PURGED 2.5 gal

SITE CONDITIONS DURING PURGING: cloudy

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: None

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [x] YES [] NO IF NO, WHY WAS A DEVIATION NECESSARY:

RECORDED BY: [Signature] 4-8-14 (Signature)

QA CHECKED BY: [Signature] 4-28-14 (Signature)

GROUND WATER MICRO PURGE LOG

WELL ID: MW-86

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

TIME	L REMOVED	PURGE RATE (mL/min)	ORP (mv)	TEMP (C)	pH (s.u.)	COND (mS/cm)	DO (mg/L)	TURBIDITY (NTU)	DEPTH TO WATER (FT BTOC)	COMMENTS
										This monitoring well cannot be low flow sampled. The water level won't stabilize. Purged dry
Call 4-8-14										

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant DELIVERY ORDER NO: CK01

Date (mm/dd/yy): 04-13-14

(Su) M Tu W Th F Sa

PAGE 1 OF 1

Task Team Members:

Crystal Hans

Hillary McGowan

CJH
4-13-14

Narrative (include time and location):

1033: Arrive at mw-91 after helping Hillary at
Mw-91B. PID = 0.2 ppm. Initial
water level = 4.82 ft BTOC. Total depth =
16.1 ft BTOC.

1052 Turn on pump. Tubing leaking. Turn pump off

1111: Tubing Replaced Turn pump back on.

Stable at 10150 30psi. Water level

Stable at 4.91 ft BTOC. Note: Spent

^{ca 4-13-14}
~~Morning~~ morning trying to find a well key that

will open lock 5660. Lowes messed up the one

key that worked when trying to make replacement

keys. Will go to a lock smith on 4-14-14.

1215 Sampled CGWMW-091-0742-GW for
Explosives.

1254: Complete sampling + begin to pack up

1255: Depart location

Daily Weather Conditions: A.M. Partly Cloudy 60°

P.M.

Recorded By Crystal Hans 4-13-14 QA Checked By Derek Dyer 4-28-14

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

DATE (mm/dd/yy): 04-13-14

TIME: 10:33

WELL ID NUMBER: MW-91

WELL LOCATION: Production / Boundary

DEPTH OF SCREENED INTERVAL (to notch): 6.44 ft. to 16.44 ft.

INNER CASING: TYPE PVC ID: 2 inches

PURGE SAVER ID: NA

WATER LEVEL INDICATOR ID: 39082

TURBIDITY ID: 81354

DEPTH TO WATER: 4.82 (ft BTOC) FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 6.44 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: 11.44 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [] Bailer [X] Bladder Pump [] Pump Type

PUMP ID: 15198

PURGE START TIME: 1111

PURGE END TIME: 1215

TOTAL VOLUME PURGED: 1 gal

SITE CONDITIONS DURING PURGING: Dry

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: Conditions dry. Able to drive to location, Two snakes at well location nearby

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [X] YES [] NO IF NO, WHY WAS A DEVIATION NECESSARY:

RECORDED BY: Capt. [Signature] 4-13-14

QA CHECKED BY: [Signature] 4-28-14

GROUND WATER MICRO PURGE LOG

WELL ID: Mw-91

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

TIME	L REMOVED	PURGE RATE (mL/min)	ORP (mv)	TEMP (C)	pH (s.u.)	COND (mS/cm)	DO (mg/L)	TURBIDITY (NTU)	DEPTH TO WATER (FT BTOC)	COMMENTS
1125	1500	100	375	13.59	5.43	0.097	2.10	7999	4.93	Reduced to 50 ml/min to reduce turbidity.
1130	1725 ¹⁷⁵⁰	50	357	13.92	5.39	0.096	1.71	7999	4.93	28 ps. 10/5
1135	2000	50	355	16.07	5.37	0.096	1.69	7999	4.92	Clear out Plowcell
1145	2250 ²²⁵⁰	50	331	18.54	5.37	0.091	2.17	726.0	4.91	
1150	2750	50	326	19.21	5.36	0.091	2.00	712.0	4.91	
1155	3000	50	319	20.07	5.34	0.091	2.09	712.0	4.91	
1200	3250	50	317	20.38	5.35	0.091	1.96	710.0	4.91	
1205	3500	50	315	20.71	5.34	0.092	1.87	717.0	4.91	
1210	3750	50	312	20.88	5.34	0.092	1.89	720.0	4.91	
1215	4000	50	309	20.92	5.33	0.092	1.86	730.0	4.91	
		Collect		Sample						

End
4-13-14

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant DELIVERY ORDER NO: CK01

Date (mm/dd/yy): 04/13/14

(Su) M Tu W Th F Sa PAGE 1 OF 1

Task Team Members:

Crystal Hann-Leidos
Hillary McBrown-BayWest

Narrative (include time and location):

1005 Arrive at MW-091B. PID = 0.0 ppm; initial depth to water = 4.76 ft BTDC; total well depth = 46.00 (hard to feel bottom); depth to water following pump placement = 4.68 ft BTDC
1020 Begin purging well. Two snakes at well upon arrival. Hide under concrete pad.
1045 First parameter reading. Troubleshoot settings to get water level stable and fill monitor flow thru cell. Cycle - 40's fill; 20's discharge; pressure = 20 psi; flow rate = 75 mL/min
1145 Done purging well. Stable after 8.25 liters. Collect [CGWMMW-091B-0743-GW] for explosives (2-1 liter ampers).
1205 Done filling sample jars. Pack up equipment.
-help Crystal fill jars/pack up.
1250 Depart well location.

ADL
4-13-14

Daily Weather Conditions: A.M. ~60°F; partly cloudy; bright sun; mod. humid.; 0-5 MPH wind
P.M.

Recorded By Hillary McBrown QA Checked By Derek Dyer 4-28-14

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

DATE (mm/dd/yy): 04/13/14

TIME: 10:05

WELL ID NUMBER: MW-91B

WELL LOCATION: Production Area / Boundary

DEPTH OF SCREENED INTERVAL (to notch): 23.15 ft. to 43.15 ft.

INNER CASING: TYPE PVC ID: 2 inches 4 inches

PURGE SAVER ID: N/A

WATER LEVEL INDICATOR ID: model/serial# 01-1170

TURBIDITY ID: mfg# 3056003

DEPTH TO WATER: 4.76 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 23.15 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: 33.0 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [] Bailer [X] Bladder Pump [] Pump Type PUMP ID: 10861

PURGE START TIME: 1020 PURGE END TIME: 1145

TOTAL VOLUME PURGED 8.25 liters

SITE CONDITIONS DURING PURGING: water is very clear

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: two snakes present upon arrival and hide under concrete pad.

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [X] YES [] NO IF NO, WHY WAS A DEVIATION NECESSARY:

RECORDED BY: [Signature] (Signature)

QA CHECKED BY: [Signature] 4-28-14 (Signature)

GROUND WATER MICRO PURGE LOG

WELL ID: MW-91B

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

TIME	L REMOVED	PURGE RATE (mL/min)	ORP (mv)	TEMP (C)	pH (s.u.)	COND (mS/cm)	DO (mg/L)	TURBIDITY (NTU)	DEPTH TO WATER (FT BTOC)	COMMENTS
1045	4.0	75	265	16.47	7.19	0.429	2.54	0.0	5.11	
1050	4.375	75	257	16.68	7.41	0.413	2.32	0.0	5.11	
1055	4.75	75	252	16.39	7.48	0.414	2.21	0.0	5.11	
1100	5.125	75	245	16.06	7.53	0.411	2.12	0.0	5.11	
1105	5.375	50	239	15.97	7.54	0.410	2.06	0.0	5.11	
1110	5.625	50	234	16.96	7.54	0.408	2.08	0.0	5.11	
1115	6.0	75	229	16.83	7.54	0.408	2.09	0.0	5.11	
1120	6.375	75	221	16.09	7.56	0.408	2.02	0.0	5.11	
1125	6.75	75	216	16.28	7.56	0.406	1.99	0.0	5.11	
1130	7.125	75	211	16.53	7.56	0.404	2.02	0.0	5.11	
1135	7.5	75	208	16.86	7.54	0.407	2.03	0.0	5.11	
1140	7.875	75	201	16.91	7.54	0.406	2.01	0.0	5.11	
1145	8.25	75	197	16.88	7.54	0.406	2.00	0.0	5.11	
	collect sample.									

[Signature]
4-13-14

0.375 L/5min

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant DELIVERY ORDER NO: CK01

Date (mm/dd/yy): 04-15-14

Su M (Tu) W Th F Sa PAGE 1 OF 1

Task Team Members:

Crystal Han
Hillary McGinn

~~_____~~
~~_____~~
~~_____~~

Narrative (include time and location):

1000: Arrive at MW-99. PZD = 0.0 ppm.
Initial water level = 9.50 ft BTOC.
Total Depth = 18.60 ft BTOC

1025: Turn on pump 1119 38 psi. water
level stable at ^{est} 9.60 ft BTOC 200 mL/min

1130 Collect sample CGW MW-099-0747-GW
for Explosives + MNX, TNX, DNx + extra vol to NOLMSD.
Collect Field duplicate CGW MW-099-⁰⁷⁶¹~~0747~~-GW
for Explosives, MNX, TNX, + DNx. _{CR 4-15-14}

1240: Turn off pump. All 12 ^{canisters} Amber
are full.

1245: Depart site to bring Hillary her bottles

1306: Waiting at Gate 64 for security

1530 Collect Equipment Rinse CGW MW-ER-0759-ER
for TNX, MNX, DNx

Daily Weather Conditions: A.M. Rain / wind 45°

P.M.

Recorded By Crystal Han 4-15-14 QA Checked By Dink Dye 4-28-14

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

DATE (mm/dd/yy): 04/15/14

TIME: 10:00

WELL ID NUMBER: Mw-99

WELL LOCATION: Production / Source

DEPTH OF SCREENED INTERVAL (toc notch): 8.40 ft. to 16.40 ft.

INNER CASING: TYPE PVC ID: 2 inches

PURGE SAVER ID: NA

WATER LEVEL INDICATOR ID: 39082

TURBIDITY ID: 81354

DEPTH TO WATER: 9.50 (ft BTOC) FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 8.40 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: 13.50 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [] Bailer [x] Bladder Pump [] Pump Type

PUMP ID: 15861

PURGE START TIME: 1025

PURGE END TIME: 1240 1130
CK 4-15-14

TOTAL VOLUME PURGED: 10.6 L, 2.8 gal

SITE CONDITIONS DURING PURGING: Rain - Ground getting soft, windy

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: None

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [x] YES [] NO IF NO, WHY WAS A DEVIATION NECESSARY:

RECORDED BY: Cynthia 4-15-14
(Signature)

QA CHECKED BY: [Signature] 4-28-14
(Signature)

GROUND WATER MICRO PURGE LOG

WELL ID: MW 29

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

TIME	ML REMOVED	PURGE RATE (mL/min)	ORP (mv)	TEMP (C)	pH (s.u.)	COND (mS/cm)	DO (mg/L)	TURBIDITY (NTU)	DEPTH TO WATER (FT BTOC)	COMMENTS
1035	2000	200	415	9.01	5.64	0.212	6.13	7999	9.61	Reduce pressure to try to get turb down 35ps.
1040	2875	175	419	8.99	5.71	0.204	5.06	7999	9.61	
1045	3750	175	436	8.94	5.76	0.191	4.46	7999	9.61	
1050	4625	175	441	8.93	5.81	0.190	5.75	7999	9.61	clean out cell turn down pressure
1055	5375	150	450	8.71	5.84	0.195	4.38	7999	9.61	clean out cell
1100	6125	150	445	8.69	5.85	0.193	4.69	7999	9.61	
1105	6875	150	444	8.69	5.87	0.193	4.82	891.0	9.61	
1110	7625	150	446	8.74	5.86	0.193	4.73	874.0	9.61	clean out cell
1115	8375	150	450	8.86	5.79	0.193	5.46	772.0	9.61	
1120	9125	150	449	8.89	5.80	0.197	4.86	723.0	9.61	
1125	9875	150	447	8.80	5.81	0.197	4.96	699.0	9.61	
1130	10625	150	447	8.91	5.80	0.197	4.97	694.0	9.61	
				Collect sample						
					cell					
					416-14					

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant DELIVERY ORDER NO: CK01

Date (mm/dd/yy): 04/08/14

Su M Tu W Th F Sa

PAGE 1 OF 1

Task Team Members:

Crystal Horn

Hillary McGowan

Call

Narrative (include time and location):

1240: Arrive at MW-101. PFD = 0.0

Initial water level = 12.05 ft BTOC

Total Depth = 19.40 ft BTOC

1300: Turned on pump

1310: Water to the surface. Water level stabilized at 12:05 ft BTOC

1347: Cleaned out flow through cell. Turbidity sensor seems not to be working correctly. Called Equipment + Supply and told them to send a new one for delivery tomorrow

1410 Collect sample CGMMW-101-0735-BW also collected MS/MSD for Explosives

1525: Complete collecting sample.

1540: Depart location

Call

4-8-14

Daily Weather Conditions: A.M.

Cloudy 50°

P.M.

Cloudy 50°

Recorded By

Crystal Horn 4-8-14

QA Checked By

Derek Dyer 4-28-14

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

DATE (mm/dd/yy): 04/08/2014

TIME: 12:20

WELL ID NUMBER: MW-101

WELL LOCATION: Production Area

DEPTH OF SCREENED INTERVAL (to notch): 9.61 ft. to 19.61 ft.

INNER CASING: TYPE PVC ID: 2 inches

PURGE SAVER ID: NA

WATER LEVEL INDICATOR ID: 39082 Solinst

TURBIDITY ID: 81357

DEPTH TO WATER: 12.05 (ft BTOG) FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 9.61 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: 16.00 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [] Bailer [x] Bladder Pump [] Pump Type PUMP ID: 15198

PURGE START TIME: 1300 PURGE END TIME: 1525 1410
4-8-14 LSK

TOTAL VOLUME PURGED: 2.6 gal

SITE CONDITIONS DURING PURGING: Sunny with on and off clouds

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: None.

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [x] YES [] NO IF NO, WHY WAS A DEVIATION NECESSARY:

RECORDED BY: Captel Hurn 4-8-14
(Signature)

QA CHECKED BY: Daniel Dwyer 4-28-14
(Signature)

GROUND WATER MICRO PURGE LOG

WELL ID: MW-101

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

TIME	m L REMOVED	PURGE RATE (mL/min)	ORP (mv)	TEMP (C)	pH (s.u.)	COND (mS/cm)	DO (mg/L)	TURBIDITY (NTU)	DEPTH TO WATER (FT BTOC)	COMMENTS
1315	750	150	332	10.18	6.37	0.340	7.09	163.0	12.05	
1320	1500	150	326	9.71	6.38	0.314	11.70	155.0	12.05	
1340	4500	150	325	9.93	6.29	0.335	7.30	167.2	12.05	Cleaved outflow through cell
1345	6000	150	321	9.68	6.32	0.327	6.78	162.8	12.05	
1355	7500	150	311	9.67	6.34	0.321	6.65	152.4	12.05	
1400	8250	150	310	9.90	6.36	0.321	6.55	149.9	12.05	
1405	9000	150	312	9.86	6.34	0.320	6.33	148.9	12.05	
1410	9750	150	312	9.87	6.35	0.320	6.30	149.2	12.05	Water Clear
			Collect	Sample						

CFJ
4-9-14

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant DELIVERY ORDER NO: CK01

Date (mm/dd/yy): 4/8/14

Su M Tu W Th F Sa

PAGE 1 OF 1

Task Team Members:

Crystal Hann-Leidos

Hilary McGowan - BayWest

Narrative (include time and location):

1240 Arrive at MW-101B. PID=0.0 ppm; initial water level = 11.78 ft BTDC
total depth = 269.10 (soft bottom); depth to water after pump
placement = 11.82 ft BTDC.

1305 Begin purging MW-101B. Cycle = 10s fill; 5s discharge Pressure
set at 40 psi. Flow rate = 150 mL/min

1420 Done purging Well is approx. stable after 11 liters. Turbidity is
bouncing around somewhat but is bouncing around the same
numbers. within ~20 NTUs.

1430 Collect ~~CGMMW-101B-0736-GW~~ ^{NR 4-8-14} [CGMMW-101B-0736-GW] for explosives (2 1-liter ambers)
-also collect [CGMMW-101B-0760-WA] for explosives (2 1-liter ambers)
~~CGMMW-101B-0760-WA~~ ^{NR 4-8-14} -pack up equipment.

1510 Depart well location. Decon. pump and prep for equip. rinse.

1530 Collect equipment rinse [CGMMW-ER-0759-ER] for
explosives (2 1-liter ambers)

~~Signature~~
4-8-14

Daily Weather Conditions: A.M. -

P.M. ~60° F; overcast/partly cloudy; 0-5 MPH wind

Recorded By Hilary McGowan

QA Checked By Diink Dyer 4-28-14

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

DATE (mm/dd/yy): 04/08/14

TIME: 12:40

WELL ID NUMBER: MW-101B

WELL LOCATION: Area B - Limited Access Area

DEPTH OF SCREENED INTERVAL (toc notch): 26.81 ft. to 63.81 ft.

INNER CASING: TYPE PVC ID: 2 inches

PURGE SAVER ID: N/A

WATER LEVEL INDICATOR ID: model/seri # = 01-1170

TURBIDITY ID: model # W-22X1; mfg # 1096006

DEPTH TO WATER: 11.78 (ft BTOC) FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 26.81 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: 58.81 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [] Bailer [x] Bladder Pump [] Pump Type PUMP ID: 10861

PURGE START TIME: 1305 PURGE END TIME: 1420

TOTAL VOLUME PURGED 11 liters

SITE CONDITIONS DURING PURGING: turbidity bounces around ~ 20 NTU from where it is recorded

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: allow time between initial purging before recording parameters to allow flow thru cells to fill and purge initial discharged water.

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [x] YES [] NO IF NO, WHY WAS A DEVIATION NECESSARY:

RECORDED BY: [Signature] (Signature)

QA CHECKED BY: [Signature] 4-28-14 (Signature)

GROUND WATER MICRO PURGE LOG

WELL ID: MW-101B

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

TIME	L REMOVED	PURGE RATE (mL/min)	ORP (mv)	TEMP (C)	pH (s.u.)	COND (mS/cm)	DO (mg/L)	TURBIDITY (NTU)	DEPTH TO WATER (FT BTOC)	COMMENTS
1320	2.25	150	-4.0	13.06	7.14	0.522	3.19	174.0	11.86	
1325	3.0	150	-8.0	12.66	7.13	0.530	0.76	150.0	11.86	
1330	3.75	150	-13	12.61	7.13	0.525	0.25	170.0	11.86	
1340	5.25	150	-20	12.00	7.12	0.501	0.09	146.0	11.86	*clean out flow thru cell
1345	6.0	150	-24	11.84	7.12	0.499	0.00	116.0	11.86	
1350	6.75	150	-27	11.80	7.11	0.489	0.00	107.0	11.86	
1355	7.50	150	-28	11.86	7.11	0.468	0.00	106.0	11.86	Clean out flow thru cell - water is very clear.
1400	8.25	150	-29	12.12	7.12	0.456	0.00	84.4	11.86	
1405	9.0	150	-27	12.33	7.14	0.449	0.00	76.9	11.86	
1410	9.75	150	-25	11.85	7.16	0.439	0.00	74.5	11.86	
1415	10.25	150	-23	11.94	7.15	0.433	0.00	79.1	11.86	
1420	11.0	150	-17	11.87	7.16	0.423	0.00	81.6	11.86	
1430	collect sample									
						112M 4-8-14				

0.75 L/5min

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant DELIVERY ORDER NO: CK01

Date (mm/dd/yy): 04/12/14

Su M Tu W Th F Sa

PAGE 1 OF 1

Task Team Members:

Crystal Hann-Leidos

Hillary McGowan-BayWest

Narrative (include time and location):

0845 Arrive at MW-102. PTD = 0.0 ppm - Initial depth to water = 9.42 ft BDC; total well depth = 17.82 ft BDC; water level following pump placement = 9.40 ft BDC.

0905 Begin purging.

0920 collect first parameter reading. Troubleshooting settings and allow monitor to fill. Cycle = 10s fill; 5s discharge.

Pressure = 20 psi Flow rate = 100 mL/min.

- see purge log for purging details/notes

1000 Done purging. Well stable after 12.375 liters

1010 collect [CGWMW-102-0739-6W] for explosives (2 1-liter canisters)

1015 Done filling sample jars. Pack up equipment.

1035 Demob from well location.

~~NDM~~
4/27/14

Daily Weather Conditions: A.M. ~55°F, bright sun/clear; mod humidity; 0-5 mph wind.

P.M.

Recorded By Hillary McGowan

QA Checked By David Dwyer 4-28-14

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

DATE (mm/dd/yy): 04/12/14

TIME: 08:45

WELL ID NUMBER: MW-102

WELL LOCATION: Production Area / Boundary

DEPTH OF SCREENED INTERVAL (to notch): 8.0 ft. to 18.0 ft.

INNER CASING: TYPE PVC ID: 2 inches

PURGE SAVER ID: N/A

WATER LEVEL INDICATOR ID: model/serial # 01-1170

TURBIDITY ID: model # W-22XD; mfg # 3056003

DEPTH TO WATER: 9.42 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 8.0 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: 13.0 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [] Bailer [X] Bladder Pump [] Pump Type PUMP ID: 10861

PURGE START TIME: 0905 PURGE END TIME: 1000

TOTAL VOLUME PURGED 12.375

SITE CONDITIONS DURING PURGING: stabilized very quickly

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: Nothing notable.

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [X] YES [] NO IF NO, WHY WAS A DEVIATION NECESSARY:

RECORDED BY: [Signature] (Signature)

QA CHECKED BY: [Signature] 4-28-14 (Signature)

GROUND WATER MICRO PURGE LOG

WELL ID: MW-102

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

TIME	L REMOVED	PURGE RATE (mL/min)	ORP (mv)	TEMP (C)	pH (s.u.)	COND (mS/cm)	DO (mg/L)	TURBIDITY (NTU)	DEPTH TO WATER (FT BTOC)	COMMENTS
0920	1.5	100 4-12-14 100	306	11.80	5.72	0.156	8.83	18.0	9.57	L removed = 3.375 Flow rate = 225 225
0930	2.5	100 4-12-14 100						18.0 9-12-14		*clean out flow thru cell - DO probe
0940	3.5	100 4-12-14 100	276	11.60	5.70	0.150	8.95	9.0	9.62	L removed = 7.875 Flow rate = 225 225
0945	4.0	100 4-12-14 100	282	11.52	5.68	0.150	8.88	10.5	9.62	L removed = 9.0 Flow rate = 225
0950	10.125	225	293	11.59	5.67	0.150	8.84	10.2	9.62	
0955	11.25	225	294	11.50	5.67	0.150	8.86	9.8	9.62	
1000	12.375	225	299	11.56	5.68	0.150	8.89	10.0	9.63	
1010	Collect sample									

~~NDM~~
4-12-14

1.125 L/min

Crystal hooks my thumb up to her well to see if it is reading the same DO she is observing with her well; DO is still reading around 8.90. The DO probe appears to be functioning. Don't think it is the tubing; no bubbles are entering the flow thru cell.

61

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant DELIVERY ORDER NO: CK01

Date (mm/dd/yy): 04-11-14

Su M Tu W Th F (Sa)

PAGE 1 OF 1

Task Team Members:

Crystal Ham

Hilary McGarr

~~_____~~
CJH
4-11-14

Gate 60

Narrative (include time and location):

0845: Arrive at MW-102B. PFD = 0.1 ppm

Initial WL = 9.30 ft BTOC, Total Depth = 47.60 ft BTOC.

0900: Begin to set up pump

0906: Turn on pump

0912: Water level stabilized at 9.30 ft BTOC at 150 mL/min 11/9 → 38 psi

1005: Collected sample CGMMW-102B-0740-6W for explosives.

1030 Complete Sampling

1040 Depart Location

~~_____~~
CJH
4-11-14

Daily Weather Conditions: A.M. Sunny 60°

P.M. _____

Recorded By Crystal Ham 4-11-14 QA Checked By Daniel Dyer 4/28/14

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

DATE (mm/dd/yy): 04/12/14

TIME: 08:45

WELL ID NUMBER: MW-102B

WELL LOCATION: Production / Boundary

DEPTH OF SCREENED INTERVAL (toc notch): NA ft. to NA ft.

INNER CASING: TYPE PVC ID: 2 inches

PURGE SAVER ID: NA

WATER LEVEL INDICATOR ID: 39082 Solinst

TURBIDITY ID: NA 81354

CR
4-1-14

DEPTH TO WATER: 9.30 (ft BTOC) FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 23.10 FT FROM MEASURE POINT (approximate)

DEPTH TO PUMP INTAKE: 37.60 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [] Bailer [x] Bladder Pump [] Pump Type

PUMP ID: 15198

PURGE START TIME: 0906

PURGE END TIME: 1005

TOTAL VOLUME PURGED: 2.4 gal

SITE CONDITIONS DURING PURGING: Sunny, No cows,

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: water clear, well easy to stabilize

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [x] YES [] NO IF NO, WHY WAS A DEVIATION NECESSARY:

RECORDED BY: Capt. Kim 4-12-14 (Signature)

QA CHECKED BY: Daniel Dyer 4-28-14 (Signature)

M

GROUND WATER MICRO PURGE LOG

WELL ID: MW-102B

PROJECT NAME: **Holston Army Ammunition Plant**

DELIVERY ORDER NO: **CK01**

TIME	M L REMOVED	PURGE RATE (mL/min)	ORP (mv)	TEMP (C)	pH (s.u.)	COND (mS/cm)	DO (mg/L)	TURBIDITY (NTU)	DEPTH TO WATER (FT BTOC)	COMMENTS
0920	275 ϕ	15 ϕ	417	11.44	7.10	0.548	1.68	85.7	9.30	
0925	300 ϕ	15 ϕ	393	11.52	7.21	0.513	2.00	63.6	9.30	Cleaned out Floor Cell
0930	CR 4-11-14									
0935	450 ϕ 375 ϕ CR 4-11-14	15 ϕ	328	11.69	7.25	0.504	3.31	90.9	9.30	
0940	525 ϕ	15 ϕ	268	11.79	7.24	0.503	2.31	93.0	9.30	
0945	600 ϕ	15 ϕ	255	11.75	7.25	0.503	2.32	96.4	9.30	
0950	675 ϕ	15 ϕ	222	11.89	7.27	0.503	2.91	95.2	9.30	Turn down pressure to see if can get turbidity down
0955	750 ϕ	15 ϕ	191	12.46	7.29	0.510	3.11	92.1	9.30	Cleaned out cell Now water to surface
1000	825 ϕ	15 ϕ	189	12.39	7.29	0.510	3.09	90.4	9.30	Return to previous pressure.
1005	900 ϕ	15 ϕ	187	12.44	7.29	0.509	2.99	91.5	9.30	
			Collect sample							
					CR					
					4-11-14					

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

Date (mm/dd/yy): 04/09/14

Su M Tu W Th F Sa

PAGE 1 OF 1

Task Team Members:

Crystal Hum

Hillary McGOWN

~~CRYK~~

Narrative (include time and location):

0815: Arrive at MW-104. PID = 0.0 ppm

Initial water level = 8.06 ft BTOC

Total depth = 18.80 ft BTOC

0825: Begin to set up pump.

0835: Turn on pump

0840: Water level stable at 8.15ft BTOC.

125 ml per min. 11 fill/9 Discharge 30psi

0846: Water begins to clear. Start to fill flow through cell.

0900 Turned down psi to 26 in order to try to reduce turbidity.

1025: Collect CGWMW-104-0725-GW for VOCs + SVOCs.

^{col}
~~4-9-14 Collect trip blank for VOCs CGWMW-TB-0765-TB~~

1105: Complete sampling and depart location

Daily Weather Conditions: A.M. Cloudy 48°

P.M. _____
Recorded By Crystal Hum QA Checked By Derek Dyer 4-28-14

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

DATE (mm/dd/yy): 04/09/14

TIME: 08:15

WELL ID NUMBER: MW-104

WELL LOCATION: Area A

DEPTH OF SCREENED INTERVAL (toc notch): 8.95 ft. to 18.5 ft.

INNER CASING: TYPE (PVC) ID: 2 inches

PURGE SAVER ID: NA

WATER LEVEL INDICATOR ID: 39082 Salinst

TURBIDITY ID: 81354

DEPTH TO WATER: 8.06 (A BTOC) FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 8.95 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: 13.95 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [] Bailer [x] Bladder Pump [] Pump Type

PUMP ID: 15198

PURGE START TIME: 0835

PURGE END TIME: 1008 1025

TOTAL VOLUME PURGED: 3.5 gal

SITE CONDITIONS DURING PURGING: Cloudy

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: ~~None~~ CK 4-9-14 Train moving in area during Sampling.

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [x] YES [] NO IF NO, WHY WAS A DEVIATION NECESSARY:

RECORDED BY: Capt J. Hen 4-9-14 (Signature)

QA CHECKED BY: Daniel Dwyer 4-28-14 (Signature)

GROUND WATER MICRO PURGE LOG

WELL ID: MW-104PROJECT NAME: Holston Army Ammunition PlantDELIVERY ORDER NO: CK01

TIME	ML REMOVED	PURGE RATE (mL/min)	ORP (mv)	TEMP (C)	pH (s.u.)	COND (mS/cm)	DO (mg/L)	TURBIDITY (NTU)	DEPTH TO WATER (FT BTOC)	COMMENTS
0850	1250	125	419	9.58	6.92	0.422	1.48	-999	ca 49.4 128.15	
0855	1875	125	417	9.49	7.12	0.420	1.75	588.0	8.15	
0900	2500	125	410	9.47	7.23	0.414	1.64	834.0	8.15	Cleaned out Flow through cell
0905	3125	125	402	9.44	7.29	0.413	1.35	568.0	8.15	
0910	3750	125	400	9.50	7.35	0.412	1.29	562.0	8.15	
0915	4375	125	397	9.48	7.36	0.410	1.25	589.0	8.15	clean out flow through cell
0920	5000	125	395	9.51	7.32	0.412	2.80	564.0	8.15	
0925	5625	125	390	9.42	7.34	0.414	1.62	528.0	8.15	
0930	6250	125	389	9.43	7.33	0.414 0.414	1.69	531.0	8.15	
0945	8125	125	380	9.42	7.36	0.413	1.56	396.0	8.15	Cleaned out flow through cell
0950	8750	125	372	9.64	7.43	0.403	4.62	326.0	8.15	Purged for 1 hr. will collect sample after stabilization.
0955	9375	125	372	9.64	7.43	0.403	1.94	268.0	8.15	
1000	10000	125	372	9.63	7.42	0.404	1.62	289.0	8.15	
1005	10625	125	371	9.61	7.40	0.403	1.58	300.0	8.15	
1010	11250	125	357	9.50	7.41	0.399	1.50	304.0	8.15	Cleaned out flow through cell

GROUND WATER MICRO PURGE LOG

WELL ID: MW-107

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

TIME	L REMOVED	PURGE RATE (mL/min)	ORP (mv)	TEMP (C)	pH (s.u.)	COND (mS/cm)	DO (mg/L)	TURBIDITY (NTU)	DEPTH TO WATER (FT BTWC)	COMMENTS
1015	11,825	125	356	9.48	7.43	0.402	2.04	305.0	8.15	Water fairly clear. Slightly cloudy.
1020	12500	125	355	9.50	7.44	0.400	2.10	300.0	8.15	cloudy.
1025	13125	125	355	9.46	7.44	0.400	2.08	298.0	8.15	
		Collect samples. Purged for over an hour.								
Added 4-9-14										

120

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant DELIVERY ORDER NO: CK01

Date (mm/dd/yy): 04/09/14

Su M Tu W Th F Sa

PAGE 1 OF 1

Task Team Members:

Crystal Hann-Leidos

Hillary McGowan - Bay West

Narrative (include time and location):

0815 Arrive at MW-105. PID=1.0ppm; initial depth to water=9.75 ft BDC

total well depth= 18.94 ft BDC

0825 Begin hand bailing.

0845 Hand bailed well dry. Bailed 15.14 liters (4 gallons)

- Perform well inspection.

0850 Depart well location to allow well to recharge before sampling

1000 Back at MW-105 well location. Sufficient water to sample

1010 collect [CGWMW-105-0726-GW] for SVOCs and VOCs (2 1-liter ampers and 3 vials w/ Hcl)

-also collect field duplicate [CGWMW-105-0760-QA] for SVOCs and VOCs (2 1-liter ampers and 3 vials w/ Hcl) ①

1040 Depart well location.

[Signature]
4-9-14

Daily Weather Conditions: A.M. ~50°F, overcast; high humidity; 0-5 MPH

P.M.

Recorded By Hillary McGowan

QA Checked By *[Signature]* 4-28-14

① Also collect [CGWMW-TB-0765-TB] for VOCs (3 40 ml vials)

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

DATE (mm/dd/yy): 04/09/14

TIME: 08:15

WELL ID NUMBER: MW-105

WELL LOCATION: Area A-SW444

DEPTH OF SCREENED INTERVAL (to notch): 9.43 ft. to 19.43 ft.

INNER CASING: TYPE PVC ID: 2 inches

PURGE SAVER ID: N/A

WATER LEVEL INDICATOR ID: model/serial # = 01-1170

TURBIDITY ID: N/A

DEPTH TO WATER: 9.75 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 9.43 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: N/A FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: Bailor [] Bladder Pump [] Pump Type

PUMP ID: N/A

PURGE START TIME: 0825

PURGE END TIME: 0845

TOTAL VOLUME PURGED: 15.14 liters

SITE CONDITIONS DURING PURGING: Nothing notable

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: rapid drawdown during hand bailing

S&A PLAN SAMPLING PROCEDURE FOLLOWED: YES [] NO IF NO, WHY WAS A DEVIATION NECESSARY:

RECORDED BY: [Signature] (Signature)

QA CHECKED BY: [Signature] 4-28-14 (Signature)

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant DELIVERY ORDER NO: CK01

Date (mm/dd/yy): 04/09/14

Su M Tu (W) Th F Sa

PAGE 1 OF 1

Task Team Members:

Crystal Ham

Hillary McGowan

ogn
4-9-14

Narrative (include time and location):

1420: Arrive at MW-106 and begin to setup. The new horizon U-22 did not come in because FedEx had a plane break down. Will not be able to begin purging until Hillary is done purging MW-107.

PID = 0.0 ppm Initial wL = 12.86 ft BTOC
Total depth = 19.18 ft BTOC

1535: Turn on pump. Water level stable at 13.10 ft BTOC 30psi 10/15 = Recharge/Discharge 150 ml/min

1620 Collect sample CGW-MW-106-0727-GW for VOLs + SVOCs.

1645: Complete sampling

1652: Depart location

Daily Weather Conditions: A.M. _____

P.M. Sunny to Partly cloudy 65°

Recorded By Crystal Ham 4-9-14

QA Checked By Duane Dyer 4-28-14

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

DATE (mm/dd/yy): 04/09/14

TIME: 14:20

WELL ID NUMBER: MW-106

WELL LOCATION: Area A

DEPTH OF SCREENED INTERVAL (toc notch): 9.54 ft. to 19.54 ft.

INNER CASING: TYPE PVC ID: 2 inches

PURGE SAVER ID: NA

WATER LEVEL INDICATOR ID: 39082 Sdinst

TURBIDITY ID: 81354

DEPTH TO WATER: 12.86 (ft BTOL) FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 9.54 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: 17.00 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [] Bailer [x] Bladder Pump [] Pump Type

PUMP ID: 15198

PURGE START TIME: 1535

PURGE END TIME: 1620

TOTAL VOLUME PURGED: 1.8 gal

SITE CONDITIONS DURING PURGING: No trains in area

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: None.

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [x] YES [] NO IF NO, WHY WAS A DEVIATION NECESSARY:

RECORDED BY: Capt. H. H. 4-9-14 (Signature)

QA CHECKED BY: [Signature] 4-28-14 (Signature)

GROUND WATER MICRO PURGE LOG

WELL ID: MW-106

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

TIME	ML REMOVED	PURGE RATE (mL/min)	ORP (mv)	TEMP (C)	pH (s.u.)	COND (mS/cm)	DO (mg/L)	TURBIDITY (NTU)	DEPTH TO WATER (FT BTOC)	COMMENTS
1540	750	150	334	13.40	7.40	0.447	5.63	194.0	13.11	
1545	1500	150	333	13.34	7.44	0.450	4.23	184.0	13.11	cleared out flow through cell
1550	2250	150	324	13.41	7.54	0.439	6.43	134.0	13.11	
1555	3000	150	324	13.41	7.47	0.450	5.55	109.0	13.21	
1600	3750	150	326	13.02	7.45	0.449	4.51	77.5	13.22	
1605	4500	150	326	12.96	7.45	0.448	4.44	65.1	13.22	
1610	5250	150	327	13.02	7.44	0.446	3.97	66.2	13.22	
1615	6000	150	328	13.01	7.44	0.446	4.00	66.2	13.22	
1620	6750	150	328	12.99	7.43	0.445	3.99	63.2	13.22	
			Collect		Sample					
					cap					
					4-9-14					

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant DELIVERY ORDER NO: CK01

Date (mm/dd/yy): 04/09/14

Su M Tu (W) Th F Sa

PAGE 1 OF 1

Task Team Members:

Crystal Hann-Ledes
Hillary McGown-Bay West

Narrative (include time and location):

1335 Arrive at MW-107. PID = 0.1 ppm. Initial depth to water = 7.74 ft BTDC; total well depth = 18.82 ft BTDC
depth to water following pump placement = 7.57 ft BTDC

1355 Begin purging. Cycle set at 20s fill, 10s discharge pressure set at 10 psi; flow rate = 200 mL/min

-had the water and aer lines switched on accident. Let well purge before hooking up to the hbnba - water is very turbid.

1530 Done purging - well approx. stable after 15.75 liters. Purged over an hour - turbidity very close to stable; decide to sample.

1540 Collect CGWMW-107-0728-GW for SVOCs & VOCs - include an MS/MSD sample = 6 1-liter ambers and 9 40mL VOA's total

1630 Depart well location to decon pump.

1730 Collect CGWMW-ER-0758-ER for VOCs & SVOCs (2 1-liter ambers and 3 40 mL VOA's w/ HCl)

Daily Weather Conditions: A.M. _____

P.M. ~ 60°F; partly cloudy; 5-10 MPH

Recorded By Hillary McGownQA Checked By Daniel Dwyer 4-28-14

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

DATE (mm/dd/yy): 04/09/14

TIME: 13:35

WELL ID NUMBER: MW-107

WELL LOCATION: Area A Boundary

DEPTH OF SCREENED INTERVAL (toc notch): 8.88 ft. to 18.88 ft.

INNER CASING: TYPE PVC ID: 2 inches

PURGE SAVER ID: N/A

WATER LEVEL INDICATOR ID: model/serial# - 01-1170

TURBIDITY ID: model# W-22XD; mfg#: 1096006

(ft BTOC)

DEPTH TO WATER: 7.74 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 8.88 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: 13.88 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [] Bailer [X] Bladder Pump [] Pump Type PUMP ID: 10861

PURGE START TIME: 1355 PURGE END TIME: 1530

TOTAL VOLUME PURGED 15.75 liters

SITE CONDITIONS DURING PURGING: let well purge 20 mins before hooking up then had due to very turbid water

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: it took a few minutes at initial purging to get the settings adjusted so water level stabilized.

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [X] YES [] NO IF NO, WHY WAS A DEVIATION NECESSARY:

RECORDED BY: [Signature] (Signature)

QA CHECKED BY: [Signature] 4-28-14 (Signature)

GROUND WATER MICRO PURGE LOG

WELL ID: MW-107

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

TIME	L REMOVED	PURGE RATE (mL/min)	ORP (mv)	TEMP (C)	pH (s.u.)	COND (mS/cm)	DO (mg/L)	TURBIDITY (NTU)	DEPTH TO WATER (FT BTOC)	COMMENTS
1415	4.0	200	350	12.31	7.57	0.379	2.44	692.0	8.10	
1420	5.0	200	353	12.04	7.46	0.357	0.56	627.0	8.10	
1425	6.0	200	344	11.81	7.42	0.349	0.56	508.0	8.10	clean out flow thru cell
1430	6.75	150	338	12.09	7.41	0.348	0.00	449.0	8.10	
1435	7.50	150	338	11.51	7.39	0.347	0.00	409.0	8.10	
1440	8.25	150	337	11.67	7.39	0.341	0.00	358.0	8.10	
1445	9.0	150	334	12.04	7.39	0.339	0.00	310.0	8.10	
1450	9.75	150	334	11.65	7.40	0.347	0.00	261.0	8.10	
1455	10.50	150	332	11.69	7.39	0.347	0.00	232.0	8.10	
1500	11.25	150	332	11.46	7.40	0.350	0.00	181.0	8.10	
1505	12.0	150	331	11.64	7.41	0.349	0.00	140.0	8.10	
1510	12.75	150	331	11.67	7.41	0.347	0.00	107.0	8.10	
1515	13.50	150	330	11.68	7.40	0.349	0.00	102.0	8.10	
1520	14.25	150	329	11.53	7.40	0.348	0.00	88.8	8.10	
1525	15.0	150	328	11.33	7.39	0.347	0.00	86.8	8.10	

1.0 L / 5 min → 0.75 L / 5 min

GROUND WATER MICRO PURGE LOG

WELL ID: MW-107

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

TIME	L REMOVED	PURGE RATE (mL/min)	ORP (mv)	TEMP (C)	pH (s.u.)	COND (mS/cm)	DO (mg/L)	TURBIDITY (NTU)	DEPTH TO WATER (FT BTWC)	COMMENTS
1530	15.75	1SD	327	11.45	7.39	0.347	0.00	82.0	88.10	
1540	End purge & collect sample									

~~AKR~~
4-9-14

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant DELIVERY ORDER NO: CK01

Date (mm/dd/yy): 04-13-14

Su M Tu W Th F Sa

PAGE 1 OF 1

Task Team Members:

Crystal Hays

Hillary McGraw

~~_____~~
~~_____~~
~~_____~~

CRK
4-13-14

Narrative (include time and location):

1334 Arrive at MW-114 PID = 0.8 ppm

Initial water level = 29.85 ft BToc.

Total depth = 10660 ft BToc

1357: Water begins to get to surface. Water-level dropping to fast. Working on settings to reduce water level drawdown

This well has historically been very difficult to stabilize = settings = 40/20

65ps: => ⁴⁶100 mL/min _{CR 4-13-14} water level stable at 30.65 ft BToc Final settings 5/19

1515 Collect sample (GWMW-114-0731-GW for SVOCs + Metals /mercury

1615: Complete collecting sample

1620: Begin packing up

1630: Depart location

Daily Weather Conditions: A.M. _____

P.M. Sunny 82°

Recorded By Capt. Hays

QA Checked By David Dyer 4-28-14

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

DATE (mm/dd/yy): 04/13/14

TIME: 13:30

WELL ID NUMBER: Mw-114

WELL LOCATION: Old Landfill

DEPTH OF SCREENED INTERVAL (to notch): 95.87 ft. to 105.87 ft.

INNER CASING: TYPE PVC ID: 2 inches

PURGE SAVER ID: NA

WATER LEVEL INDICATOR ID: 39082 + 01-1174

TURBIDITY ID: 81354

DEPTH TO WATER: 29.85 (ft BTOC) FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 95.87 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: 100.87 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [] Bailer [x] Bladder Pump [] Pump Type

PUMP ID: 10861

PURGE START TIME: 1357

PURGE END TIME: 1515

TOTAL VOLUME PURGED

SITE CONDITIONS DURING PURGING: Dry

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: None

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [x] YES [] NO IF NO, WHY WAS A DEVIATION NECESSARY:

RECORDED BY: Capt H. 4-13-14 (Signature)

QA CHECKED BY: Daniel Dyer 4-28-14 (Signature)

GROUND WATER MICRO PURGE LOG

WELL ID: YN W-114

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

TIME	L REMOVED	PURGE RATE (mL/min)	ORP (mv)	TEMP (C)	pH (s.u.)	COND (mS/cm)	DO (mg/L)	TURBIDITY (NTU)	DEPTH TO WATER (FT BTWC)	COMMENTS
1420	800	40	-23	18.09	7.19	0.632	4.68	970.0	30.65	
1425	1000	40	-29	18.80	7.17	0.629	3.95	928.0	30.65	Cloudy
1430	1200	40	-33	19.21	7.16	0.622	3.63	920.0	30.65	clear out cell
1440	1600	40	-55	18.20	7.16	0.631	3.37	749.0	30.65	
1450	2000	40	-56	17.69	7.19	0.637	3.32	745.0	30.66	
1455	2200	40	-59	17.73	7.20	0.635	3.11	749.0	30.66	
1500	2400	40	-63	17.83	7.20	0.629	2.59	741.0	30.66	water is cloudy
1505	2600	40	-63	18.28	7.20	0.627	2.42	698.0	30.66	
1510	2800	40	-66	18.20	7.21	0.628	2.42	681.0	30.66	
1515	3000	40	-66	18.27	7.21	0.628	2.43	692.3	30.66	
Collect Sample										

CJM
4-13-14

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant DELIVERY ORDER NO: CK01

Date (mm/dd/yy): 04-10-14

Su M Tu W Th F Sa

PAGE 1 OF 1

Task Team Members:

Crystal Hann
H. Henry Mc Gown
~~CGH~~

Narrative (include time and location):

1132: Arrive at MW-115 to set up for sampling.
PID = 0.0 ppm, Initial = 29.71 ft BTOC.
Total depth = 40.70 ft BTOC.
1141: Begin to set up pump
1150: Turn on pump 40 psi => 11/9
Water level stable at 29.72 ft BTOC.
100 mL MW.
1355: Complete sampling. Sample CGWMW-115-0732-GW was collected at 1305 for SVOCs, Low Level PAHs, Metals, + Mercury.
1400: Begin to pack up.
1420: Depart location

~~CGH
4-11-14~~

Daily Weather Conditions: A.M. Sunny 65°

P.M. _____

Recorded By Crystal Hann 4-10-14 QA Checked By Daniel Dwyer 4-28-14

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

DATE (mm/dd/yy): 04/10/2014

TIME: 11:32

WELL ID NUMBER: MW-115

WELL LOCATION: Area B Sumo 19129

DEPTH OF SCREENED INTERVAL (toc notch): 30.85 ft. to 40.85 ft.

INNER CASING: TYPE PVC ID: 2 inches

PURGE SAVER ID: NA

WATER LEVEL INDICATOR ID: 39082 Solinst

TURBIDITY ID: 81354

DEPTH TO WATER: 29.71 (ft BTOC) FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: ~~34.71~~ ^{CR 4-10-14} 30.85 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: 34.71 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [] Bailer [x] Bladder Pump [] Pump Type

PUMP ID: 15198

PURGE START TIME: 1150

PURGE END TIME: ~~1400~~ 1305
4-10-14 CR

TOTAL VOLUME PURGED: 7.5 L / 2 gal

SITE CONDITIONS DURING PURGING: Sunny

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: Well in good condition

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [x] YES [] NO IF NO, WHY WAS A DEVIATION NECESSARY:

RECORDED BY: Crystal Shum 4-10-14
(Signature)

QA CHECKED BY: David Duper 4-28-14
(Signature)

GROUND WATER MICRO PURGE LOG

WELL ID: MW-115

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

TIME	L REMOVED	PURGE RATE (mL/min)	ORP (mv)	TEMP (C)	pH (s.u.)	COND (mS/cm)	DO (mg/L)	TURBIDITY (NTU)	DEPTH TO WATER (FT BTOC)	COMMENTS
1200	1000	100	338	12.20	6.76	1.03	5.47	394.0	29.72	
1205	1500	100	341	12.80	6.79	0.99	6.32	296.0	29.72	
1210	2000	100	343	12.11	6.84	0.98	6.77	250.0	29.72	Clean out flow through cell
1215	2500	100	341	12.11	6.90	0.98	8.44	181.0	29.72	
1225	3500	100	348	12.29	6.96	0.97	8.15	146.0	29.72	Cleaned out cell
1235	4500	100	351	12.50	7.00	0.989	8.98	86.0	29.72	
1240	5000	100	358	12.50	7.00	0.985	9.48	90.2	29.72	Cleaned out cell
1245	5500	100	351	12.59	7.01	0.970	9.31	93.0	29.72	
1250	6000	100	352	12.62	7.03	0.970	9.12	93.2	29.72	
1255	6500	100	359	12.56	7.03	0.970	9.22	84.0	29.72	
1300	7000	100	360	12.59	7.03	0.960	9.16	83.3	29.72	
1305	7500	100	361	12.60	7.03	0.960	9.11	83.1	29.72	
		Collect Sample								
					Case					
					4-11-14					

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant DELIVERY ORDER NO: CK01

Date (mm/dd/yy): 04/10/14

Su M Tu W Th F Sa

PAGE 1 OF 2

Task Team Members:

Crystal Hann-Cerdos

Hilary McGowan-Baywest

Narrative (include time and location):

0800 Arrive at MW-116. PID = 0.0 ppm; initial depth to water = 54.02 ft BDC;

total well depth = 121.70 ^{ft BDC} (hard to feel - so deep); depth to water following

pump placement = 53.53 ft BDC.

0915 Begin purging well. Had to replace tubing; there was a hole in the water line. Attempted to purge with broken

tubing but could not get water to discharge

cycle set at 20s fill; 10s discharge. Pressure set at

~60 psi. Flow rate = 100 mL/min

0935 collect first parameter reading - troubleshoot settings and allow Honda flow-cell to fill.

1050 Done purging - well stable after 9.5 liters

1100 collect [CGMMW-116-0733-6W] and MS/MSD (for lead

Metals + Mercury only - MS/MSD) = 2 1-liter ampers and 3

500 ml plastics total. Pack up equipment. ~~4-10-14~~ 4-10-14

1205 Done filling all sample containers. Pack up equipment.

Daily Weather Conditions: A.M. ~40°F; clear skies; 0-5 MPH

P.M.

Recorded By Hilary McGowan QA Checked By Dink Dyer 4-28-14

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TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant DELIVERY ORDER NO: CK01

Date (mm/dd/yy): 04/10/14

Su M Tu W Th F Sa

PAGE 2 OF 2

Task Team Members:

Crystal Hann - Leidos

Hillary McGowan - Bay West

Narrative (include time and location):

1230 Depart well location to decon pump.

1420 Collect equipment insafe [CGWMW-ER-0758-ER] for
PERA Metals + Mercury.

~~HQ~~
4-10-14

Daily Weather Conditions: A.M.

P.M. ~60°F clear skies/sunny mod humidity 0-5 MPH

Recorded By Hillary McGowan

QA Checked By

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

DATE (mm/dd/yy): 04/10/14

TIME: 08:00

WELL ID NUMBER: MW-116

WELL LOCATION: Area B - near SWMU 17/29

DEPTH OF SCREENED INTERVAL (toc notch): 99.8 ft. to 119.8 ft.

INNER CASING: TYPE PVC ID: 2 inches

PURGE SAVER ID: N/A

WATER LEVEL INDICATOR ID: model/Serial # 01-1170

TURBIDITY ID: model # W-22XD; mfg # 1096006

DEPTH TO WATER: 54.02 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 99.8 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: 109.0 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [] Bailer [X] Bladder Pump [] Pump Type PUMP ID: 10861

PURGE START TIME: 0915 PURGE END TIME: 1050

TOTAL VOLUME PURGED 9.5 liters

SITE CONDITIONS DURING PURGING: water is very clear

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: Nothing notable

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [X] YES [] NO IF NO, WHY WAS A DEVIATION NECESSARY:

RECORDED BY: [Signature] (Signature)

QA CHECKED BY: [Signature] 4-28-14 (Signature)

GROUND WATER MICRO PURGE LOG

WELL ID: MW-114

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

TIME	L REMOVED	PURGE RATE (mL/min)	ORP (mv)	TEMP (C)	pH (s.u.)	COND (mS/cm)	DO (mg/L)	TURBIDITY (NTU)	DEPTH TO WATER (FT BTOC)	COMMENTS
0935	2.0	100	175	10.45	6.97	0.809	2.09	159.0	54.72	
0940	2.5	100	150	10.71	6.99	0.812	1.83	116.0	54.72	
0945	3.0	100	145	10.84	7.00	0.817	1.75	92.5	54.73	
0950	3.5	100	148	11.06	7.00	0.819	1.68	80.2	54.73	
0955	4.0	100	152	11.34	6.99	0.815	1.61	79.6	54.73	
* 1005	5.0	100	163	11.50	6.98	0.827	1.89	52.1	54.74	clean out flow thru cell
1010	5.5	100	164	11.55	6.98	0.832	1.81	49.5	54.74	
1015	6.0	100	169	11.56	6.98	0.834	1.82	46.4	54.75	
1020	6.5 #24 4-10-14	100	177	11.57	6.97	0.837	1.90	43.1	54.75	Flow = 50 mL/min L removed = 6.25 L
1025	7.0 #24 4-10-14	100	183	11.54	6.97	0.838	1.93	47.1	54.76	Flow = 50 mL/min L removed = 6.5
1030	7.5 #24 4-10-14	100	217	11.62	6.99	0.836	3.71	44.1	54.76	clean out flow thru cell
1035	8.0 #24 4-10-14	100	200	11.61	6.97	0.839	2.53	47.2	54.77	Flow = 50 mL/min L removed = 7.0
1040	8.5 #24 4-10-14	100	194	11.57	6.97	0.843	2.27	46.5	54.77	Flow = 50 mL/min L removed = 7.25
1045	9.0 #24 4-10-14	100	195	11.64	6.97	0.843	2.21	46.7	54.77	Flow = 50 mL/min L removed = 7.5
1050	9.5 #24 4-10-14	100	199	11.72	6.97	0.842	2.20	46.0	54.78	Flow = 50 mL/min L removed = 7.75

15 L/5 min → .25 L/5 min

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant DELIVERY ORDER NO: CK01

Date (mm/dd/yy): 04/12/14

Su M Tu W Th F (Sa)

PAGE 1 OF 1

Task Team Members:

Crystal Hann-Leidos

Hillary McGowan-Bay West

Narrative (include time and location):

1140 Arrive at MW-S1A. PID = 1.1 ppm. Initial depth to water = 5.16 ft BTDC; total well depth = 16.80 ft BTDC; depth to water following pump placement = 5.02 ft BTDC.

1200 Begin purging well. Cycle = 20 s fill; 10 s discharge. Pressure = 15 psi. Flow rate = 700 mL/min

1215 First parameter reading. Troubleshoot settings; allow flow thru cell to fill.

1220 Continue troubleshooting settings to get lower flow rate. Cycle set at 40 s fill; 20 s discharge. Pressure = 5 psi. Flow rate = 200 mL/min

1330 Done purging. Well stable after 28 liters. Collect [CGWMW-S1A-0741-GW] for explosives (21-liter ambers)

1342 Done filling sample jars. Pack up equipment.

1400 Depart well location.

~~DTM~~
4-12-14

Daily Weather Conditions: A.M.

P.M. ~75 F; clear/bright sun; mod. humid; 0-5 MPH wind

Recorded By Hillary McGowan

QA Checked By Daniel Dyer 4-28-14

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

DATE (mm/dd/yy): 04/12/14

TIME: 11:40

WELL ID NUMBER: MW-S1A

WELL LOCATION: Production Area

DEPTH OF SCREENED INTERVAL (to notch): 12.01 ft. to 17.01 ft.

INNER CASING: TYPE PVC ID: 2 inches

PURGE SAVER ID: N/A

WATER LEVEL INDICATOR ID: model/serial # 01-1170

TURBIDITY ID: model # W-22XD; rfg # 30576003

DEPTH TO WATER: 5.16 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 12.01 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: 14.50 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [] Bailer [X] Bladder Pump [] Pump Type _____ PUMP ID: dedicated

PURGE START TIME: 1200 PURGE END TIME: 1330

TOTAL VOLUME PURGED 28 liters

SITE CONDITIONS DURING PURGING: initial flow was too fast, adjusted settings to 200 ml/min flow rate

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: Nothing notable; lots of bees around well location.

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [X] YES [] NO IF NO, WHY WAS A DEVIATION NECESSARY: _____

RECORDED BY: [Signature] (Signature)

QA CHECKED BY: [Signature] 4-28-14 (Signature)

GROUND WATER MICRO PURGE LOG

WELL ID: MW-S1A

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

TIME	L REMOVED	PURGE RATE (mL/min)	ORP (mv)	TEMP (C)	pH (s.u.)	COND (mS/cm)	DO (mg/L)	TURBIDITY (NTU)	DEPTH TO WATER (FT BTWC)	COMMENTS
1215	10.5	700	236	12.29	6.62	0.763	0.23	86.9	5.60	
1220	14.0									12-14-12-14 see log comments
1225	15.0	200	212	13.16	6.61	0.773	0.16	85.8	5.39	
1230	16.0	200	208	12.91	6.60	0.768	0.15	83.0	5.39	
1235	17.0	200	205	12.94	6.60	0.755	0.13	92.1	5.39	
1240	18.0	200	219	13.86	6.59	0.755	1.84	28.3	5.39	clean out flow thru cell
1245	19.0	200	214	13.26	6.60	0.757	0.30	34.1	5.39	
1250	20.0	200	209	13.14	6.59	0.754	0.17	28.8	5.39	
1255	21.0	200	205	12.91	6.60	0.751	0.14	43.7	5.39	clean out flow thru cell
1300	22.0	200	223	12.75	6.58	0.757	0.74	16.7	5.39	
1305	23.0	200	215	12.72	6.56	0.748	0.22	23.1	5.39	
1310	24.0	200	209	12.79	6.56	0.745	0.19	34.7	5.39	
1315	25.0	200	207	12.83	6.59	0.752	0.14	38.7	5.39	
1320	26.0	200	203	12.73	6.58	0.757	0.15	41.1	5.39	
1325	27.0	200	200	12.76	6.57	0.754	0.15	36.3	5.39	

~~7.5 L/min~~ → 10/min

GROUND WATER MICRO PURGE LOG

WELL ID: MW-S1A

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

TIME	L REMOVED	PURGE RATE (mL/min)	ORP (mv)	TEMP (C)	pH (s.u.)	COND (mS/cm)	DO (mg/L)	TURBIDITY (NTU)	DEPTH TO WATER (FT BTOC)	COMMENTS
1330	28.0	200	197	12.78	6.58	0.748	0.15	40.2	5.39	
	Collect sample.									

~~#214~~
4-12-14

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

Date (mm/dd/yy): 04-16-14

Su M Tu (W) Th F Sa

PAGE 1 OF 2

Task Team Members:

Cystal Gunn

Hillary McGowan

[Handwritten signature/initials]

Narrative (include time and location):

0751: Arrive at STMW-15 Begin to set up. PID = ppm, Initial water level = 13.79 ft BToc. Total Depth = 32.20 ft BToc.

0810: Turn on pump. Water has a lot of orange particulates in it. Maybe iron

0815: Water level stable at 13.81 ft BGS 1015 12 psi. 100 mL/min

0830 Unable to turn the dedicated pump pressure down any more or I won't be able to get water to the surface. Turbidity is very high but appears to be IRON.

1000 Collected Sample CGWMW-S15-0744-GW for BTEX + Explosives. Collected MS/MSD.

1000 Collected field duplicate sample CGWMW-S15-0760-QA for BTEX.

1000 Trip blank IO = CGWMW-TB-0767-TB

Daily Weather Conditions: A.M. SUNNY 30°

P.M. _____

Recorded By Cystal Gunn 4-16-14

QA Checked By *[Signature]* 4-28-14

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TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant DELIVERY ORDER NO: CK01

Date (mm/dd/yy): 04-16-14

Su M Tu (W) Th F Sa

PAGE 2 OF 2

Task Team Members:

Crystal Ham

Harry McGowan

CYD

Narrative (include time and location):

1023: Complete Sampling

1030: Depart location

CYD
4-16-14

Daily Weather Conditions: A.M.

Sunny 30°

P.M.

Recorded By

Crystal Ham 4-16-14

QA Checked By

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

DATE (mm/dd/yy): 04/16/14

TIME: 07:51

WELL ID NUMBER: STMW-15

WELL LOCATION: Production / Burning

DEPTH OF SCREENED INTERVAL (toc notch): 22.21 ft. to 32.21 ft.

INNER CASING: TYPE PVC ID: 2 inches

PURGE SAVER ID: NA

WATER LEVEL INDICATOR ID: 39082

TURBIDITY ID: 81354

DEPTH TO WATER: 13.79 (ft BTOC) FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 22.21 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: 28.4 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [] Bailer [x] Bladder Pump [] Pump Type

PUMP ID: ~~15861~~ 22
4-16-14

PURGE START TIME: 0814 PURGE END TIME: 1000

TOTAL VOLUME PURGED: 3 gal

SITE CONDITIONS DURING PURGING: Ground dry after rain event

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: Significant iron staining on pump tubing

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [x] YES [] NO IF NO, WHY WAS A DEVIATION NECESSARY:

RECORDED BY: [Signature] 4-16-14
(Signature)

QA CHECKED BY: [Signature] 4-28-14
(Signature)

GROUND WATER MICRO PURGE LOG

WELL ID: STMW-15PROJECT NAME: Holston Army Ammunition PlantDELIVERY ORDER NO: CK01

TIME	ML REMOVED	PURGE RATE (mL/min)	ORP (mv)	TEMP (C)	pH (s.u.)	COND (mS/cm)	DO (mg/L)	TURBIDITY (NTU)	DEPTH TO WATER (FT BTWC)	COMMENTS
0820	1000	100	328	7.25	6.41	0.396	5.51	7999	13.81	
0825	1500	100	256	7.74	6.59	0.390	1.30	7999	13.81	Water has a lot of Iron particulates
0830	2000	100	188	7.89	6.61	0.391	0.84	7999	13.81	Clear out cell
0835	2500	100	121	8.26	6.64	0.389	0.79	861.0	13.81	
0840	3000	100	116	8.23	6.64	0.390	0.75	836.0	13.81	Clear out cell
0845	3500	100	114	8.24	6.63	0.389	1.65	679.0	13.81	
0855	4500	100	94	8.09	6.61	0.392	0.47	528.0	13.81	Clear cell
0905	5500	100	71	8.52	6.60	0.391	0.20	335.0	13.81	Clear out cell
0910	6000	100	99	8.29	6.63	0.389	0.95	310.0	13.81	
0920	7000	100	84	7.20	6.61	0.396	0.30	294.0	13.81	Clear out cell
0925	7500	100	81	6.60	6.59	0.391	1.25	274.0	13.81	
0935	8500	100	83	7.24	6.56	0.391	0.70	253.0	13.81	
0940	9000	100	81	7.35	6.57	0.390	0.64	250.0	13.81	
0945	9500	100	78	7.47	6.57	0.391	0.52	236.0	13.81	
0950	10,000	100	73	7.63	6.58	0.391	0.47	219.0	13.81	

GROUND WATER MICRO PURGE LOG

WELL ID: STMW-15

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

TIME	L REMOVED	PURGE RATE (mL/min)	ORP (mv)	TEMP (C)	pH (s.u.)	COND (mS/cm)	DO (mg/L)	TURBIDITY (NTU)	DEPTH TO WATER (FT BTOC)	COMMENTS
0955	10,500	104	73	7.62	6.57	0.391	0.45	217.0	13.81	
1000	11,000	104	72	7.59	6.59	0.391	0.44	212.0	13.81	
		Collect		Sample						

CJH
4-16-14



**FISCAL YEAR 2014 LONG-TERM MONITORING/
LONG-TERM OPERATIONS REPORT**
Holston Army Ammunition Plant, Kingsport, Tennessee

FALL 2014



**FISCAL YEAR 2014 LONG-TERM MONITORING/
LONG-TERM OPERATIONS REPORT**
Holston Army Ammunition Plant, Kingsport, Tennessee

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TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant DELIVERY ORDER NO: CK01

Date (mm/dd/yy): 10/15/14

Su M Tu (W) Th F Sa

PAGE 1 OF 2

Task Team Members:

Crystal	Hann	
H. Lang	McGraw	CTM
	cost	

Narrative (include time and location):

1015: Arrive at MW-48 and prepare to sample. PID = 50.6 ppm at well head. 0.0 ppm at breathing zone
 Initial wL = 30.97 ft BTCL
 Total depth = 67.00 ft BTCL

1035: Prepare to bail. While this well has a lot of water column, historically we have been unable to stabilize the water level @ a pump rate of 40 gpm.

1040: Collect sock sample CCWMW-048-Sock-0790.

1045: Begin to bail dry.

1105: Complete bailing the well dry after purging 7.5 gal. Allowing well to recharge

Daily Weather Conditions: A.M. Partly Cloudy 69°
 P.M. _____

Recorded By Crystal Hann QA Checked By Dink Dyer

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant DELIVERY ORDER NO: CK01

Date (mm/dd/yy): 10-15-14

Su M Tu W Th F Sa

PAGE 2 OF 2

Task Team Members:

Crystal Hann

Hillary McGowan

Case

Case

Narrative (include time and location):

1130: Collect Sample CGWmw-048-0774-GW for SVOCs, Low level PAHs, metals.

Also collected FD CGWmw-048-0775-QA and MS/MSD CGWmw-048-0774-GW for RCRA metals

1205: Complete Sampling MW-48. Depart location to collect source blank.

Case
10-15-14

Daily Weather Conditions: A.M. Sunny to Partly Cloudy 70°

P.M.

Recorded By Crystal Hann

QA Checked By Dink Dye

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

DATE (mm/dd/yy): 10/15/14

TIME: 10:15

WELL ID NUMBER: MW-48

WELL LOCATION: Old Landfill

DEPTH OF SCREENED INTERVAL (top notch): NA ft. to NA ft.

INNER CASING: TYPE PVC ID: 2 inches

PURGE SAVER ID: NA

WATER LEVEL INDICATOR ID: Herman

TURBIDITY ID: NA

DEPTH TO WATER: 30.97 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: NA FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: NA FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [X] Bailer [] Bladder Pump [] Pump Type PUMP ID: NA

PURGE START TIME: 1045 PURGE END TIME: 1105

TOTAL VOLUME PURGED: 7.5 gal

SITE CONDITIONS DURING PURGING: Muddy due to rain

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: None. Well has sheen on water. Strong odor

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [X] YES [] NO IF NO, WHY WAS A DEVIATION NECESSARY:

RECORDED BY: Capt. [Signature] 10-15-14 (Signature)

QA CHECKED BY: [Signature] (Signature)

GROUND WATER MICRO PURGE LOG

WELL ID: MW-48

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

TIME	L REMOVED	PURGE RATE (mL/min)	ORP (mv)	TEMP (C)	pH (s.u.)	COND (mS/cm)	DO (mg/L)	TURBIDITY (NTU)	DEPTH TO WATER (FT BTOC)	COMMENTS
	Well	Bailed	Dry							
	does	not	stabilize							

02 JP
10-15-14

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant DELIVERY ORDER NO: CK01

Date (mm/dd/yy): 10/15/14

Su M Tu W Th F Sa

PAGE 1 OF 1

Task Team Members:

Crystal Hann-Leidos

Hillary McGown-Bay West

~~QA 11-5-14~~

Narrative (include time and location):

1325 Arrive at well location MW-68. Depth to water = 25.81

Total well depth = 43.21 depth to water following pump placement = 25.68 ft BTDC. Initial PID = 0.20 ppm.

- Carry all equipment to well location.

1340 Begin purging. 20 second fill, 10 second discharge, SD PSI, 200 mL/min

1345 First Honiba reading recorded.

1430 Well is stable. Collect CGWMMW-068-0782-6W and

CGWMMW-068-0782-MS and CGWMMW-068-0782-MSD and

CGWMMW-068-0783-QA - each to be analyzed for RDX and

PEEA Metals + Mercury = 2 1-liter ambers & 1 500 mL poly each

= 8 1-liter ambers and 4 500 mL polys total.

1515 Done filling all jars. Pack up equipment and depart well location.

Handwritten signature

Daily Weather Conditions: A.M. NA

P.M. ~65° F; partly cloudy; mod. humidity; 0-5 MPH wind (slight breeze)

Recorded By Hillary McGown

QA Checked By *Quinn Dwyer*

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

DATE (mm/dd/yy): 10/15/14

TIME: 13:25

WELL ID NUMBER: MW-68

WELL LOCATION: SWMLL 20

DEPTH OF SCREENED INTERVAL (to notch): 23.57 ft. to 43.57 ft.

INNER CASING: TYPE PVC ID: 2 Inches

PURGE SAVER ID: N/A

WATER LEVEL INDICATOR ID: HERN 01-1170

TURBIDITY ID: 34027

DEPTH TO WATER: 25.81 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 23.57 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: 38.0 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [] Bailer [X] Bladder Pump [] Pump Type _____ PUMP ID: dedicated

PURGE START TIME: 1340 PURGE END TIME: 1430

TOTAL VOLUME PURGED 10.0 Liters

SITE CONDITIONS DURING PURGING: use dedicated well pump ino vehicle traffic

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: easily stabilized water level, etc

S&A PLAN SAMPLING PROCEDURE FOLLOWED: YES [] NO IF NO, WHY WAS A DEVIATION NECESSARY: _____

RECORDED BY: [Signature] (Signature)

QA CHECKED BY: [Signature] (Signature)

GROUND WATER MICRO PURGE LOG

WELL ID: MW-68

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

TIME	L REMOVED	PURGE RATE (mL/min)	ORP (mv)	TEMP (C)	pH (s.u.)	COND (mS/cm)	DO (mg/L)	TURBIDITY (NTU)	DEPTH TO WATER (FT BTOC)	COMMENTS
1345	1.0	200	28	16.92	7.04	0.830	10.24	11.4	25.80	
1350	2.0	200	17	16.08	6.92	0.808	8.46	4.9	25.80	
1355	3.0	200	41	16.17	6.88	0.796	7.84	4.4	25.80	
1400	4.0	200	67	16.09	6.76	0.799	7.42	4.7	25.80	
1405	5.0	200	81	16.01	6.68	0.802	7.13	4.5	25.80	
1410	6.0	200	84	15.67	6.61	0.802	6.79	4.7	25.80	
1415	7.0	200	93	15.21	6.62	0.799	6.05	4.5	25.80	
1420	8.0	200	98	14.83	6.65	0.798	5.89	4.6	25.80	
1425	9.0	200	102	14.56	6.68	0.800	5.91	4.6	25.80	
1430	10.0	200	106	14.61	6.72	0.799	5.96	4.3	25.80	

~~ADY~~
10-15-14

1.0L/5 minutes

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant DELIVERY ORDER NO: CK01

Date (mm/dd/yy): 10/16/14

Su M Tu W (Th) F Sa

PAGE 1 OF 1

Task Team Members:

Crystal Ham

Hilary McGowan

case

case

Narrative (include time and location):

0840: Arrive at MW-104 PID = 25.1 ppm

Breathing zone = 0.0 ppm.

Initial Water Level = 8.10 ft BToc

Total Depth = 18.99 ft BToc

0850: Begin to set up pump.

0855: Turn on pump. Water level stable

at 8.25 ft BToc. 1015 10 psi

150 ml/min

0900: Begin to fill up flow through cell

0938: Collect sample CGWMW-104-0768-GW

for VOCs + PAHs + CGWMW-TB-0786-TB for VOCs

1007: Bottles full. Begin to prepare to

leave location.

1015: Decom pump for next location

1024 Depart MW-104

Daily Weather Conditions: A.M. Cloudy 55°

P.M.

Recorded By Crystal Ham

QA Checked By Dink Drey

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

DATE (mm/dd/yy): 10/16/14

TIME: 08:40

WELL ID NUMBER: Mw-104

WELL LOCATION: Area A

DEPTH OF SCREENED INTERVAL (toc notch): 8.95 ft. to 18.95 ft.

INNER CASING: TYPE PVC ID: 2 inches

PURGE SAVER ID: NA

WATER LEVEL INDICATOR ID: Solinst

TURBIDITY ID: U-22

DEPTH TO WATER: 8.10 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 8.95 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: 13.95 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [] Bailer [] Bladder Pump [] Pump Type

PUMP ID: 10799

PURGE START TIME: 0855

PURGE END TIME: 0938

TOTAL VOLUME PURGED 4.9 L

SITE CONDITIONS DURING PURGING: Cloudy, wet

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: NONE

S&A PLAN SAMPLING PROCEDURE FOLLOWED: YES [] NO IF NO, WHY WAS A DEVIATION NECESSARY:

RECORDED BY: Crystal Hamm (Signature)

QA CHECKED BY: Daniel Dwyer (Signature)

GROUND WATER MICRO PURGE LOG

WELL ID: MU-104

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

TIME	ML REMOVED	PURGE RATE (mL/min)	ORP (mv)	TEMP (C)	pH (s.u.)	COND (mS/cm)	DO (mg/L)	TURBIDITY (NTU)	DEPTH TO WATER (FT BTOC)	COMMENTS
0903	1500	150	146	16.8	6.72	0.445	4.85	107.0	8.25	
0908	2250	150	127	17.0	7.03	0.444	4.00	132.0	8.25	
0913	3000	150	122	16.8	7.13	0.437	3.96	218.0	8.25	
0918	3375	75	115	16.7	7.18	0.410	4.52	146.0	8.22	Reduced flow rate to try to
0923	3750	75	111	16.6	7.22	0.411	3.94	130.0	8.22	reduce turbidity
0928	4125	75	108	16.5	7.24	0.410	3.88	108.0	8.22	cleaned out
0933	4500	75	105	16.6	7.25	0.409	3.87	105.0	8.22	flow through cell
0938	4875	75	104	16.6	7.26	0.408	3.87	103.0	8.22	
			Collect		Sample					
						CYH				
						10-16-14				

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant DELIVERY ORDER NO: CK01

Date (mm/dd/yy): 10/16/14

Su M Tu W Th F Sa

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Task Team Members:

Crystal Harris-Leidos

Hillary McBrown-BayWest

~~0.0 11-5-14~~

Narrative (include time and location):

0830 - Arrive at MW-105 well location. PID=9.1 ppm (breathing zone is 0.0 ppm). Initial depth to water = 9.84 ft BTDC; total depth = 18.98 ft BTDC.

- well historically bails dry - attempts have been made to purge well with low-flow methods but well will not stabilize.

0845 Begin hand bailing MW-105.

0905 Done bailing MW-105. Purged ~ 13.5 liters.

- Complete well inspection.

0910 Depart well location. Will return later to sample.

1120 Arrive at well location. Check depth to water = 13.17 ft BTDC - enough volume to sample.

1130 Collect CG MW-105-0769-GW for VOCs and low level PHTs = 2 1-liter ambers + 3 40 mL vials = 5 bottles total.

1140 Close up well, pack up and depart well location.

Daily Weather Conditions: A.M. ~50°F overcast, drizzle, high humidity; 0-5 MPH wind

P.M. ~55°F, mostly cloudy, high humidity; 0-5 MPH wind

Recorded By Hillary McBrown

QA Checked By Diana Dyer

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

DATE (mm/dd/yy): 10/16/14

TIME: 08:30

WELL ID NUMBER: MW-105

WELL LOCATION: Area A

DEPTH OF SCREENED INTERVAL (toc notch): 9.43 ft. to 19.43 ft.

INNER CASING: TYPE PVC ID: 2 inches

PURGE SAVER ID: N/A

WATER LEVEL INDICATOR ID: Heron 01-1170

TURBIDITY ID: N/A

DEPTH TO WATER: 9.84 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 9.43 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: N/A FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [] Bailer [] Bladder Pump [x] Pump Type hand bailer PUMP ID: N/A

PURGE START TIME: 0845 PURGE END TIME: 0905

TOTAL VOLUME PURGED 13.50 liters

SITE CONDITIONS DURING PURGING: no vehicle traffic; bailed down quickly - little no recharge

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: nothing notable

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [x] YES [] NO IF NO, WHY WAS A DEVIATION NECESSARY:

RECORDED BY: [Signature] (Signature)

QA CHECKED BY: [Signature] (Signature)

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant DELIVERY ORDER NO: CK01

Date (mm/dd/yy): 10-16-14

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PAGE 1 OF 1

Task Team Members:

Crystal Hann
Hillary McGowan
egal

egal

Narrative (include time and location):

10:40: Arrive at MW-106 and begin to set up
PID = 3.1 ppm
Initial w.l = 12.65 ft BTOC
Total depth = 19.5 ft BTOC
1050: Begin to set up pump
11:00 Turn on pump water-level stabilized at
12.65 ft BTOC. 7 psi. 7113. 50ml/min
1105: Begin to fill up flow through cell
1140: Collect CGMw-106-0770-GW
for VOCs + PAHs
1215: Complete sampling. Begin to pack up
1230 Depart location

Daily Weather Conditions: A.M. Cloudy 60°

P.M. _____

Recorded By Crystal Hann

QA Checked By Quint Dwyer

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

DATE (mm/dd/yy): 10-16-14

TIME: 10 : 40

WELL ID NUMBER: MW-106

WELL LOCATION: Area A

DEPTH OF SCREENED INTERVAL (toc notch): 9.54 ft. to 19.54 ft.

INNER CASING: TYPE PVC ID: 2 inches

PURGE SAVER ID: NA

WATER LEVEL INDICATOR ID: Salinot

TURBIDITY ID: Horiba U-22

DEPTH TO WATER: 12.65 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 9.54 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: 15.80 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [] Bailer [x] Bladder Pump [] Pump Type

PUMP ID: 16799

PURGE START TIME: 1100

PURGE END TIME: 1140

TOTAL VOLUME PURGED 2L

SITE CONDITIONS DURING PURGING: wet + cloudy

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: None

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [x] YES [] NO IF NO, WHY WAS A DEVIATION NECESSARY:

RECORDED BY: [Signature] (Signature)

QA CHECKED BY: [Signature] (Signature)

GROUND WATER MICRO PURGE LOG

WELL ID: MW 106

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

TIME	ML REMOVED	PURGE RATE (mL/min)	ORP (mv)	TEMP (C)	pH (s.u.)	COND (mS/cm)	DO (mg/L)	TURBIDITY (NTU)	DEPTH TO WATER (FT BTOC)	COMMENTS
1120	1000	50	108	18.3	7.12	0.457	4.53	68.8	12.72	
1125	1250	50	106	18.7	7.15	0.457	4.42	64.4	12.82	
1130	1500	50	103	19.2	7.18	0.450	4.52	34.3	12.82	
1135	1750	50	102	19.3	7.19	0.449	4.51	32.3	12.82	
1140	2000	50	101	19.4	7.20	0.450	4.51	31.9	12.82	
			Collect Sample							

C24
10-10-14

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant DELIVERY ORDER NO: CK01

Date (mm/dd/yy): 10/16/14

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PAGE 1 OF 2

Task Team Members:

Crystal Harn-Leidos
Hillary McGowan-BayWest

~~0.0 11-5-14~~

Narrative (include time and location):

- 0930 Arrive at MW-107 well location. PID = 11.8 ppm (breathing zone is 0.0 ppm). Initial depth to water = 7.35 ft BTDC; total depth = 18.82 ft BTDC; depth to water following pump placement = 7.26 ft BTDC
- ~~0951 Begin purging. 15 second fill, 15 second discharge; NEM 10-16-14~~
- water level not stable, troubleshoot settings
- 0951 Began purging. Settled on 10s fill, 20s discharge; 10 PSI, 200 mL/min.
- 1000 First Horiba reading. -Horiba was leaking. Take a preA and check "O" ring.
- 1005 First Horiba reading. -Horiba not leaking
- 1035 Well is stable. Collect CGWMW-107-0771-6W for VOCs and low level PAHs; CGWMW-107-0772-QA; CGWMW-107-0771-MS; CGWMW-107-0771-MSD - each for VOCs = 12 40 mL HCl vials and 2 1-liter ambers total.
- 1055 Done filling all sample jars. Pack up and depart well location.

Daily Weather Conditions: A.M. 255°, overcast, high humidity, 0-5 MPH

P.M. 255°, overcast, high humidity, 0-5 MPH

Recorded By Hillary McGowan

QA Checked By Link Dyer

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

Date (mm/dd/yy): 10/16/14

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Task Team Members:

Hillary McBrown - Bay West

Crystal Hann - Leidos

~~DD 11-5-14~~

Narrative (include time and location):

1400 Becon pump and collect ICOMMW-107-0773-ER
for VOCs = 3 vials total

~~DD~~
10-16-14

Daily Weather Conditions: A.M. _____

P.M. ~53° overcast, high humidity, 0-5 MPH

Recorded By Hillary McBrown

QA Checked By _____

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

DATE (mm/dd/yy): 10/16/14

TIME: 09:30

WELL ID NUMBER: MW-107

WELL LOCATION: Area A

DEPTH OF SCREENED INTERVAL (toc notch): 8.88 ft. to 13.88 ft.

INNER CASING: TYPE PVC ID: 2 inches

PURGE SAVER ID: N/A

WATER LEVEL INDICATOR ID: Hemo 01-1170

TURBIDITY ID: 34027

DEPTH TO WATER: 7.35 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 8.88 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: ~14.0 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [] Bailer [X] Bladder Pump [] Pump Type _____ PUMP ID: 15198

PURGE START TIME: 0951 PURGE END TIME: 1035

TOTAL VOLUME PURGED 8.5 liters

SITE CONDITIONS DURING PURGING: no train/vehicle traffic; fire hydrant across road from well is

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

Steadily leaking water

FIELD OBSERVATIONS: _____

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [X] YES [] NO IF NO, WHY WAS A DEVIATION NECESSARY: _____

RECORDED BY: [Signature] (Signature)

QA CHECKED BY: [Signature] (Signature)

GROUND WATER MICRO PURGE LOG

WELL ID: MW-107

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

TIME	L REMOVED	PURGE RATE (mL/min)	ORP (mv)	TEMP (C)	pH (s.u.)	COND (mS/cm)	DO (mg/L)	TURBIDITY (NTU)	DEPTH TO WATER (FT BTOC)	COMMENTS
100	1.5	200							7.68	HDM 10-16-14
	Hose is leaking - attempt to fix									
1005	2.5	200	154	17.31	6.84	0.415	3.47	40.8	7.68	
1010	3.5	200	152	18.00	6.89	0.400	1.38	38.4	7.68	
1015	4.5	200	151	18.23	6.92	0.400	0.42	32.3	7.68	
1020	5.5	200	151	18.25	6.92	0.398	0.24	34.9	7.68	
1025	6.5	200	150	18.31	6.92	0.396	0.06	31.3	7.68	
1030	7.5	200	150	18.38	6.91	0.393	0.02	30.6	7.68	
1035	8.5	200	150	18.45	6.90	0.392	0.01	32.1	7.68	

HDM
10-16-14

1.0 L/min

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant DELIVERY ORDER NO: CK01

Date (mm/dd/yy): 10-15-14

Su M Tu W Th F Sa

PAGE 1 OF 1

Task Team Members:

Crystal Ham
Hillary McGowan
CASH

CASH
10-16-14

Narrative (include time and location):

1510: Arrive at MW-114, PID = 0.0 ppm

Initial Wl = 25.82 ft BTOC

Total Depth = 105.87 ft BTOC

1515: Begin to set up pump.

1530: Turn on pump at try to stabilize the water level

Wl stable at 26.71 ft BTOC - 50 psi:

12/18. 40ml/min

1538: Begin to fill up flow through cell

1545: Flow through cell full begin to take parameters.

1610: Collect Sample CGWMW-114-0777-GW

1709: Turn off pump after filling sample bottles for TOCs, SVOCs, PAHs, + metals

1720: Depart MW-114.
CASH

Daily Weather Conditions: A.M. _____

P.M. Cloudy 65°

Recorded By Crystal Ham

QA Checked By Daryl Dyer

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

DATE (mm/dd/yy): 10-15-14

TIME: 15:10

WELL ID NUMBER: MW-114

WELL LOCATION: Old landfill

DEPTH OF SCREENED INTERVAL (toc notch): 95.87 ft. to 105.87 ft.

INNER CASING: TYPE PVC ID: 2 inches

PURGE SAVER ID: NA

WATER LEVEL INDICATOR ID: Solinst

TURBIDITY ID: U-22

DEPTH TO WATER: 25.82 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 95.87 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: 100.00 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [] Bailer [x] Bladder Pump [] Pump Type

PUMP ID: 10799

PURGE START TIME: 1530

PURGE END TIME: 16:10

TOTAL VOLUME PURGED 1.6 L

SITE CONDITIONS DURING PURGING: Cloudy, muddy

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: None

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [x] YES [] NO IF NO, WHY WAS A DEVIATION NECESSARY:

RECORDED BY: [Signature] (Signature)

QA CHECKED BY: [Signature] (Signature)

GROUND WATER MICRO PURGE LOG

WELL ID: MW-114

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

TIME	mL REMOVED	PURGE RATE (mL/min)	ORP (mv)	TEMP (C)	pH (s.u.)	COND (mS/cm)	DO (mg/L)	TURBIDITY (NTU)	DEPTH TO WATER (FT BTOC)	COMMENTS
1545	600	40	-2	16.3	7.00	0.636	6.46	43.7	26.81	
1550	800	40	-14	16.2	7.05	0.632	5.69	39.7	26.85	
1555	1000	40	-22	16.2	7.10	0.628	5.36	47.9	26.88	
1600	1200	40	-24	16.2	7.12	0.626	5.26	45.0	26.89	
1605	1400	40	-25	16.2	7.12	0.623	5.23	47.0	26.91	
1610	1600	40	-25	16.2	7.13	0.624	5.22	45.8	26.94	
			Collect sample							

Call

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

Date (mm/dd/yy): 10-15-14

Su M Tu W Th F Sa

PAGE 1 OF 1

Task Team Members:

Crystal Hunt

Hillary McGowan

~~CGM~~

Narrative (include time and location):

1255: Collect source blank ¹¹⁻⁵⁻¹⁴ ~~CGMMW-SRC-0785-SB~~ CGMMW-SRC-0768-SB
for VOCs, SVOCs, PAHs, +RDX, and metals

Collect trip blank CGMMW-TB-0768-TB

1500: Collect CGMMW-115-0780-ER
for ^{PAHs} ~~VOCs~~ ¹¹⁻⁵⁻¹⁴ SVOCs, + metals Equipment
Rigsite for MW-115.

~~1709: Turn off at 10-15-14~~

~~CGM~~
10-15-14

Daily Weather Conditions: A.M. Sunny to partly cloudy, ~70°F

P.M. same as above; slight breeze

Recorded By Crystal Hunt

QA Checked By David Dwyer

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

Date (mm/dd/yy): 10/15/14

Su M Tu W Th F Sa

PAGE 1 OF 2

Task Team Members:

Crystal Hann-Leidos

Hillary McGowan-Baywest

~~DD 11-5-14~~

Narrative (include time and location):

0830 Arrive at MW-115 well location. PID=0.0 ppm. Initial depth to water= 28.94 ft BTOC; total well depth=4048 ft BTOC; depth to water following pump placement= 28.94 ft BTOC.

0855 Begin purging MW-115. Troubleshoot pump fill/discharge and pressure settings before connecting to Horiba. Also have to allow Horiba to fill.

= 15 second fill / 15 second discharge. 40 PSI. 50 mL/min

0915 First reading recorded due to reasons stated above.

0950 Well is stable. Collect CGWMW-115-0778-GW for SVOCs/low level PAHs + RCRA Metals + Mercury (3 1-liter ambers and 1 500 ml poly) Also collect CGWMW-115-0778-MSD and CGWMW-115-0778-MS for SVOCs/low level PAHs (4 1-liter ambers total. Also collect CGWMW-115-0779-QA for SVOCs/low level PAHs (3 1-liter ambers). Total jars collected at this well= 10 1-liter ambers and 1 500 mL poly.

Daily Weather Conditions: A.M. ~65°; overcast, heavy fog, mod. humidity; 0-5 MPH wind

P.M. 265°; partly cloudy; mod humidity; 0-5 MPH (slight breeze)

Recorded By Hillary McGowan

QA Checked By Daniel Dyer

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant DELIVERY ORDER NO: CK01

Date (mm/dd/yy): 10/15/14

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PAGE 2 OF 2

Task Team Members:

Crystal Hann-Leidos

Hillary McGrown - Baywest

~~OO 11-5-14~~

Narrative (include time and location):

-do to the extreme low-flow volume, decide to not collect one 1-liter amber for both the MS/MSD sample sets = two for each versus the three for each.

1310 Done filling all 11 bottles pack up equipment and depart well location.

~~WEM~~
10-15-14

Daily Weather Conditions: A.M. 46S°; overcast; heavy fog; mod. humidity; 0-5 MPH wind

P.M. 46S°; partly cloudy; mod. humidity; 0-5 MPH (slight breeze)

Recorded By Hillary McGrown

QA Checked By Quinn Long

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

DATE (mm/dd/yy): 10/15/14

TIME: 08:30

WELL ID NUMBER: UW-115

WELL LOCATION: Old Landfill Area

DEPTH OF SCREENED INTERVAL (toc notch): 30.85 ft. to 40.85 ft.

INNER CASING: TYPE PVC ID: 2 inches

PURGE SAVER ID: N/A

WATER LEVEL INDICATOR ID: Solinst

TURBIDITY ID: 34027

DEPTH TO WATER: 28.94 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 30.85 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: 35.85 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [] Bailer [X] Bladder Pump [] Pump Type _____ PUMP ID: 10799

PURGE START TIME: 0855 PURGE END TIME: 0950

TOTAL VOLUME PURGED 2.75 liters

SITE CONDITIONS DURING PURGING: nothing notable - no vehicle traffic nearby

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: hard to get WL to stabilize initially

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [X] YES [] NO IF NO, WHY WAS A DEVIATION NECESSARY: _____

RECORDED BY: [Signature] (Signature)

QA CHECKED BY: [Signature] (Signature)

GROUND WATER MICRO PURGE LOG

WELL ID: MW-115

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

TIME	L REMOVED	PURGE RATE (mL/min)	ORP (mv)	TEMP (C)	pH (s.u.)	COND (mS/cm)	DO (mg/L)	TURBIDITY (NTU)	DEPTH TO WATER (FT BTOC)	COMMENTS
0915	1.0	SD	22	14.55	6.51	0.986	5.84	16.0	29.17	
0920	1.25	SD	24	14.38	6.52	0.987	4.03	13.2	29.17	
0925	1.50	SD	29	14.31	6.50	0.981	3.11	12.7	29.17	
0930	1.75	SD	34	14.27	6.49	0.976	2.63	12.0	29.17	
0935	2.0	SD	46	14.27	6.50	0.971	2.24	9.7	29.17	
0940	2.25	SD	57	14.24	6.49	0.966	2.30	6.2	29.18	
0945	2.50	SD	62	14.24	6.49	0.965	2.24	5.0	29.18	
0950	2.75	SD	69	14.27	6.48	0.964	2.21	4.9	29.18	

[Signature]
10-15-14

0.25 L/5 minutes

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant DELIVERY ORDER NO: CK01

Date (mm/dd/yy): 10/15/14

Su M Tu Th F Sa

PAGE 1 OF 1

Task Team Members:

Crystal Hann-Leidos

Hillary McGowan - Bay West

~~11-5-14~~

Narrative (include time and location):

1530 Arrive at MW-116 well location. PID = 0.0 ppm. Initial depth to water = 49.41; total depth = 121.42; depth to water following pump placement = 48.57 ft BDC.

1550 Begin purging. 30 second fill, 30 second discharge; 50 PSI, -water level continues to drop. Keep troubleshooting settings.

1615 Finally get WL to stabilize. took up discharge line to Horiba - wait to fill. set at 10 s fill, 20 s discharge; 50 PSI, 50 mL/min.

1630 First parameter readings recorded.

1655 ⁷⁰⁰ ₁₀₋₁₅₋₁₄ Collect [CGMMW-116-07 81-6W] for SVOCs/low level PATHs and PETA Metals + Mercury. = 4 bottles total (3 1-liter amber + 1 500 mL poly).

1810 Done filling all jars Pack up equipment and depart well location.

[Handwritten signature]

Daily Weather Conditions: A.M. NA

P.M. 26°; overcast / mostly cloudy; mod. humidity, slight breeze

Recorded By Hillary McGowan

QA Checked By *[Signature]*

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

DATE (mm/dd/yy): 10/15/14

TIME: 15:30

WELL ID NUMBER: MW-116

WELL LOCATION: SWMU 19/29

DEPTH OF SCREENED INTERVAL (toc notch): 99.8 ft. to 119.8 ft.

INNER CASING: TYPE PVO ID: 2 inches

PURGE SAVER ID: N/A

WATER LEVEL INDICATOR ID: MW-01-1170

TURBIDITY ID: 34027

DEPTH TO WATER: 49.4 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 99.8 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: 114.0 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [] Bailer [x] Bladder Pump [] Pump Type PUMP ID: 15198

PURGE START TIME: 1550 PURGE END TIME: 1655 1700

TOTAL VOLUME PURGED: 275 3.0 liters

SITE CONDITIONS DURING PURGING: no vehicle traffic

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: hard to get WL to stabilize; pre-maturely thought it was stable at 1655 - wanted one more reading to see where NO would be.

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [x] YES [] NO IF NO, WHY WAS A DEVIATION NECESSARY:

RECORDED BY: [Signature] (Signature)

QA CHECKED BY: [Signature] (Signature)

GROUND WATER MICRO PURGE LOG

WELL ID: MW-116

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

TIME	L REMOVED	PURGE RATE (mL/min)	ORP (mv)	TEMP (C)	pH (s.u.)	COND (mS/cm)	DO (mg/L)	TURBIDITY (NTU)	DEPTH TO WATER (FT BTOC)	COMMENTS
1630	1.5	SD	-177	16.43	7.12	0.795	4.98	8.1	49.78	
1635	1.75	SD	-186	16.22	7.07	0.787	3.34	9.3	49.78	
1640	2.0	SD	-155	15.88	7.01	0.785	2.64	7.7	49.79	
1645	2.25	SD	-143	15.79	6.98	0.786	2.81	8.2	49.79	
1650	2.50	SD	-138	15.68	6.97	0.788	1.73	8.4	49.80	
1655	2.75	SD	-134	15.63	6.96	0.789	1.76	9.4	49.80	
1700	3.0	SD	-126	15.59	6.96	0.791	1.72	9.1	49.81	

~~ADJ~~



**FISCAL YEAR 2014 LONG-TERM MONITORING/
LONG-TERM OPERATIONS REPORT**
Holston Army Ammunition Plant, Kingsport, Tennessee

**APPENDIX A.3
SURFACE WATER SAMPLING LOGS**



**FISCAL YEAR 2014 LONG-TERM MONITORING/
LONG-TERM OPERATIONS REPORT**
Holston Army Ammunition Plant, Kingsport, Tennessee

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TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant DELIVERY ORDER NO: CK01

Date (mm/dd/yy): 04-14-14

Su (M) Tu W Th F Sa

PAGE 1 OF 2

Task Team Members:

Crystal Harn

A. Larry McGowan

Cyse

Narrative (include time and location):

0730: Arrive at surface water location SW-1 upgradient location.

0750: Collect CSWSW-001-0752-SW for VOCs, SVOCs, RCRA metals + mercury, explosives, pesticides, bromacil + triphthal CGWMMW-TB-0706-TB for VOCs. pH = 6.38 SU, Cond = 0.358 mS/cm, turb = 6.6 NTU, Do = 8.44 mg/L, temp = 17.42 °C, ORP = 319 mV.

0815: Depart SW-1

0840: Arrive at SW-2. Down gradient of the IWT F.

0900: Collect CSWSW-002-0753-SW for VOCs, SVOCs, RCRA metals + mercury, explosives, pesticides, bromacil. pH = 7.17 SU, Cond = 0.356 mS/cm, turb = 10.6 NTU, Do = 8.35 mg/L, Temp = 17.62 °C, ORP = 225 mV.

Daily Weather Conditions: A.M. Partly cloudy to cloudy ⁴⁻¹⁴⁻¹⁴ 70° 60°

P.M.

Recorded By Crystal Harn 4-14-14 QA Checked By Daryl Day 4-28-14

92

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant

DELIVERY ORDER NO: CK01

Date (mm/dd/yy): 04-14-14

Su M Tu W Th F Sa

PAGE 2 OF 2

Task Team Members:

Crystal Ham

Allan Mc Gowan

~~CSB
4-14-14~~

Narrative (include time and location):

0955 Arrive at SW-3. Down gradient of Area B.

1000: Collect CSWSW-003-0754. SW for VOCs, SVOCs, RCRA metals + Mercury, explosives, pesticides, and bromacil.

pH = 7.64 SU, Cond = 0.354 mS/cm, turb = 17.8 NTU₅

DO = 7.76 mg/L, Temp = 17.99°C, ORP = 229 mV

1005: Dennis Mayhew on site

1030: Depart location. All surface water sampling complete

~~CSB
4-14-14~~

Daily Weather Conditions: A.M.

Partly cloudy to cloudy 60°

P.M.

Recorded By

Crystal Ham 4-14-14

QA Checked By

David Dyer 4-28-14



**FISCAL YEAR 2014 LONG-TERM MONITORING/
LONG-TERM OPERATIONS REPORT**
Holston Army Ammunition Plant, Kingsport, Tennessee

**APPENDIX A.4
WELL INSPECTIONS
(SPRING AND FALL 2014)**



**FISCAL YEAR 2014 LONG-TERM MONITORING/
LONG-TERM OPERATIONS REPORT**
Holston Army Ammunition Plant, Kingsport, Tennessee

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**FISCAL YEAR 2014 LONG-TERM MONITORING/
LONG-TERM OPERATIONS REPORT**
Holston Army Ammunition Plant, Kingsport, Tennessee

SPRING 2014



**FISCAL YEAR 2014 LONG-TERM MONITORING/
LONG-TERM OPERATIONS REPORT**
Holston Army Ammunition Plant, Kingsport, Tennessee

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HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 04/16/14

Time: 0910

WELL INFORMATION

Well Number: GM-12 Location/Functional Area: Burning Grounds

Casing Type: Steel Stainless Steel PVC

Screened/Open-Hole Well Type: screened Monitor Interval Length: 20 Ft

Flush-mount/Above-ground Completion: above ground

Reported Constructed Depth: 73.73 ft BGS or BTOC (circle one)

INSPECTION ITEMS YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

Number of guard posts at well: 4

Are the posts positioned to prevent collision damage to the well?

Are any of the posts damaged or degraded?

Is a concrete pad installed?

Is the pad cracked or deteriorated?

Is steel protective casing installed?

Does the protective casing have a weep hole?

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Flush-mount completion:

Is the traffic cover securely bolted to the flush-mount box?

Does the well have a flush-mount box?

Is the traffic cover cracked or broken?

Is the concrete apron cracked or deteriorated?

<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Identification:

Is the well labeled with the correct number?

Describe labeling: "GM-12" stickers on steel protective casing

Security:

Does the well have a cap or lid?

Does the well have a weatherproof lock?

Does the lock secure the well?

Does the inner casing have a cap?

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Down-hole Condition:

Is the well casing bent, corroded, or broken (at the surface?)

Is the well casing loose (at the surface?)

Is a measurement point marked at the top of the well casing?

Measured depth of the well from measurement point: 73.60 ft BTOC

Thickness of sediment accumulation (reported depth-present measurement): N/A

Are there any obstructions in the well?

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Inspection Date: 4/16/14

Inspected by: Hilary McGown

HOLSTON ARMY AMMUNITION PLANT WELL INSPECTION CHECKLIST

Date: 4-12-14
Time: 1200

WELL INFORMATION

Well Number: GM-14

Location/Functional Area: Production / Boundary

Casing Type: Steel ⁴⁻²⁸⁻¹⁴ Stainless Steel PVC

Screened/Open-Hole Well Type: SCREEN

Monitor Interval Length: 20 Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 47.31 ft BGS or (BTOC) (circle one)

INSPECTION ITEMS

YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

- Number of guard posts at well: 4
- Are the posts positioned to prevent collision damage to the well? YES NO N/A
- Are any of the posts damaged or degraded? YES NO N/A
- Is a concrete pad installed? YES NO N/A
- Is the pad cracked or deteriorated? YES NO N/A
- Is steel protective casing installed? YES NO N/A
- Does the protective casing have a weep hole? YES NO N/A

Flush-mount completion:

- Is the traffic cover securely bolted to the flush-mount box? YES NO N/A
- Does the well have a flush-mount box? YES NO N/A
- Is the traffic cover cracked or broken? YES NO N/A
- Is the concrete apron cracked or deteriorated? YES NO N/A

Identification:

- Is the well labeled with the correct number? YES NO N/A
- Describe labeling: Stickers GM-14

Security:

- Does the well have a cap or lid? YES NO N/A
- Does the well have a weatherproof lock? YES NO N/A
- Does the lock secure the well? YES NO N/A
- Does the inner casing have a cap? YES NO N/A

Down-hole Condition:

- Is the well casing bent, corroded, or broken (at the surface?) YES NO N/A
- Is the well casing loose (at the surface?) YES NO N/A
- Is a measurement point marked at the top of the well casing? YES NO N/A
- Measured depth of the well from measurement point: 48.00 ft BTOC
- Thickness of sediment accumulation (reported depth-present measurement): NA
- Are there any obstructions in the well? YES NO N/A

Inspection Date: 4-12-14

Inspected by: Captel Ham

HOLSTON ARMY AMMUNITION PLANT WELL INSPECTION CHECKLIST

Date: 4-12-14
Time: 1555

WELL INFORMATION

Well Number: MW-11 Location/Functional Area: Production / Boundary

Casing Type: Steel ^{C.R. 4-28-14} Stainless Steel PVC

Screened/Open-Hole Well Type: Screen Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 18.00 ft BGS or BTOC (circle one)

INSPECTION ITEMS

YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

- Number of guard posts at well: 3
- Are the posts positioned to prevent collision damage to the well?
- Are any of the posts damaged or degraded?
- Is a concrete pad installed?
- Is the pad cracked or deteriorated?
- Is steel protective casing installed?
- Does the protective casing have a weep hole?

<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Flush-mount completion:

- Is the traffic cover securely bolted to the flush-mount box?
- Does the well have a flush-mount box?
- Is the traffic cover cracked or broken?
- Is the concrete apron cracked or deteriorated?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

Identification:

- Is the well labeled with the correct number?
- Describe labeling: Sticker - 11

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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Security:

- Does the well have a cap or lid?
- Does the well have a weatherproof lock?
- Does the lock secure the well?
- Does the inner casing have a cap?

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Down-hole Condition:

- Is the well casing bent, corroded, or broken (at the surface?)
- Is the well casing loose (at the surface?)
- Is a measurement point marked at the top of the well casing?
- Measured depth of the well from measurement point: 17.70
- Thickness of sediment accumulation (reported depth-present measurement): 0.34
- Are there any obstructions in the well?

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Inspection Date: 4-12-14

Inspected by: Capt. [Signature]

HOLSTON ARMY AMMUNITION PLANT WELL INSPECTION CHECKLIST

Date: 04/12/14
Time: 1600

WELL INFORMATION

Well Number: MW-11B Location/Functional Area: Production Area Perimeter

Casing Type: Steel Stainless Steel PVC

Screened/Open-Hole Well Type: open-hole Monitor Interval Length: 47 Ft

Flush-mount/Above-ground Completion: above-ground

Reported Constructed Depth: 123.47 ft BGS or BTOC (circle one)

INSPECTION ITEMS

YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

Number of guard posts at well: 3

Are the posts positioned to prevent collision damage to the well?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Are any of the posts damaged or degraded?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Is a concrete pad installed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is the pad cracked or deteriorated?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Is steel protective casing installed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Does the protective casing have a weep hole?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Flush-mount completion:

Is the traffic cover securely bolted to the flush-mount box?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Does the well have a flush-mount box?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Is the traffic cover cracked or broken?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Is the concrete apron cracked or deteriorated?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

Identification:

Is the well labeled with the correct number?
Describe labeling: "11B" stickers on steel protective casing

Security:

Does the well have a cap or lid?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Does the well have a weatherproof lock?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Does the lock secure the well?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Does the inner casing have a cap?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Down-hole Condition:

Is the well casing bent, corroded, or broken (at the surface?)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Is the well casing loose (at the surface?)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Is a measurement point marked at the top of the well casing?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Measured depth of the well from measurement point: <u>104.10 ft BTOC</u>				
Thickness of sediment accumulation (reported depth-present measurement): <u>N/A</u>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Are there any obstructions in the well?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Inspection Date: 4/12/14

Inspected by: Hillary McGraw

**HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST**

Date: 4-7-2014

Time: 0845

WELL INFORMATION

Well Number: MW-15 Location/Functional Area: Area B

Casing Type: ^{CR 4-28-14} Steel Stainless Steel PVC

Screened/Open-Hole Well Type: Screened Monitor Interval Length: _____ Ft

Flush-mount/Above-ground Completion: Above-ground wl = 9.74 ft BTOC

Reported Constructed Depth: 24.21 ft BGS or BTOC (circle one)

INSPECTION ITEMS YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

Number of guard posts at well: 3

Are the posts positioned to prevent collision damage to the well?

Are any of the posts damaged or degraded?

Is a concrete pad installed?

Is the pad cracked or deteriorated?

Is steel protective casing installed?

Does the protective casing have a weep hole? installed 6/24/14

Flush-mount completion:

Is the traffic cover securely bolted to the flush-mount box?

Does the well have a flush-mount box?

Is the traffic cover cracked or broken?

Is the concrete apron cracked or deteriorated?

Identification:

Is the well labeled with the correct number?

Describe labeling: Stickers Saying MW-15

Security:

Does the well have a cap or lid?

Does the well have a weatherproof lock?

Does the lock secure the well?

Does the inner casing have a cap?

Down-hole Condition:

Is the well casing bent, corroded, or broken (at the surface)?

Is the well casing loose (at the surface)?

Is a measurement point marked at the top of the well casing?

Measured depth of the well from measurement point: 24.18 ft BTOC

Thickness of sediment accumulation (reported depth-present measurement): 0.03ft

Are there any obstructions in the well?

Inspection Date: 4-7-14

Inspected by: Cyril Hamm

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 4-7-14
Time: 1012

WELL INFORMATION

Well Number: MW-23 Location/Functional Area: Production Area

Casing Type: Steel Stainless Steel PVC

Screened/Open-Hole Well Type: Screen Monitor Interval Length: NA Ft

Flush-mount/Above-ground Completion: Above-ground well = 6.98 ft BTOC

Reported Constructed Depth: 15.20 ft BGS or BTOC (circle one)

INSPECTION ITEMS

YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

Number of guard posts at well: 3

Are the posts positioned to prevent collision damage to the well?

Are any of the posts damaged or degraded?

Is a concrete pad installed?

Is the pad cracked or deteriorated?

Is steel protective casing installed?

Does the protective casing have a weep hole?

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Installed 6/24/14

Flush-mount completion:

Is the traffic cover securely bolted to the flush-mount box?

Does the well have a flush-mount box?

Is the traffic cover cracked or broken?

Is the concrete apron cracked or deteriorated?

<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

Identification:

Is the well labeled with the correct number?

Describe labeling: Stickers MW-23

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
-------------------------------------	--------------------------	--------------------------	--

Security:

Does the well have a cap or lid?

Does the well have a weatherproof lock?

Does the lock secure the well?

Does the inner casing have a cap?

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Down-hole Condition:

Is the well casing bent, corroded, or broken (at the surface?)

Is the well casing loose (at the surface?)

Is a measurement point marked at the top of the well casing?

Measured depth of the well from measurement point: 15.15 ft BTOC

Thickness of sediment accumulation (reported depth-present measurement): 0.05 ft

Are there any obstructions in the well?

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Inspection Date: 4-7-14

Inspected by: Captel Ham

**HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST**

Date: 4-7-14

Time: 1006

WELL INFORMATION

Well Number: MW-27 Location/Functional Area: Production Area

Casing Type: ^{CR 4-28-14} Steel Stainless Steel PVC

Screened/Open-Hole Well Type: Screen Monitor Interval Length: NA Ft
_{CR 4-7-14}

Flush-mount/Above-ground Completion: Above-ground We = 8.70 Ft BTOC
8.64

Reported Constructed Depth: 10.45 ft BGS or BTOC (circle one)

INSPECTION ITEMS YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

Number of guard posts at well: 3

Are the posts positioned to prevent collision damage to the well?

Are any of the posts damaged or degraded?

Is a concrete pad installed?

Is the pad cracked or deteriorated?

Is steel protective casing installed?

Does the protective casing have a weep hole? installed 6/24/14

Flush-mount completion:

Is the traffic cover securely bolted to the flush-mount box?

Does the well have a flush-mount box?

Is the traffic cover cracked or broken?

Is the concrete apron cracked or deteriorated?

Identification:

Is the well labeled with the correct number?

Describe labeling: MW-27 stickers

Security:

Does the well have a cap or lid?

Does the well have a weatherproof lock?

Does the lock secure the well?

Does the inner casing have a cap?

Down-hole Condition:

Is the well casing bent, corroded, or broken (at the surface?)

Is the well casing loose (at the surface?)

Is a measurement point marked at the top of the well casing?

Measured depth of the well from measurement point: 10.92 Ft BTOC

Thickness of sediment accumulation (reported depth-present measurement): NA

Are there any obstructions in the well?

Inspection Date: 4-7-14

Inspected by: Captal Glen

**HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST**

Date: 4-7-14

Time: 0937

WELL INFORMATION

Well Number: MW-39 Location/Functional Area: Production Area

Casing Type: ^{Cor 4-28-14} Steel Stainless Steel PVC

Screened/Open-Hole Well Type: Screened Monitor Interval Length: NA Ft

Flush-mount/Above-ground Completion: Above-ground well = 11.08 ft B10C

Reported Constructed Depth: 16.22 ft BGS or (B10C) (circle one)

INSPECTION ITEMS YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

Number of guard posts at well: 3

- Are the posts positioned to prevent collision damage to the well? YES NO N/A
- Are any of the posts damaged or degraded? YES NO N/A
- Is a concrete pad installed? YES NO N/A
- Is the pad cracked or deteriorated? YES NO N/A
- Is steel protective casing installed? YES NO N/A
- Does the protective casing have a weep hole? YES NO N/A Installed 6/24/14

Flush-mount completion:

- Is the traffic cover securely bolted to the flush-mount box? YES NO N/A
- Does the well have a flush-mount box? YES NO N/A
- Is the traffic cover cracked or broken? YES NO N/A
- Is the concrete apron cracked or deteriorated? YES NO N/A

Identification:

- Is the well labeled with the correct number? YES NO N/A
- Describe labeling: Stickers MW-39

Security:

- Does the well have a cap or lid? YES NO N/A
- Does the well have a weatherproof lock? YES NO N/A
- Does the lock secure the well? YES NO N/A
- Does the inner casing have a cap? YES NO N/A

Down-hole Condition:

- Is the well casing bent, corroded, or broken (at the surface?) YES NO N/A
- Is the well casing loose (at the surface?) YES NO N/A
- Is a measurement point marked at the top of the well casing? YES NO N/A
- Measured depth of the well from measurement point: 16.18 ft B10C
- Thickness of sediment accumulation (reported depth-present measurement): 0.04 ft
- Are there any obstructions in the well? YES NO N/A

Inspection Date: 4-7-14

Inspected by: Capt. H. [Signature]

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 4-10-14
Time: 0805

WELL INFORMATION

Well Number: MW-48 Location/Functional Area: B Area

Casing Type: Steel ^{ex 4-28-14} Stainless Steel PVC

Screened/Open-Hole Well Type: Screen Monitor Interval Length: NA Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 66.90 ft BGS or BTOC (circle one)

INSPECTION ITEMS

YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

- Number of guard posts at well: 3
- Are the posts positioned to prevent collision damage to the well?
- Are any of the posts damaged or degraded?
- Is a concrete pad installed?
- Is the pad cracked or deteriorated?
- Is steel protective casing installed?
- Does the protective casing have a weep hole?

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Flush-mount completion:

- Is the traffic cover securely bolted to the flush-mount box?
- Does the well have a flush-mount box?
- Is the traffic cover cracked or broken?
- Is the concrete apron cracked or deteriorated?

<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

Identification:

- Is the well labeled with the correct number?
- Describe labeling: Stickers - 48

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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Security:

- Does the well have a cap or lid?
- Does the well have a weatherproof lock?
- Does the lock secure the well?
- Does the inner casing have a cap?

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Down-hole Condition:

- Is the well casing bent, corroded, or broken (at the surface?)
- Is the well casing loose (at the surface?)
- Is a measurement point marked at the top of the well casing?
- Measured depth of the well from measurement point: 68.40 ft BTOC
- Thickness of sediment accumulation (reported depth-present measurement): NA
- Are there any obstructions in the well?

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Inspection Date: 4-10-14

Inspected by: Capt. [Signature]

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 4/15/14
Time: 1030

WELL INFORMATION

Well Number: MW-55 Location/Functional Area: Background

Casing Type: Steel Stainless Steel PVC

Screened/Open-Hole Well Type: screened Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: above ground

Reported Constructed Depth: 117.72 ft BGS of (BTOC) (circle one)

INSPECTION ITEMS

YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

- Number of guard posts at well: 3
- Are the posts positioned to prevent collision damage to the well?
- Are any of the posts damaged or degraded?
- Is a concrete pad installed?
- Is the pad cracked or deteriorated?
- Is steel protective casing installed?
- Does the protective casing have a weep hole?

Flush-mount completion:

- Is the traffic cover securely bolted to the flush-mount box?
- Does the well have a flush-mount box?
- Is the traffic cover cracked or broken?
- Is the concrete apron cracked or deteriorated?

Identification:

- Is the well labeled with the correct number?
- Describe labeling: "55" stickers on steel protective casing

Security:

- Does the well have a cap or lid?
- Does the well have a weatherproof lock?
- Does the lock secure the well?
- Does the inner casing have a cap?

Down-hole Condition:

- Is the well casing bent, corroded, or broken (at the surface)?
- Is the well casing loose (at the surface)?
- Is a measurement point marked at the top of the well casing?
- Measured depth of the well from measurement point: ~119.10 ft BTOC
- Thickness of sediment accumulation (reported depth-present measurement): N/A
- Are there any obstructions in the well?

Inspection Date: 4/15/14

Inspected by: Hilary McGowan

HOLSTON ARMY AMMUNITION PLANT WELL INSPECTION CHECKLIST

Date: 4-10-14
Time: 1015

WELL INFORMATION

Well Number: MW-68 Location/Functional Area: Area B

Casing Type: Steel ^{C.R. 4-28-14} Stainless Steel PVC

Screened/Open-Hole Well Type: Screened Monitor Interval Length: 20 Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 43.57 ft BGS or **BTOC** (circle one)

INSPECTION ITEMS

Well-head Completion:

Above-ground completion:

- Number of guard posts at well: 2
- Are the posts positioned to prevent collision damage to the well?
- Are any of the posts damaged or degraded?
- Is a concrete pad installed?
- Is the pad cracked or deteriorated?
- Is steel protective casing installed?
- Does the protective casing have a weep hole?

YES NO N/A COMMENTS

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Flush-mount completion:

- Is the traffic cover securely bolted to the flush-mount box?
- Does the well have a flush-mount box?
- Is the traffic cover cracked or broken?
- Is the concrete apron cracked or deteriorated?

<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Identification:

- Is the well labeled with the correct number?
- Describe labeling: Sticker - 68

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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Security:

- Does the well have a cap or lid?
- Does the well have a weatherproof lock?
- Does the lock secure the well?
- Does the inner casing have a cap?

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Down-hole Condition:

- Is the well casing bent, corroded, or broken (at the surface?)
- Is the well casing loose (at the surface?)
- Is a measurement point marked at the top of the well casing?
- Measured depth of the well from measurement point: 43.31 ft **BTOC**
- Thickness of sediment accumulation (reported depth-present measurement): 0.26
- Are there any obstructions in the well?

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Inspection Date: 4-10-14

Inspected by: Capt. [Signature]

HOLSTON ARMY AMMUNITION PLANT WELL INSPECTION CHECKLIST

Date: 4/13/14
Time: 1420

WELL INFORMATION

Well Number: MW-68 Location/Functional Area: SWMU 20

Casing Type: Steel Stainless Steel PVC

Screened/Open-Hole Well Type: screened Monitor Interval Length: 20 Ft

Flush-mount/Above-ground Completion: above ground

Reported Constructed Depth: 43.57 ft BGS or BTOC (circle one)

INSPECTION ITEMS

YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

Number of guard posts at well:	<u>2</u>			
Are the posts positioned to prevent collision damage to the well?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>one is slightly loose</u>
Are any of the posts damaged or degraded?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is a concrete pad installed?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Is the pad cracked or deteriorated?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is steel protective casing installed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Does the protective casing have a weep hole?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Flush-mount completion:

Is the traffic cover securely bolted to the flush-mount box?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Does the well have a flush-mount box?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Is the traffic cover cracked or broken?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Is the concrete apron cracked or deteriorated?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

Identification:

Is the well labeled with the correct number? [] [] []
Describe labeling: "68" stickers on steel protective casing

Security:

Does the well have a cap or lid?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Does the well have a weatherproof lock?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Does the lock secure the well?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Does the inner casing have a cap?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Down-hole Condition:

Is the well casing bent, corroded, or broken (at the surface)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Is the well casing loose (at the surface)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Is a measurement point marked at the top of the well casing?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Measured depth of the well from measurement point:	<u>43.38</u> ft	<u>BTOC</u>		
Thickness of sediment accumulation (reported depth-present measurement):	<u>0.20</u> ft			
Are there any obstructions in the well?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Inspection Date: 4/13/14

Inspected by: Hillary McGowan

HOLSTON ARMY AMMUNITION PLANT WELL INSPECTION CHECKLIST

Date: 4-10-14

Time: 1030

WELL INFORMATION

Well Number: MW-68B Location/Functional Area: Area B

Casing Type: ^{CR 4-26-14} Steel Stainless Steel PVC

Screened/Open-Hole Well Type: Screened Monitor Interval Length: NA Ft

Flush-mount/Above-ground Completion: Above-ground Wl = 30.90 ft BTOC

Reported Constructed Depth: NA ft BGS or BTOC (circle one)

INSPECTION ITEMS YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

Number of guard posts at well: 2

Are the posts positioned to prevent collision damage to the well?

Are any of the posts damaged or degraded?

Is a concrete pad installed?

Is the pad cracked or deteriorated?

Is steel protective casing installed?

Does the protective casing have a weep hole?

Flush-mount completion:

Is the traffic cover securely bolted to the flush-mount box?

Does the well have a flush-mount box?

Is the traffic cover cracked or broken?

Is the concrete apron cracked or deteriorated?

Identification:

Is the well labeled with the correct number?

Describe labeling: Stickers MW-68B

Security:

Does the well have a cap or lid?

Does the well have a weatherproof lock?

Does the lock secure the well?

Does the inner casing have a cap?

Down-hole Condition:

Is the well casing bent, corroded, or broken (at the surface)?

Is the well casing loose (at the surface)?

Is a measurement point marked at the top of the well casing?

Measured depth of the well from measurement point: 82.00 ft BTOC

Thickness of sediment accumulation (reported depth-present measurement):

Are there any obstructions in the well?

Inspection Date: 4-10-14

Inspected by: Cynthia Hill

HOLSTON ARMY AMMUNITION PLANT WELL INSPECTION CHECKLIST

Date: 4-11-14
Time: 1435

WELL INFORMATION

Well Number: MW-70 Location/Functional Area: Area B

Casing Type: Steel ^{ex 4-28-14} Stainless Steel PVC

Screened/Open-Hole Well Type: Screen Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 52.50 ft BGS or BTOC (circle one)

INSPECTION ITEMS

YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

- Number of guard posts at well: 4
- Are the posts positioned to prevent collision damage to the well?
- Are any of the posts damaged or degraded?
- Is a concrete pad installed?
- Is the pad cracked or deteriorated?
- Is steel protective casing installed?
- Does the protective casing have a weep hole?

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Flush-mount completion:

- Is the traffic cover securely bolted to the flush-mount box?
- Does the well have a flush-mount box?
- Is the traffic cover cracked or broken?
- Is the concrete apron cracked or deteriorated?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

Identification:

- Is the well labeled with the correct number?
- Describe labeling: stickers - 70

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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Security:

- Does the well have a cap or lid?
- Does the well have a weatherproof lock?
- Does the lock secure the well?
- Does the inner casing have a cap?

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Down-hole Condition:

- Is the well casing bent, corroded, or broken (at the surface)?
- Is the well casing loose (at the surface)?
- Is a measurement point marked at the top of the well casing?

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Measured depth of the well from measurement point: 52.90 FT BTOC 30 FT

Thickness of sediment accumulation (reported depth-present measurement): NA

Are there any obstructions in the well?

Inspection Date: 4-11-14

Inspected by: Capt. H. [Signature]

HOLSTON ARMY AMMUNITION PLANT WELL INSPECTION CHECKLIST

Date: 4/8/14
Time: 0930

WELL INFORMATION

Well Number: MW-073 Location/Functional Area: Area B - SWML 7/78/06/07

Casing Type: ^{ex 4-28-14} Steel Stainless Steel PVC

Screened/Open-Hole Well Type: screened Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: above ground

Reported Constructed Depth: 16.50 ft BGS or BTOC (circle one)

INSPECTION ITEMS

YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

- Number of guard posts at well: 4
- Are the posts positioned to prevent collision damage to the well? [] [] []
- Are any of the posts damaged or degraded? [] [] []
- Is a concrete pad installed? [] [] []
- Is the pad cracked or deteriorated? [] [] []
- Is steel protective casing installed? [] [] []
- Does the protective casing have a weep hole? [] [] []

<input checked="" type="checkbox"/>	[]	[]	[]	_____
<input checked="" type="checkbox"/>	[]	[]	[]	_____
<input checked="" type="checkbox"/>	[]	[]	[]	_____
<input checked="" type="checkbox"/>	[]	[]	[]	_____
<input checked="" type="checkbox"/>	[]	[]	[]	_____

Flush-mount completion:

- Is the traffic cover securely bolted to the flush-mount box? [] [] []
- Does the well have a flush-mount box? [] [] []
- Is the traffic cover cracked or broken? [] [] []
- Is the concrete apron cracked or deteriorated? [] [] []

[]	[]	[]	[]	_____
[]	[]	[]	[]	_____
[]	[]	[]	[]	_____
[]	[]	[]	[]	_____

Identification:

- Is the well labeled with the correct number? [] [] []
- Describe labeling: number "7" and "3" stickers

<input checked="" type="checkbox"/>	[]	[]	[]	_____
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Security:

- Does the well have a cap or lid? [] [] []
- Does the well have a weatherproof lock? [] [] []
- Does the lock secure the well? [] [] []
- Does the inner casing have a cap? [] [] []

<input checked="" type="checkbox"/>	[]	[]	[]	_____
<input checked="" type="checkbox"/>	[]	[]	[]	_____
<input checked="" type="checkbox"/>	[]	[]	[]	_____
<input checked="" type="checkbox"/>	[]	[]	[]	_____

Down-hole Condition:

- Is the well casing bent, corroded, or broken (at the surface)? [] [] []
- Is the well casing loose (at the surface)? [] [] []
- Is a measurement point marked at the top of the well casing? [] [] []

[]	[]	[]	[]	_____
[]	[]	[]	[]	_____
<input checked="" type="checkbox"/>	[]	[]	[]	_____

Measured depth of the well from measurement point: 15.22 ft BTOC

Thickness of sediment accumulation (reported depth-present measurement): ~ 1.25

Are there any obstructions in the well? [] [] [] _____

Inspection Date: 4/8/14

Inspected by: Hillam McGowan

HOLSTON ARMY AMMUNITION PLANT WELL INSPECTION CHECKLIST

Date: 4-8-14
Time: 0928

WELL INFORMATION

Well Number: Mw-75 Location/Functional Area: ^{CH 4-8-14} P10 Area B

Casing Type: Steel Stainless Steel PVC

Screened/Open-Hole Well Type: Screen Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: Above-ground

Reported Constructed Depth: 15.50 ft BGS or (BTOC) (circle one)

INSPECTION ITEMS

YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

- Number of guard posts at well: 4
- Are the posts positioned to prevent collision damage to the well?
- Are any of the posts damaged or degraded?
- Is a concrete pad installed?
- Is the pad cracked or deteriorated?
- Is steel protective casing installed?
- Does the protective casing have a weep hole?

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Flush-mount completion:

- Is the traffic cover securely bolted to the flush-mount box?
- Does the well have a flush-mount box?
- Is the traffic cover cracked or broken?
- Is the concrete apron cracked or deteriorated?

<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

Identification:

- Is the well labeled with the correct number?
- Describe labeling: Sticker - 75

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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Security:

- Does the well have a cap or lid?
- Does the well have a weatherproof lock?
- Does the lock secure the well?
- Does the inner casing have a cap?

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Down-hole Condition:

- Is the well casing bent, corroded, or broken (at the surface?)
- Is the well casing loose (at the surface?)
- Is a measurement point marked at the top of the well casing?

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Measured depth of the well from measurement point: 15.30 ft BTOC

Thickness of sediment accumulation (reported depth-present measurement): 0.20 ft

Are there any obstructions in the well?

Inspection Date: 4-8-14

Inspected by: Captain H Ann

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 4-7-14
Time: 0950

WELL INFORMATION

Well Number: MW-76 ^{CR 4-28-14} Location/Functional Area: Production

Casing Type: Steel Stainless Steel PVC

Screened/Open-Hole Well Type: Screened Monitor Interval Length: NA Ft

Flush-mount/Above-ground Completion: Above-ground wl = 5.43 ft BTOC

Reported Constructed Depth: 15.56 ft BGS or BTOC (circle one)

INSPECTION ITEMS

YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

Number of guard posts at well: 3

Are the posts positioned to prevent collision damage to the well?

Are any of the posts damaged or degraded?

Is a concrete pad installed?

Is the pad cracked or deteriorated?

Is steel protective casing installed?

Does the protective casing have a weep hole? installed 6/24/14

Flush-mount completion:

Is the traffic cover securely bolted to the flush-mount box?

Does the well have a flush-mount box?

Is the traffic cover cracked or broken?

Is the concrete apron cracked or deteriorated?

Identification:

Is the well labeled with the correct number?

Describe labeling: Stickers MW-76

Security:

Does the well have a cap or lid?

Does the well have a weatherproof lock?

Does the lock secure the well?

Does the inner casing have a cap?

Down-hole Condition:

Is the well casing bent, corroded, or broken (at the surface?)

Is the well casing loose (at the surface?)

Is a measurement point marked at the top of the well casing?

Measured depth of the well from measurement point: 15.17 ft BTOC

Thickness of sediment accumulation (reported depth-present measurement): 0.39 ft

Are there any obstructions in the well?

Inspection Date: 4-7-14

Inspected by: Capt. Hamm

**HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST**

Date: 4-7-14

Time: 0956

WELL INFORMATION

Well Number: MW-77 Location/Functional Area: Production Area

Casing Type: ^{Cor 4-22-14} Steel Stainless Steel PVC

Screened/Open-Hole Well Type: Screened Monitor Interval Length: NA Ft

Flush-mount/Above-ground Completion: Above-ground Wd = 9.11 ft BTOL

Reported Constructed Depth: 20.47 ft BGS of BTOC (circle one)

INSPECTION ITEMS

YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

Number of guard posts at well: 3

Are the posts positioned to prevent collision damage to the well?

Are any of the posts damaged or degraded?

Is a concrete pad installed?

Is the pad cracked or deteriorated?

Is steel protective casing installed?

Does the protective casing have a weep hole? installed 6/24/14

Flush-mount completion:

Is the traffic cover securely bolted to the flush-mount box?

Does the well have a flush-mount box?

Is the traffic cover cracked or broken?

Is the concrete apron cracked or deteriorated?

Identification:

Is the well labeled with the correct number?

Describe labeling: Sticker MW-77

Security:

Does the well have a cap or lid?

Does the well have a weatherproof lock?

Does the lock secure the well?

Does the inner casing have a cap?

Down-hole Condition:

Is the well casing bent, corroded, or broken (at the surface?)

Is the well casing loose (at the surface?)

Is a measurement point marked at the top of the well casing?

Measured depth of the well from measurement point: 20.18 ft BTOL

Thickness of sediment accumulation (reported depth-present measurement): 0.29 ft

Are there any obstructions in the well?

Inspection Date: 4-7-14

Inspected by: Captain Hann

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 4-8-14
Time: 1020

WELL INFORMATION

Well Number: MW-86 Location/Functional Area: Area B

Casing Type: Steel ^{ex 4-20-14} Stainless Steel PVC

Screened/Open-Hole Well Type: Screen Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: Above-ground

Reported Constructed Depth: 19.91 ft BGS or BTOC (circle one)

INSPECTION ITEMS YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

Number of guard posts at well: 3

- Are the posts positioned to prevent collision damage to the well?
- Are any of the posts damaged or degraded?
- Is a concrete pad installed?
- Is the pad cracked or deteriorated?
- Is steel protective casing installed?
- Does the protective casing have a weep hole? Installed 6/24/14

Flush-mount completion:

- Is the traffic cover securely bolted to the flush-mount box?
- Does the well have a flush-mount box?
- Is the traffic cover cracked or broken?
- Is the concrete apron cracked or deteriorated?

Identification:

- Is the well labeled with the correct number?
- Describe labeling: Stickers - 86

Security:

- Does the well have a cap or lid?
- Does the well have a weatherproof lock?
- Does the lock secure the well?
- Does the inner casing have a cap?

Down-hole Condition:

- Is the well casing bent, corroded, or broken (at the surface)?
- Is the well casing loose (at the surface)?
- Is a measurement point marked at the top of the well casing?
- Measured depth of the well from measurement point: 19.60 ft BTOC
- Thickness of sediment accumulation (reported depth-present measurement): 0.31 ft
- Are there any obstructions in the well?

Inspection Date: 4-8-14

Inspected by: Cuph Johnson

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 4-13-14

Time: 1033

WELL INFORMATION

Well Number: MW-91 Location/Functional Area: Production (Boundary)

Casing Type: Steel ^{ex 4-22-14} Stainless Steel PVC

Screened/Open-Hole Well Type: Screen Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 16.44 ft BGS or BTOC (circle one)

INSPECTION ITEMS YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

- Number of guard posts at well: 3
- Are the posts positioned to prevent collision damage to the well?
- Are any of the posts damaged or degraded?
- Is a concrete pad installed?
- Is the pad cracked or deteriorated?
- Is steel protective casing installed?
- Does the protective casing have a weep hole?

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Flush-mount completion:

- Is the traffic cover securely bolted to the flush-mount box?
- Does the well have a flush-mount box?
- Is the traffic cover cracked or broken?
- Is the concrete apron cracked or deteriorated?

<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Identification:

- Is the well labeled with the correct number?
- Describe labeling: Sticker - 91

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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Security:

- Does the well have a cap or lid?
- Does the well have a weatherproof lock?
- Does the lock secure the well?
- Does the inner casing have a cap?

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Down-hole Condition:

- Is the well casing bent, corroded, or broken (at the surface)?
- Is the well casing loose (at the surface)?
- Is a measurement point marked at the top of the well casing?
- Measured depth of the well from measurement point: 16.10 FF BTOC
- Thickness of sediment accumulation (reported depth-present measurement): 0.30 FF
- Are there any obstructions in the well?

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Inspection Date: 4-13-14

Inspected by: Crystal Huan

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 04/13/14
Time: 1040

WELL INFORMATION

Well Number: MW-91B Location/Functional Area: Production Area/Boundary

Casing Type: Steel ^{C of 4-28-14} Stainless Steel PVC

Screened/Open-Hole Well Type: open hole Monitor Interval Length: 20 Ft

Flush-mount/Above-ground Completion: above ground

Reported Constructed Depth: 43.15 ft BGS of BTOC (circle one)

INSPECTION ITEMS YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

Number of guard posts at well: 3
Are the posts positioned to prevent collision damage to the well?
Are any of the posts damaged or degraded?
Is a concrete pad installed?
Is the pad cracked or deteriorated?
Is steel protective casing installed?
Does the protective casing have a weep hole?

Flush-mount completion:

Is the traffic cover securely bolted to the flush-mount box?
Does the well have a flush-mount box?
Is the traffic cover cracked or broken?
Is the concrete apron cracked or deteriorated?

Identification:

Is the well labeled with the correct number?
Describe labeling: "91B" stickers on steel protective casing

Security:

Does the well have a cap or lid?
Does the well have a weatherproof lock?
Does the lock secure the well?
Does the inner casing have a cap?

Down-hole Condition:

Is the well casing bent, corroded, or broken (at the surface)?
Is the well casing loose (at the surface)?
Is a measurement point marked at the top of the well casing?

Measured depth of the well from measurement point: 46.00 ft BTOC

Thickness of sediment accumulation (reported depth-present measurement): N/A

Are there any obstructions in the well?

Inspection Date: 4/13/14

Inspected by: Hillary Mcbown

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 4-7-14
Time: 0910

WELL INFORMATION

Well Number: MW - 96 Location/Functional Area: Production Area

Casing Type: Steel ~~Stainless Steel~~ ~~PVC~~

Screened/Open-Hole Well Type: Screened Monitor Interval Length: NA Ft

Flush-mount/Above-ground Completion: Above-ground WL = 8.13 ft BTOC

Reported Constructed Depth: 17.60 ft BGS or BTOC (circle one)

INSPECTION ITEMS YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

Number of guard posts at well: 3

Are the posts positioned to prevent collision damage to the well?

Are any of the posts damaged or degraded?

Is a concrete pad installed?

Is the pad cracked or deteriorated?

Is steel protective casing installed?

Does the protective casing have a weep hole? installed 6/24/14

Flush-mount completion:

Is the traffic cover securely bolted to the flush-mount box?

Does the well have a flush-mount box?

Is the traffic cover cracked or broken?

Is the concrete apron cracked or deteriorated?

Identification:

Is the well labeled with the correct number?

Describe labeling: Sticker MW-96

Security:

Does the well have a cap or lid?

Does the well have a weatherproof lock?

Does the lock secure the well?

Does the inner casing have a cap?

Down-hole Condition:

Is the well casing bent, corroded, or broken (at the surface?)

Is the well casing loose (at the surface?)

Is a measurement point marked at the top of the well casing?

Measured depth of the well from measurement point: 17.71 ft BTOC

Thickness of sediment accumulation (reported depth-present measurement): NA

Are there any obstructions in the well?

Inspection Date: 4-7-14

Inspected by: Captel Hamm

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 4-7-14
Time: 0926

WELL INFORMATION

Well Number: MW-97 Location/Functional Area: Production Area

Casing Type: Steel Stainless Steel PVC

Screened/Open-Hole Well Type: Screened Monitor Interval Length: NA Ft

Flush-mount/Above-ground Completion: Above-ground wl = 4.87 ft BTOC

Reported Constructed Depth: 20.41 ft BGS or BTOC (circle one)

INSPECTION ITEMS YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

Number of guard posts at well: 3

- Are the posts positioned to prevent collision damage to the well?
- Are any of the posts damaged or degraded?
- Is a concrete pad installed?
- Is the pad cracked or deteriorated?
- Is steel protective casing installed?
- Does the protective casing have a weep hole? Installed 6/24/14

Flush-mount completion:

- Is the traffic cover securely bolted to the flush-mount box?
- Does the well have a flush-mount box?
- Is the traffic cover cracked or broken?
- Is the concrete apron cracked or deteriorated?

Identification:

- Is the well labeled with the correct number?
- Describe labeling: SI

Security:

- Does the well have a cap or lid?
- Does the well have a weatherproof lock?
- Does the lock secure the well?
- Does the inner casing have a cap?

Down-hole Condition:

- Is the well casing bent, corroded, or broken (at the surface)?
- Is the well casing loose (at the surface)?
- Is a measurement point marked at the top of the well casing?
- Measured depth of the well from measurement point: 16.43 ft BTOC
- Thickness of sediment accumulation (reported depth-present measurement): Soft depth does not match constructed
- Are there any obstructions in the well?

Inspection Date: 4-7-14

Inspected by: Crystal Helm

HOLSTON ARMY AMMUNITION PLANT WELL INSPECTION CHECKLIST

Date: 4-15-14
Time: 1000

WELL INFORMATION

Well Number: MW-99 Location/Functional Area: Production / Source

Casing Type: Steel Stainless Steel PVC

Screened/Open-Hole Well Type: Screen Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 18.70 ft BGS of BTOC (circle one)

INSPECTION ITEMS

YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

Number of guard posts at well: 3

Are the posts positioned to prevent collision damage to the well?

Are any of the posts damaged or degraded?

Is a concrete pad installed?

Is the pad cracked or deteriorated?

Is steel protective casing installed?

Does the protective casing have a weep hole? installed 6/24/14

Flush-mount completion:

Is the traffic cover securely bolted to the flush-mount box?

Does the well have a flush-mount box?

Is the traffic cover cracked or broken?

Is the concrete apron cracked or deteriorated?

Identification:

Is the well labeled with the correct number?

Describe labeling: Sticker 99

Security:

Does the well have a cap or lid?

Does the well have a weatherproof lock?

Does the lock secure the well?

Does the inner casing have a cap?

Down-hole Condition:

Is the well casing bent, corroded, or broken (at the surface)?

Is the well casing loose (at the surface)?

Is a measurement point marked at the top of the well casing?

Measured depth of the well from measurement point: 18.60ft BTOC

Thickness of sediment accumulation (reported depth-present measurement): NA

Are there any obstructions in the well?

Inspection Date: 4-15-14

Inspected by: Capt. [Signature]

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 4-8-14
Time: 1240

WELL INFORMATION

Well Number: MW-101 Location/Functional Area: Production

Casing Type: ^{ex 4-28-14} Steel Stainless Steel PVC

Screened/Open-Hole Well Type: Screen Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: Above-ground

Reported Constructed Depth: 19.61 ft BGS or BTOC (circle one)

INSPECTION ITEMS

YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

Number of guard posts at well: 3
Are the posts positioned to prevent collision damage to the well?
Are any of the posts damaged or degraded?
Is a concrete pad installed?
Is the pad cracked or deteriorated?
Is steel protective casing installed?
Does the protective casing have a weep hole?

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>Installed 6/24/14</u>

Flush-mount completion:

Is the traffic cover securely bolted to the flush-mount box?
Does the well have a flush-mount box?
Is the traffic cover cracked or broken?
Is the concrete apron cracked or deteriorated?

<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

Identification:

Is the well labeled with the correct number?
Describe labeling: Sticker - 101

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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Security:

Does the well have a cap or lid?
Does the well have a weatherproof lock?
Does the lock secure the well?
Does the inner casing have a cap?

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Down-hole Condition:

Is the well casing bent, corroded, or broken (at the surface)?
Is the well casing loose (at the surface)?
Is a measurement point marked at the top of the well casing?
Measured depth of the well from measurement point: 19.40 ft BTOC
Thickness of sediment accumulation (reported depth-present measurement): 0.21 ft
Are there any obstructions in the well?

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Inspection Date: 4-8-2014

Inspected by: Cynthia Jones

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 4/8/14
Time: 1315

WELL INFORMATION

Well Number: MW-101B Location/Functional Area: Limited Access Area - Area B

Casing Type: Steel ^{C&G-28-14} Stainless Steel PVC

Screened/Open-Hole Well Type: open hole Monitor Interval Length: 37 Ft

Flush-mount/Above-ground Completion: above ground

Reported Constructed Depth: 63.81 ft BGS or BTOC (circle one)

INSPECTION ITEMS

YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

- Number of guard posts at well: 3
- Are the posts positioned to prevent collision damage to the well? [] []
- Are any of the posts damaged or degraded? [] []
- Is a concrete pad installed? [] []
- Is the pad cracked or deteriorated? [] []
- Is steel protective casing installed? [] []
- Does the protective casing have a weep hole? ~~[]~~ [] Installed 6/24/14

Flush-mount completion:

- Is the traffic cover securely bolted to the flush-mount box? [] []
- Does the well have a flush-mount box? [] []
- Is the traffic cover cracked or broken? [] []
- Is the concrete apron cracked or deteriorated? [] []

Identification:

- Is the well labeled with the correct number? [] []
- Describe labeling: "1" "0" "1" "B" stickers

Security:

- Does the well have a cap or lid? [] []
- Does the well have a weatherproof lock? [] []
- Does the lock secure the well? [] []
- Does the inner casing have a cap? [] []

Down-hole Condition:

- Is the well casing bent, corroded, or broken (at the surface)? [] []
- Is the well casing loose (at the surface)? [] []
- Is a measurement point marked at the top of the well casing? [] []
- Measured depth of the well from measurement point: ~69.10 (soft bottom)
- Thickness of sediment accumulation (reported depth-present measurement): _____
- Are there any obstructions in the well? [] []

Inspection Date: 4/8/14

Inspected by: Hilary McBawn

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 4/12/14
Time: 0925

WELL INFORMATION

Well Number: MW-102 Location/Functional Area: Production Area / Boundary

Casing Type: Steel ^{CR 4-28-14} Stainless Steel PVC

Screened/Open-Hole Well Type: Screened Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: Above ground

Reported Constructed Depth: 18.0 ft BGS or BTOC (circle one)

INSPECTION ITEMS

YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

- Number of guard posts at well: 3
- Are the posts positioned to prevent collision damage to the well?
- Are any of the posts damaged or degraded?
- Is a concrete pad installed?
- Is the pad cracked or deteriorated?
- Is steel protective casing installed?
- Does the protective casing have a weep hole?

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	_____
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	_____
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

Flush-mount completion:

- Is the traffic cover securely bolted to the flush-mount box?
- Does the well have a flush-mount box?
- Is the traffic cover cracked or broken?
- Is the concrete apron cracked or deteriorated?

<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____

Identification:

Is the well labeled with the correct number?

Describe labeling: "102" stickers on protective steel casing

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
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Security:

- Does the well have a cap or lid?
- Does the well have a weatherproof lock?
- Does the lock secure the well?
- Does the inner casing have a cap?

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

Down-hole Condition:

- Is the well casing bent, corroded, or broken (at the surface?)
- Is the well casing loose (at the surface?)
- Is a measurement point marked at the top of the well casing?
- Measured depth of the well from measurement point: 17.82 ft BTOC
- Thickness of sediment accumulation (reported depth-present measurement): ~0.20

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	_____
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	_____
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

Are there any obstructions in the well?

Inspection Date: 4/12/14

Inspected by: Hillary McBowen

HOLSTON ARMY AMMUNITION PLANT WELL INSPECTION CHECKLIST

Date: 4-12-14
Time: 0845

WELL INFORMATION

Well Number: MW-102B Location/Functional Area: Production / Boundary

Casing Type: Steel Stainless Steel PVC

Screened/Open-Hole Well Type: Open Monitor Interval Length: 24.5 Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 26.49 ft BGS of BTOC (circle one) *Reported construction depth is correct. Really around 47.50 ft BTOC*

INSPECTION ITEMS

YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

- Number of guard posts at well: 3
- Are the posts positioned to prevent collision damage to the well?
- Are any of the posts damaged or degraded?
- Is a concrete pad installed?
- Is the pad cracked or deteriorated?
- Is steel protective casing installed?
- Does the protective casing have a weep hole?

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	installed 6/24/14

Flush-mount completion:

- Is the traffic cover securely bolted to the flush-mount box?
- Does the well have a flush-mount box?
- Is the traffic cover cracked or broken?
- Is the concrete apron cracked or deteriorated?

<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

Identification:

Is the well labeled with the correct number?

Describe labeling: Stickers MW-102B - Slightly torn

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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Security:

- Does the well have a cap or lid?
- Does the well have a weatherproof lock?
- Does the lock secure the well?
- Does the inner casing have a cap?

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Down-hole Condition:

- Is the well casing bent, corroded, or broken (at the surface)?
- Is the well casing loose (at the surface)?
- Is a measurement point marked at the top of the well casing?

Measured depth of the well from measurement point: 47.60 Ft BTOC

Thickness of sediment accumulation (reported depth-present measurement): NA

Are there any obstructions in the well?

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Inspection Date: 4-12-14

Inspected by: Cristel Hawn

HOLSTON ARMY AMMUNITION PLANT WELL INSPECTION CHECKLIST

Date: 4-9-14
Time: 0815

WELL INFORMATION

Well Number: MW-104 Location/Functional Area: Area A

Casing Type: Steel Stainless Steel PVC

Screened/Open-Hole Well Type: Screen Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: ⁰²⁴⁹⁻¹⁴ A Flush

Reported Constructed Depth: 18.95 ft BGS of BTCC (circle one)

INSPECTION ITEMS

YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

- Number of guard posts at well: 0
- Are the posts positioned to prevent collision damage to the well?
- Are any of the posts damaged or degraded?
- Is a concrete pad installed?
- Is the pad cracked or deteriorated?
- Is steel protective casing installed?
- Does the protective casing have a weep hole?

Flush-mount completion:

- Is the traffic cover securely bolted to the flush-mount box?
- Does the well have a flush-mount box?
- Is the traffic cover cracked or broken?
- Is the concrete apron cracked or deteriorated?

Identification:

- Is the well labeled with the correct number?
- Describe labeling: on flush mount box MW-104

Security:

- Does the well have a cap or lid?
- Does the well have a weatherproof lock?
- Does the lock secure the well?
- Does the inner casing have a cap?

Down-hole Condition:

- Is the well casing bent, corroded, or broken (at the surface)?
- Is the well casing loose (at the surface)?
- Is a measurement point marked at the top of the well casing?
- Measured depth of the well from measurement point: 18.80 ft BTCC
- Thickness of sediment accumulation (reported depth-present measurement): 0.15 ft
- Are there any obstructions in the well?

Inspection Date: 4-9-14

Inspected by: Captain [Signature]

HOLSTON ARMY AMMUNITION PLANT WELL INSPECTION CHECKLIST

Date: 04/09/14
Time: 0845

WELL INFORMATION

Well Number: MW-105 Location/Functional Area: Area A / SWMU 4
Casing Type: ~~Steel~~ Stainless Steel ~~PVC~~ PEM 4/9/14

Screened/Open-Hole Well Type: screened Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: flush-mount

Reported Constructed Depth: 19.43 ft BGS or BTDC (circle one)

INSPECTION ITEMS

YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

- Number of guard posts at well: N/A
- Are the posts positioned to prevent collision damage to the well?
- Are any of the posts damaged or degraded?
- Is a concrete pad installed?
- Is the pad cracked or deteriorated?
- Is steel protective casing installed?
- Does the protective casing have a weep hole?

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Flush-mount completion:

- Is the traffic cover securely bolted to the flush-mount box?
- Does the well have a flush-mount box?
- Is the traffic cover cracked or broken?
- Is the concrete apron cracked or deteriorated?

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

perimeter cracks
↳ small

Identification:

- Is the well labeled with the correct number?
- Describe labeling: "MW-105" written in black marker on concrete pad

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Security:

- Does the well have a cap or lid?
- Does the well have a weatherproof lock?
- Does the lock secure the well?
- Does the inner casing have a cap?

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Down-hole Condition:

- Is the well casing bent, corroded, or broken (at the surface)?
- Is the well casing loose (at the surface)?
- Is a measurement point marked at the top of the well casing?
- Measured depth of the well from measurement point: 18.94 ft BTDC
- Thickness of sediment accumulation (reported depth-present measurement): ~0.57 ft
- Are there any obstructions in the well?

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Inspection Date: 4/9/14

Inspected by: Hillary McGowan

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 4-9-14
Time: 1400

WELL INFORMATION

Well Number: MW-106 Location/Functional Area: Area A

Casing Type: Steel Stainless Steel PVC

Screened/Open-Hole Well Type: Screened Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: Flush

Reported Constructed Depth: 19.54 ft BGS or BTOC (circle one)

INSPECTION ITEMS

YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

- Number of guard posts at well: 0
- Are the posts positioned to prevent collision damage to the well?
- Are any of the posts damaged or degraded?
- Is a concrete pad installed?
- Is the pad cracked or deteriorated?
- Is steel protective casing installed?
- Does the protective casing have a weep hole?

Flush-mount completion:

- Is the traffic cover securely bolted to the flush-mount box?
- Does the well have a flush-mount box?
- Is the traffic cover cracked or broken?
- Is the concrete apron cracked or deteriorated?

Identification:

- Is the well labeled with the correct number?
- Describe labeling: ON Flush mount box MW-106

Security:

- Does the well have a cap or lid?
- Does the well have a weatherproof lock?
- Does the lock secure the well?
- Does the inner casing have a cap?

Down-hole Condition:

- Is the well casing bent, corroded, or broken (at the surface)?
- Is the well casing loose (at the surface)?
- Is a measurement point marked at the top of the well casing?
- Measured depth of the well from measurement point: 19.18 ft BTOC
- Thickness of sediment accumulation (reported depth-present measurement): 0.36 ft
- Are there any obstructions in the well?

Inspection Date: 4-9-14

Inspected by: Crystal Allen

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 04/09/14

Time: 1420

WELL INFORMATION

Well Number: MW-107 Location/Functional Area: Area A Boundary
Casing Type: ~~Steel~~ ^{CR 4-28-14} Stainless Steel ~~PVC~~ ^{new 4/9/14}

Screened/Open-Hole Well Type: screened Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: flush-mount

Reported Constructed Depth: 18.88 ft BGS or BTOC (circle one)

INSPECTION ITEMS

YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

- Number of guard posts at well: N/A
- Are the posts positioned to prevent collision damage to the well?
- Are any of the posts damaged or degraded?
- Is a concrete pad installed?
- Is the pad cracked or deteriorated?
- Is steel protective casing installed?
- Does the protective casing have a weep hole?

Flush-mount completion:

- Is the traffic cover securely bolted to the flush-mount box?
- Does the well have a flush-mount box?
- Is the traffic cover cracked or broken?
- Is the concrete apron cracked or deteriorated?

Identification:

- Is the well labeled with the correct number?
- Describe labeling: "MW-107" stamped into metal plate on flushmount box

Security:

- Does the well have a cap or lid?
- Does the well have a weatherproof lock?
- Does the lock secure the well?
- Does the inner casing have a cap?

Down-hole Condition:

- Is the well casing bent, corroded, or broken (at the surface)? ^{4/9/14 new}
- Is the well casing loose (at the surface)?
- Is a measurement point marked at the top of the well casing?
- Measured depth of the well from measurement point: 18.82 ft BTOC
- Thickness of sediment accumulation (reported depth-present measurement): 0.06
- Are there any obstructions in the well?

Inspection Date: 4/9/14

Inspected by: Hillary McGowan

HOLSTON ARMY AMMUNITION PLANT WELL INSPECTION CHECKLIST

Date: 4-13-14

Time: 1334

WELL INFORMATION

Well Number: MW-114 Location/Functional Area: Old Landfill

Casing Type: Steel ^{C&4-2814} Stainless Steel PVC

Screened/Open-Hole Well Type: SCREEN Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 105.87 ft BGS of BTOC (circle one)

INSPECTION ITEMS

YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

Number of guard posts at well: 4

Are the posts positioned to prevent collision damage to the well?

Are any of the posts damaged or degraded?

Is a concrete pad installed?

Is the pad cracked or deteriorated?

Is steel protective casing installed?

Does the protective casing have a weep hole? installed 6/24/14

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

has a spot where it froze but does not reduce the protection of the well

Flush-mount completion:

Is the traffic cover securely bolted to the flush-mount box?

Does the well have a flush-mount box?

Is the traffic cover cracked or broken?

Is the concrete apron cracked or deteriorated?

<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Identification:

Is the well labeled with the correct number?

Describe labeling: Sticker 114

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Security:

Does the well have a cap or lid?

Does the well have a weatherproof lock?

Does the lock secure the well?

Does the inner casing have a cap?

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Down-hole Condition:

Is the well casing bent, corroded, or broken (at the surface)?

Is the well casing loose (at the surface)?

Is a measurement point marked at the top of the well casing?

Measured depth of the well from measurement point: 106.60 ft BTOC

Thickness of sediment accumulation (reported depth-present measurement): NA

Are there any obstructions in the well?

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Inspection Date: 4-13-14

Inspected by: Capt. [Signature]

HOLSTON ARMY AMMUNITION PLANT WELL INSPECTION CHECKLIST

Date: 4-10-14
Time: 1132

WELL INFORMATION

Well Number: MW-115 Location/Functional Area: Aren B - Landfill

Casing Type: ^{or 4-28-14} Steel Stainless Steel PVC

Screened/Open-Hole Well Type: Screen Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 40.85 ft BGS or **(BTOC)** (circle one)

INSPECTION ITEMS

YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

Number of guard posts at well: 4

Are the posts positioned to prevent collision damage to the well?

Are any of the posts damaged or degraded?

Is a concrete pad installed?

Is the pad cracked or deteriorated?

Is steel protective casing installed?

Does the protective casing have a weep hole?

Flush-mount completion:

Is the traffic cover securely bolted to the flush-mount box?

Does the well have a flush-mount box?

Is the traffic cover cracked or broken?

Is the concrete apron cracked or deteriorated?

Identification:

Is the well labeled with the correct number?

Describe labeling: Stickers - 115

Security:

Does the well have a cap or lid?

Does the well have a weatherproof lock?

Does the lock secure the well?

Does the inner casing have a cap?

Down-hole Condition:

Is the well casing bent, corroded, or broken (at the surface?)

Is the well casing loose (at the surface?)

Is a measurement point marked at the top of the well casing?

Measured depth of the well from measurement point: 40.70 ft BTOC

Thickness of sediment accumulation (reported depth-present measurement): 0.15

Are there any obstructions in the well?

Inspection Date: 4-10-14

Inspected by: Captal Shuman

HOLSTON ARMY AMMUNITION PLANT WELL INSPECTION CHECKLIST

Date: 04/10/14
Time: 0930

WELL INFORMATION

Well Number: MW-116 Location/Functional Area: Area B - near SWMU 19/29

Casing Type: ^{CR 4-28-14} Steel Stainless Steel PVC

Screened/Open-Hole Well Type: screened Monitor Interval Length: 20 Ft

Flush-mount/Above-ground Completion: above-ground

Reported Constructed Depth: 119.80 ft BGS or BTOC (circle one)

INSPECTION ITEMS

YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

- Number of guard posts at well: 4
- Are the posts positioned to prevent collision damage to the well?
- Are any of the posts damaged or degraded?
- Is a concrete pad installed?
- Is the pad cracked or deteriorated?
- Is steel protective casing installed?
- Does the protective casing have a weep hole?

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>some paint chipping</u>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Flush-mount completion:

- Is the traffic cover securely bolted to the flush-mount box?
- Does the well have a flush-mount box?
- Is the traffic cover cracked or broken?
- Is the concrete apron cracked or deteriorated?

<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

Identification:

Is the well labeled with the correct number?
Describe labeling: "116" stickers on steel casing

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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Security:

- Does the well have a cap or lid?
- Does the well have a weatherproof lock?
- Does the lock secure the well?
- Does the inner casing have a cap?

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Down-hole Condition:

- Is the well casing bent, corroded, or broken (at the surface)?
- Is the well casing loose (at the surface)?
- Is a measurement point marked at the top of the well casing?

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Measured depth of the well from measurement point: 121.70 (hard to feel bottom)

Thickness of sediment accumulation (reported depth-present measurement): 0

Are there any obstructions in the well?

Inspection Date: 4/10/14

Inspected by: Hillary McGrown

**HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST**

Date: 4/11/14
Time: 1030

WELL INFORMATION

Well Number: MW-110B Location/Functional Area: Area B-Limited Access Area

Casing Type: Steel ^{02 4-28-14} Stainless Steel PVC

Screened/Open-Hole Well Type: Screened Monitor Interval Length: NA Ft

Flush-mount/Above-ground Completion: Above-ground WL = 7.55 ft BTOC

Reported Constructed Depth: 22.30 ft BGS or **BT**OC (circle one)

INSPECTION ITEMS YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

Number of guard posts at well: 4

- Are the posts positioned to prevent collision damage to the well? _____
- Are any of the posts damaged or degraded? _____
- Is a concrete pad installed? _____
- Is the pad cracked or deteriorated? _____
- Is steel protective casing installed? _____
- Does the protective casing have a weep hole? installed 6/24/14

Flush-mount completion:

- Is the traffic cover securely bolted to the flush-mount box? _____
- Does the well have a flush-mount box? _____
- Is the traffic cover cracked or broken? _____
- Is the concrete apron cracked or deteriorated? _____

Identification:

- Is the well labeled with the correct number? _____
- Describe labeling: "MW-110B" stickers on steel protective casing

Security:

- Does the well have a cap or lid? _____
- Does the well have a weatherproof lock? _____
- Does the lock secure the well? _____
- Does the inner casing have a cap? _____

Down-hole Condition:

- Is the well casing bent, corroded, or broken (at the surface)? _____
- Is the well casing loose (at the surface)? _____
- Is a measurement point marked at the top of the well casing? _____
- Measured depth of the well from measurement point: 22.25 ft BTOC
- Thickness of sediment accumulation (reported depth-present measurement): 0.05 ft
- Are there any obstructions in the well? _____

Inspection Date: 4/11/14

Inspected by: Hillary McGown

HOLSTON ARMY AMMUNITION PLANT WELL INSPECTION CHECKLIST

Date: 04/12/14
Time: 1215

WELL INFORMATION

Well Number: MW-SIA Location/Functional Area: Production Area

Casing Type: Steel ^{C.R. 4-28-14} Stainless Steel PVC

Screened/Open-Hole Well Type: screened Monitor Interval Length: 5 Ft

Flush-mount/Above-ground Completion: Above ground

Reported Constructed Depth: 17.01 ft BGS or BTOC (circle one)

INSPECTION ITEMS

YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

- Number of guard posts at well: 4
- Are the posts positioned to prevent collision damage to the well? YES NO N/A
- Are any of the posts damaged or degraded? YES NO N/A
- Is a concrete pad installed? YES NO N/A
- Is the pad cracked or deteriorated? YES NO N/A
- Is steel protective casing installed? YES NO N/A
- Does the protective casing have a weep hole? YES NO N/A

Flush-mount completion:

- Is the traffic cover securely bolted to the flush-mount box? YES NO N/A
- Does the well have a flush-mount box? YES NO N/A
- Is the traffic cover cracked or broken? YES NO N/A
- Is the concrete apron cracked or deteriorated? YES NO N/A

Identification:

- Is the well labeled with the correct number? YES NO N/A
- Describe labeling: "SIA" "SIB" stickers on steel protective casing

Security:

- Does the well have a cap or lid? YES NO N/A
- Does the well have a weatherproof lock? YES NO N/A
- Does the lock secure the well? YES NO N/A
- Does the inner casing have a cap? YES NO N/A

Down-hole Condition:

- Is the well casing bent, corroded, or broken (at the surface)? YES NO N/A
- Is the well casing loose (at the surface)? YES NO N/A
- Is a measurement point marked at the top of the well casing? YES NO N/A
- Measured depth of the well from measurement point: 16.80 ft BTOC
- Thickness of sediment accumulation (reported depth-present measurement): ~0.70
- Are there any obstructions in the well? YES NO N/A

Inspection Date: 4/12/14

Inspected by: William McBrown

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 4/12/14
Time: 1230

WELL INFORMATION

Well Number: MW-SIB Location/Functional Area: Production Area

Casing Type: CR 4-28-14 Steel Stainless Steel PVC

Screened/Open-Hole Well Type: Screened Monitor Interval Length: NA Ft

Flush-mount/Above-ground Completion: Above-ground WL = 5.05 FT BTDC

Reported Constructed Depth: 39.63 ft BGS or BTDC (circle one)

INSPECTION ITEMS YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

Number of guard posts at well: 4

Are the posts positioned to prevent collision damage to the well?

Are any of the posts damaged or degraded?

Is a concrete pad installed?

Is the pad cracked or deteriorated?

Is steel protective casing installed?

Does the protective casing have a weep hole?

Flush-mount completion:

Is the traffic cover securely bolted to the flush-mount box?

Does the well have a flush-mount box?

Is the traffic cover cracked or broken?

Is the concrete apron cracked or deteriorated?

Identification:

Is the well labeled with the correct number?

Describe labeling: "SIB" stickers on protective steel casing

Security:

Does the well have a cap or lid?

Does the well have a weatherproof lock?

Does the lock secure the well?

Does the inner casing have a cap?

Down-hole Condition:

Is the well casing bent, corroded, or broken (at the surface?)

Is the well casing loose (at the surface?)

Is a measurement point marked at the top of the well casing?

Measured depth of the well from measurement point: 39.55 FT BTDC

Thickness of sediment accumulation (reported depth-present measurement): 0.08 FT

Are there any obstructions in the well?

Inspection Date: 4/12/14

Inspected by: Hillary McGowan

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 4-7-14
Time: 1020

WELL INFORMATION

Well Number: STMW-2 Location/Functional Area: Burning Ground

Casing Type: 4-20-14 Steel Stainless Steel PVC

Screened/Open-Hole Well Type: Screen Monitor Interval Length: NA Ft

Flush-mount/Above-ground Completion: Above-ground wl = 5.88 ft BTOC

Reported Constructed Depth: 10.72 ft BGS or BTOC (circle one)

INSPECTION ITEMS YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

Number of guard posts at well: 3

Are the posts positioned to prevent collision damage to the well?

Are any of the posts damaged or degraded?

Is a concrete pad installed?

Is the pad cracked or deteriorated?

Is steel protective casing installed?

Does the protective casing have a weep hole? installed 6/24/14

Flush-mount completion:

Is the traffic cover securely bolted to the flush-mount box?

Does the well have a flush-mount box?

Is the traffic cover cracked or broken?

Is the concrete apron cracked or deteriorated?

Identification:

Is the well labeled with the correct number?

Describe labeling: Stickers STMW-02

Security:

Does the well have a cap or lid?

Does the well have a weatherproof lock?

Does the lock secure the well?

Does the inner casing have a cap?

Down-hole Condition:

Is the well casing bent, corroded, or broken (at the surface)?

Is the well casing loose (at the surface)?

Is a measurement point marked at the top of the well casing?

Measured depth of the well from measurement point: 16.40 ft BTOC Does not match constructed.

Thickness of sediment accumulation (reported depth-present measurement): Soft

Are there any obstructions in the well?

Inspection Date: 4-7-14

Inspected by: Captain Ham

**HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST**

Date: 4-16-14

Time: 0751

WELL INFORMATION

Well Number: STMW-15 Location/Functional Area: Production - Burning

Casing Type: Steel Stainless Steel PVC

Screened/Open-Hole Well Type: Screen Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 32.21 ft BGS or BTOC (circle one)

INSPECTION ITEMS YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

Number of guard posts at well: 4

Are the posts positioned to prevent collision damage to the well? [] [] []

Are any of the posts damaged or degraded? [] [] []

Is a concrete pad installed? [] [] []

Is the pad cracked or deteriorated? [] [] []

Is steel protective casing installed? [] [] []

Does the protective casing have a weep hole? [] [] [] installed 6/24/14

Flush-mount completion:

Is the traffic cover securely bolted to the flush-mount box? [] [] []

Does the well have a flush-mount box? [] [] []

Is the traffic cover cracked or broken? [] [] []

Is the concrete apron cracked or deteriorated? [] [] []

Identification:

Is the well labeled with the correct number? [] [] []

Describe labeling: STMW-15

Security:

Does the well have a cap or lid? [] [] []

Does the well have a weatherproof lock? [] [] []

Does the lock secure the well? [] [] []

Does the inner casing have a cap? [] [] []

Down-hole Condition:

Is the well casing bent, corroded, or broken (at the surface)? [] [] []

Is the well casing loose (at the surface)? [] [] []

Is a measurement point marked at the top of the well casing? [] [] []

Measured depth of the well from measurement point: 32.20 ft BTOC

Thickness of sediment accumulation (reported depth-present measurement): 0.01 ft

Are there any obstructions in the well? [] [] []

Inspection Date: 4-16-14

Inspected by: Cynthia Stum



**FISCAL YEAR 2014 LONG-TERM MONITORING/
LONG-TERM OPERATIONS REPORT**
Holston Army Ammunition Plant, Kingsport, Tennessee

FALL 2014



**FISCAL YEAR 2014 LONG-TERM MONITORING/
LONG-TERM OPERATIONS REPORT**
Holston Army Ammunition Plant, Kingsport, Tennessee

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HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 10-14-14

Time: 1618

WELL INFORMATION

Well Number: GMA-12 Location/Functional Area: Production - Baseline

Casing Type: Steel Stainless Steel PVC

Screened/Open-Hole Well Type: Screen Monitor Interval Length: 20 Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 73.73 ft BGS or BTOC (circle one)

INSPECTION ITEMS wt = 8,99 ft BTOC YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

ce 10-14-14

Number of guard posts at well: 4

Are the posts positioned to prevent collision damage to the well?

Are any of the posts damaged or degraded?

Is a concrete pad installed?

Is the pad cracked or deteriorated?

Is steel protective casing installed?

Does the protective casing have a weep hole?

Flush-mount completion:

Is the traffic cover securely bolted to the flush-mount box?

Does the well have a flush-mount box?

Is the traffic cover cracked or broken?

Is the concrete apron cracked or deteriorated?

Identification:

Is the well labeled with the correct number?

Describe labeling: Stickers

Security:

Does the well have a cap or lid?

Does the well have a weatherproof lock?

Does the lock secure the well?

Does the inner casing have a cap?

Down-hole Condition:

Is the well casing bent, corroded, or broken (at the surface)?

Is the well casing loose (at the surface)?

Is a measurement point marked at the top of the well casing?

Measured depth of the well from measurement point: 73.55 ft BTOC

Thickness of sediment accumulation (reported depth-present measurement): 73.55 - 73.55 = 0.18 ft

Are there any obstructions in the well?

Inspection Date: 10-14-14

Inspected by: Cynthia Stamm

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 10-14-14
Time: 1551

WELL INFORMATION

Well Number: ^{LR 10-14-14} 8-14 GM-M Location/Functional Area: Production-Boundary

Casing Type: Steel Stainless Steel PVC

Screened/Open-Hole Well Type: Screen Monitor Interval Length: 20 Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 47.31 ft BGS or BTOC (circle one)

INSPECTION ITEMS Wd = 16.71 ft BTOC YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

Number of guard posts at well: 4

Are the posts positioned to prevent collision damage to the well?

Are any of the posts damaged or degraded?

Is a concrete pad installed?

Is the pad cracked or deteriorated?

Is steel protective casing installed?

Does the protective casing have a weep hole?

Flush-mount completion:

Is the traffic cover securely bolted to the flush-mount box?

Does the well have a flush-mount box?

Is the traffic cover cracked or broken?

Is the concrete apron cracked or deteriorated?

Identification:

Is the well labeled with the correct number?

Describe labeling: stickers

Security:

Does the well have a cap or lid?

Does the well have a weatherproof lock?

Does the lock secure the well?

Does the inner casing have a cap?

Down-hole Condition:

Is the well casing bent, corroded, or broken (at the surface?)

Is the well casing loose (at the surface?)

Is a measurement point marked at the top of the well casing?

Measured depth of the well from measurement point: 47.90 ft BTOC

Thickness of sediment accumulation (reported depth-present measurement): NA

Are there any obstructions in the well?

Inspection Date: 10-14-14

Inspected by: Crystal H...

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 10-17-14
Time: 1620

WELL INFORMATION

Well Number: MW-11 Location/Functional Area: Boundary

Casing Type: Steel Stainless Steel PVC

Screened/Open-Hole Well Type: Screen Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 18.00 ft BGS or (BTOC) (circle one)

INSPECTION ITEMS wc = 4.25 ft BtoC YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

Number of guard posts at well: 3

- Are the posts positioned to prevent collision damage to the well? [] []
- Are any of the posts damaged or degraded? [] []
- Is a concrete pad installed? [] []
- Is the pad cracked or deteriorated? [] []
- Is steel protective casing installed? [] []
- Does the protective casing have a weep hole? [] []

Flush-mount completion:

- Is the traffic cover securely bolted to the flush-mount box? [] []
- Does the well have a flush-mount box? [] []
- Is the traffic cover cracked or broken? [] []
- Is the concrete apron cracked or deteriorated? [] []

Identification:

Is the well labeled with the correct number? [] []
Describe labeling: stickers

Security:

- Does the well have a cap or lid? [] []
- Does the well have a weatherproof lock? [] []
- Does the lock secure the well? [] []
- Does the inner casing have a cap? [] []

Down-hole Condition:

- Is the well casing bent, corroded, or broken (at the surface?) [] []
- Is the well casing loose (at the surface?) [] []
- Is a measurement point marked at the top of the well casing? [] []
- Measured depth of the well from measurement point: 16.91 ft BTOC
- Thickness of sediment accumulation (reported depth-present measurement): 1.09 ft soft
- Are there any obstructions in the well? [] []

Inspection Date: 10-17-14

Inspected by: Captain Illman

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 10-17-14
Time: 1625

WELL INFORMATION

Well Number: MW-113 Location/Functional Area: Boundary

Casing Type: Steel Stainless Steel PVC

Screened/Open-Hole Well Type: Open Monitor Interval Length: 47 Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 63.47 ft BGS (or BTOC (circle one))

INSPECTION ITEMS wl = 1.04 ft BTOC YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

Number of guard posts at well: 3

- Are the posts positioned to prevent collision damage to the well? [] [] []
- Are any of the posts damaged or degraded? [] [] []
- Is a concrete pad installed? [] [] []
- Is the pad cracked or deteriorated? [] [] []
- Is steel protective casing installed? [] [] []
- Does the protective casing have a weep hole? [] [] []

Flush-mount completion:

- Is the traffic cover securely bolted to the flush-mount box? [] [] []
- Does the well have a flush-mount box? [] [] []
- Is the traffic cover cracked or broken? [] [] []
- Is the concrete apron cracked or deteriorated? [] [] []

Identification:

- Is the well labeled with the correct number? [] [] []
- Describe labeling: Stickers

Security:

- Does the well have a cap or lid? [] [] []
- Does the well have a weatherproof lock? [] [] []
- Does the lock secure the well? [] [] []
- Does the inner casing have a cap? [] [] []

Down-hole Condition:

- Is the well casing bent, corroded, or broken (at the surface)? [] [] []
- Is the well casing loose (at the surface)? [] [] []
- Is a measurement point marked at the top of the well casing? [] [] []
- Measured depth of the well from measurement point: 63.71 ft BTOC
- Thickness of sediment accumulation (reported depth-present measurement): Soft - NA
- Are there any obstructions in the well? [] [] []

Inspection Date: 10-17-14

Inspected by: Captain John

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 10-15-14
Time: 1015

WELL INFORMATION

Well Number: MW-48 Location/Functional Area: Old Landfill

Casing Type: _____ Steel _____ Stainless Steel PVC

Screened/Open-Hole Well Type: Screen Monitor Interval Length: NA Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 66.90 ft BGS or BTOC (circle one) cd 10-15-14

INSPECTION ITEMS YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

Number of guard posts at well: 3

- Are the posts positioned to prevent collision damage to the well? _____
- Are any of the posts damaged or degraded? _____
- Is a concrete pad installed? _____
- Is the pad cracked or deteriorated? _____
- Is steel protective casing installed? _____
- Does the protective casing have a weep hole? _____

Flush-mount completion:

- Is the traffic cover securely bolted to the flush-mount box? _____
- Does the well have a flush-mount box? _____
- Is the traffic cover cracked or broken? _____
- Is the concrete apron cracked or deteriorated? _____

Identification:

- Is the well labeled with the correct number? _____
- Describe labeling: Stickers

Security:

- Does the well have a cap or lid? _____
- Does the well have a weatherproof lock? _____
- Does the lock secure the well? _____
- Does the inner casing have a cap? _____

Down-hole Condition:

- Is the well casing bent, corroded, or broken (at the surface)? _____
- Is the well casing loose (at the surface)? _____
- Is a measurement point marked at the top of the well casing? _____
- Measured depth of the well from measurement point: 67.00 ft BTOC
- Thickness of sediment accumulation (reported depth-present measurement): NA
- Are there any obstructions in the well? _____

Inspection Date: 10-15-14

Inspected by: Capt. Ham

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 10-17-14
Time: 1455

WELL INFORMATION

Well Number: mw-55 Location/Functional Area: Old land fill - Background

Casing Type: Steel Stainless Steel PVC

Screened/Open-Hole Well Type: Screen Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 117.72 ft BGS or BTOC (circle one)

INSPECTION ITEMS wk = 79.53 ft BTOC YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

Number of guard posts at well: 3

- Are the posts positioned to prevent collision damage to the well? [] [] []
- Are any of the posts damaged or degraded? [] [] []
- Is a concrete pad installed? [] [] []
- Is the pad cracked or deteriorated? [] [] []
- Is steel protective casing installed? [] [] []
- Does the protective casing have a weep hole? [] [] []

Flush-mount completion:

- Is the traffic cover securely bolted to the flush-mount box? [] [] []
- Does the well have a flush-mount box? [] [] []
- Is the traffic cover cracked or broken? [] [] []
- Is the concrete apron cracked or deteriorated? [] [] []

Identification:

- Is the well labeled with the correct number? [] [] []
- Describe labeling: stickers

Security:

- Does the well have a cap or lid? [] [] []
- Does the well have a weatherproof lock? [] [] []
- Does the lock secure the well? [] [] []
- Does the inner casing have a cap? [] [] []

Down-hole Condition:

- Is the well casing bent, corroded, or broken (at the surface?) [] [] []
- Is the well casing loose (at the surface?) [] [] []
- Is a measurement point marked at the top of the well casing? [] [] []
- Measured depth of the well from measurement point: 118.00 ft BTOC
- Thickness of sediment accumulation (reported depth-present measurement): 117.00 ft 11-14 silt - NA
- Are there any obstructions in the well? [] [] []

Inspection Date: 10-17-14

Inspected by: Capt. Henn

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 10/15/14
Time: 1300

WELL INFORMATION

Well Number: MW-68 Location/Functional Area: SWMU 20

Casing Type: Steel Stainless Steel PVC

Screened/Open-Hole Well Type: Screened Monitor Interval Length: 20 Ft

Flush-mount/Above-ground Completion: above-ground

Reported Constructed Depth: 43.57 ft BGS or BTOO (circle one)

INSPECTION ITEMS YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

Number of guard posts at well: 2

Are the posts positioned to prevent collision damage to the well? _____

Are any of the posts damaged or degraded? _____

Is a concrete pad installed? _____

Is the pad cracked or deteriorated? _____

Is steel protective casing installed? _____

Does the protective casing have a weep hole? _____

Flush-mount completion:

Is the traffic cover securely bolted to the flush-mount box? _____

Does the well have a flush-mount box? _____

Is the traffic cover cracked or broken? _____

Is the concrete apron cracked or deteriorated? _____

Identification:

Is the well labeled with the correct number? _____

Describe labeling: stickers labeled as "68"

Security:

Does the well have a cap or lid? _____

Does the well have a weatherproof lock? _____

Does the lock secure the well? _____

Does the inner casing have a cap? _____

Down-hole Condition:

Is the well casing bent, corroded, or broken (at the surface?) _____

Is the well casing loose (at the surface?) _____

Is a measurement point marked at the top of the well casing? _____

Measured depth of the well from measurement point: 43.21

Thickness of sediment accumulation (reported depth-present measurement): 0.36 ft

Are there any obstructions in the well? _____

Inspection Date: 10/15/14

Inspected by: Hillary McBrown

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 10-17-14
Time: 1020

WELL INFORMATION

Well Number: MW-70 Location/Functional Area: Admin - Source

Casing Type: Steel Stainless Steel PVC

Screened/Open-Hole Well Type: Screen Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 52.50 ft BGS or BTOC (circle one)

INSPECTION ITEMS WR = 35.63 ft BTOC YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

Number of guard posts at well: 4

- Are the posts positioned to prevent collision damage to the well?
- Are any of the posts damaged or degraded?
- Is a concrete pad installed?
- Is the pad cracked or deteriorated?
- Is steel protective casing installed?
- Does the protective casing have a weep hole?

Flush-mount completion:

- Is the traffic cover securely bolted to the flush-mount box?
- Does the well have a flush-mount box?
- Is the traffic cover cracked or broken?
- Is the concrete apron cracked or deteriorated?

Identification:

- Is the well labeled with the correct number?
- Describe labeling: Stickers

Security:

- Does the well have a cap or lid?
- Does the well have a weatherproof lock?
- Does the lock secure the well?
- Does the inner casing have a cap?

Down-hole Condition:

- Is the well casing bent, corroded, or broken (at the surface)?
- Is the well casing loose (at the surface)?
- Is a measurement point marked at the top of the well casing?
- Measured depth of the well from measurement point: 52.25 ft BTOC
- Thickness of sediment accumulation (reported depth-present measurement): 0.25 ft
- Are there any obstructions in the well?

Inspection Date: 10-17-14

Inspected by: Capt. [Signature]

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 10-17-14
Time: 1045

WELL INFORMATION

Well Number: MW-73 Location/Functional Area: Area B - Source

Casing Type: Steel Stainless Steel PVC

Screened/Open-Hole Well Type: Screen Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 16.50 ft BGS or BTOC (circle one)

INSPECTION ITEMS w2 = 4.32 ft BTOC YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

Number of guard posts at well: 4

- Are the posts positioned to prevent collision damage to the well? [X] [] [] []
- Are any of the posts damaged or degraded? [] [X] [] []
- Is a concrete pad installed? [X] [] [] []
- Is the pad cracked or deteriorated? [] [X] [] []
- Is steel protective casing installed? [X] [] [] []
- Does the protective casing have a weep hole? [X] [] [] []

Flush-mount completion:

- Is the traffic cover securely bolted to the flush-mount box? [] [] [X] []
- Does the well have a flush-mount box? [] [] [X] []
- Is the traffic cover cracked or broken? [] [] [X] []
- Is the concrete apron cracked or deteriorated? [] [] [X] []

Identification:

Is the well labeled with the correct number? [X] [] [] []
Describe labeling: sticker

Security:

- Does the well have a cap or lid? [X] [] [] []
- Does the well have a weatherproof lock? [X] [] [] []
- Does the lock secure the well? [X] [] [] []
- Does the inner casing have a cap? [X] [] [] []

Down-hole Condition:

- Is the well casing bent, corroded, or broken (at the surface?) [] [X] [] []
- Is the well casing loose (at the surface?) [] [X] [] []
- Is a measurement point marked at the top of the well casing? [X] [] [] []
- Measured depth of the well from measurement point: 15.22 ft BTOC
- Thickness of sediment accumulation (reported depth-present measurement): 1.28 ft
- Are there any obstructions in the well? [] [X] [] []

Inspection Date: 10-17-14

Inspected by: Crystal Jhun

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 10-17-14
Time: 1050

WELL INFORMATION

Well Number: MW-75 Location/Functional Area: Area B - Source

Casing Type: Steel Stainless Steel PVC

Screened/Open-Hole Well Type: Screened Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 15.50 ft BGS or BTOC (circle one)

INSPECTION ITEMS Wd = 4.53 ft BTOC YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

Number of guard posts at well: 4

- Are the posts positioned to prevent collision damage to the well?
- Are any of the posts damaged or degraded?
- Is a concrete pad installed?
- Is the pad cracked or deteriorated?
- Is steel protective casing installed?
- Does the protective casing have a weep hole?

Flush-mount completion:

- Is the traffic cover securely bolted to the flush-mount box?
- Does the well have a flush-mount box?
- Is the traffic cover cracked or broken?
- Is the concrete apron cracked or deteriorated?

Identification:

- Is the well labeled with the correct number?
- Describe labeling: stickers

Security:

- Does the well have a cap or lid?
- Does the well have a weatherproof lock?
- Does the lock secure the well?
- Does the inner casing have a cap?

Down-hole Condition:

- Is the well casing bent, corroded, or broken (at the surface?)
- Is the well casing loose (at the surface?)
- Is a measurement point marked at the top of the well casing?
- Measured depth of the well from measurement point: 15.24 ft BTOC
- Thickness of sediment accumulation (reported depth-present measurement): 0.26 ft
- Are there any obstructions in the well?

Inspection Date: 10-17-14

Inspected by: Capt. J. H. ...

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 10-17-14
Time: 1037

WELL INFORMATION

Well Number: MW-86 Location/Functional Area: Area B - Source

Casing Type: _____ Steel _____ Stainless Steel PVC

Screened/Open-Hole Well Type: Screen Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 19.91 ft BGS or BTOC (circle one)

INSPECTION ITEMS wl = 9.24 ft BTOC YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

Number of guard posts at well: 3

- Are the posts positioned to prevent collision damage to the well? [] [] _____
- Are any of the posts damaged or degraded? [] [] _____
- Is a concrete pad installed? [] [] _____
- Is the pad cracked or deteriorated? [] [] _____
- Is steel protective casing installed? [] [] _____
- Does the protective casing have a weep hole? [] [] _____

Flush-mount completion:

- Is the traffic cover securely bolted to the flush-mount box? [] _____
- Does the well have a flush-mount box? [] [] _____
- Is the traffic cover cracked or broken? [] [] _____
- Is the concrete apron cracked or deteriorated? [] [] _____

Identification:

- Is the well labeled with the correct number? [] [] _____
- Describe labeling: S-tickers

Security:

- Does the well have a cap or lid? [] [] _____
- Does the well have a weatherproof lock? [] [] _____
- Does the lock secure the well? [] [] _____
- Does the inner casing have a cap? [] [] _____

Down-hole Condition:

- Is the well casing bent, corroded, or broken (at the surface)? [] [] _____
- Is the well casing loose (at the surface)? [] [] _____
- Is a measurement point marked at the top of the well casing? [] [] _____
- Measured depth of the well from measurement point: 19.85 ft BTOC
- Thickness of sediment accumulation (reported depth-present measurement): 0.06 ft
- Are there any obstructions in the well? [] [] _____

Inspection Date: 10-17-14 Inspected by: Captel Ham

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 10-17-14
Time: 1633

WELL INFORMATION

Well Number: MW-91 Location/Functional Area: Boundary

Casing Type: Steel Stainless Steel PVC

Screened/Open-Hole Well Type: Screen Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 16.44 ft BGS or BTOC (circle one)

INSPECTION ITEMS well = 3.74 ft BTOC YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

Number of guard posts at well: 3

Are the posts positioned to prevent collision damage to the well?

Are any of the posts damaged or degraded?

Is a concrete pad installed?

Is the pad cracked or deteriorated?

Is steel protective casing installed?

Does the protective casing have a weep hole?

Flush-mount completion:

Is the traffic cover securely bolted to the flush-mount box?

Does the well have a flush-mount box?

Is the traffic cover cracked or broken?

Is the concrete apron cracked or deteriorated?

Identification:

Is the well labeled with the correct number?

Describe labeling: Sticker

Security:

Does the well have a cap or lid?

Does the well have a weatherproof lock?

Does the lock secure the well?

Does the inner casing have a cap?

Down-hole Condition:

Is the well casing bent, corroded, or broken (at the surface?)

Is the well casing loose (at the surface?)

Is a measurement point marked at the top of the well casing?

Measured depth of the well from measurement point: 16.20 ft BTOC

Thickness of sediment accumulation (reported depth-present measurement): 0.245 salt

Are there any obstructions in the well?

Inspection Date: 10-17-14

Inspected by: Capt. [Signature]

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 10-17-14
Time: 1640

WELL INFORMATION

Well Number: MW-91B Location/Functional Area: Boundary

Casing Type: _____ Steel _____ Stainless Steel PVC

Screened/Open-Hole Well Type: Open Monitor Interval Length: 20 Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 43.15 ft BGS or BTOC (circle one)

INSPECTION ITEMS Well = 3.96 ft BTOC YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

Number of guard posts at well: 3

Are the posts positioned to prevent collision damage to the well?

Are any of the posts damaged or degraded?

Is a concrete pad installed?

Is the pad cracked or deteriorated?

Is steel protective casing installed?

Does the protective casing have a weep hole?

Flush-mount completion:

Is the traffic cover securely bolted to the flush-mount box?

Does the well have a flush-mount box?

Is the traffic cover cracked or broken?

Is the concrete apron cracked or deteriorated?

Identification:

Is the well labeled with the correct number?

Describe labeling: Stickers

Security:

Does the well have a cap or lid?

Does the well have a weatherproof lock?

Does the lock secure the well?

Does the inner casing have a cap?

Down-hole Condition:

Is the well casing bent, corroded, or broken (at the surface)?

Is the well casing loose (at the surface)?

Is a measurement point marked at the top of the well casing?

Measured depth of the well from measurement point: 43.89 ft BTOC

Thickness of sediment accumulation (reported depth-present measurement): NA

Are there any obstructions in the well?

Inspection Date: 10-17-14

Inspected by: Captain [Signature]

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 10-14-14
Time: 1639

WELL INFORMATION

Well Number: MW-99 Location/Functional Area: Production - Source

Casing Type: Steel Stainless Steel PVC

Screened/Open-Hole Well Type: Screen Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 18.40 ft BGS or BTOC (circle one)

INSPECTION ITEMS 10.2: 8.80 ft BTOC YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

Number of guard posts at well: 3

Are the posts positioned to prevent collision damage to the well?

Are any of the posts damaged or degraded?

Is a concrete pad installed?

Is the pad cracked or deteriorated?

Is steel protective casing installed?

Does the protective casing have a weep hole?

Flush-mount completion:

Is the traffic cover securely bolted to the flush-mount box?

Does the well have a flush-mount box?

Is the traffic cover cracked or broken?

Is the concrete apron cracked or deteriorated?

Identification:

Is the well labeled with the correct number?

Describe labeling: Sticker - 99

Security:

Does the well have a cap or lid?

Does the well have a weatherproof lock?

Does the lock secure the well?

Does the inner casing have a cap?

Down-hole Condition:

Is the well casing bent, corroded, or broken (at the surface?)

Is the well casing loose (at the surface?)

Is a measurement point marked at the top of the well casing?

Measured depth of the well from measurement point: 18.65 ft BTOC

Thickness of sediment accumulation (reported depth-present measurement): NA

Are there any obstructions in the well?

Inspection Date: 10-14-14

Inspected by: Captain [Signature]

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 10-14-14
Time: 1510

WELL INFORMATION

Well Number: M1W-101 Location/Functional Area: Production - Boundary

Casing Type: Steel Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: Screen Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 19.61 ft BGS of BTOC (circle one)

INSPECTION ITEMS well = 1199ft BTOC YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

Number of guard posts at well: 3

Are the posts positioned to prevent collision damage to the well? [] [] []

Are any of the posts damaged or degraded? [] [] []

Is a concrete pad installed? [] [] []

Is the pad cracked or deteriorated? [] [] []

Is steel protective casing installed? [] [] []

Does the protective casing have a weep hole? [] [] []

Flush-mount completion:

Is the traffic cover securely bolted to the flush-mount box? [] [] []

Does the well have a flush-mount box? [] [] []

Is the traffic cover cracked or broken? [] [] []

Is the concrete apron cracked or deteriorated? [] [] []

Identification:

Is the well labeled with the correct number? [] [] []

Describe labeling: Sticker

Security:

Does the well have a cap or lid? [] [] []

Does the well have a weatherproof lock? [] [] []

Does the lock secure the well? [] [] []

Does the inner casing have a cap? [] [] []

Down-hole Condition:

Is the well casing bent, corroded, or broken (at the surface)? [] [] []

Is the well casing loose (at the surface)? [] [] []

Is a measurement point marked at the top of the well casing? [] [] []

Measured depth of the well from measurement point: 19.39 ft BTOC

Thickness of sediment accumulation (reported depth-present measurement): 0.22ft

Are there any obstructions in the well? [] [] []

Inspection Date: 10-14-14

Inspected by: Capt. [Signature]

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 10-14-14
Time: 1502

WELL INFORMATION

Well Number: MW-101 B Location/Functional Area: Production - Boundary

Casing Type: Steel Stainless Steel PVC

Screened/Open-Hole Well Type: CR 10-14-14
Screen Open Monitor Interval Length: 37 Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 63.81 ft BGS or BTOC (circle one)

INSPECTION ITEMS Well: H.6961 BTOC YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

Number of guard posts at well: 3

- Are the posts positioned to prevent collision damage to the well? [] [] []
- Are any of the posts damaged or degraded? [] [] []
- Is a concrete pad installed? [] [] []
- Is the pad cracked or deteriorated? [] [] []
- Is steel protective casing installed? [] [] []
- Does the protective casing have a weep hole? [] [] []

Flush-mount completion:

- Is the traffic cover securely bolted to the flush-mount box? ^{CR} [] [] ₁₀₋₁₄₋₁₄
- Does the well have a flush-mount box? [] [] []
- Is the traffic cover cracked or broken? [] [] []
- Is the concrete apron cracked or deteriorated? [] [] []

Identification:

- Is the well labeled with the correct number? [] [] []
- Describe labeling: Stickers

Security:

- Does the well have a cap or lid? [] [] []
- Does the well have a weatherproof lock? [] [] []
- Does the lock secure the well? [] [] []
- Does the inner casing have a cap? [] [] []

Down-hole Condition:

- Is the well casing bent, corroded, or broken (at the surface)? [] [] []
- Is the well casing loose (at the surface)? [] [] []
- Is a measurement point marked at the top of the well casing? [] [] []
- Measured depth of the well from measurement point: 69.33 ft BTOC
- Thickness of sediment accumulation (reported depth-present measurement): Soft - NA
- Are there any obstructions in the well? [] [] []

Inspection Date: 10-14-14

Inspected by: Capt. J. P. [Signature]

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 10-14-14
Time: 1530

WELL INFORMATION

Well Number: MW-102 Location/Functional Area: Production - Boundary

Casing Type: Steel Stainless Steel PVC

Screened/Open-Hole Well Type: Screen Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 18,00 ft BGS or BTOC (circle one)

INSPECTION ITEMS W2 = 9.47 ft BTOC YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

Number of guard posts at well: 3

- Are the posts positioned to prevent collision damage to the well?
- Are any of the posts damaged or degraded?
- Is a concrete pad installed?
- Is the pad cracked or deteriorated?
- Is steel protective casing installed?
- Does the protective casing have a weep hole?

Flush-mount completion:

- Is the traffic cover securely bolted to the flush-mount box?
- Does the well have a flush-mount box?
- Is the traffic cover cracked or broken?
- Is the concrete apron cracked or deteriorated?

Identification:

- Is the well labeled with the correct number?
- Describe labeling: stickers

Security:

- Does the well have a cap or lid?
- Does the well have a weatherproof lock?
- Does the lock secure the well?
- Does the inner casing have a cap?

Down-hole Condition:

- Is the well casing bent, corroded, or broken (at the surface?)
- Is the well casing loose (at the surface?)
- Is a measurement point marked at the top of the well casing?
- Measured depth of the well from measurement point: 17.83 ft BTOC
- Thickness of sediment accumulation (reported depth-present measurement): 17.83 ft BTOC - 17.66 ft = 0.17 ft
- Are there any obstructions in the well?

Inspection Date: 10/14/14

Inspected by: C. J. Allen

HOLSTON ARMY AMMUNITION PLANT WELL INSPECTION CHECKLIST

Date: 10-14-14
Time: 1335

WELL INFORMATION

Well Number: MW-102B Location/Functional Area: Production - Boundary

Casing Type: Steel Stainless Steel PVC

Screened/Open-Hole Well Type: Open Monitor Interval Length: 24.5 Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 26.47 ft BGS or **BTOC** (circle one) *Note that reported depth listed here is incorrect as indicated in historical documents*

INSPECTION ITEMS WR = 9.56 FT BTOC **YES NO N/A COMMENTS**

Well-head Completion:

Above-ground completion:

- Number of guard posts at well: 3
- Are the posts positioned to prevent collision damage to the well?
- Are any of the posts damaged or degraded?
- Is a concrete pad installed?
- Is the pad cracked or deteriorated?
- Is steel protective casing installed?
- Does the protective casing have a weep hole?

Flush-mount completion:

- Is the traffic cover securely bolted to the flush-mount box?
- Does the well have a flush-mount box?
- Is the traffic cover cracked or broken?
- Is the concrete apron cracked or deteriorated?

Identification:

- Is the well labeled with the correct number?
- Describe labeling: Stickers

Security:

- Does the well have a cap or lid?
- Does the well have a weatherproof lock?
- Does the lock secure the well?
- Does the inner casing have a cap?

Down-hole Condition:

- Is the well casing bent, corroded, or broken (at the surface)?
- Is the well casing loose (at the surface)?
- Is a measurement point marked at the top of the well casing?
- Measured depth of the well from measurement point: 51.07 FT **BTOC**
- Thickness of sediment accumulation (reported depth-present measurement): SOL - **NA**
- Are there any obstructions in the well?

Inspection Date: 10-14-14

Inspected by: Cynthia Lunn

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 10-16-14
Time: 0840

WELL INFORMATION

Well Number: MW-104 Location/Functional Area: Area A

Casing Type: _____ Steel _____ Stainless Steel PVC

Screened/Open-Hole Well Type: Screen Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: Flush

Reported Constructed Depth: 18.95 ft BGS or BTOC (circle one)

INSPECTION ITEMS

YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

Number of guard posts at well: 0

Are the posts positioned to prevent collision damage to the well?

Are any of the posts damaged or degraded?

Is a concrete pad installed?

Is the pad cracked or deteriorated?

Is steel protective casing installed?

Does the protective casing have a weep hole?

Flush-mount completion:

Is the traffic cover securely bolted to the flush-mount box?

Does the well have a flush-mount box?

Is the traffic cover cracked or broken?

Is the concrete apron cracked or deteriorated?

Identification:

Is the well labeled with the correct number?

Describe labeling: MW-104 EA punched

Security:

Does the well have a cap or lid?

Does the well have a weatherproof lock?

Does the lock secure the well?

Does the inner casing have a cap?

Down-hole Condition:

Is the well casing bent, corroded, or broken (at the surface)?

Is the well casing loose (at the surface)?

Is a measurement point marked at the top of the well casing?

Measured depth of the well from measurement point: 18.99 ft BTOC

Thickness of sediment accumulation (reported depth-present measurement): None

Are there any obstructions in the well?

Inspection Date: 10-16-14

Inspected by: Crystal Allen

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 10/16/14
Time: 0905

WELL INFORMATION

Well Number: MW-105 Location/Functional Area: Area A

Casing Type: Steel Stainless Steel PVC

Screened/Open-Hole Well Type: screened Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: flush-mount

Reported Constructed Depth: 19.43 ft BGS or BTCC (circle one)

INSPECTION ITEMS YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

- Number of guard posts at well: 0
- Are the posts positioned to prevent collision damage to the well? YES NO N/A
- Are any of the posts damaged or degraded? YES NO N/A
- Is a concrete pad installed? YES NO N/A
- Is the pad cracked or deteriorated? YES NO N/A
- Is steel protective casing installed? YES NO N/A
- Does the protective casing have a weep hole? YES NO N/A

Flush-mount completion:

- Is the traffic cover securely bolted to the flush-mount box? YES NO N/A
- Does the well have a flush-mount box? YES NO N/A
- Is the traffic cover cracked or broken? YES NO N/A
- Is the concrete apron cracked or deteriorated? YES NO N/A

Identification:

- Is the well labeled with the correct number? YES NO N/A
- Describe labeling: black marker on concrete pad identifying as "MW-105"

Security:

- Does the well have a cap or lid? YES NO N/A
- Does the well have a weatherproof lock? YES NO N/A
- Does the lock secure the well? YES NO N/A
- Does the inner casing have a cap? YES NO N/A

Down-hole Condition:

- Is the well casing bent, corroded, or broken (at the surface)? YES NO N/A
- Is the well casing loose (at the surface)? YES NO N/A
- Is a measurement point marked at the top of the well casing? YES NO N/A
- Measured depth of the well from measurement point: 18.98
- Thickness of sediment accumulation (reported depth-present measurement): 0.45
- Are there any obstructions in the well? YES NO N/A

Inspection Date: 10/16/14

Inspected by: Hillary McGowan

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 6-16-14

Time: 1040

WELL INFORMATION

Well Number: MW-106 Location/Functional Area: Area A

Casing Type: Steel Stainless Steel PVC

Screened/Open-Hole Well Type: Screen Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: Flush

Reported Constructed Depth: 19.54 ft BGS or BTOC (circle one)

INSPECTION ITEMS

YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

Number of guard posts at well: 0

Are the posts positioned to prevent collision damage to the well?

Are any of the posts damaged or degraded?

Is a concrete pad installed?

Is the pad cracked or deteriorated?

Is steel protective casing installed?

Does the protective casing have a weep hole?

Flush-mount completion:

Is the traffic cover securely bolted to the flush-mount box?

Does the well have a flush-mount box?

Is the traffic cover cracked or broken?

Is the concrete apron cracked or deteriorated?

Identification:

Is the well labeled with the correct number?

Describe labeling: MW-106 passed in

Security:

Does the well have a cap or lid?

Does the well have a weatherproof lock?

Does the lock secure the well?

Does the inner casing have a cap?

Down-hole Condition:

Is the well casing bent, corroded, or broken (at the surface)?

Is the well casing loose (at the surface)?

Is a measurement point marked at the top of the well casing?

Measured depth of the well from measurement point: 19.50 ft BTOC

Thickness of sediment accumulation (reported depth-present measurement): 0.04 ft

Are there any obstructions in the well?

Inspection Date: 10-16-14

Inspected by: Cuphlan

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 10/16/14

Time: 1005

WELL INFORMATION

Well Number: MW-107 Location/Functional Area: Area A

Casing Type: Steel Stainless Steel PVC

Screened/Open-Hole Well Type: Screened Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: flush-mount

Reported Constructed Depth: 18.88 ft BGS or BTCC (circle one)

INSPECTION ITEMS YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

Number of guard posts at well: 0

Are the posts positioned to prevent collision damage to the well? [] [] [X]

Are any of the posts damaged or degraded? [] [] [X]

Is a concrete pad installed? [] [] [X]

Is the pad cracked or deteriorated? [] [] [X]

Is steel protective casing installed? [] [] [X]

Does the protective casing have a weep hole? [] [] [X]

Flush-mount completion:

Is the traffic cover securely bolted to the flush-mount box? [X] [] []

Does the well have a flush-mount box? [X] [] []

Is the traffic cover cracked or broken? [] [X] []

Is the concrete apron cracked or deteriorated? [] [X] []

Identification:

Is the well labeled with the correct number? [X] [] []

Describe labeling: metal plate stamped with "MW-107"

Security:

Does the well have a cap or lid? [X] [] []

Does the well have a weatherproof lock? [X] [] []

Does the lock secure the well? [X] [] []

Does the inner casing have a cap? [X] [] []

Down-hole Condition:

Is the well casing bent, corroded, or broken (at the surface)? [] [X] []

Is the well casing loose (at the surface)? [] [X] []

Is a measurement point marked at the top of the well casing? [X] [] []

Measured depth of the well from measurement point: 18.82

Thickness of sediment accumulation (reported depth-present measurement): 0.06 ft

Are there any obstructions in the well? [] [X] []

Inspection Date: 10/16/14

Inspected by: Hillary McGowan

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 10-15-14

Time: 1510

WELL INFORMATION

Well Number: MW-114 Location/Functional Area: Old Landfill

Casing Type: Steel Stainless Steel PVC

Screened/Open-Hole Well Type: SCREEN Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 105.87 ft BGS or BTOC (circle one)

INSPECTION ITEMS YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

Number of guard posts at well: 3

- Are the posts positioned to prevent collision damage to the well? [] [] []
- Are any of the posts damaged or degraded? [] [] []
- Is a concrete pad installed? [] [] []
- Is the pad cracked or deteriorated? [] [] []
- Is steel protective casing installed? [] [] []
- Does the protective casing have a weep hole? [] [] []

Flush-mount completion:

- Is the traffic cover securely bolted to the flush-mount box? [] []
- Does the well have a flush-mount box? [] []
- Is the traffic cover cracked or broken? [] []
- Is the concrete apron cracked or deteriorated? [] []

Identification:

- Is the well labeled with the correct number? [] [] []
- Describe labeling: Sticker

Security:

- Does the well have a cap or lid? [] [] []
- Does the well have a weatherproof lock? [] [] []
- Does the lock secure the well? [] [] []
- Does the inner casing have a cap? [] [] []

Down-hole Condition:

- Is the well casing bent, corroded, or broken (at the surface)? [] [] []
- Is the well casing loose (at the surface)? [] [] []
- Is a measurement point marked at the top of the well casing? [] [] []
- Measured depth of the well from measurement point: 105.87 ft BTOC
- Thickness of sediment accumulation (reported depth-present measurement): 0.0 ft
- Are there any obstructions in the well? [] [] []

Inspection Date: 10-15-14

Inspected by: Capt. [Signature]

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 10/15/14
Time: 0910

WELL INFORMATION

Well Number: MW-115 Location/Functional Area: old Landfill Area

Casing Type: ~~10" Steel~~ 10" Steel Stainless Steel PVC

Screened/Open-Hole Well Type: Screened Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: above-ground

Reported Constructed Depth: 40.85 ft BGS or BTOC (circle one)

INSPECTION ITEMS

YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

Number of guard posts at well: 4

- Are the posts positioned to prevent collision damage to the well? [] []
- Are any of the posts damaged or degraded? [] []
- Is a concrete pad installed? [] []
- Is the pad cracked or deteriorated? [] []
- Is steel protective casing installed? [] []
- Does the protective casing have a weep hole? [] []

Flush-mount completion:

- Is the traffic cover securely bolted to the flush-mount box? [] []
- Does the well have a flush-mount box? [] []
- Is the traffic cover cracked or broken? [] []
- Is the concrete apron cracked or deteriorated? [] []

Identification:

- Is the well labeled with the correct number? [] []
- Describe labeling: stickers labeling as "115"

Security:

- Does the well have a cap or lid? [] []
- Does the well have a weatherproof lock? [] []
- Does the lock secure the well? [] []
- Does the inner casing have a cap? [] []

Down-hole Condition:

- Is the well casing bent, corroded, or broken (at the surface?) [] []
- Is the well casing loose (at the surface?) [] []
- Is a measurement point marked at the top of the well casing? [] []
- Measured depth of the well from measurement point: 40.48 ft BTOC
- Thickness of sediment accumulation (reported depth-present measurement): 0.38 ft 0.37 ft DD 11-5-14
- Are there any obstructions in the well? [] []

Inspection Date: 10/15/14

Inspected by: Hillary McGowan

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 10/15/14
Time: 1620

WELL INFORMATION

Well Number: MW-116 Location/Functional Area: SWMU 19/29

Casing Type: Steel Stainless Steel PVC

Screened/Open-Hole Well Type: Screened Monitor Interval Length: 20 Ft

Flush-mount/Above-ground Completion: above-ground

Reported Constructed Depth: 119.80 ft BGS or 800 (circle one)

INSPECTION ITEMS YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

Number of guard posts at well: 4

- Are the posts positioned to prevent collision damage to the well? [] []
- Are any of the posts damaged or degraded? [] []
- Is a concrete pad installed? [] []
- Is the pad cracked or deteriorated? [] []
- Is steel protective casing installed? [] []
- Does the protective casing have a weep hole? [] []

Flush-mount completion:

- Is the traffic cover securely bolted to the flush-mount box? [] []
- Does the well have a flush-mount box? [] []
- Is the traffic cover cracked or broken? [] []
- Is the concrete apron cracked or deteriorated? [] []

Identification:

Is the well labeled with the correct number? [] []
Describe labeling: stickers identifying as "116"

Security:

- Does the well have a cap or lid? [] []
- Does the well have a weatherproof lock? [] []
- Does the lock secure the well? [] []
- Does the inner casing have a cap? [] []

Down-hole Condition:

- Is the well casing bent, corroded, or broken (at the surface)? [] []
- Is the well casing loose (at the surface)? [] []
- Is a measurement point marked at the top of the well casing? [] []
- Measured depth of the well from measurement point: 121.42
- Thickness of sediment accumulation (reported depth-present measurement): N/A
- Are there any obstructions in the well? [] []

Inspection Date: 10/15/14

Inspected by: Hillary McGrown

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 10-14-14
Time: 1825

WELL INFORMATION

Well Number: MW-SIA Location/Functional Area: Production - Boundary

Casing Type: Steel Stainless Steel PVC

Screened/Open-Hole Well Type: Screen Monitor Interval Length: 5 Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 17.01 ft BGS of BTOC (circle one)

INSPECTION ITEMS W2-4.86 ft BTOC YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

Number of guard posts at well: 4

Are the posts positioned to prevent collision damage to the well?

Are any of the posts damaged or degraded?

Is a concrete pad installed?

Is the pad cracked or deteriorated?

Is steel protective casing installed?

Does the protective casing have a weep hole?

Flush-mount completion:

Is the traffic cover securely bolted to the flush-mount box?

Does the well have a flush-mount box?

Is the traffic cover cracked or broken?

Is the concrete apron cracked or deteriorated?

Identification:

Is the well labeled with the correct number?

Describe labeling: Stickers

Security:

Does the well have a cap or lid?

Does the well have a weatherproof lock?

Does the lock secure the well?

Does the inner casing have a cap?

Down-hole Condition:

Is the well casing bent, corroded, or broken (at the surface)?

Is the well casing loose (at the surface)?

Is a measurement point marked at the top of the well casing?

Measured depth of the well from measurement point: 16.80 ft BTOC

Thickness of sediment accumulation (reported depth-present measurement): 0.21 ft

Are there any obstructions in the well?

Inspection Date: 10-14-14

Inspected by: Cristina L. ...

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 10-14-14
Time: 1602

WELL INFORMATION

Well Number: STMW-15 Location/Functional Area: Production - Boundary

Casing Type: Steel Stainless Steel PVC

Screened/Open-Hole Well Type: Screen Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 32.21 ft BGS of BTOL (circle one)

INSPECTION ITEMS WEL = 13.96 FT BTOL YES NO N/A COMMENTS

Well-head Completion:

Above-ground completion:

Number of guard posts at well: 4

- Are the posts positioned to prevent collision damage to the well? [] [] []
- Are any of the posts damaged or degraded? [] [] []
- Is a concrete pad installed? [] [] []
- Is the pad cracked or deteriorated? [] [] []
- Is steel protective casing installed? [] [] []
- Does the protective casing have a weep hole? [] [] []

Flush-mount completion:

- Is the traffic cover securely bolted to the flush-mount box? [] [] []
- Does the well have a flush-mount box? [] [] []
- Is the traffic cover cracked or broken? [] [] []
- Is the concrete apron cracked or deteriorated? [] [] []

Identification:

- Is the well labeled with the correct number? [] [] []
- Describe labeling: Sticker

Security:

- Does the well have a cap or lid? [] [] []
- Does the well have a weatherproof lock? [] [] []
- Does the lock secure the well? [] [] []
- Does the inner casing have a cap? [] [] []

Down-hole Condition:

- Is the well casing bent, corroded, or broken (at the surface)? [] [] []
- Is the well casing loose (at the surface)? [] [] []
- Is a measurement point marked at the top of the well casing? [] [] []
- Measured depth of the well from measurement point: 32.08 FT BTOL
- Thickness of sediment accumulation (reported depth-present measurement): 0.13 FT
- Are there any obstructions in the well? [] [] []

Inspection Date: 10-14-14

Inspected by: Capt. J. H. [Signature]

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**FISCAL YEAR 2014 LONG-TERM MONITORING/
LONG-TERM OPERATIONS REPORT**
Holston Army Ammunition Plant, Kingsport, Tennessee

APPENDIX B
**2014 ANALYTICAL RESULTS, CHAIN-OF-CUSTODY FORMS, AND
VALIDATION CHECKLISTS (PROVIDED ON COMPACT DISC)**



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**FISCAL YEAR 2014 LONG-TERM MONITORING/
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Holston Army Ammunition Plant, Kingsport, Tennessee

**APPENDIX C
CORRECTIVE ACTION ORDER MODIFICATION-LISTED TARGET
ANALYTES, SCREENING CRITERIA, AND GROUNDWATER
PROTECTION STANDARDS**



**FISCAL YEAR 2014 LONG-TERM MONITORING/
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Holston Army Ammunition Plant, Kingsport, Tennessee

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TABLE G-3
Groundwater Protection Standards Including the Calculations for the Target Analytes Detected at AOC-GW Component Units
Holston Army Ammunition Plant (HSAAP), Kingsport, Tennessee

Source Area	Source Units	Chemical Compound Class	Detected Constituents (all units in µg/L)	Maximum Detected Concentration ¹	Tennessee General Water Quality Criteria ²					Lowest Water Quality Criteria	Ground Water Protection Standard ³	Point of Compliance (POC) Maximum Detected Concentration ⁴
					Fish and Aquatic Life - Continuous	Recreational Uses - Water and Organism	Recreational Uses - Organism Only	Domestic Water Supply	RSL or MCL			
Area A	SWMU 96	SVOCs	Naphthalene	9.1	NV	NV	NV	0.14	RSL	0.14	238	0.12J
		VOCs	Benzene	11J	NV	22	510	5	MCL	5	8500	ND
			Methylene Chloride	7.8	NV	46	5900	5	MCL	5	8500	ND
Area B Landfill Area	SWMUs 19 and 29	RCRA Metals	Arsenic	12	150	10	10	10	MCL	10	17000	27.9
			Lead	16.5	2.5	NV	NV	15	MCL	2.5	4250	84.6
		SVOCs	Bis(2-ethylhexyl)phthalate	2,200	NV	12	22	6	MCL	6	10200	7.4J
			Dibenzofuran	860J	NV	NV	NV	5.8	RSL	5.8	9860	ND
			Fluorene	1,200	NV	1100	5300	220	RSL	220	374000	ND
			2-Methylnaphthalene	3300J	NV	NV	NV	27	RSL	27	45900	ND
			Naphthalene	1100J	NV	NV	NV	0.14	RSL	0.14	238	ND
	N-Nitrosodiphenylamine	150	NV	33	60	10	RSL	10	17000	ND		
	SWMU 20	Explosives	RDX	76	NV	NV	NV	0.61	RSL	0.61	1037	76
		RCRA Metals	Arsenic	53	150	10	10	10	MCL	10	17000	5.8
Chromium, Total			213	11	NV	NV	100	MCL	11	18700	12.4	
Area B Production and Shop Area	SWMU 18	RCRA Metals	Mercury (elemental)	3.87	0.77	0.05	0.051	2	MCL	0.05	85	NA
	SWMUs 77/78/86/87 and 88	Pesticides	Bromacil	330J	NV	NV	NV	70 LHA	CAS NO. 314-40-9 not on RSL table	70	119000	NA
			Chlordane (total)	0.235	0.0043	0.0080	0.0081	2	MCL	0.0043	7.31	NA
			Dieldrin	0.78	0.056	0.00052	0.00054	0.0015	RSL	0.00052	0.884	NA
	Production Area SWMUs and AOCs	Explosives	2,4-Dinitrotoluene	0.39	NV	1.1	34	0.2	RSL	0.2	340	ND
			2,6-Dinitrotoluene	12	NV	NV	NV	15	RSL	15	25500	ND
			2,4,6-Trinitrotoluene	11	NV	NV	NV	2.2	RSL	2.2	3740	ND
			2-Amino-4,6-Dinitrotoluene	7.9	NV	NV	NV	30	RSL	30	51000	ND
			4-Amino-2,6-Dinitrotoluene	8.8	NV	NV	NV	30	RSL	30	51000	ND
			Nitroglycerin	19	NV	NV	NV	1.5	RSL	1.5	2550	ND
	RDX	2,200	NV	NV	NV	0.61	RSL	0.61	1037	0.87J		

NOTES: NV - No value is established by the State of Tennessee. ND - not detected. NA - no boundary well present. RDX - Hexahydro-1,3,5-trinitro-1,3,5-triazine
RCRA - Resource Conservation Recovery Act VOCs - Volatile Organic Compounds SVOCs - Semi-Volatile Organic Compounds
All units in micrograms per liter (µg/L) which is equivalent to parts per billion (ppb).
¹Maximum detected concentration from all known historical history of the included wells through the Fall 2006 LTM event recorded in the AOC-GW Corrective Measures Report.
²Tennessee General Water Quality Criteria, 1200-4-3, (May 2011). Where no value established by TN 1200-4-3, then US EPA Regional Screening Levels (RSLs) are used for that constituent in the domestic water supply column. RSL values are in italics where used. MCL values are used in lieu of RSL when available.
³Proposed Ground Water Protection Standard is the lowest criteria multiplied by the site-specific dilution factor of 17,000 multiplied by 10 percent.
⁴Maximum detected concentration from POC/boundary wells. Boundary wells define the point of compliance (POC).

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**FISCAL YEAR 2014 LONG-TERM MONITORING/
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Holston Army Ammunition Plant, Kingsport, Tennessee

**APPENDIX D
2014 INSPECTIONS**

- D.1 LANDFILL INSPECTION FORMS (SPRING 2014)
- D.2 LANDFILL INSPECTION FORMS (FALL 2014)
- D.3 HOLSTON ARMY AMMUNITION PLANT LANDFILL CAP/COVER INSPECTION REPORT FORMS (EVENT 1)
- D.4 HOLSTON ARMY AMMUNITION PLANT LANDFILL CAP/COVER INSPECTION REPORT FORMS (EVENT 2)



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**FISCAL YEAR 2014 LONG-TERM MONITORING/
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Holston Army Ammunition Plant, Kingsport, Tennessee

**APPENDIX D.1
LANDFILL INSPECTION FORMS (SPRING 2014)**



**FISCAL YEAR 2014 LONG-TERM MONITORING/
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Holston Army Ammunition Plant, Kingsport, Tennessee

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LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # J120094	Task: 07
Date: 04/09/14	

SWMU 4 – Coal Tar Tanks behind Building 8

INSPECTION FINDINGS:

Examine for coal tar seepage [SWMUs 14, 26, 96, 103 only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Sign is legible, accurate, stable, and clear of obstructions. Small pieces of coal tar (ranging from 2 to 5 cm) are visible scattered along the surface of the eastern and northern sides of the SWMU area. No fences or gates are present. No signs of settlement, erosion or unauthorized activity.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?

Yes _____ No If yes, describe location and extent:

REPAIRS REQUIRED? Yes No _____ If yes, describe extent and location:

Small pieces of coal tar require removal.

Inspected by:
Hillary McGown, Bay West
Crystal Hann, Leidos

Date: 04/09/14
Time: 0935

REPAIR RECORD

LANDFILL CAP/COVER INSPECTION REPORT

LANDFILL CAP/COVER INSPECTION REPORT	
SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # J120094	Task: 07
<i>(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)</i>	
No repairs required.	
Repairs completed on:	
Repair Record completed by:	Date: Time:
COAL TAR REMOVAL (Include quantity removed, repairs made to cap, disposition of coal tar, etc.)	
Approximately 0.5 gallon of coal tar is picked by hand up along the eastern and northern portions of the SWMU. The coal tar is placed in a garbage bag which is placed in the 55-gallon steel drum located in Building 141.	
Repairs completed on: 04/11/14	
Repair Record completed by: Hillary McGown, Bay West	Date: 04/11/14 Time: 0820

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # J120094	Task: 07
Date: 04/09/14	

SWMU 14 – Coal Tar Landfill 1

INSPECTION FINDINGS:

Examine for coal tar seepage [SWMUs 14, 26, 96, 103 only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Sign is accurate, legible, stable and clear of obstructions. Vegetation is approximately 6 inches tall (recently mowed); good, thick vegetation is visible throughout the SWMU area with no areas bare of vegetation. Fence along southwest perimeter is in good condition and the gate is locked; no other fences or gates are present. No evidence of coal tar is visible on the surface (visual or olfactory). No signs of erosion or settlement are observed.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?

Yes _____ No If yes, describe location and extent:

REPAIRS REQUIRED? Yes _____ No If yes, describe extent and location:

No repairs required.

Inspected by: Hillary McGown, Bay West Crystal Hann, Leidos	Date: 04/09/14 Time: 1115
--	------------------------------

REPAIR RECORD

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections

Field Activity: Landfill Cap/Cover Inspection

Job # J120094

Task: 07

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Not applicable.

Repairs completed on:

Repair Record completed by:

Date:

Time:

COAL TAR REMOVAL

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

No coal tar is observed.

Repairs completed on:

Repair Record completed by:

Date:

Time:

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections

Field Activity: Landfill Cap/Cover Inspection

Job # J120094	Task: 07
Date: 04/07/14	
SWMU 18 – Closed Sanitary Landfill	
<p>INSPECTION FINDINGS: <i>Examine for coal tar seepage [SWMUs 14, 26, 96, 103 only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.</i></p> <p>Sign is accurate, legible, stable, and clear of vegetation. Vegetation is 6 to 12 inches tall with good, thick growth. No fences or gates present. Area around the fill material for the telephone poles has some bare soil/erosion along the southern slope; this has been previously noted, is not part of the landfill cover, and remains stable. Three depressions are observed in the middle-central area of the SWMU where water has pooled following a heavy rainfall event. Four additional depressions are observed near MW-70 where minor rutting and pooled water is observed following a heavy rainfall event. Overall grass/vegetation in good condition. The few depressions with pooling water have not changed in size or are not draining off-site. These observations are noted following a rain event and likely would not be observable otherwise. No waste/debris observed at the surface.</p> <p>04/11/14: Follow-up inspection: Check depressions previously observed; no surface water observed where previously identified. No repairs warranted at present.</p> <p>LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance? Yes _____ No <input checked="" type="checkbox"/> If yes, describe location and extent:</p>	
<p>REPAIRS REQUIRED? Yes _____ No <input checked="" type="checkbox"/> If yes, describe extent and location:</p> <p>No repairs required.</p>	
Inspected by: Hillary McGown, Bay West Crystal Hann, Leidos	Date: 04/07/14 Time: 1320
<p>REPAIR RECORD <i>(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)</i></p>	

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
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Job # J120094	Task: 07
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No repairs required.

Repairs completed on:

Repair Record completed by:	Date:
	Time:

COAL TAR REMOVAL

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not applicable.

Repairs completed on:

Repair Record completed by:	Date:
	Time:

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
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Job # J120094	Task: 07
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Date: 04/07/14	
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LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections

Field Activity: Landfill Cap/Cover Inspection

Job # J120094

Task: 07

SWMUs 19/29 – Construction Debris Landfill and Former Sedimentation Pond

INSPECTION FINDINGS:

Examine for coal tar seepage [SWMUs 14, 26, 96, 103 only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Sign is legible, accurate, stable, and clear of vegetation. Vegetation is 6 to 12 inches tall with good, thick growth. No areas of bare vegetation observed. Drainage area noted and repaired in 2013 looks stable with no signs of further erosion. Small pieces of asphalt are observed on the surface near the mounded area near the north/northeast corner of the SWMU area. Some large pieces of asphalt are present adjacent to the mounded area and in the far northeast corner of the SWMU. One large piece of asphalt is present south of the SWMU sign within the middle of the SWMU area. These pieces are partially buried so their actual size is difficult to determine. Culvert with free-flowing drainage is observed along the eastern side of the SWMU area; asphalt pieces are observed along the ridge/side slope of the landfill adjacent to this culvert. No fences or gates present.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?

Yes _____ No If yes, describe location and extent:

REPAIRS REQUIRED? Yes No _____ If yes, describe extent and location:

Loose, moveable pieces of asphalt require removal; Mr. Mayton indicates that the larger pieces of asphalt can remain in place.

Inspected by: Hillary McGown, Bay West
Crystal Hann, Leidos

Date: 04/07/14
Time: 1405

REPAIR RECORD

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

LANDFILL CAP/COVER INSPECTION REPORT	
SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # J120094	Task: 07
<p>Smaller/loose pieces of asphalt in the northeast corner and along the eastern side of the SWMU adjacent to the culvert are picked up. One larger piece of asphalt is removed from the middle of the SWMU area south of the sign. Asphalt pieces are picked up by hand and placed in 5-gallon buckets. Approximately 8 gallons of asphalt is picked up and placed in a BAE landfill receptacle marked as “Landfill Refuse” located outside of Building 140.</p>	
Repairs completed on: 04/11/14	
Repair Record completed by: Hillary McGown, Bay West	Date: 04/11/14 Time: 1235
<p>COAL TAR REMOVAL (Include quantity removed, repairs made to cap, disposition of coal tar, etc.)</p> <p>Not applicable.</p>	
Repairs completed on:	
Repair Record completed by:	Date: Time:

LANDFILL CAP/COVER INSPECTION REPORT	
SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # J120094	Task: 07

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # J120094	Task: 07
Date: 04/07/14	

SWMU 20 – Rock Quarry Landfill

INSPECTION FINDINGS:

Examine for coal tar seepage [SWMUs 14, 26, 96, 103 only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Sign is accurate, legible, stable, and clear of vegetation. Vegetation is 6 to 12 inches tall. Some areas are bare of vegetation are visible along the access road and in the southern portion of the SWMU area, just up-gradient from the monitoring wells. Construction debris is observed along the rock wall on the eastern side of the landfill rock face: roofing tar/asphalt, fibrous white material, metal sheeting. A small depression with standing water is present near MW-68. The sinkhole adjacent to the rock fall which was filled in January of 2013 has re-opened and requires repair. Severe rutting and bare soil is present in the southwest portion of the SWMU area near MW-68B.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?
Yes _____ No X _____ If yes, describe location and extent:

REPAIRS REQUIRED? Yes _____ X _____ No _____ If yes, describe extent and location:

The sinkhole which has re-opened requires filling. The areas of bare vegetation along the access road and in the southern portion of the SWMU area require seeding/straw. The rutting in the southwestern portion of the SWMU requires filling and leveling, followed by seeding and straw. The debris along the eastern rock face of the SWMU requires removal.

Inspected by: Hillary McGown, Bay West Crystal Hann, Leidos	Date: 04/07/14 Time: 1430
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REPAIR RECORD
(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

LANDFILL CAP/COVER INSPECTION REPORT	
SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # J120094	Task: 07
<p>The re-opened sinkhole was filled in using shovels. Approximately six 5-gallon buckets of gravel from the gravel pile adjacent to SWMUs 19/29 are placed in the hole. Following the gravel, three 5-gallon buckets with clay obtained from the Borrow Pit was placed in the sinkhole to form the 2-foot clay cap, followed by two 40-pound bags of topsoil. Seed and straw was placed over the sinkhole area following filling. Areas bare of vegetation along the access road and in the southeast corner of the SWMU area are seeded using a tall fescue grass mix and straw is spread over the areas following seeding. Dennis Mayton is informed of the debris along the eastern rock face of the quarry. A BAE asbestos expert will assess if the materials are asbestos-containing. BAE will remove the material. The rutted area in the southwestern corner adjacent to MW-68B is also discussed with Dennis Mayton and the Bay West PM. The area is too large (~30 feet by 30 feet) and the ruts are too deep (maximum depth is 8 inches) to attempt to fill in by hand. A landscaper will be needed to fix this area. Nothing is done to attempt to fix this area during this field event.</p> <p>04/16/14: Premier Landscapes personnel visit the rutted area to obtain information for preparing a bid to fix this area in June.</p> <p>06/24/14: Premier Landscapes personnel spread approximately 8 cubic yards of topsoil over the rutted area. The topsoil is spread with a small skid loader without tracks. A fescue seed mix is spread over the area and is covered with straw following seeding. A silt fence is installed down-gradient from the work area and up-gradient from the monitoring well location to prevent silt from entering the outfall.</p>	
Repairs completed on: Sinkhole filling and seeding: 04/11/14; rutting filling and seeding: 06/24/14	
Repair Record completed by: Hillary McGown, Bay West	Date: 04/11/14 & 06/24/14 Time: 1145 & 1055
<p>COAL TAR REMOVAL (Include quantity removed, repairs made to cap, disposition of coal tar, etc.)</p> <p>Not applicable.</p>	
Repairs completed on:	
Repair Record completed by:	Date:

LANDFILL CAP/COVER INSPECTION REPORT	
SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # J120094	Task: 07

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # J120094	Task: 07
Date: 04/07/14	

SWMU 26 – WWII Coal Tar Site

INSPECTION FINDINGS:

Examine for coal tar seepage [SWMUs 14, 26, 96, 103 only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Sign is present, legible, accurate, stable, and clear of vegetation. Vegetation is 6 inches tall, with good growth noted over the SWMU area. The area east of access road where coal tar was previously excavated is still bare of vegetation and requires seeding. No signs of coal tar of surface (visual or olfactory). No signs of erosion, settlement, or unauthorized activities.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?

Yes _____ No If yes, describe location and extent:

REPAIRS REQUIRED? Yes No _____ If yes, describe extent and location:

Area just east of access road requires seeding and straw.

Inspected by:
Hillary McGown, Bay West
Crystal Hann, Leidos

Date: 04/07/14
Time: 1525

REPAIR RECORD

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
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Job # J120094	Task: 07
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(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

A bare area approximately 10 feet by 15 feet is seeded with a tall fescue grass seed mix. Straw is spread out over the seeded area.

Repairs completed on: 04/11/14

Repair Record completed by: Hillary McGown, Bay West	Date: 04/11/14 Time: 0950
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COAL TAR REMOVAL
(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not applicable; no coal tar was observed.

Repairs completed on:

Repair Record completed by:	Date: Time:
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LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
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Job # J120094	Task: 07
Date: 04/07/14	
SWMUs 77/78/86/87 – Pesticide Sites at Building 148	
<p>INSPECTION FINDINGS: <i>Examine for coal tar seepage [SWMUs 14, 26, 96, 103 only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.</i></p> <p>Signs are accurate, legible, stable and clear of vegetation. Vegetation is approximately 3 feet tall and is in good condition. There is a storage bin full of rainwater adjacent to SWMU area which is almost overflowing. The bin says "Contaminated with Pesticides." No signs of ground disturbance or unauthorized activities. The SWMU is partially surrounded by a fence which is in good condition; no gates are present.</p> <p>No gates or fences present. No evidence of digging or other unauthorized activities.</p> <p>The Bay West Project Manager reports the storage bin to Dennis Mayton for BAE resolution.</p>	
<p>LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance? Yes _____ No <u>X</u> _____ If yes, describe location and extent:</p>	
<p>REPAIRS REQUIRED? Yes _____ No <u>X</u> _____ If yes, describe extent and location:</p> <p>No repairs required.</p>	
<p>Inspected by: Hillary McGown, Bay West Crystal Hann, Leidos</p>	<p>Date: 04/07/14 Time: 1305</p>
<p>REPAIR RECORD <i>(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)</i></p>	

LANDFILL CAP/COVER INSPECTION REPORT	
SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # J120094	Task: 07
<p>BAE sampled the liquid in the container for pesticides and covered the container. The analytical results were all below the method detection limits.</p>	
Repairs completed on:	
Repair Record completed by:	Date: Time:
<p>COAL TAR REMOVAL (Include quantity removed, repairs made to cap, disposition of coal tar, etc.)</p> <p style="margin-top: 50px;">Not applicable.</p>	
Repairs completed on:	
Repair Record completed by:	Date: Time:

LANDFILL CAP/COVER INSPECTION REPORT	
SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # J120094	Task: 07
Date: 04/07/14	

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections

Field Activity: Landfill Cap/Cover Inspection

Job # J120094

Task: 07

SWMU 88 – WWII Pesticide Site

INSPECTION FINDINGS:

Examine for coal tar seepage [SWMUs 14, 26, 96, 103 only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Sign is legible, accurate, stable, and clear of vegetation. Vegetation looks good; grass is approximately 6 inches tall. No areas are bare of vegetation. No obvious signs of erosion or settlement. No signs of ground disturbance of unauthorized activities. No gates or fences present.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?

Yes _____ No If yes, describe location and extent:

REPAIRS REQUIRED? Yes _____ No If yes, describe extent and location:

No repairs required.

Inspected by:
Hillary McGown, Bay West
Crystal Hann, Leidos

Date: 04/07/14
Time: 1315

REPAIR RECORD

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections		Field Activity: Landfill Cap/Cover Inspection	
Job # J120094		Task: 07	
Not applicable.			
Repairs completed on:			
Repair Record completed by:		Date:	
		Time:	
COAL TAR REMOVAL (Include quantity removed, repairs made to cap, disposition of coal tar, etc.)			
Not applicable.			
Repairs completed on:			
Repair Record completed by:		Date:	
		Time:	

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # J120094	Task: 07
Date: 04/09/14	

SWMU 96 – Gas Producer Coal Tar Storage Tanks

INSPECTION FINDINGS:

Examine for coal tar seepage [SWMUs 14, 26, 96, 103 only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Signs are legible, accurate, stable and clear of obstructions. No signs of erosion, depressions or unauthorized activity. No fences or gates present. Observed some small pieces of coal tar adjacent to the containment pads along the eastern perimeter.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?

Yes _____ No If yes, describe location and extent:

REPAIRS REQUIRED? Yes No _____ If yes, describe extent and location:

Coal tar along the eastern perimeter requires removal.

Inspected by: Hillary McGown, Bay West Crystal Hann, Leidos	Date: 04/09/14 Time: 1145
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REPAIR RECORD

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections

Field Activity: Landfill Cap/Cover Inspection

Job # J120094

Task: 07

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

No repairs required.

Repairs completed on:

Repair Record completed by:

Date:

Time:

COAL TAR REMOVAL

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Approximately 0.50 gallon of coal tar and rocks with coal tar is picked up by hand along the eastern perimeter. No repairs to the cap are required. The removed coal tar is placed in a garbage bag and placed into the 55-gallon steel coal tar drum located in Building 141.

Repairs completed on: 04/09/14

Repair Record completed by: Hillary McGown, Bay West

Date: 04/09/14

Time: 1150

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # J120094	Task: 07
Date: 04/09/14	
SWMU 103 – Ditch behind Gas Producer Building	
<p>INSPECTION FINDINGS: <i>Examine for coal tar seepage [SWMUs 14, 26, 96, 103 only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.</i></p> <p>Sign is accurate, legible, stable, and clear of vegetation. Coal tar is present on the surface in the same location as the previous inspection, behind the fence just east of the ditch. Coal tar is observed in the river along the bank where it is historically observed and known about by TDEC. TDEC is not requiring removal of this coal tar. No signs of unauthorized activity, erosion or settlement. Gate and fence are in good condition.</p>	
<p>LAND USE CONTROL INSPECTION Evidence of cap excavation or disturbance? Yes _____ No <u> X </u> If yes, describe location and extent:</p>	
<p>REPAIRS REQUIRED? Yes _____ No <u> X </u> If yes, describe extent and location:</p> <p>Coal tar along the south side of the fence line requires removal.</p>	
Inspected by: Hillary McGown, Bay West Crystal Hann, Leidos	Date: 04/09/14 Time 1220
<p>REPAIR RECORD <i>(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)</i></p>	

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections		Field Activity: Landfill Cap/Cover Inspection	
Job # J120094		Task: 07	
No repairs required.			
Repairs completed on:			
Repair Record completed by:		Date:	
		Time:	
COAL TAR REMOVAL (Include quantity removed, repairs made to cap, disposition of coal tar, etc.) Approximately 0.25 gallon of small pieces of coal tar ranging in size from 2 cm to 7 cm is removed by hand from the surface south of the fence line and east of the ditch. A few larger pieces are removed from the area along the riverbank. The coal tar is placed in a garbage bag and placed into the 55-gallon steel coal tar drum located in Building 141.			
Repairs completed on: 04/09/14			
Repair Record completed by: Hillary McGown, Bay West		Date: 04/09/14 Time: 1230	



**FISCAL YEAR 2014 LONG-TERM MONITORING/
LONG-TERM OPERATIONS REPORT**
Holston Army Ammunition Plant, Kingsport, Tennessee

**APPENDIX D.2
LANDFILL INSPECTION FORMS (FALL 2014)**



**FISCAL YEAR 2014 LONG-TERM MONITORING/
LONG-TERM OPERATIONS REPORT**
Holston Army Ammunition Plant, Kingsport, Tennessee

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LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #J120094	Task: 07
Date: 10/17/14	

SWMU 4 – Coal Tar Tanks behind Building 8

INSPECTION FINDINGS:

Examine for coal tar seepage [SWMUs 14, 26, 96, 103 only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Sign is accurate, legible, stable, and in good condition. No fences or gates are present. No vegetation cover (cap is gravel). Ground surface does not appear to be disturbed; no signs of unauthorized activity. No signs of erosion or settlement. Small pieces of coal tar are present scattered along the surface of the eastern side of the SWMU area.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?

Yes _____ No X If yes, describe location and extent:

REPAIRS REQUIRED? Yes X No _____ If yes, describe extent and location:

Small pieces of coal tar require removal.

Inspected by:
Hillary McGown – Bay West
Crystal Hann - Leidos

Date: 10/17/14
Time: 0755

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
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Job #J120094	Task: 07
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REPAIR RECORD:

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Not applicable – no repairs required.

Repairs completed on:

Repair Record completed by:

Date:

Time:

COAL TAR REMOVAL:

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Approximately 0.50 gallon of coal tar picked up by hand along the eastern portion of the surface of the SWMU area. The coal tar is placed in a garbage bag, which is placed in the 55-gallon steel coal tar drum located in Building 141. No additional repairs to cap are required.

Repairs completed on: 10/17/14

Repair Record completed by:

Hillary McGown – Bay West

Date: 10/17/14

Time: 0755

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #J120094	Task: 07
Date: 10/17/14	
SWMU 14 – Coal Tar Landfill 1	
INSPECTION FINDINGS: <i>Examine for coal tar seepage [SWMUs 14, 26, 96, 103 only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.</i>	
<p>Good vegetative cover; vegetation is approximately 6 inches tall (recently mowed); no areas bare of vegetation. Fence and gate along southern perimeter of the SWMU are in good condition; gate is locked; no other fences or gates present. No surface water ponding observed. No signs of unauthorized activity. No sign of erosion or settlement. Sign is accurate, legible, stable, and clear of vegetation. No evidence of coal tar on ground surface (visual or olfactory).</p>	
LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance? Yes _____ No <input checked="" type="checkbox"/> If yes, describe location and extent:	
REPAIRS REQUIRED? Yes _____ No <input checked="" type="checkbox"/> If yes, describe extent and location:	
No repairs required.	
Inspected by: Hillary McGown – Bay West Crystal Hann - Leidos	Date: 10/17/14 Time: 0845

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
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Job #J120094	Task: 07
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REPAIR RECORD:

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Not applicable – no repairs required.

Repairs completed on:

Repair Record completed by:

Date:

Time:

COAL TAR REMOVAL:

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not applicable – no coal tar is observed.

Repairs completed on:

Repair Record completed by:

Date:

Time:

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
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Job #J120094	Task: 07
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Date: 10/17/14	
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SWMU 18 – Closed Sanitary Landfill

INSPECTION FINDINGS:

Examine for coal tar seepage [SWMUs 14, 26, 96, 103 only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Good vegetative cover; grass is approximately 6 to 12 inches tall; no areas bare of vegetation. No surface water ponding observed. The area around the fill material for the telephone poles has some bare soil/erosion along the southern slope; this has been previously noted and is not part of the landfill cover and has remained stable. No fences or gates are present. No signs of unauthorized activity. No signs of erosion or settlement. Sign is accurate, legible, sturdy, and clear of vegetation.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?

Yes _____ No If yes, describe location and extent:

REPAIRS REQUIRED? Yes _____ No If yes, describe extent and location:

No repairs required.

Inspected by: Hillary McGown – Bay West Crystal Hann - Leidos	Date: 10/17/14 Time: 0955
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LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
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Job #J120094	Task: 07
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REPAIR RECORD:

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Not applicable – no repairs required.

Repairs completed on:

Repair Record completed by:

Date:
Time:

COAL TAR REMOVAL:

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not applicable.

Repairs completed on:

Repair Record completed by:

Date:
Time:

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
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Job #J120094	Task: 07
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Date: 10/17/14	
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SWMUs 19/29 – Construction Debris Landfill and Former Sedimentation Pond

INSPECTION FINDINGS:

Examine for coal tar seepage [SWMUs 14, 26, 96, 103 only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Sign is in good condition (accurate, legible, stable, and clear of vegetation). Good vegetative cover; grass is thick and is 6 to 12 inches tall; no areas bare of vegetation. Drainage area noted in 2013 continues to appear stable. As noted in the Spring 2014 inspection, very large, unmovable pieces of asphalt are observed adjacent to the mounded area and in the northeast corner of the SWMU, as well as along the eastern side of the SWMU area (near free-flowing drainage culvert) and also along the west-central portion of the SWMU. No fences or gates present.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?

Yes _____ No If yes, describe location and extent:

REPAIRS REQUIRED? Yes _____ No If yes, describe extent and location:

Not applicable – no new small moveable pieces of asphalt or other construction debris are observed. During the Spring 2014 inspection, we were given verbal confirmation that the larger, buried pieces of asphalt could remain in place.

Inspected by: Hillary McGown – Bay West Crystal Hann - Leidos	Date: 10/17/14 Time: 1510
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LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
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Job #J120094	Task: 07
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REPAIR RECORD:

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Not applicable – no repairs required.

Repairs completed on:

Repair Record completed by:

Date:
Time:

COAL TAR REMOVAL:

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not applicable.

Repairs completed on:

Repair Record completed by:

Date:
Time:

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
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Job #J120094	Task: 07
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Date: 10/17/14	
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SWMU 20 – Rock Quarry Landfill

INSPECTION FINDINGS:

Examine for coal tar seepage [SWMUs 14, 26, 96, 103 only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Sign is present, legible, accurate, stable, and clear of vegetation. Vegetation is approximately 3 to 4 feet tall; the inspection is unable to be completed. Vegetation appears to be in good condition; no areas bare of vegetation are observed. The area near the southern extent of the SWMU area, which was re-landscaped in June 2014 appears to be in good condition (good thick vegetation cover and no standing/pooling surface water is visible).

Follow-up inspection on 12/16/14 – grass not mown. Vegetation near southern end of the SWMU is in good conditions with no bare spots noted. No sinkholes or new rock slides noted.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?

Yes _____ No X If yes, describe location and extent:

REPAIRS REQUIRED? Yes _____ No X If yes, describe extent and location:

No repairs noted at this time.

Inspected by: Hillary McGown – Bay West Crystal Hann - Leidos Dennis Mayton – Holston	Date: 10/17/14 Time: 1530 12/16/14
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LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
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Job #J120094	Task: 07
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REPAIR RECORD:

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Not applicable – no repairs required.

Repairs completed on:

Repair Record completed by:

Date:
Time:

COAL TAR REMOVAL:

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not applicable.

Repairs completed on:

Repair Record completed by:

Date:
Time:

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
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Job #J120094	Task: 07
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Date: 10/17/14	
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SWMU 26 – WWII Coal Tar Site

INSPECTION FINDINGS:

Examine for coal tar seepage [SWMUs 14, 26, 96, 103 only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Vegetation in area north of ditch is approximately 2 to 3 feet tall; good vegetative cover. Vegetation cover over the larger SWMU area is 6 to 12 inches tall; good and thick vegetation is present over the SWMU area; no areas bare of vegetation are observed. No signs of coal tar observed at surface (visual or olfactory). Sign is in good condition (legible, accurate, clear of vegetation, and stable). No sign of unauthorized activity. No signs of erosion or settlement. No fences or gates present. Area east of access road where coal tar was previously excavated is bare of vegetation and requires seeding.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?

Yes _____ No X If yes, describe location and extent:

REPAIRS REQUIRED? Yes X No _____ If yes, describe extent and location:

Area east of access road requires seeding and straw.

Inspected by: Hillary McGown – Bay West Crystal Hann - Leidos	Date: 10/17/14 Time: 1255
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LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
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Job #J120094	Task: 07
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REPAIR RECORD:

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

A bare area approximately 10 feet by 15 feet east of access road is seeded with a tall fescue grass seed mix. Straw is spread out over the seeded area.

Repairs completed on: 10/17/14

Repair Record completed by:
Hillary McGown – Bay West

Date: 10/17/14
Time: 1300

COAL TAR REMOVAL:

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not applicable; no coal tar was discovered.

Repairs completed on:

Repair Record completed by:

Date:
Time:

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
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Job #J120094	Task: 07
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Date: 10/17/14	
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SWMUs 77/78/86/87 – Pesticide Sites at Building 148

INSPECTION FINDINGS:

Examine for coal tar seepage [SWMUs 14, 26, 96, 103 only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

No evidence of unauthorized activity. Storage bin noted during the Spring 2014 inspection event to have been filled with water has now been covered and secured with poly sheeting. Mr. Mayton indicated that BAE had analyzed the contents for pesticides; all results were below the method detection limits. The northernmost sign is slightly bent but otherwise all signs are in good condition (accurate, legible, sturdy, and clear of vegetation). No signs of unauthorized activity. No signs of settlement or erosion. Vegetation is approximately 6 inches tall and is in good condition; no areas bare of vegetation are observed. Area is partially surrounded by a fence which is in good condition; no gates present.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?

Yes _____ No X If yes, describe location and extent:

REPAIRS REQUIRED? Yes _____ No X If yes, describe extent and location:

No repairs required.

Inspected by: Hillary McGown – Bay West Crystal Hann - Leidos	Date: 10/17/14 Time: 1050
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LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
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Job #J120094	Task: 07
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REPAIR RECORD:

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Not applicable – no repairs required.

Repairs completed on:

Repair Record completed by:

Date:

Time:

COAL TAR REMOVAL:

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not applicable.

Repairs completed on:

Repair Record completed by:

Date:

Time:

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
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Job #J120094	Task: 07
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Date: 10/17/14	
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SWMU 88 – WWII Pesticide Site

INSPECTION FINDINGS:

Examine for coal tar seepage [SWMUs 14, 26, 96, 103 only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Sign is accurate, legible, clear of vegetation and stable. No sign of unauthorized activity. No signs of erosion or settlement. Vegetation looks good; grass is approximately 6 inches tall; no areas are bare of vegetation. No materials or equipment stored on SWMU area. No gates or fences present.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?

Yes _____ No X If yes, describe location and extent:

REPAIRS REQUIRED? Yes _____ No X If yes, describe extent and location:

No repairs required.

Inspected by: Hillary McGown – Bay West Crystal Hann – Leidos	Date: 10/17/14 Time: 1035
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LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
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Job #J120094	Task: 07
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REPAIR RECORD:

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Not applicable – no repairs required.

Repairs completed on:

Repair Record completed by:

Date:
Time:

COAL TAR REMOVAL:

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not applicable.

Repairs completed on:

Repair Record completed by:

Date:
Time:

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #J120094	Task: 07
Date: 10/17/14	

SWMU 96 – Gas Producer Coal Tar Storage Tanks

INSPECTION FINDINGS:

Examine for coal tar seepage [SWMUs 14, 26, 96, 103 only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Signs are accurate, legible, sturdy, and in good condition. Surface water ponding observed by the northernmost sign and also in the central area of the SWMU; surface water does not appear to be migrating off-site. No vegetation; cap cover is gravel. No fences or gates present. Five fence stakes are observed near the building to the east. Metal sheeting and poly sheeting debris are observed on the SWMU cover. A large pile of soil and rock (~4 cubic yards) is present near the western portion of the SWMU area. Coal tar is observed near the soil mound and adjacent to the concrete containment along the western side of the SWMU. Area along the western portion of the SWMU adjacent to the concrete containment appears to have been disturbed – the surface is very hummocky and it looks as if new gravel has been spread.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?

Yes No If yes, describe location and extent:

Area along the western portion of the SWMU adjacent to the concrete containment appears to have been disturbed – the surface is very hummocky and it looks like new gravel has been spread. Also, the large mound of dirt and rock. Mr. Mayton is aware of the site conditions.

REPAIRS REQUIRED? Yes No If yes, describe extent and location:

Fence posts require removal. The large dirt mound and hummocky gravel require investigating. Debris requires removal. Coal tar requires removal.

Inspected by:
Hillary McGown – Bay West
Crystal Hann - Leidos

Date: 10/17/14
Time: 0735

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
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Job #J120094	Task: 07
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REPAIR RECORD:

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

The sheet metal was secured along the north side of the building to the east of the SWMU area. The poly sheeting was placed in a dumpster adjacent to the SWMU area.

10/22/14: The large mound of soil/rock and the fence posts were removed from the site by BAE personnel.

Repairs completed on: 10/17/14; 10/22/14

Repair Record completed by: Hillary McGown – Bay West	Date: 10/17/14 Time: 0920
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COAL TAR REMOVAL:

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Approximately 0.50 gallon of coal tar and rocks coated in coal tar picked up by hand along the western perimeter as well as adjacent to the large soil mound. The coal tar placed into a garbage bag. The removed coal tar is placed into the 55-gallon steel coal tar drum located in Building 141. No repairs to the cap are required.

Repairs completed on: 10/17/14

Repair Record completed by: Hillary McGown – Bay West	Date: 10/17/14 Time: 0740
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LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #J120094	Task: 07
Date: 10/17/14	

SWMU 103 – Ditch behind Gas Producer Building

INSPECTION FINDINGS:

Examine for coal tar seepage [SWMUs 14, 26, 96, 103 only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Sign is accurate, legible, sturdy and clear of vegetation. Coal tar is still present along the bank of the river where it is historically observed and known about by TDEC. TDEC is not requiring removal of this coal tar. This area is not attempted to be accessed at the time of the inspection, surfaces are slick. No signs of unauthorized activity, settlement or erosion. Fence and gate are in good condition. Coal tar is observed on the surface east of the SWMU sign just south of the fence (same location as previous inspections).

LAND USE CONTROL INSPECTION Evidence of cap excavation or disturbance?

Yes _____ No X If yes, describe location and extent:

REPAIRS REQUIRED? Yes X No _____ If yes, describe extent and location:

Coal tar observed south of the fence line requires removal.

Inspected by:
Hillary McGown – Bay West
Crystal Hann - Leidos

Date: 10/17/14
Time: 0810

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
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Job #J120094	Task: 07
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REPAIR RECORD:

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Not applicable – no repairs required.

Repairs completed on:

Repair Record completed by:

Date:

Time:

COAL TAR REMOVAL:

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Approximately 0.10 gallon of small pieces of coal removed by hand from the surface south of the fence line and east of the ditch. The coal tar is placed in a garbage bag and placed into the 55-gallon steel coal tar drum located in Building 141. No additional repairs to the cap are required at this time.

Repairs completed on: 10/17/14

Repair Record completed by:

Date: 10/17/14

Hillary McGown – Bay West

Time: 0810



**FISCAL YEAR 2014 LONG-TERM MONITORING/
LONG-TERM OPERATIONS REPORT**
Holston Army Ammunition Plant, Kingsport, Tennessee

**APPENDIX D.3
HOLSTON ARMY AMMUNITION PLANT LANDFILL CAP/COVER
INSPECTION REPORT FORMS (EVENT 1)**



**FISCAL YEAR 2014 LONG-TERM MONITORING/
LONG-TERM OPERATIONS REPORT**
Holston Army Ammunition Plant, Kingsport, Tennessee

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LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A
Date: 5/1/2014	
Site: AOC N – Hydraulic Fluid Leak, Elevator at Building G-2	

INSPECTION FINDINGS:

Examine for coal tar seepage [coal tar sites only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

No sign of digging or erosion.

Sign is legible

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?

Yes ___ No ___X___ If yes, describe location and extent:

REPAIRS REQUIRED? Yes ___ No ___X___ If yes, describe extent and location:

Inspected by: Dennis Mayton

Date: 5/1/2014
Time: 1110 hours

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A
REPAIR RECORD <i>(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)</i>	
Repairs completed on: NA	
Repair Record completed by: NA	Date: NA
COAL TAR REMOVAL <i>(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)</i>	
Not Applicable.	
Repairs completed on: N/A	
Repair Record completed by: N/A	Date: N/A

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A
Date: 5/12/2014	
Site: SWMU38/39 Fly Ash Landfill and Ponds 1 & 2	

INSPECTION FINDINGS:

Examine for coal tar seepage [coal tar sites only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Established vegetation on entire landfill and vegetation looks fine. Signs present. No subsidence, rills/grooves/channels/ditches cut into soil. Drainage ditches free from debris.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?

Yes ____ No If yes, describe location and extent:

REPAIRS REQUIRED? Yes ____ No If yes, describe extent and location:

Inspected by: Paul Bailey BAE, Dennis Mayton, Chris Lamb and Mary Ann Hicks TDEC	Date: 5/12/2014 1345
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LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections

Field Activity: Landfill Cap/Cover Inspection

Job # N/A

Task: N/A

REPAIR RECORD

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Not Applicable.

Repairs completed on: N/A

Repair Record completed by: N/A

Date: N/A

COAL TAR REMOVAL

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not Applicable.

Repairs completed on: N/A

Repair Record completed by: N/A

Date: N/A

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A
Date: 5/1/2014	
Site: SWMU 24 – Building 200 Coal Tar and Fly Ash Landfill	

INSPECTION FINDINGS:

Examine for coal tar seepage [coal tar sites only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Erosion path in coal, but not in soil below coal.

No digging areas observed.

Sign is legible.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?

Yes ____ No If yes, describe location and extent:

REPAIRS REQUIRED? Yes ____ No If yes, describe extent and location:

Inspected by: Dennis Mayton

Date: 5/1/2014

Time: 1030 hours

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections

Field Activity: Landfill Cap/Cover Inspection

Job # N/A

Task: N/A

REPAIR RECORD

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Repairs completed on:

Repair Record completed by: NA

Date: NA

COAL TAR REMOVAL

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not Applicable.

Repairs completed on: N/A

Repair Record completed by: N/A

Date: N/A

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A
Date: 6/23/2014	
Site: SWMU 25 – Area B Tar Burial Site	

INSPECTION FINDINGS:

Examine for coal tar seepage [coal tar sites only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Vegetation is well established over the entire site.

The silt fencing has been removed due to vegetation covering the entire site.

Sign is legible.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?

Yes ___ No ___X___ If yes, describe location and extent:

REPAIRS REQUIRED? Yes ___ No ___X___ If yes, describe extent and location:

Inspected by: Dennis Mayton

Date: 6/23/2014

Time: 1310 hours

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections

Field Activity: Landfill Cap/Cover Inspection

Job # N/A

Task: N/A

REPAIR RECORD

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Repairs completed on: NA

Repair Record completed by: NA

Date: NA

COAL TAR REMOVAL

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not Applicable.

Repairs completed on: N/A

Repair Record completed by: N/A

Date: N/A

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A
Date: 5/1/2014	
Site: SWMU 27 – Sedimentation Pond for Coal Pile	

INSPECTION FINDINGS:

Examine for coal tar seepage [coal tar sites only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Good vegetation around pond.

No sign of unauthorized use.

Sign is legible

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?

Yes ____ No If yes, describe location and extent:

REPAIRS REQUIRED? Yes ____ No If yes, describe extent and location:

Inspected by: Dennis Mayton

Date: 5/1/2014

Time: 1035 hours

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections

Field Activity: Landfill Cap/Cover Inspection

Job # N/A

Task: N/A

REPAIR RECORD

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Repairs completed on: NA

Repair Record completed by: NA

Date: NA

COAL TAR REMOVAL

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not Applicable.

Repairs completed on: N/A

Repair Record completed by: N/A

Date: N/A

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A
Date: 5/1/2014	
Site: SWMU 37 – Nitric Acid Spill Pond	

INSPECTION FINDINGS:

Examine for coal tar seepage [coal tar sites only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Heavy vegetation on fence and around ponds.

No unauthorized use observed.

Sign is legible

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?

Yes ___ No If yes, describe location and extent:

REPAIRS REQUIRED? Yes ___ No If yes, describe extent and location:

Inspected by: Dennis Mayton

Date: 5/1/2014
Time: 1040 hours

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections

Field Activity: Landfill Cap/Cover Inspection

Job # N/A

Task: N/A

REPAIR RECORD

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Repairs completed on: NA

Repair Record completed by: NA

Date: NA

COAL TAR REMOVAL

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not Applicable.

Repairs completed on: N/A

Repair Record completed by: N/A

Date: N/A

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A
Date: 5/1/2014	
Site: SWMU 3 – Catch Basins	

INSPECTION FINDINGS:

Examine for coal tar seepage [coal tar sites only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Building E-1, H-1, H-3, H-8, and H-10: Building demolished, No excavation or site disturbance was noted.

Building D-1, D-2, D-8, E-2, G-9, H-4, H-5, H-6, H-7, L-1, M-4, N-4, and N-7: No excavation or site disturbance was noted.

Signs are legible.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?

Yes ____ No If yes, describe location and extent:

REPAIRS REQUIRED? Yes ____ No If yes, describe extent and location:

Inspected by: Dennis Mayton

Date: 5/1/2014

Time: 1230 to 1630 hours

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections

Field Activity: Landfill Cap/Cover Inspection

Job # N/A

Task: N/A

REPAIR RECORD

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

N/A

Repairs completed on: N/A

Repair Record completed by: N/A

Date: N/A

COAL TAR REMOVAL

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not Applicable.

Repairs completed on: N/A

Repair Record completed by: N/A

Date: N/A

LANDFILL CAP/COVER INSPECTION REPORT	
SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A
Date: 5/6/2014	
<i>Site: SWMU 3 – Catch Basins</i>	
<p>INSPECTION FINDINGS: <i>Examine for coal tar seepage [coal tar sites only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.</i></p> <p>Building H-9: Building currently being demolished, notification to TDEC was made. Due to demolition sign is not at site, but will be installed upon demolition completion.</p> <p>Building H-2: Crews preparing to demolish building, notification to TDEC was made. Due to demolition sign is not at site, but will be installed upon demolition completion.</p> <p>Building E-10: Crews have replaced two holes in the apron channel. TDEC was notified of the holes.</p> <p>Building E-5, E-8, E-9, G-10, I-5, O-3: No excavation or site disturbance was noted. Signs are legible.</p> <p>Building J-3: Crews continued remodeling of building. Disturbance of concrete was made to TDEC.</p>	
<p>LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance? Yes <input checked="" type="checkbox"/> (J-3) No <input type="checkbox"/> If yes, describe location and extent: Concrete aprons and catch basins removed for building remodeling. As an additional follow-up to the J-3 incident additional statement have been placed in the subcontractor safety guide to address excavation requirements to include specific language addressing SWMU areas (referencing PPS 6.10). Safety Permit personnel have been given additional instructions "NOT" to sign digging permits within 10ft. of a building without a member of the Environmental Department assessing the proposed excavation area. The operating contractors has engaged their Engineering Department and requested that they cover this topic in pre-contract award meetings for any projects that require excavation activities around production buildings.</p>	
<p>REPAIRS REQUIRED? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> If yes, describe extent and location:</p>	
Inspected by: Dennis Mayton	Date: 5/6/2014 Time: 0900 to 1200 hours

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections

Field Activity: Landfill Cap/Cover Inspection

Job # N/A

Task: N/A

REPAIR RECORD

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

N/A

Repairs completed on: N/A

Repair Record completed by: N/A

Date: N/A

COAL TAR REMOVAL

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not Applicable.

Repairs completed on: N/A

Repair Record completed by: N/A

Date: N/A

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A
Date: 6/5/2014	
Site: SWMU 3 – Catch Basins	

INSPECTION FINDINGS:

Examine for coal tar seepage [coal tar sites only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Building D-5, D-10, E-3, E-6, E-7, G-6, G-7, K-3, L-3, L-4, L-8, M-3, N-5, N-6, and N-8: No excavation or site disturbance was noted. Due to buildings being active, crews were not able to install signs since last inspection. A signs has been installed on the fence going into the limit area to cover the entire area. A sign will be installed at the building during the next shutdown.

E-4 Some digging near building due to a spill, but not near the apron.

N-3 Apron concrete was removed. Notification had previously been made to TDEC of disturbance.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?

Yes (N3) No If yes, describe location and extent: Concrete aprons for building remodeling. As an additional follow-up to the N-3 incident additional statement have been placed in the subcontractor safety guide to address excavation requirements to include specific language addressing SWMU areas (referencing PPS 6.10). Safety Permit personnel have been given additional instructions "NOT" to sign digging permits within 10ft. of a building without a member of the Environmental Department assessing the proposed excavation area. The operating contractors has engaged their Engineering Department and requested that they cover this topic in pre-contract award meetings for any projects that require excavation activities around production buildings.

REPAIRS REQUIRED? Yes No If yes, describe extent and location:

Inspected by: Dennis Mayton	Date: 6/5/2014 Time: 1300 to 1600 hours
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LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections

Field Activity: Landfill Cap/Cover Inspection

Job # N/A

Task: N/A

REPAIR RECORD

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

N/A

Repairs completed on: N/A

Repair Record completed by: N/A

Date: N/A

COAL TAR REMOVAL

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not Applicable.

Repairs completed on: N/A

Repair Record completed by: N/A

Date: N/A

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A
Date: 6/9/2014	
Site: SWMU 3 – Catch Basins	

INSPECTION FINDINGS:

Examine for coal tar seepage [coal tar sites only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Building G-4, G-5, I-6, K-5, L-5, L-6, M-5 and M-6: No excavation or site disturbance was noted. Due to buildings being active, crews were not able to install signs since last inspection. A signs has been installed on the fence going into the limit area to cover the entire area. A sign will be installed at the building during the next shutdown.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?

Yes ___ No If yes, describe location and extent:

REPAIRS REQUIRED? Yes ___ No If yes, describe extent and location:

Inspected by: Dennis Mayton

Date: 6/9/2014

Time: 1345 to 1600 hours

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections

Field Activity: Landfill Cap/Cover Inspection

Job # N/A

Task: N/A

REPAIR RECORD

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

N/A

Repairs completed on: N/A

Repair Record completed by: N/A

Date: N/A

COAL TAR REMOVAL

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not Applicable.

Repairs completed on: N/A

Repair Record completed by: N/A

Date: N/A

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A
Date: 6/10/2014	
Site: SWMU 3 – Catch Basins	

INSPECTION FINDINGS:

Examine for coal tar seepage [coal tar sites only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Building B-3: No excavation or site disturbance was noted. Due to buildings being active, crews were not able to install signs since last inspection. A sign has been installed on the fence going into the limit area to cover the entire area. A sign will be installed at the building during the next shutdown.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?

Yes ___ No X If yes, describe location and extent:

REPAIRS REQUIRED? Yes X No ___ If yes, describe extent and location:

Cracks in the concrete apron require sealant.

Inspected by: Dennis Mayton

Date: 6/10/2014

Time: 1350 hours

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections

Field Activity: Landfill Cap/Cover Inspection

Job # N/A

Task: N/A

REPAIR RECORD

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Repairs to the cracks in the apron repaired by placing sealant and pouring additional concrete.

Repairs completed on: July 10, 2014

Repair Record completed by: Dennis Mayton

Date: July 30, 2014

COAL TAR REMOVAL

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not Applicable.

Repairs completed on: N/A

Repair Record completed by: N/A

Date: N/A

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A
Date: 5/1/2014	
Site: SWMU 44 – Former Burning Pads	

INSPECTION FINDINGS:
Examine for coal tar seepage [coal tar sites only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.
No excavation or site disturbance noted.
Sign is legible

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?
Yes ____ No If yes, describe location and extent:

REPAIRS REQUIRED? Yes ____ No If yes, describe extent and location:

Inspected by: Dennis Mayton	Date: 5/1/2014 Time: 1050 hours
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LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections

Field Activity: Landfill Cap/Cover Inspection

Job # N/A

Task: N/A

REPAIR RECORD

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Repairs completed on: NA

Repair Record completed by: NA

Date: NA

COAL TAR REMOVAL

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not Applicable.

Repairs completed on: N/A

Repair Record completed by: N/A

Date: N/A

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A
Date: 5/1/2014	
Site: SWMU 47 – Burning Piles	

INSPECTION FINDINGS:

Examine for coal tar seepage [coal tar sites only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

No excavation or site disturbance noted.

Sign is legible

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?

Yes ____ No If yes, describe location and extent:

REPAIRS REQUIRED? Yes ____ No If yes, describe extent and location:

Inspected by: Dennis Mayton

Date: 5/1/2014
Time: 1052 hours

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections

Field Activity: Landfill Cap/Cover Inspection

Job # N/A

Task: N/A

REPAIR RECORD

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Repairs completed on: NA

Repair Record completed by: NA

Date: NA

COAL TAR REMOVAL

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not Applicable.

Repairs completed on: N/A

Repair Record completed by: N/A

Date: N/A

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A
Date: 5/1/2014	
Site: SWMU 56 – Existing Coal Pile	

INSPECTION FINDINGS:

Examine for coal tar seepage [coal tar sites only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Erosion path in coal, but not in soil below coal.

Disturbance only from loading coal in the coal pile not in soil below the coal.

Sign is legible

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?

Yes ____ No If yes, describe location and extent:

REPAIRS REQUIRED? Yes ____ No If yes, describe extent and location:

Inspected by: Dennis Mayton

Date: 5/1/2014
Time: 1033 hours

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections

Field Activity: Landfill Cap/Cover Inspection

Job # N/A

Task: N/A

REPAIR RECORD

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Repairs completed on: NA

Repair Record completed by: NA

Date: NA

COAL TAR REMOVAL

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not Applicable.

Repairs completed on: N/A

Repair Record completed by: N/A

Date: N/A



**FISCAL YEAR 2014 LONG-TERM MONITORING/
LONG-TERM OPERATIONS REPORT**
Holston Army Ammunition Plant, Kingsport, Tennessee

**APPENDIX D.4
HOLSTON ARMY AMMUNITION PLANT LANDFILL CAP/COVER
INSPECTION REPORT FORMS (EVENT 2)**



**FISCAL YEAR 2014 LONG-TERM MONITORING/
LONG-TERM OPERATIONS REPORT**
Holston Army Ammunition Plant, Kingsport, Tennessee

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LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A
Date: 10/30/2014	
Site: AOC N – Hydraulic Fluid Leak, Elevator at Building G-2	

INSPECTION FINDINGS:

Examine for coal tar seepage [coal tar sites only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

No sign of digging or erosion.

Sign is legible.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?

Yes ___ No ___X___ If yes, describe location and extent:

REPAIRS REQUIRED? Yes ___ No ___X___ If yes, describe extent and location:

Inspected by: Dennis Mayton

Date: 10/30/2014
Time: 0830 hours

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections

Field Activity: Landfill Cap/Cover Inspection

Job # N/A

Task: N/A

REPAIR RECORD

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Repairs completed on: NA

Repair Record completed by: NA

Date: NA

COAL TAR REMOVAL

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not Applicable.

Repairs completed on: N/A

Repair Record completed by: N/A

Date: N/A

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A
Date: 10/30/2014	
Site: SWMU 3 – Catch Basins	
INSPECTION FINDINGS: <i>Examine for coal tar seepage [coal tar sites only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.</i> Building H-1, H-2, H-3, H-8, H-9 and H-10: Building demolished, No excavation or site disturbance was noted. Building D-1, D-2, D-5, D-8, D-10, E-4, E-5, E-6, G-6, G-10, H-4, H-5, H-6, H-7, K-3, K-5, L-1, L-3, L-4, L-5, L-6, M-3, M-4, M-5, M-6, N-3, N-4 and N-5: No excavation or site disturbance was noted. E-10 Some digging near building for repairs and building modifications. TDEC was notified prior to the work. Building J-3: Crews continued remodeling of building. Disturbance of concrete was made to TDEC. Signs are legible. LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance? Yes ____ No <input checked="" type="checkbox"/> If yes, describe location and extent:	
REPAIRS REQUIRED? Yes ____ No <input checked="" type="checkbox"/> If yes, describe extent and location:	
Inspected by: Dennis Mayton	Date: 10/30/2014 Time: 0900 to 1500 hours

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections

Field Activity: Landfill Cap/Cover Inspection

Job # N/A

Task: N/A

REPAIR RECORD

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

N/A

Repairs completed on: N/A

Repair Record completed by: N/A

Date: N/A

COAL TAR REMOVAL

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not Applicable.

Repairs completed on: N/A

Repair Record completed by: N/A

Date: N/A

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A
Date: 11/5/2014	
Site: SWMU 3 – Catch Basins	

INSPECTION FINDINGS:

Examine for coal tar seepage [coal tar sites only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Building E-1: Building demolished, No excavation or site disturbance was noted.

Building B-3, E-2, E-8, E-9, E-7, G-4, G-5, , G-7, I-5, I-6, L-8, N-6, N-7, N-8, O-3: No excavation or site disturbance was noted.

E-3 Some digging near building for repairs and building modifications. TDEC was notified prior to the work.

Signs are legible.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?

Yes ____ No If yes, describe location and extent:

REPAIRS REQUIRED? Yes ____ No If yes, describe extent and location:

Inspected by: Dennis Mayton

Date: 11/5/2014

Time: 1000 to 1500 hours

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections

Field Activity: Landfill Cap/Cover Inspection

Job # N/A

Task: N/A

REPAIR RECORD

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

N/A

Repairs completed on: N/A

Repair Record completed by: N/A

Date: N/A

COAL TAR REMOVAL

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not Applicable.

Repairs completed on: N/A

Repair Record completed by: N/A

Date: N/A

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A
Date: 10/30/2014	
<i>Site: SWMU 24 – Building 200 Coal Tar and Fly Ash Landfill</i>	

INSPECTION FINDINGS:

Examine for coal tar seepage [coal tar sites only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Erosion path in coal, but not in soil below coal.

Evidence of digging that was reported to TDEC. Digging was part of wastewater line repair.

Sign is legible.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?

Yes ____ No If yes, describe location and extent:

REPAIRS REQUIRED? Yes ____ No If yes, describe extent and location:

Inspected by: Dennis Mayton

Date: 10/30/2014
Time: 0837 hours

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections

Field Activity: Landfill Cap/Cover Inspection

Job # N/A

Task: N/A

REPAIR RECORD

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Repairs completed on:

Repair Record completed by: NA

Date: NA

COAL TAR REMOVAL

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not Applicable.

Repairs completed on: N/A

Repair Record completed by: N/A

Date: N/A

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A
Date: 12/16/2014	

Site: SWMU 25 – Area B Tar Burial Site

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INSPECTION FINDINGS:
Examine for coal tar seepage [coal tar sites only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.
Vegetation is well established over the entire site. No unauthorized digging observed. No soil disturbance. Sign is legible.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?
Yes ___ No ___X___ If yes, describe location and extent:

REPAIRS REQUIRED? Yes ___ No ___X___ If yes, describe extent and location:

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Inspected by: Dennis Mayton	Date: 12/16/2014 Time: 1400 hours
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REPAIR RECORD
(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
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Job # N/A	Task: N/A
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Repairs completed on: NA

Repair Record completed by: NA	Date: NA
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COAL TAR REMOVAL
(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not Applicable.

Repairs completed on: N/A

Repair Record completed by: N/A	Date: N/A
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LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A
Date: 10/30/2014	
Site: SWMU 27 – Sedimentation Pond for Coal Pile	

INSPECTION FINDINGS:

Examine for coal tar seepage [coal tar sites only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Good vegetation around pond.

No sign of unauthorized use.

Sign is legible.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?

Yes ____ No If yes, describe location and extent:

REPAIRS REQUIRED? Yes ____ No If yes, describe extent and location:

Inspected by: Dennis Mayton

Date: 10/30/2014
Time: 0840 hours

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A
REPAIR RECORD <i>(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)</i>	
Repairs completed on: NA	
Repair Record completed by: NA	Date: NA
COAL TAR REMOVAL <i>(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)</i>	
Not Applicable.	
Repairs completed on: N/A	
Repair Record completed by: N/A	Date: N/A

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A
Date: 10/30/2014	
<i>Site: SWMU 37 – Nitric Acid Spill Pond</i>	

INSPECTION FINDINGS:

Examine for coal tar seepage [coal tar sites only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Heavy vegetation on fence and around ponds.

No unauthorized use observed.

Sign is legible

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?

Yes ___ No If yes, describe location and extent:

REPAIRS REQUIRED? Yes ___ No If yes, describe extent and location:

Inspected by: Dennis Mayton

Date: 10/30/2014
Time: 0835 hours

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections

Field Activity: Landfill Cap/Cover Inspection

Job # N/A

Task: N/A

REPAIR RECORD

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Repairs completed on: NA

Repair Record completed by: NA

Date: NA

COAL TAR REMOVAL

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not Applicable.

Repairs completed on: N/A

Repair Record completed by: N/A

Date: N/A

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A
Date: 8/6/2014	
Site: SWMU38/39 Fly Ash Landfill and Ponds 1 & 2	

INSPECTION FINDINGS:

Examine for coal tar seepage [coal tar sites only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Established vegetation on entire landfill and vegetation looks fine. Signs present. No subsidence, rills/grooves/channels/ditches cut into soil. Drainage ditches free from debris.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?

Yes ___ No X If yes, describe location and extent:

REPAIRS REQUIRED? Yes ___ No X If yes, describe extent and location:

Inspected by: Paul Bailey BAE, Dennis Mayton,
Chris Lamb TDEC

Date: 8/6 /2014
1300

REPAIR RECORD

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A
Not Applicable.	
Repairs completed on: N/A	
Repair Record completed by: N/A	Date: N/A
COAL TAR REMOVAL (Include quantity removed, repairs made to cap, disposition of coal tar, etc.) Not Applicable.	
Repairs completed on: N/A	
Repair Record completed by: N/A	Date: N/A

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A
Date: 10/30/2014	
Site: SWMU 44 – Former Burning Pads	

INSPECTION FINDINGS:
Examine for coal tar seepage [coal tar sites only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.
No excavation or site disturbance noted.
Sign is legible.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?
Yes ____ No If yes, describe location and extent:

REPAIRS REQUIRED? Yes ____ No If yes, describe extent and location:

Inspected by: Dennis Mayton	Date: 10/30/2014 Time: 0850 hours
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LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections

Field Activity: Landfill Cap/Cover Inspection

Job # N/A

Task: N/A

REPAIR RECORD

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Repairs completed on: NA

Repair Record completed by: NA

Date: NA

COAL TAR REMOVAL

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not Applicable.

Repairs completed on: N/A

Repair Record completed by: N/A

Date: N/A

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A
Date: 10/30/2014	
Site: SWMU 47 – Burning Piles	

INSPECTION FINDINGS:
Examine for coal tar seepage [coal tar sites only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.
No excavation or site disturbance noted.
Sign is legible.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?
Yes ____ No If yes, describe location and extent:

REPAIRS REQUIRED? Yes ____ No If yes, describe extent and location:

Inspected by: Dennis Mayton	Date: 10/30/2014 Time: 0855 hours
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LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections

Field Activity: Landfill Cap/Cover Inspection

Job # N/A

Task: N/A

REPAIR RECORD

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Repairs completed on: NA

Repair Record completed by: NA

Date: NA

COAL TAR REMOVAL

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not Applicable.

Repairs completed on: N/A

Repair Record completed by: N/A

Date: N/A

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A
Date: 10/30/2014	
Site: SWMU 56 – Existing Coal Pile	

INSPECTION FINDINGS:

Examine for coal tar seepage [coal tar sites only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Erosion path in coal, but not in soil below coal.

Disturbance only from loading coal in the coal pile not in soil below the coal.

Sign is legible.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?

Yes ____ No If yes, describe location and extent:

REPAIRS REQUIRED? Yes ____ No If yes, describe extent and location:

Inspected by: Dennis Mayton

Date: 10/30/2014
Time: 0845 hours

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections

Field Activity: Landfill Cap/Cover Inspection

Job # N/A

Task: N/A

REPAIR RECORD

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Repairs completed on: NA

Repair Record completed by: NA

Date: NA

COAL TAR REMOVAL

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not Applicable.

Repairs completed on: N/A

Repair Record completed by: N/A

Date: N/A