Statement of Basis
Solid Waste Management Unit 4
Coal Tar Tanks Behind Building 8
HSAAP-37
Kingsport, Tennessee

INTRODUCTION

This Statement of Basis summarizes the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI), interim measures (IM), and proposed final remedy selected for Solid Waste Management Unit (SWMU) 4, Coal Tar Tanks behind Building 8, at the Holston Army Ammunition Plant (HSAAP), Kingsport, Tennessee. This SWMU is under U.S. Army Installation Restoration Program unit HSAAP-37 in the HSAAP Installation Action Plan. The selected final remedy for SWMU 4 is to maintain the existing soil cover and land use controls and provide long-term monitoring.

SITE BACKGROUND

SWMU 4 is located in Area A on the south side of Building 8 (Figures 1 and 2). Two, 2,000-gallon, above-ground coal tar tanks were located at the SWMU. The tanks were reportedly used between 1978 and 1994. Coal tar generated from the Producer Gas Plant was stored in the tanks for use as supplemental fuel in the Building 8 boilers. The coal tar by-product of the gas plant was gravity fed through steam-traced pipes from Building 10 to these tanks. Overfills may have occurred during operations of the tanks causing coal tar or coal tar liquor to be released onto the concrete pad or ground surface. The tanks were removed in 1996 following the shutdown of the Producer Gas Plant in 1994. Contaminated soil was also excavated from the unit in 1996 (USACHPPM 2002). Current and reasonably anticipated future land use at this unit is industrial, government-controlled restricted access. The contaminant of concern at SWMU 4 is coal tar.

SUMMARY OF CONTAMINANT EVALUATION

Soil: Investigations were conducted at SWMU 4 in 1997 and 2000/2001. In 1997, as part of the Sampling Visit Phase (USACHPPM 1998), four soil samples were collected at the site from varying depths (Figure 3). The samples were analyzed for metals and semivolatile organic compounds (SVOCs). Polynuclear aromatic hydrocarbons (PAHs) were detected above the 2000 residential and industrial relevant action levels (RALs). Exceedances are summarized in Table 1.

In 2000, eleven samples were collected from six borings completed at SWMU 4 (Figure 3). The samples were analyzed for volatile organic compounds (VOCs), SVOCs, and metals. There were no metals detected above RALs or background levels. No VOCs were detected above the 2000 residential risk-based RALs. Six SVOCs were detected above the industrial RALs and one SVOC was above only the residential RAL in Boring H-4-5 (2 to 2.5 feet below grade). These SVOCs are summarized in Table 2.

Table 1. Summary of Semivolatile Organic Compounds Exceeding Risk-Based Relevant Action Levels at SWMU 4 - 1997 RFI Soil Sampling

Chemical Compound	Residential RAL mg/kg	Industrial RAL mg/kg	H-4-1 mg/kg	H-4-3 mg/kg	H-4-4 mg/kg
Benzo(a)anthracene	0.62	2.9	0.87	**8.8**	0.45
Benzo(a)pyrene	0.062	0.29	**0.52**	**4.9**	0.26J
Benzo(b)fluoranthene	0.62	2.9	0.53	**5.0**	0.23

RAL - 2000 Risk-Based Relevant Action Level
J – Estimated quantity
Bold type indicates exceedance of industrial RAL

Table2. Summary of Semivolatile Organic Compounds Exceeding Risk-Based Relevant Action Levels at SWMU 4 - 2000 RFI Soil Sampling

Chemical Compound	Residential RAL mg/kg	Industrial RAL mg/kg	H-4-5 mg/kg
Napththalene	56	190	120.0J
Benzo(a)anthracene	0.62	2.9	**54.0J**
Benzo(b)fluoranthene	0.62	2.9	**31J**
Benzo(k)fluoranthene	6.2	29	**37.0**
Benzo(a)pyrene	0.062	0.29	**40J**
Indeno(1,2,3-cd)pyrene	0.62	2.9	**15J**
Dibenz(a,h)anthracene	0.062	0.29	**5.8J**

RAL - 2000 Risk-Based Relevant Action Level
J – Estimated quantity
Bold type indicates exceedance of industrial RAL

Also during the 2000 RFI, nine direct push (DP) borings were completed; samples from the DP borings were visually inspected for the presence of coal tar or coal tar staining. No solid coal tar masses were encountered in any of the borings. Smaller sand-sized pieces of coal tar were encountered from grade to three feet below grade. Coal tar staining was observed in most of the cores (USACHPPM 2002).

Soil Remediation: In 2003, an interim measure (IM) was completed at SWMU 4 to remove coal tar and coal tar-contaminated soil and concrete. Approximately 110 cubic yards of concrete and contaminated soil were removed at the northern side of the SWMU (Figure 2) to a depth of approximately five feet. The concrete berm and pad were removed. The concrete support pads were not removed. Excavation was limited due to existing structures to the north (Building 8 and retaining wall), south (concrete debris), and east and west (precipitators). Three sidewall and two

bottom verification samples (Figure 3) were collected and analyzed for SVOCs. Four SVOCs were present above 2000 residential RALs; one of these SVOCs was also above the 2000 industrial RALs (see Table 3). The structural integrity of existing buildings would have been compromised by further excavation. The coal tar was disposed at the HSAAP Class II landfill and the site was backfilled. The IM recommended that the site be monitored for surficial coal tar (USACHPPM 2004). Small pieces of surfacing coal tar are being removed during the periodic inspections as needed (Figure 4).

Table 3. Summary of Semivolatile Organic Compounds Exceeding Risk-Based Relevant Action Levels at SWMU 4

Chemical Compound	Residential RAL mg/kg	Industrial RAL mg/kg	BS-1 mg/kg	BS-2 mg/kg	SW-2 mg/kg	SW-3 mg/kg
Benzo(a)anthracene	0.62	2.9	0.36	0.20	0.85	2.2
Benzo(a)pyrene	0.062	0.29	0.22J	0.12J	**0.52**	**1.4**
Benzo(b)fluoranthene	0.62	2.9	0.29	0.15	0.62	1.7
Dibenz(a,h)anthracene	0.062	0.29	0.057	ND	0.11J	0.19J

RAL - 2000 Risk-Based Relevant Action Level
Bold type indicates exceedance of industrial RAL
J – Estimated quantity
ND – Not Detected

Groundwater: The groundwater under SWMU 4 is being addressed separately as part of HSAAP's final remedy for AOC-GW, Area of Concern Site-Wide Groundwater.

SELECTED FINAL REMEDY

The current and reasonably anticipated future land use at this unit is industrial, government-controlled restricted access. The selected final remedy for SWMU 4 is to maintain the existing soil cover as well as the land use controls and long-term maintenance that are already in place and being conducted under the Long-Term Monitoring/Long-Term Operations Program. The components of the final remedy include:

- Access controls (site-specific or facility-wide fencing);
- Signs;
- Excavation restrictions;
- Inspections and maintenance; and
- Long-term groundwater monitoring under AOC-GW.

Access controls are in place and implemented through existing HSAAP security procedures. Maintenance will include periodic inspections and the removal of coal tar as needed.

REFERENCES

US Army Center for Health Promotion and Preventive Medicine (USACHPPM) 1998. Sampling Visit Phase, RCRA Facility Assessment Release Assessment, No. 38-EH-5694-97, Holston Army Ammunition Plant, Kingsport, Tennessee, 12-22 May and 8-19 September 1997, May.

USACHPPM 2002. RCRA Facility Investigation of Solid Waste Management Units HSAAP-004 (Coal Tar Tank Site), HSAAP-014 (Coal Tar Landfill 1), and HSAAP-103 (Building 8 Coal Tar Tanks Drainage Ditch), 4-11 December 2000 and 8-14 January 2001, USACHPPM Project No. 38-EH-1296-01, Holston Army Ammunition Plant, Kingsport, Tennessee, February.

USACHPPM 2004. Interim Measures Report, Solid Waste Management Units HSAAP-004 (Coal Tar Tank Site), HSAAP-014 (Coal Tar Landfill 1) and HSAAP-026 (World War II Coal Tar Site), 5-7 August 2003, Holston Army Ammunition Plant, Kingsport, Tennessee, USACHPPM Project No. 38-EH-6172-03, July.

Statement of Basis
Solid Waste Management Unit 14
Coal Tar Landfill 1
HSAAP-003
Kingsport, Tennessee

INTRODUCTION

This Statement of Basis summarizes the environmental investigation and the proposed final remedy for Solid Waste Management Unit (SWMU) 14, Coal Tar Landfill 1, at the Holston Army Ammunition Plant (HSAAP) in Kingsport, Tennessee (Figures 1 and 2). This SWMU is part of U.S. Army Installation Restoration Program unit HSAAP-003 in the HSAAP Installation Action Plan. The selected final remedy for SWMU 14 is to maintain the existing cap, as well as the land use controls and long-term maintenance that are already being conducted under the Long-Term Monitoring/Long-Term Operations (LTM/LTO) Program.

SITE BACKGROUND

Coal Tar Landfill 1 (SWMU 14) is located on the west side of the HSAAP Area A industrial complex (Figure 2). The site is located 40 to 50 feet north of the South Fork of the Holston River, and is bounded on its northern edge by multiple railroad tracks (USACHPPM 1997, 2002, and 2004). The landfill is approximately 2 acres in extent and was operational from 1949 to 1978. Topographic surveys and borehole drilling indicate that the landfill may be 10 to 15 feet in depth in certain areas. The unit was used to dispose of coal tar generated from the coal gasification plant in Area A and fly ash/cinders generated in Area A and Area B boilers. These wastes contain organic chemicals, primarily polynuclear aromatic hydrocarbons and other semivolatile organic compounds (SVOCs), and trace metals. Following its closure in 1983, the landfill was capped with at least 2 feet of clay and riprap was placed along the slope of the river to control erosion. The cap over the closed Coal Tar Landfill 1 must be maintained. The current and reasonably anticipated future land use at this unit is industrial, government-controlled restricted access.

SUMMARY OF CONTAMINANT EVALUATION

Prior to closure of the Coal Tar Landfill 1, groundwater sampling was conducted in 1981 to determine if leachate from the waste material was migrating to groundwater and surface water. Coal tar constituents, i.e., phenols, cresols and naphthalene, were detected in 40 percent of the analyzed groundwater samples collected from monitoring wells; however, all detected concentrations were below risk-based relevant action levels (RALs) (USACHPPM 2002). A 1997 Environmental Baseline Survey (USACHPPM 1997) indicated that a coal tar and fly ash interim removal action was in progress at the Coal Tar Landfill 1 as part of RCRA Facility Investigation (RFI) activities for both this unit and the adjacent Coal Tar Landfill 2 (SWMU 15). The survey also cited periodic semiannual monitoring of wells adjacent to SWMU 14 had been conducted since the 1980s and noted that no degradation of groundwater quality had been observed in any samples collected to date.

A 1998 joint RFI for Coal Tar Landfill 1 (SWMU 14) and Coal Tar Landfill 2 (SWMU 15) compiled soil and groundwater sampling data from investigation activities conducted at these units during 1996 and 1997 (USACHPPM 2004). The purpose of the investigation was to determine if leachate from the waste material was migrating to groundwater and surface water. A total of 15 soil and 6 groundwater samples were collected and analyzed for metals and organic compounds. In one soil sample installed within the identified boundaries of the landfill wastes, one chemical exceeded risk-based RALs: benzo(a)pyrene concentrations (1.5 mg/kg) exceeded the corresponding 2000 residential risk-based RAL (0.062 mg/kg) and industrial risk-based RAL (0.29 mg/kg). No exceedances of constituents above risk-based RALs were observed in other soil samples. Based on the limited number of groundwater samples at this site, no exceedances of constituents above risk-based RALs were observed. Therefore, contaminant migration beyond the landfill boundary was not indicated. However, visible coal tar was observed along the bank and in the riverbed of the South Fork Holston River during these RFI activities.

Additional RFI activities at SWMU 14 were conducted between December 2000 and January 2001 (USACHPPM 2002) to identify the locations of subsurface coal tar within the landfill and to evaluate whether coal tar was migrating from the unit to the bank of the South Fork of the Holston River. Under this investigation, soil samples were collected from 31 boreholes within the landfill, a visual survey was conducted along the river bank, and 4 sediment samples were collected from the riverbed. Sediment samples were analyzed for metals and organic compounds. All concentrations of metals in sediment samples were comparable to site background concentrations in soil. SVOCs were detected above risk-based RALs in one sediment sample collected on the downstream side of two storm water drains. The concentrations of these SVOCs and their associated risk-based RALs are summarized in Table 1.

Table 1. Summary of Semivolatile Organic Compounds Exceeding Risk-Based Relevant Action Levels in Sediment at SWMU 14

Chemical Compound	Residential RAL[a] (mg/kg)	Industrial RAL[a] (mg/kg)	Result (mg/kg)
Benzo(a)anthracene	0.62	2.9	10DJ
Benzo(b)fluoranthene	0.62	2.9	8.5DJ
Benzo(a)pyrene	0.062	0.29	7.3DJ
Indeno(1,2,3-cd)pyrene	0.62	2.9	3.7
Dibenz(a,h)anthracene	0.062	0.29	1.9

SWMU - Solid waste management unit
RAL - Relevant action level
[a] 2000 risk-based RAL
D - Diluted sample
J - Estimated value less than method reporting limits

These SVOC detections were attributed to the weathering of the discarded coal tar on the river bank rather than contaminant migration from the landfill. Soil boring samples were not submitted

for chemical analyses but were visually inspected to determine the distribution of coal tar within the landfill. These samples indicated that coal tar within the landfill occurred as two discrete masses mixed with other wastes (e.g., fly ash) on the northern half of the unit. Coal tar had not migrated in the subsurface beyond the boundaries of the SWMU. During the river bank survey, nine discrete exposures of coal tar were observed, comprising a total volume small enough to be contained within a 55-gal drum. It was determined that this coal tar was discarded onto the ground surface during closure activities at SWMU 14 and did not indicate coal tar migration from the unit.

Based on the data collected during the 2000/2001 RFI (USACHPPM 2002), interim measures (IM) were conducted at SWMU 14 in 2004 (USACHPPM 2004). The IM included excavation and removal of 83 cubic yards of soil and coal tar from the northwestern portion of SWMU 14, where a coal tar seam had breached the clay cap. Following the excavation, the clay cap was repaired and the area reseeded to prevent erosion. The IM Report recommended that no additional RFI characterization or additional corrective measures were required for this unit. Periodic inspections of the clay cap were recommended to identify any future coal tar breaches. Pieces of surfacing coal tar were removed during one of the periodic inspections.

Migration of coal tar wastes or contaminants sourced from coal tar has not been observed downgradient of the SWMU. Coal tar deposits observed on the river bank at locations downgradient of the unit are not the result of migration of wastes from the unit. The removal of coal tar material has reduced the potential for future release of contaminants to groundwater. The landfill has been closed and capped with a clay cover to limit direct exposure to the source material and to reduce rainfall infiltration and potential subsequent leaching of contaminants to groundwater.

Overall, coal tar wastes at SWMU 14 have not resulted in impacts to groundwater. Other than one sediment sample containing SVOCs above risk-based RALs, soil contaminants at the unit do not exceed action levels and do not represent a source of contaminants to groundwater. No current groundwater use exists within HSAAP, and no future groundwater use is known or anticipated in the vicinity of the SWMU. Public potable water supply is available to HSAAP and all surrounding residential areas. The South Fork of the Holston River functions as a regional groundwater flow divide in the downgradient direction of the SWMU, which prevents any contaminant migration beyond the river. As such, there are no current or anticipated future groundwater receptors. This SWMU will not be monitored for groundwater because it is adjacent to the Holston River and there is insufficient space to install wells between the landfill and river.

SELECTED FINAL REMEDY

The landfill is capped with a clay cover to limit direct exposure to the source material and to reduce rainfall infiltration and potential for leaching of contaminants to groundwater. The current and reasonably anticipated future land use at this unit is industrial, government-controlled restricted access.

The selected final remedy for SWMU 14 is to maintain the existing cap, as well as the land use controls and long-term maintenance that are already in place and being conducted under the LTM/LTO Program.

The components of the final remedy include the following:

- access controls (site-specific or facility-wide fencing),
- signs,
- excavation restrictions, and
- inspections and maintenance.

Access controls are in place and implemented through existing HSAAP security procedures. Maintenance will include periodic inspections and the removal of coal tar as needed.

REFERENCES

USACHPPM (U. S. Army Center for Health Promotion and Preventive Medicine) 1997. Environmental Baseline Survey No. 38-EH-6956-97, Holston Army Ammunition Plant, Kingsport, Tennessee, 23 June-2 July.

USACHPPM 2002. RCRA Facility Investigation of Solid Waste Management Units HSAAP-004 (Coal Tar Tank Site), HSAAP-014 (Coal Tar Landfill 1), and HSAAP-103 (Building 8 Coal Tar Tanks Drainage Ditch), 4-11 December 2000 and 8-14 January 2001, USACHPPM Project No. 38-EH-1296-01, Holston Army Ammunition Plant, Kingsport, Tennessee, February.

USACHPPM 2004. RCRA Interim Measures Report, Solid Waste Management Units HSAAP-004 (Coal Tar Tank Site), HSAAP-014 (Coal Tar Landfill 1), and HSAAP-026 (World War II Coal Tar Site), 5-7 August 2003, USACHPPM Project No. 38-EH-6172-03, Holston Army Ammunition Plant, Kingsport, Tennessee, February.

Statement of Basis
Solid Waste Management Unit 15
Coal Tar Landfill 2
HSAAP-22
Kingsport, Tennessee

INTRODUCTION

This Statement of Basis summarizes the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI), interim measures (IM), and proposed final remedy for Solid Waste Management Unit (SWMU) 15, Coal Tar Landfill 2, at the Holston Army Ammunition Plant (HSAAP) in Kingsport, Tennessee. This SWMU is under U.S. Army Installation Restoration Program unit HSAAP-22 in the HSAAP Installation Action Plan. The selected final remedy for SWMU 15 is No Further Action.

SITE BACKGROUND

SWMU 15 was formerly located in Area A, (Figures 1 and 2), northwest of SWMU 14, Coal Tar Landfill 1. The site was also bounded by the South Fork of the Holston River to the southwest and the HSAAP railroad corridor and pipelines to the northeast. The site was discovered in 1986 by a HSAAP employee who noticed a blackened area and stressed vegetation at the site. The dates of operation of SWMU 15 are unknown, but it appears that the site was used to dispose of coal tar generated from the coal gasification plant in Area A and fly ash from the coal-powered industrial boilers. The site was approximately 30 feet by 50 feet (Kearny 1991). The contaminant of concern at SWMU 15 was coal tar. SWMU 15 was clean closed after an Interim Measure (IM) to remove all contaminants to below residential relevant action levels (RALs).

SUMMARY OF CONTAMINANT EVALUATION

A joint remedial investigation was conducted at SWMUs 14 and 15 in 1996 (Rust 1996). The purpose of the investigation was to determine the nature and extent of soil and groundwater contamination and whether said contamination constituted a threat to human health or the environment. Thirteen soil borings, one permanent monitoring well and three temporary well points were completed at the site (Figure 3). A total of 26 soil samples and four groundwater samples were collected and analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), metals, total petroleum hydrocarbons as Gasoline Range Organics and Diesel Range Organics (GRO/DRO), radionuclides, and sulfide. Two sediment samples were collected from the river bed adjacent to SWMU 15 and analyzed for the same constituents. There were no VOCs in the soil or sediment samples above the 1995 risk-based RALs, (Human Health Screening Criteria from the Defense Site Environmental Restoration Tracking System [DSERTS]). The only SVOC detected above the RALs was phenanthrene in the sample from boring SB-1502 from 8 to 10 feet below grade (18 mg/kg versus RAL of 6.1 mg/kg). There were no VOCs or metals in either sediment sample above the RALs. The only SVOCs detected in the sediment samples above the RALs were found in Sample SED-2, namely, anthracene detected at 52 mg/kg (RAL - 19 mg/kg) and phenanthrene detected at 120 mg/kg (RAL - 6.1 mg/kg).

The groundwater flow direction was determined to be west-southwest toward the Holston River. Based on the limited number of groundwater samples collected at the site, no VOCs were present above the 1994 risk-based RALs (US EPA maximum contaminant levels [MCLs]). The only SVOC above the RALs was benzo(a)pyrene at a concentration of 1 µg/L versus the MCL of 0.2 µg/L in temporary well GW-21.

An IM was completed in 1995. Approximately 200 drums of coal tar and river bottom sediments were removed adjacent to SWMUs 14 and 15 (Rust 1996). An additional 28 drums of coal tar were removed from the riverbed in the area of the 1996 sediment samples in 1996 and 1997 (HSAAP 1998). In 1997, an IM was completed at SWMU 15 to remove coal tar and fly ash. Approximately 6,000 cubic yards of fly ash and 690 cubic yards of coal tar were removed from the site. Excavation continued until visible coal tar and fly ash had been removed and undisturbed native soils were encountered. Four composite soil samples were collected from the bottom of the excavation and analyzed for VOCs, SVOCs, metals, GRO, DRO, radionuclides, and sulfide. There were no exceedances of the 1996 risk-based RALs. The excavated material was disposed of off-site as non-hazardous waste and the site was backfilled with borrow materials from a HSAAP Area B uncontaminated borrow site.

The IM removed site contaminants which might have acted as a source of groundwater contamination. No current groundwater use exists within HSAAP, and no future use of groundwater is known or anticipated in the vicinity of SWMU 15. Public potable water supply is available to HSAAP and surrounding users. The South Fork of the Holston River functions as a regional groundwater divide downgradient of the SWMU, which prevents any residual contaminant migration beyond the river. As such, there are no current or anticipated future groundwater receptors. This SWMU will not be monitored for groundwater because it is adjacent to the Holston River and there is insufficient space to install wells between the former landfill and the river.

SELECTED FINAL REMEDY

No further action is the selected final remedy at SWMU 15.

REFERENCES

A.T. Kearney, Inc. (Kearney) 1991. RCRA Facility Assessment of Holston Army Ammunition Plant, Kingsport, Tennessee, EPA I.D. No. TN5210020421, August 30.

Holston Army Ammunition Plant (HSAAP) 1998. Removal Action for Solid Waste Management Unit 15, Area A, HSAAP, Prepared for Tennessee Department of Environment and Conservation, Nashville, TN, March 3.

Rust Environmental & Infrastructure Inc. (Rust) 1996. Prefinal RCRA Facility Report, Solid Waste Management Units 14 & 15, Holston Army Ammunition Plant, Kingsport, Tennessee, Rust E&I Project No. 32167, November 22.

Statement of Basis
Solid Waste Management Unit 18
Former Sanitary Landfill
HSAAP-33
Kingsport, Tennessee

INTRODUCTION

This Statement of Basis summarizes the environmental investigation and proposed final remedy for Solid Waste Management Unit (SWMU) 18, Former Sanitary Landfill, at the Holston Army Ammunition Plant (HSAAP) in Kingsport, Tennessee (Figures 1 and 2). This SWMU is included in U.S. Army Installation Restoration Program Unit HSAAP-33 in the HSAAP Installation Action Plan. The selected final remedy for waste material and soil within SWMU 18 is to maintain the existing land use controls and long-term maintenance that are already being conducted under the Long-Term Monitoring/Long-Term Operations (LTM/LTO) Program. The groundwater under SWMU 18 is being addressed separately as part of HSAAP's final remedy for AOC-GW, Area of Concern Site-Wide Groundwater.

SITE BACKGROUND

SWMU 18 is located in Area B west of Building 155/159 and south of the fire station along Bachmann Way (Figures 1 and 2). The SWMU was used from 1966/1967 to 1984 to dispose of wastes such as empty pesticide containers, asbestos waste, fluorescent tubes, laboratory breakage (glass), light bulbs, cafeteria waste, oils, and cleaning agents. Wastes were disposed by the trench method and filling to grade. It has been estimated that the unit received 2,160 cubic yards of waste. The unit is approximately 7 acres in area, capped with a two-foot-thick clay cover and vegetated. TDEC acknowledged closure of the unit in May 1986. The current and reasonably anticipated future land use at this unit is industrial, government-controlled restricted access.

SUMMARY OF CONTAMINANT EVALUATION

Environmental investigations were conducted at SWMU 18 as part of the 1997 RCRA Sampling Visit Phase (USACHPPM 1998) and the 2001-2006 AOC-GW RCRA Facility Investigation (RFI). The 1997 Sampling Visit Phase included the installation of three groundwater monitoring wells (MW-69, MW-70, and MW-71) and collection of groundwater samples from two existing wells (MW-14 and MW-15) and two new wells (Figure 3). One of the 1997 wells, well MW-71, had insufficient water and was not sampled. The samples were analyzed for volatile organic compounds (VOCs), semivolatile compounds (SVOCs), metals, pesticides, and herbicides. The only exceedance of the risk-based relevant action levels (RALs) in any of the wells was mercury in Well MW-70 at 0.0033 mg/L. The U.S. Environmental Protection Agency drinking water maximum contaminant level (EPA MCL) is 0.002 mg/L. As the presence of mercury in Well MW-70 indicated a possible release to groundwater at the unit, it was recommended that SWMU 18 be included in AOC-GW RFI.

Nine site-wide RFI ground-water sampling events, that included wells at SWMU 18, were conducted in June 2001, January 2002, July 2002, January 2003, February 2004, April 2005, August 2005, April 2006, and August 2006 (USACHPPM 2003, USACHPPM 2004, and Bay West 2007a). Downgradient Well MW-70 was sampled during each event (Figure 3). Upgradient well MW-15 was sampled in June 2001, January 2002, January 2003, February 2004, and both events in 2005 and 2006. A second downgradient well, MW-14, was sampled in 2005 and 2006. Analysis conducted during the RFI investigation included VOCs, SVOCs, explosives, metals and mercury. The only analyte detected above the risk-based RALs was mercury. There were three exceedances of arsenic, two in well MW-15 in September 2005 (0.82 µg/L) and September 2006 (0.39 µg/L), and one in MW-14 in September 2005 (0.4J µg/L). The arsenic tapwater RAL was 0.045 µg/L. The mercury risk-based RAL of 2 µg/L (EPA MCL) was exceeded during each sampling event at well MW-70. The concentrations ranged from 2.5J µg/L (February 2004) to 3.87 µg/L (April 2006). The AOC-GW RFI concluded that while the site represents a source of mercury to the groundwater, the concentration trends are stable and localized to the vicinity of MW-70. The AOC-GW Corrective Measures Report (Bay West and SAIC 2007b) recommended that Well MW-70 be included in the AOC-GW LTM monitoring program (annual monitoring for mercury).

SELECTED FINAL REMEDY

The current reasonably anticipated future land use at this unit is industrial, government-controlled restricted access. The selected final remedy for waste material and soil within SWMU 18 is to maintain the existing clay cover, as well as the land use controls and long-term maintenance that are already being conducted under the LTM/LTO Program. The components of the final remedy include the following:

- Access controls (site-specific or facility-wide fencing),
- Signs,
- Excavation restrictions,
- Inspections and maintenance, and
- Long-term groundwater monitoring under AOC-GW.

Access controls are currently implemented through existing HSAAP security procedures. Excavation restrictions include HSAAP management and TDEC approval of all non-maintenance activities completed at SWMU 18 and the base-wide Safety Dig Permit program encompassing all HSAAP soil disturbance activities. Maintenance will include periodic inspections of the cap and vegetation cover and repairs as needed.

The final remedy of land use controls and LTM/LTO will control the source of any releases and protect human health and the environment in both the short and long terms. Land use controls, i.e., Safety Dig Permit procedures, facility fencing, and signage, will ensure the cap is not disturbed without the knowledge and approval of HSAAP and TDEC. Inspections and maintenance will ensure the on-going integrity of the landfill cap. Groundwater monitoring will identify changes in groundwater quality near the landfill.

REFERENCES

Bay West and SAIC (Bay West Inc. and Science Applications International Corporation) 2007a. RCRA Facility Investigation Report for AOC-GW, Site-Wide Groundwater, HSAAP-33, FRPI Environmental Remediation Services, Army Ammunition Plant, Kingsport, Tennessee, March.

Bay West and SAIC 2007b. Corrective Measures Report for AOC-GW, Site-Wide Groundwater (AOC-GW), FRPI Environmental Remediation Services, Army Ammunition Plant, Kingsport, Tennessee, August.

USACHPPM (US Army Center for Health Promotion and Preventive Medicine) 1998. Sampling Visit Phase, RCRA Facility Assessment, Release Assessment, Holston USACHPPM Project No. 38-EH-5694-97, May.

USACHPPM 2003. RCRA Facility Investigation Report Site-Wide Ground Water, July 2002 and January 2003, Holston Army Ammunition Plant, Kingsport, Tennessee, USACHPPM Project No. 38-EH-5089-03, May.

USACHPPM 2004. RCRA Facility Investigation Report Site-Wide Ground Water, 2- 13 February 2004, Holston Army Ammunition Plant, Kingsport, Tennessee, USACHPPM Project No. 38-EH-01N7-04, June.

Statement of Basis
Solid Waste Management Units 19/29
Construction Debris Landfill and
Former Sedimentation Pond for Sanitary Landfill
HSAAP-33
Kingsport, Tennessee

INTRODUCTION

This Statement of Basis summarizes the environmental investigation and the proposed final remedy for Solid Waste Management Units (SWMUs) 19 and 29 at the Holston Army Ammunition Plant (HSAAP) in Kingsport, Tennessee (Figures 1 and 2). SWMUs 19 and 29 are the Construction Debris Landfill and Former Sedimentation Pond for Sanitary Landfill, respectively. These SWMUs are included in the U.S. Army's Installation Restoration Program (IRP) unit HSAAP-33 in the HSAAP Installation Action Plan. Unit HSAAP-33 is the Site-wide Groundwater Area of Concern (AOC-GW). The selected final remedy for the waste materials and soil within SWMUs 19 and 29 is to maintain the existing land use controls and long-term maintenance that are already being conducted under the Long-Term Monitoring/Long-Term Operations (LTM/LTO) Program. The groundwater under SWMUs 19/29 is being addressed separately as part of HSAAP's final remedy for AOC-GW, Area of Concern Site-Wide Groundwater.

SITE BACKGROUND

SWMUs 19 and 29 are located in the northwest corner of Area B, immediately north of the Holston River (Figure 1). SWMU 29 is an unlined sedimentation pond that formerly functioned as a storm water runoff control system for the now-inactive Sanitary Landfill (SWMU 17), a No Further Action (NFA) site located within Area B (Figure 2). After the dam for this pond collapsed in 1984 as a result of heavy rain and flood conditions, HSAAP was granted TDEC approval to use this former pond as an uncontaminated construction debris landfill site, designated as SWMU 19 (Figure 2). SWMUs 19 and 29 are approximately 2 acres in area. Disposal of inert construction materials such as concrete, crushed rock, dirt, and asphalt at SWMU 19 occurred from 1984 through at least June 1997. At present, SWMU 19 is capped with a native clay cover. Because SWMUs 19 and 29 are co-located, they were investigated as a single unit for IRP planning purposes.

SUMMARY OF CONTAMINANT EVALUATION

During a Survey Phase RCRA Facility Assessment in 1995 and 1996, three monitoring wells in the vicinity of SWMUs 19 and 29 were sampled (USACHPPM 1996). Soil samples were also collected. Petroleum-related contamination was detected in downgradient well MW-48, although the source of this contamination was considered to be from sources other than SWMUs 19 or 29 (Figure 2). Confirmatory sampling conducted in 2000 showed semivolatile organic compounds (SVOCs) at concentrations in groundwater above the U. S. Environmental Protection Agency Region 9 tap water preliminary remediation goals (PRGs) at MW-48 (USACHPPM 2000).

Nine of the ten SVOCs detected in MW-48 were not detected in the two upgradient wells sampled. The April 2000 Confirmatory Sampling Report recommended NFA for soils because analytical results from soil borings indicated that the soil surrounding the unit was not contaminated (USACHPPM 2000). The Confirmatory Sampling Report recommended an RFI for groundwater.

Under the Corrective Action Order, an RFI for SWMUs 19 and 29 was initiated in federal fiscal year 2005. The primary objective of the RFI was to determine the source and extent of the SVOC contamination in groundwater in the vicinity of well MW-48. The RFI included installing four new groundwater monitoring wells to provide data on the downgradient extent of contamination. The new wells were installed in May 2005 at the safest practical downgradient locations based on site characteristics. Two rounds of sampling of the new wells were performed between April 30 and October 10, 2005 (Bay West and SAIC). One new well (MW-115) was not sampled for SVOCs as intended during the Fall 2005 sampling event due to insufficient recharge. New wells were sampled for volatile organic compounds (VOCs), SVOCs, and total RCRA metals (arsenic, barium, cadmium, chromium, mercury, lead, selenium, and silver). Samples were not analyzed for explosives, as historical data indicate that explosives contamination is not a concern at this unit. A spring and seep survey in areas hydraulically downgradient of the unit was also conducted, but no visible seeps or springs were found.

The RFI also incorporated data from four existing wells in the SWMUs 19 and 29 vicinity, which were sampled as part of facility-wide groundwater monitoring efforts. These four wells include upgradient well MW-55, side-gradient wells MW-46 and MW-47, and downgradient well MW-48 (Figure 2). Wells MW-46 and MW-55 were sampled seven times between June 2001 and September 2005. Well MW-47 was sampled once in September 2005. Well MW-48 was sampled twice in 2005.

RCRA metals were below PRGs and health-based screening levels in all new and existing wells, with the exception of lead and arsenic. Up and side-gradient wells MW-55, MW-46, and MW-47 did not contain RCRA metals above PRGs or federal Safe Drinking Water Act maximum contaminant levels (MCLs). Arsenic exceeded its PRG (0.045 μg/L) in wells MW-48 and the four new RFI wells (MW-114, MW-115, MW-116 and MW-117). However, arsenic concentrations did not exceed the MCL of 10 μg/L. Lead exceeded its federal treatment technology standard (15 μg/L) in a field duplicate sample from MW-117 (16.5 μg/L) during the June 2005 sampling round.

SVOC contamination is most pronounced in MW-48, the well closest to the downgradient edge of the landfill. Five SVOCs were present at concentrations higher than their associated PRGs and MCLs in well MW-48 in one or both 2005 sampling events: bis(2-ethylhexyl)phthalate, dibenzofuran, 2-methylnapthalene, fluorine, and naphthalene. Small droplets of nonaqueous-phase liquid (NAPL) and a hydrocarbon sheen were observed during sample collection at well MW-48. Three SVOCs were detected in the other downgradient wells (MW-114 through MW-117): bis(2-ethylhexyl)phthalate, dimethylphthalate, and di-n-butylphthalate. Bis(2-ethylhexyl)-phthalate was also detected at a low estimated concentration in upgradient well MW-55 during the Spring 2005 sampling event. The remaining two SVOCs were detected sporadically at trace concentrations substantially below risk-based screening criteria.

VOCs were detected in MW-48, MW-115 and MW-116 during the 2005 sampling events. Methylene chloride was the only VOC detected above risk-based criteria or MCLs. Methylene chloride was detected in MW-116 in Fall 2005 at a concentration of 6.5 µg/L, in exceedence of the PRG (4.3 µg/L) and the MCL (5 µg/L) for the compound.

Migration of NAPL and SVOCs from the well MW-48 vicinity is limited based on the low number of detections and concentrations observed in downgradient wells. SVOC concentrations and the occurrence of NAPL appear to exhibit a seasonal trend with higher concentrations occurring in months of low precipitation. Field surveys conducted in April 2005 during wet season conditions did not find any evidence of springs or seeps along the southern landfill boundary or along the escarpment of the Holston River that would serve as preferential exit pathways for groundwater contaminant migration.

Based on available historical data and the 2005 RFI results, SWMUs 19 and 29 cannot be definitively identified as the source of contamination observed in the well MW-48 vicinity. Well MW-48 is immediately downgradient of the co-located SWMUs 19 and 29, which indicates one of the units may be a potential source for the observed contaminants. However, a large area upgradient of well MW-48 and SWMUs 19 and 29 has also historically been used for waste landfill operations such as SWMU 17 (Figure 2).

Also, available operational information for SWMU 29 does not indicate that contaminated materials were placed into the unit. Operational history for SWMU 19 indicates that the unit received non-contaminated construction/demolition wastes. A site walkover in April 2005 did not indicate the presence of visible material other than inert construction-type materials: concrete, reinforcement bar, etc.

No current groundwater use exists within HSAAP, and no future groundwater use is known or anticipated in the vicinity of the SWMUs. Public potable water supply is available to HSAAP and all surrounding residential areas. Based on site hydrogeologic conditions, no contaminants are anticipated to migrate from the SWMUs to off-site receptors.

Migration of contaminants from the SWMUs to off-site receptors is not likely based on: (1) the nearest potable water wells are located a considerable distance upgradient of the SWMUs, and (2) the Holston River is a groundwater flow boundary and discharge zone downgradient of Area B (Figure 2), which prevents any migration beyond the river. As such, there are no current or anticipated future groundwater receptors.

SELECTED FINAL REMEDY

The recent RFI for SWMUs 19 and 29 adequately characterized the site characteristics and extent of contamination. Soil sampling in the SWMUs 19 and 29 vicinity did not show contaminants above risk-based criteria. The RFI determined that groundwater contaminants occur in the vicinity of SWMUs 19 and 29 at concentrations above risk-based screening criteria. However, the extent of groundwater contamination is limited.

The groundwater under SWMUs 19/29 is being addressed separately as part of HSAAP's final remedy for AOC-GW, Area of Concern Site-Wide Groundwater. TDEC concurred that it is not necessary to evaluate any other remedial alternatives. The selected final remedy for the waste materials and soil within SWMUs 19 and 29 is to maintain the existing land use controls and long-term maintenance that are already being conducted under the LTM/LTO Program.

The selected final remedy of land use controls and maintenance of the pre-existing clay cap meets RCRA threshold selection criteria in that it will be both protective of human health and the environment and provide adequate control of the source of the release. Additionally, the remedy can be implemented in a cost effective manner that is protective of workers in the short term and will be reliable and effective in protecting human health and the environment in the long term.

REFERENCES

Bay West and SAIC (Bay West, Inc. and Science Applications International Corporation, Inc.) 2006. RCRA Facility Investigation Report for SWMUs 19 and 29 – Construction Debris Landfill and Sedimentation Pond, September 2006, Holston Army Ammunition Plant, Kingsport, Tennessee, FPRO Contract W9128F-04-D-0018, Task Order 0001, BW040296, September.

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Statement of Basis
Solid Waste Management Unit 20
Area B Rock Quarry Landfill
HSAAP-33
Kingsport, Tennessee

INTRODUCTION

This Statement of Basis presents an overview of the environmental investigation and proposed final remedy for waste material and soil within Solid Waste Management Unit (SWMU) 20, Rock Quarry Landfill, at the Holston Army Ammunition Plant (HSAAP) in Kingsport, Tennessee (Figures 1 and 2). This SWMU is under U.S. Army Installation Restoration Program unit HSAAP-33 in the HSAAP Installation Action Plan. The selected final remedy for the waste materials and contaminated soil within SWMU 20 is to maintain the existing land use controls and long-term maintenance that are already being conducted under the Long-Term Monitoring/Long-Term Operations (LTM/LTO) Program. The groundwater under SWMU 20 is being addressed separately as part of HSAAP's final remedy for AOC-GW, Area of Concern Site-Wide Groundwater.

SITE BACKGROUND

SWMU 20 is located in the northwest corner of Area B, immediately north of the Holston River (Figure 1). SWMU 20 is a former stone quarry used in the 1940's during the construction of HSAAP, which was subsequently used as a construction/demolition landfill until its official closure in 1983. The wastes disposed of at the landfill reportedly consisted of fiberglass insulation, automobile batteries, broken tools, broken fences, galvanized metal, straps and bands, tin-zinc cans, trees, stumps, tires, non-recyclable metals, rubber, and fly ash (USACHPPM 1996).

Additionally, 6 cubic yards of incompletely decontaminated (i.e., less than three times) concrete from an explosives production area building were disposed in the unit, along with other construction debris such as brick, concrete, and tile. The unit is approximately five acres, with vertical quarry walls on the east and west sides. The quarry was filled with an estimated 30 to 50 feet of waste material during landfill operations and was capped with a 2-foot layer of clay at the time of closure. Surface runoff from the cap is directed to shallow ditches along the east and west edges of the cap. Runoff in these ditches flows to a gap in the quarry wall located at the southern end of the SWMU and down a nearly vertical rock escarpment into the Holston River. The clay cover is vegetated with grass, which is periodically mowed. Historical quarrying operations cut into bedrock on all sides of the unit and landfilled wastes were placed directly on the quarry floor and contained within the quarry walls. Because of the configuration of the SWMU, there is little or no adjacent soil subject to potential contamination. The current and reasonably anticipated future land use at this unit is industrial, government-controlled restricted access.

SUMMARY OF CONTAMINANT EVALUATION

Several investigations have been conducted at SWMU 20, inclusive of the RFI. During a 1996 Survey Phase of the RCRA Facility Assessment, the cap at the unit was observed to be in good condition (USACHPPM 1996). In 1997, a groundwater monitoring well (MW-68) was constructed at the southern boundary of the unit near the Holston River to determine if a release to groundwater had occurred from the unit (USACHPPM 1999). No metals, volatile organic compounds (VOCs), or semivolatile organic compounds (SVOCs) were detected above risk-based criteria or federal and state drinking water maximum contaminant levels (MCLs). Two explosives compounds, cyclotrimethylenetrinitramine (RDX) and cyclotetramethylenetetranitramine (HMX), were detected in the groundwater at concentrations of 7 and 12 µg/L, respectively. The RDX concentration exceeded the U. S. Environmental Protection Agency (EPA) Region 9 tapwater preliminary remediation goal (PRG) of 0.61 µg/L and lifetime health advisory (LHA) level of 2 µg/L (EPA 2004).

Groundwater at HSAAP was investigated as part of a site-wide RFI, inclusive of SWMU 20. Well MW-68 was incorporated into the RFI for site-wide groundwater and sampled five times between June 2001 and February 2004 (USACHPPM 2003a, 2003b, and 2004). HMX and RDX were detected at well MW-68 during every sampling event, and a long-term decreasing concentration trend was observed for both contaminants. RDX concentrations in well MW-68 ranged from a high concentration of 76 µg/L in January 2002 to a low of 15 µg/L in February 2004.

In July and August 2004, four additional monitoring wells were installed as part of an RFI specific to SWMU 20 to characterize local groundwater conditions (Bay West and SAIC 2005). A well pair (MW-112/MW-112B) was installed upgradient of the unit, one shallow aquifer zone well (MW-113) was installed cross-gradient of the unit, and a deep aquifer zone well (MW-68B) was installed adjacent to existing well MW-68. Three of the four new wells, and existing well MW-68, were sampled for explosives, VOCs, SVOCs, pesticides, herbicides, polychlorinated biphenyls, RCRA metals (unfiltered), and manganese. Well MW-112B could not be sampled due to insufficient recharge. RDX and HMX were detected in samples collected from wells MW-68, MW-68B, and MW-113. RDX concentrations at wells MW-68 and MW-68B exceeded the PRG and the result for well MW-68 also was above the EPA LHA (2 µg/L). The remaining RDX and HMX detected results were below PRG and LHA values. One SVOC, bis(2-ethylhexyl)phthalate, was detected at concentrations above its PRG and LHA in wells MW-68 and MW-113. Arsenic was detected at concentrations above its respective PRG in wells MW-68 and MW-113; however, the results did not exceed the MCL. Total chromium was detected above its MCL in well MW-113.

The RFI recommended an additional round of sampling of SWMU 20 wells to determine if the elevated RCRA metals above risk-based screening criteria were attributable to high turbidity levels observed in the previous RFI samples. This additional sampling was performed in Fall 2005 (Bay West and SAIC 2006a and 2006b). Filtered and unfiltered groundwater samples were collected from four of the five SWMU 20 monitoring wells (excepting MW-112B). RCRA metals concentrations in the supplemental samples were generally much lower than the 2004 RFI

samples and turbidity levels were also lower. Only arsenic was detected above the PRG in one well (MW-113), although concentrations were below the MCL. Weight of evidence indicates that the previously observed elevated metals were the result of high sample turbidity and that metals are not site-related groundwater contaminants of concern at SWMU 20. Well MW-68 was sampled for explosives and monitored natural attenuation parameters in May and October 2005 under the fiscal year (FY) 2005 site-wide groundwater LTM/LTO Program. The FY 2005 RDX concentrations in well MW-68 were above the LHA screening value, although concentrations continued to exhibit an overall decreasing trend since 2001. Detections of HMX remained below the regulatory screening criteria and also indicated a decreasing trend over time.

No current groundwater use exists within HSAAP, and no future groundwater use is known or anticipated in the vicinity of SWMU 20. Public potable water supply is available to HSAAP and all surrounding residential areas. Because of on-site hydrogeologic conditions, no contaminants are anticipated to migrate from the SWMUs to off-site receptors.

Migration of contaminants from SWMU 20 to off-site groundwater receptors is not likely based on: (1) the nearest potable water wells are located a considerable distance upgradient of the SWMU; and (2) the Holston River is a groundwater flow boundary and discharge zone downgradient of Area B (Figure 2), which prevents any migration beyond the river. As such, there are no current or anticipated future groundwater receptors.

SELECTED FINAL REMEDY

The SWMU 20 RFI adequately characterized the site characteristics and groundwater conditions at the SWMU. The RFI data indicate that migration of the contaminants from interred waste materials to groundwater has occurred at concentrations above risk-based screening criteria. However, the groundwater contamination is not widespread and the concentrations are stable or declining.

The proposed final remedy for the waste materials and soils within SWMU 20 is to maintain the existing land use controls and long-term maintenance that are already being conducted under the LTM/LTO Program. Land use controls will include signs and postings and excavation restrictions to ensure the clay cover over the landfill is not disturbed. Excavation restrictions are enforced through the existing HSAAP safety/dig permit procedures and Environmental Management System. Long-term maintenance will include semiannual inspections and maintenance of the clay cover. Groundwater contamination at SWMU 20 is being addressed as part of AOC-GW, Site-wide Groundwater.

The remedy of land use controls and maintenance of the existing clay cap meets RCRA threshold selection criteria in that it will be both protective of human health and the environment and provide adequate control of the source of the release. Additionally, the remedy can be implemented in a cost-effective manner that is protective of workers in the short term and will be reliable and effective in protecting human health and the environment in the long term.

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Bay West and SAIC (Bay West, Inc. and Science Applications International Corporation) 2005. RCRA Facility Investigation Report for SWMU 20 – Rock Quarry Landfill, October 2005, Holston Army Ammunition Plant, Kingsport, Tennessee, FPRI Contract W9128F-04-D-0018, Task Order 0001, BWJ040296, October.

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USACHPPM 1999. Confirmatory Sampling Work Plan for the Holston Army Ammunition Plant, Kingsport, Tennessee, EPA ID No. TN5 21-002-0421, USACHPPM Project No. 38-EH-5694, November.

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USACHPPM 2003b. RCRA Facility Investigation Report for Site-Wide Groundwater, July 2002 and January 2003, Holston Army Ammunition Plant, Kingsport, Tennessee, EPA ID No. TN5 21-002-0421, USACHPPM Project No. 38-EH-5089-03, May.

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Statement of Basis
Solid Waste Management Unit 25
Area B Tar Burial Site
HSAAP-08
Kingsport, Tennessee

INTRODUCTION

This Statement of Basis presents an overview of the environmental investigation and proposed final remedy for Solid Waste Management Unit (SWMU) 25, Area B Tar Burial Site, at the Holston Army Ammunition Plant (HSAAP) in Kingsport, Tennessee (Figures 1 and 2). This SWMU is designated as U.S. Army Installation Restoration Program unit HSAAP-08 in the HSAAP Installation Action Plan. The proposed final remedy for soils at SWMU 25 is to maintain the existing land use controls and long-term maintenance. The groundwater under SWMU 25 is being addressed separately as part of HSAAP's final remedy for AOC-GW, Area of Concern Site-Wide Groundwater.

SITE BACKGROUND

SWMU 25, the Area B Tar Burial Site, is located on the west end of Area B, southeast of SWMU 17, the Closed Sanitary Landfill (Figure 1). SWMU 25 consists of a trench estimated to be 15 feet wide, 75 feet long, and 10 feet deep; the exact boundaries of which had not been determined prior to the 2006 RFI (Figure 2). Between 1978 and 1980, approximately 60 cubic yards of coal tar from the Area A Gas Producer Facility were reportedly disposed in the trench. The site was covered with a two-foot clay cap in 1980, and an additional two feet of clay were added in 1985. The final cover at the site is vegetated with grass. SWMU 25 is listed on the state of Tennessee Superfund List of Inactive Hazardous Substances Sites (USACHPPM 1996). The current and reasonably anticipated future land use at this unit is industrial, government-controlled restricted access.

SUMMARY OF CONTAMINANT EVALUATION

No investigations specific to SWMU 25 had been conducted prior to the 2006 RFI. During the Survey Phase of the RCRA Facility Assessment and follow-on Environmental Baseline Survey, the clay cover at the unit was observed to be in fair to good condition (USACHPPM 1996, 1997). The objectives of the SWMU 25 RFI (Bay West and SAIC 2006a) consisted of a visual inspection of the unit and collection of soil samples from subsurface borings to define the boundaries of the disposal trench and to determine the occurrence and distribution of any residual contaminants at the boundaries of the unit. In general, the clay cover capping the disposal pit was observed to be in good condition with well-established vegetative cover. Coal tar seepage was evident in a few small areas. Five direct-push soil borings were installed in April 2005 at points along the edge of the SWMU's clay cap (Figure 2). Two soil samples were collected from each direct-push boring and analyzed for semivolatile organic compounds. The samples were collected from approximately the 5 to 7 and the 10 to 12-foot below ground

surface intervals of each boring, corresponding to the mid-point depth and the bottom depth of the disposal trench, as estimated from operational records. No contamination was detected above remedial action levels. Coal tar removal was completed at SWMU 25 and the cap repaired in September 2005 as part of routine fiscal year 2005 Long-Term Monitoring (LTM)/Long-Term Operations (LTO) Program activities.

SELECTED FINAL REMEDY

The SWMU 25 RFI adequately defined the boundaries of the SWMU and documented the absence of soil contamination outside of the burial pit above remedial action levels. The proposed final remedy for soils at SWMU 25 is to maintain the existing land use controls and long-term maintenance that are already conducted under the LTM/LTO Program. The groundwater under SWMU 25 is being addressed separately as part of HSAAP's final remedy for AOC-GW, Area of Concern Site-Wide Groundwater.

REFERENCES

Bay West and SAIC (Bay West, Inc. and Science Applications International Corporation) 2006. RCRA Facility Investigation Report for SWMU 25 – Area B Tar Burial Site, February 2006, Holston Army Ammunition Plant, Kingsport, Tennessee, FPRI Contract W9128F-04-D-0018, Task Order 0001, BWJ040296, February.

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Statement of Basis
Solid Waste Management Unit 26
WWII Coal Tar Site
HSAAP-33
Kingsport, Tennessee

INTRODUCTION

This Statement of Basis summarizes the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI), interim measures (IM), and proposed final remedy for Solid Waste Management Unit (SWMU) 26, WWII (World War II) Coal Tar Site at the Holston Army Ammunition Plant (HSAAP) in Kingsport, Tennessee. This SWMU is under U. S. Army Installation Restoration Program unit HSAAP-33 in the HSAAP Installation Action Plan. The selected final remedy for SWMU 26 is to maintain the existing soil cover as well as the land use controls and long-term maintenance that are already being conducted under the Long-Term Monitoring/Long-Term Operations (LTM/LTO) Program.

SITE BACKGROUND

SWMU 26 is located in Area B, on the flood plain of the Holston River, south of the explosives production area, between former Sodium Nitrate Ponds 3 and 4 (Figures 1 and 2). The surface of the unit is relatively flat across the northern half and then gently slopes upward and then downward in the southern part. The surface is vegetated. A drainage ditch is located approximately 40 feet north of the unit and 100 feet west of the unit. There are no records that identify the dates of usage. The site was used to dispose of coal tar from the Producer Gas Plant during WWII (USACHPPM 2002). Coal tar was reportedly dumped down the railroad embankment and covered with clay and railroad ballast. The site is approximately six acres in size. The current and reasonably anticipated future land use at this unit is industrial, government-controlled restricted access. The contaminant of concern at SWMU 26 is coal tar.

SUMMARY OF CONTAMINANT EVALUATION

An RFI was completed in 1996. Geophysical surveys using ground penetrating radar and electromagnetic induction were initially completed to evaluate the subsurface for the presence of buried coal tar. The surveys were inconclusive as to the presence of coal tar. Subsequently, 16 soil borings and three groundwater monitoring wells (MW-2601, MW-2602, MW-2603) were completed at the site (Figure 3). The borings were visually inspected for the presence of coal tar. In addition, a total of 22 soil samples and eight groundwater samples (MW-2601, MW-2602, MW-2603, MW-3, MW-4, MW-13, S-3A, and S-10A) were collected. The soil samples were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), RCRA metals, total petroleum hydrocarbons (TPH), sulfide, and radionuclides. The groundwater samples were analyzed for VOCs, SVOCs, RCRA metals, TPH, sulfate, nitrate, nitrite, total organic halogens and total dissolved solids (Rust 1998).

There were no VOCs in the soil above the 2000 residential or industrial risk-based relevant action levels (RALs). There were three SVOCs above the residential and/or industrial RALs as summarized in Table 1.

Table 1. Summary of Semivolatile Organic Compounds Exceeding Risk-Based Relevant Action Levels at SWMU 26 – 1996 RFI Soil Sampling

Chemical Compound	Residential RAL mg/kg	Industrial RAL mg/kg	SB-2603 mg/kg	SB-2606 mg/kg	SB-2607 mg/kg
Benzo(a)anthracene	0.62	2.9	0.08J	**8.0**	**11.0**
Benzo(a)pyrene	0.062	0.29	0.10J	**6.0**	**8.0**
Benzo(b)fluoranthene	0.62	2.9	0.092J	**5.1**	**6.3**

RAL - 2000 Risk-Based Relevant Action Level
J – Estimated quantity
Bold type indicates exceedance of industrial RAL

There were no VOCs or RCRA metals present in the groundwater above the risk-based RALs (US EPA Maximum Contaminant Levels [MCLs] and tapwater RALs) in 1996. The only SVOC present above the RALs was n-nitrosodimethylamine in three wells, including two side-gradient wells. The concentrations ranged from 1.4J µg/L (downgradient well MW-2602) to 2,200 µg/L (side-gradient well S3A); the tapwater RAL is 0.0013 µg/L. N-nitrosodimethylamine is not attributed to coal tar.

In 2001, 64 direct push soil borings and three hand auger borings were completed at SWMU 26 (Figure 3). Sixteen soil samples were analyzed for SVOCs and RCRA metals; six soil samples were analyzed for VOCs. Five groundwater samples (four discrete samples and a quality control duplicate) were collected from four existing wells (MW-2601, MW-2602, MW-2603, and S3A) and analyzed for VOCs, SVOCs, and metals (USACHPPM 2002).

There were no VOCs above the industrial risk-based RALs in any of the soil samples. The only RCRA metal above the industrial risk-based RALs in any of the soil samples was arsenic. There were 14 exceedances of the arsenic industrial RAL of 2.7 mg/kg; the concentrations exceeding the RAL ranged from 3.27 mg/kg to7.46 mg/kg. All the arsenic concentrations were below maximum site background concentrations.

Six soil samples contained at least one SVOC above the residential risk-based RALs. Five soil samples contained SVOCs above the industrial risk-based RALs. Dibenzo(a,h)anthracene was not detected at 0.38 mg/kg in three samples. This detection limit was above the industrial risk-based RAL. The sample results are summarized in Table 2.

Table 2. Summary of Semivolatile Organic Compounds Exceeding Risk-Based Relevant Action Levels at SWMU 26 - 2001 RFI Soil Sampling

Chemical Compound	Residential RAL (mg/kg)	Industrial RAL (mg/kg)	H-26-38B (mg/kg)	H-26-39A (mg/kg)	H-26-39A(D) (mg/kg)	H-26-40A (mg/kg)	H-26-40B (mg/kg)	H-26-45A (mg/kg)
Napththalene	56	190	<0.38	170	120J	3.5	0.99	0.93
Benzo(a)anthracene	0.62	2.9	0.28J	**100J**	**68J**	2J	0.65	0.89
Chrysene	62	290	0.25J	74J	50J	1.5J	0.48	0.70
Benzo(b)fluoranthene	0.62	2.9	0.24J	**40J**	**28J**	1.1J	0.36J	0.58
Benzo(k)fluoranthene	6.2	29	<0.38	**62**	**45J**	1.2J	0.39	0.48
Benzo(a)pyrene	0.062	0.29	0.20J	**61**	**43J**	**1.3J**	**0.38J**	**0.57**
Indeno (1,2,3-cd)pyrene	0.62	2.9	<0.38	**32**	**22J**	0.73J	<0.39	0.3J
Dibenz(a,h)anthracene	0.062	0.29	<0.38	**13J**	**11J**	**0.33J**	<0.39	<0.38

RAL - 2000 Risk-Based Relevant Action Level
D – Duplicate Sample
J – Estimated Value
Bold type indicates exceedance of industrial RAL

There were no exceedances of risk-based RALs (MCLs and tapwater RALs) in downgradient well MW-2602 in 2001. There were SVOC exceedances of the risk-based RALs in one monitoring well, MW-2601, within the landfill:

- bis[2-ethylhexyl]phthalate at 53J µg/L vs. tapwater RAL of 4.8 µg/L. Bis[2-ethylhexyl] phthalate is a plasticizer and not attributed to coal tar.

Groundwater quality at SWMU 26 has not been impacted by the coal tar.

The limits of coal tar delineated in the RFI are shown on Figure 3. Coal tar was also visible in the fill area to the northeast of SWMU 26. The RFI concluded that a release of hazardous constituents from SWMU 26 was not indicated (USACHPPM 2002).

In 2003, an IM was completed to remove coal tar and coal tar-contaminated soil from the upper two feet at the fill area to the northeast of SWMU 26 (Figure 4). Approximately 75 cubic yards of coal tar and contaminated soil were removed and disposed of at the HSAAP Class II landfill. Coal tar was visible in the base of the excavations. The excavations were backfilled with a clay cover. The IM recommendation was to conduct periodic monitoring for coal tar at the surface of SWMU 26. Coal tar occasionally surfaces and is being removed during periodic inspections.

SELECTED FINAL REMEDY

The current and reasonably anticipated future land use at this unit is industrial, government-controlled restricted access. The selected final remedy for SWMU 26 is to maintain the existing clay cover as well as the land use controls and long-term maintenance that are already in place and being conducted under the Long-Term Monitoring/Long-Term Operations Program. The components of the final remedy include:

- Access controls (site-specific or facility-wide fencing);
- Signs;
- Excavation restrictions;
- Inspections and maintenance; and
- Long-term groundwater monitoring under Area of Concern-Groundwater (AOC-GW)

Access controls are in place and implemented through existing HSAAP security procedures. Maintenance will include periodic inspections and the removal of coal tar as needed.

REFERENCES

Bay West and SAIC (Bay West, Inc. and Science Applications International Corporation) 2006. RCRA Facility Investigation Report for SWMU 25 – Area B Tar Burial Site, February 2006, Holston Army Ammunition Plant, Kingsport, Tennessee, FPRI Contract W9128F-04-D-0018, Task Order 0001, BWJ040296, February.

USACHPPM (U.S. Army Center for Health Promotion and Preventive Medicine) 1996. Survey Phase, RCRA Facility Assessment No. 38-EH-5035-96, GWSWP, July.

USACHPPM 1997. Environmental Baseline Survey No. 38-EH-6956-97, Holston Army Ammunition Plant, Kingsport, Tennessee, June 23 – July 2.

Statement of Basis
Solid Waste Management Units 38/39
Sodium Nitrate Ponds 1 and 2
HSAAP-13
Kingsport, Tennessee

INTRODUCTION

This Statement of Basis presents an overview of the environmental investigation and the selected final remedy for Solid Waste Management Units (SWMUs) 38 and 39 at the Holston Army Ammunition Plant (HSAAP) in Kingsport, Tennessee (Figures 1 and 2). These SWMUs comprise U.S. Army Installation Restoration Program unit HSAAP-013 in the HSAAP Installation Action Plan.

SITE BACKGROUND

SWMUs 38 and 39 are co-located on the east-central side of HSAAP Area B approximately 2,000 feet west of the Holston River (Figure 1). SWMUs 38 and 39 are former sodium nitrate ponds, which covered 3.6 and 2.6 acres, respectively. SWMU 38 (Sodium Nitrate Pond 1) had an 11.1-million-gallon capacity and SWMU 39 (Sodium Nitrate Pond 2) had a 9.2-million-gallon capacity (Figure 2). These ponds operated from 1969 to 1972 as unlined lagoons for the storage of liquid sodium nitrate solution. They received sodium nitrate solution from the acetic acid recovery system after the sodium nitrate processing facility was destroyed by fire. The sludges within the ponds contained various inorganic nitrogen compounds, weak acetic acid, and may have contained trace amounts of the explosives cyclotetramethylenetetranitramine (a.k.a. HMX) and cyclotrimethylenetrinitramine (a.k.a. RDX). The ponds were closed in 1972 by processing the sludges within the ponds, draining the residual water to the Holston River, and installing a 2-foot clay cap. Although processed and stabilized, the SWMUs 38 and 39 sludges remain under the Fly Ash Landfill (SWMU 22) and its cap. The current and reasonably anticipated future land use at these units is industrial, government-controlled restricted access.

Following closure of SWMUs 38 and 39, SWMU 22 (Fly Ash Landfill) and SWMU 28 (Sedimentation Pond) were constructed on top of the former ponds (Figure 2). These two sites, which operated from 1983 until 1997, are regulated under the TDEC Solid Waste Division. SWMU 22 was permitted under TDEC solid waste regulations (ID number of #IDL 37-104-0062) and includes Phase I located south of Road 1921 and Phase II located north of Road 1921. SWMU 28 served as the Sedimentation Pond for the Fly Ash Landfill, and is located in the southeastern corner of the Phase I unit. In the fall of 1997, the Fly Ash Landfill was closed under TDEC solid waste management requirements (TN Rule 1200-1-7), which included placement of a geomembrane cover and clay cap. SWMU 28 still functions as a catch basin for runoff from the SWMU 22 landfill cap. The SWMU 22 landfill cap will continue to be maintained as required by the solid waste unit post-closure plan.

SUMMARY OF CONTAMINANT EVALUATION

A 1997 Environmental Baseline Survey (USACHPPM 1997) cited periodic monitoring of four wells in the vicinity of the SWMUs under TDEC solid waste requirements for general water quality parameters, total dissolved solids, anions, and metals. These historical data indicated that groundwater from one well (MW-65) immediately downgradient of the SWMUs contained sporadic iron, manganese, potassium, and sulfate above screening criteria.

The 2005 RFI for SWMUs 38 and 39 (Bay West 2005) compiled sediment/soil core data from beneath SWMU 28, which was collected as part of an RFI conducted by the U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM) in August 2004 (Figure 2; USACHPPM 2004c, 2004d). The SWMUs 38 and 39 RFI Report also compiled groundwater data collected between 2001 and 2004 by USACHPPM as part of site-wide groundwater RFI activities (USACHPPM 2003a, 2003b, 2004a, 2004b, 2004c, 2004d). Sediment/soil core samples from beneath SWMU 28 were collected to determine if explosives contamination from the former sodium nitrate ponds underlying SWMU 22 was present within the unconsolidated zone. Eight primary sediment/soil samples and one field duplicate were collected from four coring locations to maximum depths of 4 feet below the bottom of the basin. All sediment/soil samples were analyzed for explosives. No explosives were detected above remedial action levels.

The groundwater under SWMU 38 and 39 is being addressed separately as part of HSAAP's final remedy for AOC-GW, Area of Concern Site-Wide Groundwater. As part of the site-wide groundwater RFI, downgradient well MW-65 (Figure 2) was analyzed for water quality parameters, cyanide, metals, volatile organic compounds, semivolatile organic compounds, polychlorinated biphenyls, pesticides, herbicides, and explosives over the course of five sampling events between June 2001 and February 2004. No hazardous constituents were detected in the samples collected during these investigations. In addition to well MW-65, two temporary wells, TWP-27 (downgradient) and TWP-28 (upgradient), were analyzed twice for explosives in 2003 and 2004 as part of site-wide groundwater RFI activities (USACHPPM 2004a). No explosives were detected in either temporary well.

SELECTED FINAL REMEDY

The August 2004 RFI for SWMUs 38 and 39 adequately defined the degree and extent of contamination. SWMUs 38 and 39 have been closed and the source material at these units reprocessed. SWMU 22, which overlies the former sodium nitrate ponds, was closed in accordance with TDEC solid waste management regulations. Data from the RFI indicate that sediment/soil beneath SWMU 28 and adjacent to SWMUs 38 and 39 does not contain explosive compounds above remedial action levels.

Engineering and administrative controls are required as part of the solid waste unit post-closure plan for the SWMU 22 Fly Ash Landfill that overlies SWMUs 38 and 39. These controls include inspection and maintenance of the existing clay caps covering SMWU 22, drainage controls associated with SWMU 28, and administrative controls that prevent unauthorized soil disturbance or excavations into the caps. Maintenance of the solid waste unit controls will prevent any direct contact with the SWMUs 38 and 39 materials and will minimize rainfall infiltration and any resultant leaching of contaminants still potentially associated with the stabilized sludges within the former sodium nitrate ponds. Groundwater is being addressed as part of site-wide groundwater (AOC-GW). Based on the SWMUs 38 and 39 RFI results and these existing controls and programs, the selected remedy for SWMUs 38 and 39 is institutional controls.

REFERENCES

Bay West (Bay West, Inc.) 2005. RCRA Facility Investigation Report for SWMUs 22, 28, 38, and 39 – Fly Ash Landfill, Sedimentation Pond, and Sodium Nitrate Ponds 1 and 2, September 2005, Holston Army Ammunition Plant, Kingsport, Tennessee, FPRO Contract W9128F-04-D-0018, Task Order 0001, BWJ040296, September

USACHPPM (U.S. Army Center for Health Promotion and Preventive Medicine) 1997. Environmental Baseline Survey No. 38-EH-6956-97, Holston Army Ammunition Plant, Kingsport, Tennessee, June 23 – July 2.

USACHPPM 2003a. RCRA Facility Investigation Report for Site-Wide Groundwater, April – June 2001 and January 2002, Holston Army Ammunition Plant, Kingsport, Tennessee, EPA ID No. TN5 21-002-0421, USACHPPM Project No. 38-EH-5089-02, May.

USACHPPM 2003b. RCRA Facility Investigation Report for Site-Wide Groundwater, July 2002 and January 2003, Holston Army Ammunition Plant, Kingsport, Tennessee, EPA ID No. TN5 21-002-0421, USACHPPM Project No. 38-EH-5089-03, May.

USACHPPM 2004a. RCRA Facility Investigation Report for Site-Wide Groundwater, February 2004, Holston Army Ammunition Plant, Kingsport, Tennessee, EPA ID No. TN5 21-002-0421, USACHPPM Project No. 38-EH-01N7-04, June.

USACHPPM 2004b. Draft Additional Interim Measures Report for Site-Wide Groundwater Area B (Explosives Production Area), March 30 through April 14, 2004 Holston Army Ammunition Plant, Kingsport, Tennessee, June.

USACHPPM 2004c. RCRA Facility Investigation Work Plan SWMU HSAAP-028 Sedimentation Pond for Fly Ash Landfill, Holston Army Ammunition Plant, Kingsport, Tennessee, August

USACHPPM 2004d. Directorate of Laboratory Sciences Final Analytical Report, Holston Army Ammunition Plant Sedimentation Pond, Holston Army Ammunition Plant, Kingsport, Tennessee, September.

Statement of Basis
Solid Waste Management Units 43, 46, 47, 48 and 49
Burning Ground, Burning Cages, Burning Piles, Sludge Dewatering Station, and Vehicle Wash Pad at Burning Ground
HSAAP-015
Kingsport, Tennessee

INTRODUCTION

This Statement of Basis presents an overview of the environmental investigation and proposed final remedy for soil within Solid Waste Management Unit (SWMU) 43 (Burning Ground), including SMWUs 46 (Burning Cages), 47 (Burning Piles), 48 (Sludge Dewatering Station), and 49 (Vehicle Wash Pad at the Burning Ground) at the Holston Army Ammunition Plant (HSAAP) in Kingsport, Tennessee (Figures 1 and 2). SWMU 43 is the fenced Burning Ground in the southern portion of the HSAAP Area B explosives production area; SWMUs 46 through 49 are component SWMUs located within the fenced perimeter of SWMU 43. These SWMUs are under U.S. Army Installation Restoration Program unit HSAAP-015 in the HSAAP Installation Action Plan. The approved final remedy for soil within SWMUs 43, 46, 48, and 49 is no further action, with groundwater for all five sites being addressed separately as part of AOC-GW, Site-wide Groundwater Area of Concern. The approved final remedy for soil within SWMU 47 is institutional controls to restrict site usage to industrial. The Burning Ground will be addressed in the site closure plan.

SITE BACKGROUND

The Burning Ground (SWMU 43) encompasses approximately 40 acres of Area B and is located south of the explosives production area, adjacent to the Holston River (Figures 1 and 2). The Burning Ground has been used continuously since 1942 for the thermal treatment of off-specification explosives and explosives-contaminated materials (e.g., construction/demolition material from building rehabilitation activities, contaminated packing materials/pallets, and process byproduct oils and chemicals). Materials to be burned are transported to the Burning Ground from throughout the facility. Ashes from burned materials are land-filled, and burned scrap metals are taken to the scrap metal yard. Vegetation covers areas where active treatment operations do not occur. The Burning Ground is surrounded by a barbed wire-topped chain-link fence, and access to the area is restricted

Although the specific various treatment operations have evolved with time, the physical layout of the Burning Ground has remained constant. Over the operational history, the Burning Ground has contained individual areas where wastes have been burned in cages (SWMU 46), on elevated burning pans, ground pads (SWMU 44), burning piles (SWMU 47), and solvent burning tanks (SWMU 50). Other waste management practices at the SWMU have included operation of a sludge dewatering station (SWMU 48) and vehicle wash pad (SWMU 49). Descriptions of the component units within SWMU 43 addressed by this Statement of Basis (SWMUs 46, 47, 48, and 49) are provided below. Two other SWMUs within the Burning Ground, SWMU 44 (Former

Burning Pads) and SWMU 50 (Solvent Burning Tanks), are addressed under separate Statements of Basis because they were separately regulated units during their operations. All of these component SWMUs are located within the boundaries of the fenced Burning Ground and access is controlled.

Burning Cages (SWMU 46): Two burning cages are located at the Burning Ground, approximately 100 feet north (Cage #1) and 100 feet east (Cage #2) of the Burning Pan (Figure 2). Cage #1 is sited atop a gravel area and Cage #2 is underlain by compacted clay. Each wire cage is approximately 20 feet wide by 20 feet long by 18 feet high, surrounded by a 3- to 6-in. concrete curb, and is connected to the HSAAP industrial sewer system. The cages are used to burn explosives-contaminated material such as paper, cardboard, filter cloths, plastic bags, or other light material that might blow away prior to or during burning. The cages are still active.

Burning Piles (SWMU 47): Burning piles have been located on five areas within the Burning Ground since the 1940s to burn materials contaminated with explosives compounds, such as wooden pallets, wooden crates, hoses, scrap metal and piping, metal and cardboard drums, and other heavy or bulky items. After a pile is burned, the ashes and other residue are removed and disposed of in the HSAAP sanitary landfill. The burned metal is disposed of as scrap. The upper few inches of soil are removed to the sanitary landfill and replaced with clean soil and gravel. The five Burning Pile areas (shown in Figure 2) are as follows:

- Burning Piles #1 and #2 are listed as active. Both piles are located in the southwest quadrant of the Burning Ground and are approximately 120 feet in diameter. Pile #1 is centered about 210 feet northwest of the Burning Pans, and Pile #2 is centered about 145 feet east of the northeast corner of the Burning Pans. In 1987, drainage systems were installed beneath these two piles to capture contaminated rainwater that contacted waste materials stockpiled to be burned. The drainage systems were connected to the HSAAP industrial sewer system.
- Burning Pile #3 is located in the southeast section of the Burning Ground and centered 350 feet northeast of Pile #2 and 40 feet east of the drainage ditch. It is oval in shape, with axes of 100 and 175 feet in length. The pile is currently inactive and is comprised of piles of mixed soil and gravel overgrown with grasses and small shrubs.
- Burning Pile #4 is a rectangular area of about 70 by 120 feet, which is located 100 feet from the east side of Pile #3. The pile has been inactive since 1989 and is completely overgrown with grasses and small shrubs.
- Burning Pile #5 is located in the southeast section of the Burning Ground, approximately 400 feet south of Pile #3, and was an oval shape approximately 175 by 125 feet in extent. The pile has been inactive since 1989 and the area is currently covered with vegetative growth.

Sludge Dewatering Station (SWMU 48): The Sludge Dewatering Station is located in the southeast section of the Burning Ground, on the south side of Road 1951-A and east of the major drainage ditch that bisects the Burning Ground (Figure 2). The unit was constructed for the purpose of dewatering wet explosive wastes prior to burning, such as explosives-contaminated sludge from facilities such as impoundments and the industrial waste treatment plant. The actual dates of operation for this unit are unknown, as various historical references indicate that the

facility was either never used for its intended purpose or was operated from the 1940s to 1981. The unit consists of a ramp that is approximately 60 feet long, 20 feet wide, and 3 feet high at the center. The center of the ramp is covered by a corrugated metal roof. A concrete basin is located on the south side of the unit and a several-hundred-gallon, fiberglass water tank is located at the southwest corner of the unit. Wastewater runoff flowed to a baffled settling basin, which discharged to the industrial sewer line. Prior to connection to the industrial sewer system, wastewater was discharged to a ditch and, ultimately, the Holston River.

Vehicle Wash Pad at the Burning Ground (SWMU 49): The Vehicle Wash Pad is located in the southeast section of the Burning Ground, adjacent to the end of Road 1951, which served as the original access point to the area (Figure 2). The wash pad has been in use since 1944 to clean vehicles that transport contaminated materials to the Burning Ground for thermal treatment. The unit consists of a square concrete wash pad approximately 10 feet on each side and surrounded with a 6-in. concrete curb. Prior to 1986, the wash water discharged onto the ground to drain into a ditch running along the east side of the Burning Ground and into the Holston River. The wash pad currently drains to a concrete basin with baffles to remove the sediment, and the water then enters the industrial sewer system.

The current and reasonably anticipated future land use for these units is industrial, government-controlled restricted access. There is no current or anticipated future groundwater use at HSAAP.

SUMMARY OF CONTAMINANT EVALUATION

Multiple environmental investigations were conducted at the Burning Ground (SWMUs 43) and the component units addressed under this Statement of Basis (SWMUs 46, 47, 48, and 49). These investigations include a 1984 and 1986 soil investigation (USAEHA 1984; USACHPPM 2002), monitoring well installation, semiannual groundwater monitoring at perimeter wells since 1981, and the 2002 RFI (USACHPPM 2002)

Seven groundwater monitoring wells were installed around the perimeter of the Burning Ground area in 1980 and sampled semiannually for volatile organic compounds (VOCs) and explosives thereafter. Forty-five sampling events were conducted between October 1981 and January 2002 (USACHPPM 2002). The results of this monitoring have indicated that two slugs of groundwater contaminated with octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX) and hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX) may have passed through the Burning Ground from an upgradient source in 1988 and again in 1996 (USACHPPM 2002). In March 1988, RDX was detected above its 2000 risk-based tap water relevant action level (RAL) of 0.61 μg/L in four of seven perimeter wells at concentrations of 42 μg/L in one side-gradient well, 389 and 144 μg/L in two downgradient wells, and 143 μg/L in an upgradient well. RDX was not detected again at any Burning Ground perimeter well until March 1996, at which time it was observed above its risk-based tap water RAL in four of seven perimeter wells: three upgradient wells at 33.4, 70.5, and 185.2 μg/L, and one downgradient well at 805.5 μg/L. In April 1996, both HMX and RDX were detected at MW-6 on the southern boundary of the Burning Ground at concentrations above their respective 2000 risk-based tap water RALs; HMX was detected at a concentration of 13,000 μg/L (compared to the 2000 risk-based tap water RAL of 1,800 μg/L) and RDX was detected at a concentration of 55,000 μg/L (compared to the 2000 risk-based tap water RAL of 0.61 μg/L).

Neither of these explosives was detected at any of the seven Burning Ground perimeter wells during the subsequent July 1996 sampling event, and no explosives have been detected since. The RFI for the Burning Ground (USACHPPM 2002) concluded that many of these detections were transient in nature and occurred at wells up- and side-gradient of the Burning Ground and its component units.

A total of 75 soil samples were collected from 25 borings throughout the Burning Ground and analyzed for explosives during a 1984 soil investigation (USAEHA 1984). Borings were completed as follows: ten borings within and around the perimeter of SWMU 43, one boring adjacent to SWMU 46, five borings at SWMU 47, one boring at SWMU 48, and two borings at SWMU 49. The remaining samples were collected from six borings associated with two other units at the Burning Ground (SWMU 44 - Former Burning Pads and SWMU 50 - Solvent Burning Tank Unit) and are addressed separately in their respective Statement of Basis documents. While explosives were detected at several locations at SWMUs 46, 48, and 49, the concentrations were below risk-based RALs. RDX was detected at concentrations exceeding risk-based RALs at two locations associated with SWMU 43 and two samples associated with SWMU 47. Within SWMU 43, RDX was detected at locations in the southwest corner (Boring # 6) and the south-central portion (Boring # 22) of the burning ground at concentrations of 28.5 mg/kg [sample from 0 to 0.5 feet below ground surface (bgs)] and 52 mg/kg (sample from 0.25 to 1 feet bgs), respectively. These results exceeded the 2000 residential risk-based RAL (4.4 mg/kg) and industrial RAL (22 mg/kg). An RFI for the Burning Ground was performed in April 2002 (USACHPPM 2002). The RFI included the completion of one boring adjacent to 1984 Boring #6 and two borings adjacent to 1984 Boring #22. The samples were analyzed for explosives; no explosives were detected above the RALs.

At Burning Pile #1 (SWMU 47), RDX was detected in soil in the 0 to 1-feet bgs interval at a concentration of 18.6 mg/kg, which exceeded the 2000 residential risk-based RAL (4.4 mg/kg), but was less than the industrial risk-based RAL (22 mg/kg). At Burning Pile #3 (SWMU 47), detections of both RDX and HMX above risk-based RALs were observed. HMX was detected in the 2 to 3-feet bgs interval at a concentration of 35,500 mg/kg, exceeding the 2000 residential risk-based RAL of 3,100 mg/kg, but below the industrial risk-based RAL of 44,000 mg/kg. RDX exceeded its 2000 residential (4.4 mg/kg) and industrial risk-based RALs (22 mg/kg) in two sample intervals at Burning Pile #3, at concentrations of 44.2 mg/kg (0 to 1 feet bgs) and 4,180 mg/kg (2 to 3 feet bgs). RDX exceeded its 2000 residential risk-based RAL (4.4 mg/kg), but not the industrial RAL (22 mg/kg), at a concentration of 17.5 mg/kg in the 4.5 to 6 feet bgs sample interval at Burning Pile #3. An additional soil investigation was conducted in April 1986, again indicating the occurrence of HMX, RDX, and trinitrotoluene in the subsurface soil of the Burning Ground, particularly in association with Burning Piles #1 and #5 (A.T. Kearney Inc. 1991). A RCRA Facility Investigation (RFI) for the entire Burning Ground was recommended.

In addition to the soil borings completed adjacent to 1984 borings associated with SWMU 43, the 2002 RFI (USACHPPM 2002) also focused on soil and groundwater at the three inactive Burning Piles (SWMU 47, Piles #3 through #5), and the soil at or near the Vehicle Wash Pad (SWMU 49). A total of 59 soil samples were collected from 16 locations (inclusive of temporary and permanent monitoring well locations) and analyzed for explosives. No explosives were

detected above RALs. Analyses for metals and VOCs were also conducted at 7 out of the 16 locations. No metals exceeded risk-based RALs or HSAAP background values.

At Burning Pile #5, two VOCs exceeded risk-based RALs in the 4 to 5.5 feet bgs interval. Benzene was detected at 1.3 mg/kg in a duplicate sample only (exceeding the 2000 residential risk-based RAL of 0.65 mg/kg, but not the industrial risk-based RAL of 1.5 mg/kg). Tetrachloroethene (PCE) was detected in a primary sample and its duplicate at 7.1 and 8.1 mg/kg, respectively, exceeding the 2000 residential risk-based RAL (5.7 mg/kg), but not the industrial risk-based RAL (19 mg/kg).

The 2002 RFI also included the installation of three new groundwater monitoring wells in the southeast part of the Burning Ground and six temporary well points around Burning Piles #3 and #4. Groundwater samples collected from the newly installed wells were analyzed for VOCs and explosives; no VOCs were detected. RDX was detected in groundwater at all three new monitoring wells (screened from about 7 to 17 feet bgs) at concentrations of 5.4, 31, and 270 μg/L, all of which exceeded the 2000 risk-based tap water RAL (0.61 μg/L). RDX was also detected at all six of the temporary well points (screened from 10 to 15 feet bgs) and exceeded the risk-based tap water RAL at five of the six locations with concentrations ranging from 7.4 to 730 μg/L. The highest RDX concentrations in groundwater were observed at the well points south of Burning Pile #3. The 2002 RFI recommended no further action for soil at SWMUs 43, 46, 47, 48, and 49. The RFI recommended that contaminants in the groundwater should be evaluated in conjunction with the site-wide monitoring program.

The previous investigations at SWMUs 43, 46, 47, 48, and 49 adequately characterized the site characteristics and extent of soil and groundwater contamination. The investigation data showed that soil contamination above risk-based RALs occurs predominantly at locations associated with the Burning Piles unit (SWMU 47). However, results of the 2002 RFI did not indicate the presence of explosive compounds cited in the 1984 soil investigation and are representative of current site conditions. Contamination in soil and groundwater predominantly occurs at discrete locations associated with past operational activities and is not indicative of an ongoing source. PCE concentrations in one primary and duplicate sample collected during the 2002 RFI exceeded residential risk-based RALs, but were below industrial risk-based RALs. Concurrent groundwater sampling did not indicate the presence of PCE in site monitoring wells. Groundwater monitoring performed semiannually since 1981 at the Burning Ground has not indicated a release of contaminants to or beyond the unit boundaries.

SELECTED FINAL REMEDY

The selected final remedy for soil within SWMUs 43, 46, 48, and 49 is no further action, with groundwater for all five sites being addressed separately as part of AOC-GW, Site-wide Groundwater. The selected final remedy for soil within SWMU 47 is institutional controls to restrict site usage to industrial.

REFERENCES

A.T. Kearney, Inc. 1991. RCRA Facility Assessment of Holston Army Ammunition Plant, Kingsport, Tennessee, Project No. 68-W9-0040, Draft, August

USAEHA (U. S. Army Environmental Hygiene Agency) 1984. Hazardous Waste Study, Phase 4 of AMC Open-Burning/Open-Detonation Grounds Evaluation, Investigation of Soil Contamination at the Open-Burning Grounds, Holston Army Ammunition Plant, Kingsport, Tennessee, Project No. 37-26-0512-85, November.

USACHPPM (U. S. Army Center for Health Promotion and Preventive Medicine) 1997. Survey Phase RCRA Facility Assessment, Holston Army Ammunition Plant, Kingsport, Tennessee, Project No. 38-EH-5035-96, February

USACHPPM 2002. RCRA Facility Investigation for Solid Waste Management Unit HSAAP-043, Burning Ground, Holston Army Ammunition Plant, Kingsport, Tennessee, USACHPPM Project No. 38-EH-7543-02, April.

Statement of Basis
Solid Waste Management Unit 44
Former Burning Pads
HSAAP-015
Kingsport, Tennessee

INTRODUCTION

This Statement of Basis presents an overview of the environmental investigation and proposed final remedy for soil within Solid Waste Management Unit (SWMU) 44, the Former Burning Pads, at the Holston Army Ammunition Plant (HSAAP) in Kingsport, Tennessee (Figures 1 and 2). This SWMU is under U.S. Army Installation Restoration Program unit HSAAP-015 in the HSAAP Installation Action Plan. The approved final remedy for soil within SWMU 44 is institutional controls to restrict site usage to industrial. The groundwater under SWMU 44 is being addressed separately as part of HSAAP's final remedy for AOC-GW, Area of Concern Site-Wide Groundwater..

SITE BACKGROUND

SWMU 44 is located in Area B within the southwest quadrant of the Burning Ground, south of the explosives production area, and approximately 300 feet north of the Holston River (Figures 1 and 2). Active from the mid-1940s to 1984, the SWMU consisted of two clay-lined burning pads raised several inches above the ground surface. One pad was approximately 140 feet long by 8 feet wide, and the second pad was approximately 176 feet long by 8 feet wide. Contaminated and off-specification explosives were burned on plastic sheets spread over the pads. The unit was closed in 1984, at which time the top 6 in. of soil underlying the pads were excavated, burned to destroy any explosive residues, and then land-filled at the Active Sanitary Landfill (SWMU 17). The excavated area was then backfilled with clean soil, and four metal Burning Pans (SWMU 45) lined with 6 in. of clay were installed atop the location of the two Former Burning Pads (SWMU 44). The burning pad area is secured from unauthorized access by a chain-link fence atop a four-foot high gravel and earthen berm. There is no remaining physical evidence of the Former Burning Pads due to the construction of the present Burning Pans, which are still active. The current and reasonably anticipated future land use at this unit is industrial, government-controlled restricted access.

SUMMARY OF CONTAMINANT EVALUATION

Two phases of environmental investigation were conducted at SWMU 44: a 1984 soil investigation and the 2002 RCRA Facility Investigation (RFI; USACHPPM 2002).

Four soil samples were collected from the footprint of the Former Burning Pads during a 1984 soil investigation at the Burning Ground (USAEHA 1984). The explosive hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX) was detected in two of four samples collected from 0 to 1 foot below ground surface (bgs) at locations in the northwest and southeast portions of SWMU 44.

The 1984 data were not previously compared to risk-based relevant action levels (RALs); therefore, 2008 RALs are used in this report for comparison purposes. At the northwestern sample location, RDX was detected at concentrations of 3.3 mg/kg (0 to 0.75 feet) and 11.1 mg/kg (0.75 to 1 feet). The latter result exceeded the residential risk-based RAL of 4.4 mg/kg, but was below the industrial risk-based RAL of 16 mg/kg. No explosive compounds were detected in any of the sample intervals deeper than 1 foot bgs. The soil investigation concluded that the Former Burning Pads unit was effectively remediated by the removal of contaminated soil and subsequent capping with clay when the new overlying burning pans were constructed in 1984.

Four wells (MW082 through MW085) were installed immediately downgradient of SWMU 44 to monitor the overlying active Burning Pans unit (USACHPPM 2002). Samples were collected from these four monitoring wells on four occasions: November and December 1998 and January and February 1999. There were no detections of explosives above risk-based tap water RALs in these wells.

An RFI for the Burning Ground was performed in April 2002 (USACHPPM 2002). However, no additional sampling was conducted specific to, or in the vicinity of, SWMU 44.

The previous investigations at SWMU 44 have adequately characterized the site characteristics and extent of soil and groundwater contamination. No groundwater contamination above risk-based RALs exists at a short lateral distance downgradient of the unit. No physical evidence of SWMU 44 exists at present.

SELECTED FINAL REMEDY

The approved final remedy for soil within SWMU 44 is institutional controls to restrict site usage to industrial. Groundwater is being addressed separately as part of AOC-GW, Site-wide Groundwater.

REFERENCES

A.T. Kearney, Inc. 1991. RCRA Facility Assessment of Holston Army Ammunition Plant, Kingsport, Tennessee, Project No. 68-W9-0040, Draft, August
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USAEHA (U. S. Army Environmental Hygiene Agency) 1984. Hazardous Waste Study, Phase 4 of AMC Open-Burning/Open-Detonation Grounds Evaluation, Investigation of Soil Contamination at the Open-Burning Grounds, Holston Army Ammunition Plant, Kingsport, Tennessee, Project No. 37-26-0512-85, November.

USACHPPM (U. S. Army Center for Health Promotion and Preventive Medicine) 1997. Environmental Baseline Survey, Holston Army Ammunition Plant, Kingsport, Tennessee, USACHPPM Project No. 38-EH-6956-97, August.

USACHPPM 2002. RCRA Facility Investigation for Solid Waste Management Unit HSAAP-043, Burning Ground, Holston Army Ammunition Plant, Kingsport, Tennessee, USACHPPM Project No. 38-EH-7543-02, April.

Statement of Basis
Solid Waste Management Unit 50
Former Solvent Burn Tank Unit
HSAAP-033
Kingsport, Tennessee

INTRODUCTION

This Statement of Basis presents an overview of the environmental investigation and proposed final remedy for soil within Solid Waste Management Unit (SWMU) 50, the Former Solvent Burn Tank Unit (SBTU), at the Holston Army Ammunition Plant (HSAAP) in Kingsport, Tennessee (Figures 1 and 2). This SWMU is under U.S. Army Installation Restoration Program unit HSAAP-033 in the HSAAP Installation Action Plan. SWMU 50 was initially regulated under a Post-Closure Corrective Action Order and was subject to hazardous waste management closure and post-closure permitting requirements. On June 26, 2002, TDEC approved a HSAAP request to place SWMU 50 under corrective action authority pursuant to alternate mechanisms for closure and post-closure of regulated units (63 Federal Register 56709). This action replaced the closure and groundwater monitoring requirements at SWMU 50 with similar, site-specific requirements developed through the corrective action process. The selected final remedy for soil within SWMU 50 is no further action. Groundwater is being addressed separately as part of AOC-GW, Site-wide Groundwater Area of Concern.

SITE BACKGROUND

SWMU 50 is located in Area B within the southwest quadrant of the Burning Ground, south of the explosives production area, and approximately 700 feet north of the Holston River (Figures 1 and 2). The unit consisted of two metal tanks 10 feet in diameter and 5 feet deep, which were set 4 feet below the ground surface, with the open tops extending 1 foot above the ground surface. The unit was used from the early 1960s to 1984 to burn explosive-contaminated, non-halogenated spent solvents and oils. The southern-most tank was removed in 1982 and the hole was filled with clean soil. Following a directive from the U.S. Army to cease open burning of explosive-contaminated solvents, HSAAP submitted a Closure Plan for the Former SBTU (SWMU 50) on November 2, 1983. In the Closure Plan, the facility stated that contaminated waste solvents would be treated by the HSAAP Industrial Wastewater Treatment Plant. On July 13, 1984, the Tennessee Department of Health and the Environment (predecessor to TDEC) approved the Closure Plan for the Former SBTU (SWMU 50). In 1984, the northern-most tank was drained and excavated; the drained liquids were discharged to the HSAAP industrial sewer. The tank was burned on one of the burning piles (SWMU 47) to remove any residual explosives prior to its disposal. The tank cavity was filled with clean soil and the site covered with 6 in. of gravel. The Former SBTU site is no longer visible and its precise former location is not documented. The presumed location of the former site is covered by a gravel road. The current and reasonably anticipated future land use at this unit is industrial, government-controlled restricted access.

SUMMARY OF CONTAMINANT EVALUATION

Multiple phases of environmental investigation were conducted at SWMU 50 following removal of the Former SBTU in 1984. These investigations include the 1984 soil investigation, the 1997 RCRA Sampling Visit Phase (USACHPPM 1997), the 2002 RCRA Facility Investigation (RFI) for the Burning Ground (USACHPPM 2002c), and Post-Closure Groundwater Monitoring from November 2000 through March 2002 (USACHPPM 2000, 2001, 2002a, and 2002b).

Soil samples were collected in 1984, after the northern-most tank was excavated, during an investigation of the Burning Ground and analyzed for explosives (USAEHA 1984). No explosive contaminants were detected in soil within the footprint or to the south of the Former SBTU (USACHPPM 2002c). The 1991 RCRA Facility Assessment recommended an RFI for the unit as part of an investigation for the entire burning ground (A.T. Kearney Inc. 1991). The 2002 RFI for the Burning Ground (USACHPPM 2002c) did not include additional soil sampling for SWMU 50 because no soil contamination was previously detected at locations associated with the unit during the 1984 investigation and because it concluded that the unit was being sufficiently investigated under Post-Closure Care Plan (PCCP) monitoring.

From late 1995 to early 1997, soil and groundwater assessments were conducted at SWMU 50, including the installation of a groundwater monitoring network in compliance with 40 Code of Federal Regulations Part 265.91. In December 1997, HSAAP submitted a closure certification for the unit and a Closure Report summarizing the results of the soil assessment. The Closure Report concluded that contaminants in the soil presented no threat to human health or the environment and should be allowed to degrade or attenuate by natural processes (USCHPPM 2000). In April 1998, HSAAP submitted a PCCP for the Former SBTU, which specified the monitoring and maintenance activities for the unit and the frequency at which they would be performed. Monitoring wells were constructed subsequent to 1993 at the unit with monitoring wells last installed in August 1999. A total of 15 groundwater monitoring wells were installed specifically to address potential impacts related to SWMU 50.

Six groundwater monitoring wells were sampled from 2000 to 2002 for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and explosive compounds in accordance with the PCCP. No explosives compounds were detected above risk-based relevant action levels (RALs) for tap water at the six SWMU 50 monitoring wells between 2000 and 2002. A total of 14 SVOCs and VOCs were detected in groundwater at least once at concentrations above risk-based tap water RALs during six semiannual events conducted between November 2000 and March 2002 (USACHPPM 2000, 2001, 2002a, and 2002b), as shown in Table 1.

The majority of SVOC and VOC detections occurred in wells STMW-3 and STMW-5, which are located immediately downgradient of the Former SBTU. Data indicate that the SVOC/VOC plume extends to a distance of approximately 170 feet downgradient of the unit. However, concentrations of fuel-related SVOCs have decreased one to two orders of magnitude since the initial groundwater investigation at the unit in 1993, and the overall trend of VOC concentrations since 1995 in downgradient wells has been decreasing (USACHPPM 2002c).

Table 1. Summary of SVOC and VOC Compounds Exceeding Risk-Based Relevant Action Levels at SWMU 50, 2000 to 2002 Post-Closure Groundwater Samples

Chemical Compound	Maximum Detection (µg/L)	Risk-Based RAL[a] (µg/L)
Benzene	2,200	0.41
Bis(2-ethylhexyl)phthalate	390	4.8
Bis(2-chloroethyl)ether	7.6	0.012
Chloromethane	160	1.8
1,1-Dichloroethane	27	2.4
2,4-Dinitrophenol	580	73
2,4-Dinitrotoluene	480	73
Ethylbenzene	46	1.5
Hexachlorocyclopentadiene	240	220
Naphthalene	13	0.14
Pentachlorophenol	240	0.56
Toluene	2,800	2,300
Trichloroethene	3	1.7
Vinyl Chloride	5.7	0.016

RAL - Relevant action level
[a]2008 risk-based tap water RAL

The March 2002 Monitoring Report concluded that the site would be recommended for formal closure as per the terms of the PCCP because the results of groundwater sampling indicated that contaminant concentrations throughout the plume were stable or decreasing, and there is no evidence that contaminants were migrating from the site (USACHPPM 2002b).

Previous investigations at SWMU 50 have adequately characterized the site characteristics and extent of soil and groundwater contamination. The RFI concluded that no soil contamination related to former SWMU operations is present at SWMU 50. Occurrences of contaminants in excess of risk-based RALs are limited to multiple SVOCs and VOCs in groundwater. The extent of groundwater contamination associated with SWMU 50 has been defined, concentrations of VOCs and SVOCs throughout the plume are stable to decreasing, and expansion of the plume beyond its current extent (about 170 feet downgradient of the unit) is not occurring. Long-term monitoring data for downgradient well STMW-15 as part of the AOC-GW network have not indicated the migration of contamination to the SMWU boundary.

SELECTED FINAL REMEDY

The selected final remedy for soil within SWMU 50 is NFA. Groundwater is being addressed separately as part of AOC-GW, Site-wide Groundwater.

REFERENCES

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USAEHA (U. S. Army Environmental Hygiene Agency) 1984. Hazardous Waste Study, Phase 4 of AMC Open-Burning/Open-Detonation Grounds Evaluation, Investigation of Soil Contamination at the Open-Burning Grounds, Holston Army Ammunition Plant, Kingsport, Tennessee, Project No. 37-26-0512-85, November.

USACHPPM (U. S. Army Center for Health Promotion and Preventive Medicine) 1997. Survey Phase RCRA Facility Assessment, Holston Army Ammunition Plant, Kingsport, Tennessee, Project No. 38-EH-5035-96, February.

USACHPPM 2000. Former Solvent Burn Tank Unit Year 2000 Annual Groundwater Monitoring Report, Holston Army Ammunition Plant, Kingsport, Tennessee, Project No. 38-EH-8839-00, November.

USACHPPM 2001. Former Solvent Burn Tank Unit Year 2001 Annual Groundwater Monitoring Report, Holston Army Ammunition Plant, Kingsport, Tennessee, Project No. 38-EH-8839-01, December.

Statement of Basis
Solid Waste Management Unit 70
Production Yard 12
HSAAP-38
Kingsport, Tennessee

INTRODUCTION

This Statement of Basis contains a summary of the location, operating history, contaminants detected, interim measures completed and final remedy selected for Solid Waste Management Unit (SWMU) 70 – Production Yard 12, Storage Area/Welding Pad at the Holston Army Ammunition Plant (HSAAP), Kingsport, Tennessee. In the Army's current Installation Restoration Program (IRP), this site is included in HSAAP-38.

SITE BACKGROUND

The production yards, also referred to as the storage yards, are located throughout HSAAP. The yards are used to store materials awaiting use, materials for reuse, materials awaiting decontamination, decontaminated material, and material that may be scrapped. The yards are of variable size and most have crushed rock covering the ground surface. Most items stored in the yards are stored off the ground on railroad ties or on other support material such as concrete blocks. The majority of the items stored in the yards are ferrous or stainless steel pipes and tanks used in the various manufacturing processes.

SWMU 70 – Production Yard 12, (Figures 1 and 2) is located in the central portion of the Area B Shop Area. It is associated with the storage of lead soldering equipment on a concrete pad under a covered porch at Building 550. The SWMU is identified as the gravel covered area immediately adjacent to Building 550. The soils may have been contaminated with lead solder from the soldering equipment.

The contaminant of concern is lead.

SUMMARY OF CONTAMINANT EVALUATION

Environmental samples were collected at SWMU 70 – Production Yard 12 from surface soils. Samples have been analyzed for lead. Elevated lead contamination was identified adjacent to a concrete porch attached to Building 550.

Soil: Four surface soil samples were collected in November 2000 (Figure 3; USACHPPM, 2002). The samples were analyzed for total lead. Elevated concentrations of lead ranging from 18,800 mg/kg to 192,000 mg/kg were detected in the surface soils at Building 550. The lead concentrations exceeded background levels and the 2004 EPA Region 9 (Region 9) Industrial Preliminary Remedial Goal (PRG) of 800 mg/kg for lead in soil.

Due to the elevated lead contamination in the 2000 sampling event, an Interim Measure was performed to remove the area of lead-contaminated soil. In May 2005, the upper one foot of soil was removed from the area adjacent to the concrete pad (Figure 4). Thirteen cubic yards of soil were removed during the May 2005 event. Eight sidewall and seven bottom locations were sampled for lead after excavation was complete. Eleven samples were below the Region 9 Residential PRG of 400 mg/kg. The samples from three locations were above the Region 9 Industrial PRG of 800 mg/kg. One additional sample was above the Region 9 Residential PRG of 400 mg/kg.

In July 2005 an additional one foot of soil was removed from the areas that exceeded the Region 9 Residential PRG (Figure 5). Two cubic yards of soil were removed during the July 2005 event. The excavation bottom was again sampled in 3 locations. After this second excavation event, all verification analyses were below the Region 9 Residential PRG of 400 mg/kg for lead in soil. Characterization testing of excavated soil indicated the material was classified as a D008 RCRA-hazardous waste. A total of 15 cubic yards of contaminated soil was approved for disposal at the Michigan Disposal Waste Treatment Plant in Belleville, Michigan. In July 2005 the soil was manifested, transported, treated, and disposed of at the Belleville, Michigan facility.

Groundwater: The contamination was limited to surficial soils; groundwater has not been impacted by SWMU 70 activities.

SELECTED REMEDY

The IM was successful in removing lead contaminated soil to below relevant regulatory levels and reducing the risk to human exposure and the environment. No further action is warranted at SWMU 70 – Production Yard 12, Storage Area/Welding Pad.

REFERENCES

Bay West, 2005. Interim Measures Report, SWMU 70 – Production Yard 12, Storage Area/Welding Pad (HSSAP-38), Holston Army Ammunition Plant, Kingsport, Tennessee, U.S. Army Corps of Engineers, Mobile District, Bay West, Inc., September 2005.

U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM), 2002. Additional Confirmatory Sampling (ACS) Report for the Holston Army Ammunition Plant, (HSAAP), Kingsport, Tennessee, 13-16 November 2000 and 24-27 October 2001, USACHPPM Project No. 38-EH-7977-02, USACHPPM, March 2002.

Statement of Basis
Solid Waste Management Units 77, 78, 86 and 87
Pesticide Areas Near Building 148
HSAAP-26
Kingsport, Tennessee

INTRODUCTION

This Statement of Basis contains a summary of the location, operating history, contaminants detected, interim measures, and remedy selected for Solid Waste Management Units (SWMUs) 77, 78, 86 and 87, Pesticide Areas near Building 148, at the Holston Army Ammunition Plant (HSAAP), Kingsport, Tennessee. In the Army's current Installation Restoration Program (IRP), this site is included in HSAAP-26.

SITE BACKGROUND

SWMUs 77, 78, 86 and 87 are located in the Area B shop area, southeast and east of Building 148 (Figures 1 and 2). Building 148 was constructed around 1970 and was used as the pesticide mixing and handling area for HSAAP until 1998. The septic tank and drain field were also constructed in 1970. Pesticides were prepared and equipment and personnel were rinsed off in the building and on the gravel driveway on the northeast side of the building. In 1976, a concrete pre-filter tank (SWMU 77, Pesticide Rinsate UST 148-1) was constructed upstream of the septic tank. The pre-filter tank was connected to the floor and sink drains in Building 148 and to the drain for the outdoor washdown station (SWMU 87, Active Pesticide Wash-Down Area). The pre-filter tank was filled with 1-inch aggregate and was used to separate solids from wastewater. Wastewater flowed from the pre-filter tank to a 130-cubic foot capacity septic tank (SWMU 78, Pesticide Rinsate UST 148-2). From the septic tank, wastewater flowed to a drain field (SWMU 86, Pesticide Drain Field). Drain field tiles were reportedly set in gravel and buried 18 inches below the surface. The drain field was approximately 12 feet wide by 60 feet long. The building floor drains and the outside washdown station drain were plugged in 1986. The sink remained connected to the pre-filter tank. The pre-filter and the septic tanks were removed in July 2004.

The contaminants of concern at SWMUs 77, 78, 86 and 87 are pesticides and herbicides.

SUMMARY OF CONTAMINANT EVALUATION

Environmental samples were collected from site soil and groundwater and analyzed for pesticides and herbicides. Elevated pesticide and herbicide contamination has been identified in the soil and groundwater in the vicinity of the drain field.

Soil/Sediment: Soil samples have been collected at the SWMUs as part of RCRA Facility Investigation (RFI) activities in May 1997, March 2003, and March 2004. In May 1997, eight soil samples were collected from four borings near the drain field (Figure 3; USACHPPM, 1998). The samples were analyzed for herbicides and pesticides. The only pesticide or herbicide

that exceeded the 2004 EPA Region 9 (Region 9) Residential Preliminary Remediation Goals (PRGs) in the samples from the borings was dieldrin in the composite sample from the Boring H-86-4, completed in the east end of the drain field. The dieldrin concentration was 0.08 mg/kg; the Region 9 Residential PRG is 0.03 mg/kg.

Two sediment samples and two surface soil samples were also collected in 1997 (Figure 3). The sediment samples, H-87-1 and H-87-2, were collected in the drainage ditches to the south and southwest of the washdown pad. One soil sample was collected under the faucet on the east side of Building 148 (H-87-4) and a second soil sample was collected south of the washdown pad (H-87-3). Chlordane concentrations exceeded the Region 9 Residential PRG in the two samples from the ditches. Chlordane concentrations in the ditch samples ranged from 2.24 mg/kg to 3.72 mg/kg; the Region 9 Residential PRG is 1.6 mg/kg. Aldrin in ditch sample H-87-2 was 0.08 mg/kg which is above the Residential PRG of 0.029 mg/kg. The sample beneath the faucet, H-87-4, exhibited a chlordane concentration of 40.1 mg/kg; this concentration exceeded the Region 9 Industrial PRG of 6.5 mg/kg. This sample also contained 4,4-DDD above the Region 9 Residential PRG (7.37 mg/kg versus 2.4 mg/kg).

In March 2003, 71 soil samples were collected from 37 borings in the area of Building 148 (Figures 4 and 5; USACHPPM 2004a). The samples were analyzed for pesticides and herbicides. One or more pesticides or herbicides were detected in 19 of the 71 soil samples collected. Of those 19 samples, only four samples exhibited concentrations of one or more pesticides above the Region 9 Industrial PRGs. These samples were:

- Sample 25B, north east of drain field, depth 3.2’ to 3.8’ – Dieldrin (0.113 mg/kg versus PRG of 0.11 mg/kg)
- Sample 29B, south of the west end of the drain field, depth 3.6’ to 3.9’ – Dieldrin (0.68 mg/kg versus PRG of 0.11 mg/kg)
- Sample 31B, west end of drain field, depth 2.6’ to 3.0’ – Aldrin (2.04 mg/kg versus PRG of 0.1 mg/kg), chlordane (28.6 mg/kg vs. PRG of 6.5 mg/kg), and dieldrin (1.44 mg/kg versus PRG of 0.11 mg/kg). This sample also contained heptachlor above the Region 9 Residential PRG (0.344 mg/kg versus PRG of 0.11 mg/kg).
- Sample 32B, center of drain field, depth 3.0’ to 3.4’ – Aldrin (0.626 mg/kg versus PRG of 0.1 mg/kg). This sample also contained chlordane and dieldrin above their respective Region 9 Residential PRGs (chlordane - 2.04 mg/kg versus PRG of 1.6 mg/kg and dieldrin - 0.0956 mg/kg versus PRG of 0.03 mg/kg).

Two additional samples exhibited concentrations of pesticides above their Region 9 Residential PRGs, namely, sample 27B, south of the eastern end of the drain field (depth 3.5’to 4.0’; dieldrin- 0.0778 mg/kg versus PRG of 0.03 mg/kg) and sample 36A, north of the western end of the drain field (depth 3” to 6”; chlordane - 1.85 mg/kg versus PRG of 1.6 mg/kg).

In March 2004, eleven soil samples were collected from eight borings (USACHPPM, 2004b). Four borings were completed around the pre-filter tank and four borings were completed around the septic tank (Figure 6). The borings were completed approximately two feet below the bottom of the tanks, a depth of approximately 8 feet at the pre-filter tank and 9 feet at the septic tank. Six soil samples were collected at the pre-filter tank and five samples were collected at the septic

tank. The samples were analyzed for pesticides and herbicides. The only pesticide or herbicide above the Region 9 Residential PRGs at the pre-filter tank was aldrin in H-77-1, the sample from the southeast corner of the tank (0.0748 mg/kg versus PRG of 0.029 mg/kg). This aldrin concentration was below the Industrial PRG of 0.1 mg/kg. None of the pesticides detected at the septic tank exceeded the Region 9 Residential PRGs. There were no herbicides detected in the samples from the septic tank.

The presence of pesticides above the Region 9 Industrial PRGs in and immediately adjacent to the drain field and beneath the faucet at Building 148 resulted in an IM to remove the contamination. In May 2005, excavation was completed at the drain field and beneath the faucet. The drain field (approximately 25 feet by 75 feet), an area immediately east of the drain field (approximately 19 feet by 15 feet), and an area immediately to the southwest of the drain field (approximately 23 feet by 13 feet) were excavated to 4.5 feet below grade (Figure 7). An area approximately three feet wide by five feet long by one foot deep was excavated beneath the faucet. The IM resulted in 325 cubic yards of soil being removed.

One soil sample was collected beneath the former pre-filter tank, two samples were collected beneath the former septic tank, and one sample was collected from the bottom of the excavation beneath the faucet. Thirteen sidewall and nine bottom samples were collected from the drain field excavation. All the samples were analyzed for pesticides and herbicides. The pesticides and herbicides were all below the Region 9 Industrial PRGs. All the pesticides and herbicides were also below the Region 9 Residential PRGs except for the two samples beneath the former septic tank (077-SE-002 and 077-SE-003). Chlordane in those samples ranged from 2.3J (J is the laboratory designation for an estimated quantity) mg/kg to 3.4J mg/kg; the chlordane Region 9 Residential PRG is 1.6 mg/kg.

Four composite surface soil samples were collected from the perimeter of the contaminated soil stockpile. The samples were collected to confirm that no contaminated material washed off the piles during storm events that damaged the plastic covers. The samples were analyzed for pesticides and herbicides. There were no pesticides and herbicides detected above their Region 9 Residential PRGs.

Characterization testing indicated the soil was a non-hazardous waste. The soil was approved for disposal at the Allied Waste/BFI Carter Valley Landfill in Church Hill, Tennessee. The soil was transported and disposed in September 2005.

At the completion of IM activities, there were five areas at the SWMUs shown in Figure 8 where soil concentrations are above the Residential PRGs, namely:

- Beneath the former septic tank
- 1997 Ditch Sample H-87-1
- 1997 Ditch Sample H-87-2
- 2003 Boring 27
- 2003 Boring 36

Groundwater: In 1997, groundwater monitoring wells, MW-72, MW-73, MW-74, and MW-75, were completed in and around the drain field (USACHPPM, 1998). Water level measurements indicated a groundwater flow direction to the south (Figure 3). Groundwater samples were analyzed for pesticides and herbicides. The analysis found pesticides in three of the four wells and herbicides in all the wells. The highest concentrations were in well MW-74, the well completed in the east end of the drain field. The EPA maximum contaminant levels (MCLs) were exceeded for chlordane (4.26 ug/L versus 2 ug/L), 2,4-D (151 ug/L versus 70 ug/L), and 2,4,5-TP (113 ug/L versus 50 ug/L) in MW-74, and for 2,4,5-TP (88 ug/L versus 50 ug/L) in MW-75. The EPA drinking water equivalent level (DWEL) for dieldrin was exceeded in MW-74 (2.76 ug/L versus 2 ug/L).

In March 2003, thirteen temporary monitoring wells were installed, sampled and then abandoned (Figures 4 and 5; USACHPPM 2004a). Water level measurements collected in the four existing wells and 13 temporary wells indicated a southwesterly flow in the area of the drain field.

Groundwater samples were collected from the four existing wells and the 13 temporary wells in March 2003. The samples were analyzed for pesticides and herbicides. At least one pesticide or herbicide was detected in all 17 samples collected. However, only one sample exhibited compounds above the MCLs or DWELs. That sample was from MW-74, a well which was completed in the drain field. Chlordane was detected in MW-74 at a concentration of 19.03 ug/L (MCL = 2 ug/L) and dieldrin was detected at 5.39 ug/L (DWEL = 2 ug/L).

Well MW-74 was abandoned in April 2005 at the start of IM activities.

There are no current uses of groundwater at HSAAP and no future groundwater uses are known or anticipated in the vicinity of the SWMUs. The removal of the contaminated soil at the drain field has removed the major contributing source of contamination in the downgradient wells. Groundwater is being addressed separately under a site-wide groundwater (AOC-GW) RFI. Downgradient wells MW-73 and MW-75 will be monitored as part of the site-wide groundwater long term monitoring (LTM)/long term operation (LTO) program. The wells will be analyzed for pesticides and herbicides. Data from these wells will be incorporated into an evaluation of a final remedy for site-wide groundwater under the RFI for Site-Wide Groundwater Area of Concern (AOC-GW).

SELECTED FINAL REMEDY

RFI activities have adequately defined contaminant conditions at SWMUs 77, 78, 86 and 87. The Interim Measure was successful in removing pesticide/herbicide-contaminated soil to below relevant regulatory levels. The site remains under government control and in industrial use; any change in usage is unlikely. Therefore, there is no significant risk to human health and the environment under current and foreseeable future use. To prevent uncontrolled human exposure to the contaminants that remain above the Region 9 Residential PRGs, the selected remedy is to implement land use/institutional controls at the site. These controls would consist of excavation restrictions to prevent unauthorized/uncontrolled soil disturbance.

REFERENCES

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USACHPPM, 2004a. RCRA Facility Investigation, Solid Waste Management Unit HSAAP-086, Building 148 Pesticide Rinsate Drain Field and Related Units, Holston Army Ammunition Plan, Kingsport, Tennessee, 10-20 March 2003, EPA ID No. TN5 21-002-0421, USACHPPM Project No. 38-EH-6690-03, USACHPPM, March 2004.

USACHPPM, 2004b. RCRA Facility Investigation Addendum, Solid Waste Management Unit HSAAP-086, Building 148 Pesticide Rinsate Drain Field and Related Units, Holston Army Ammunition Plan, Kingsport, Tennessee, 29-31 March 2004,EPA ID No. TN5 21-002-0421, USACHPPM Project No. 38-EH-6690-03A; USACHPPM, May 2004.

Statement of Basis
Solid Waste Management Unit 83
Waste Thermal Treatment Units
HSAAP-27
Kingsport, Tennessee

INTRODUCTION

This Statement of Basis contains a summary of the location, operating history, contaminants detected, interim measures, and remedy selected for Solid Waste Management Unit (SWMU) 83, Waste Thermal Treatment Units, at Holston Army Ammunition Plant (HSAAP), Kingsport, Tennessee. In the Army's current Installation Restoration Program (IRP), this site is included in HSAAP-27.

SITE BACKGROUND

SWMU 83 is located in the southeast corner of the Area B Shop Area off of Road 1967 (Figures 1 and 2). The Decontamination Oven was previously closed due to an explosive mishap. It thermally treated metal materials that are or may be contaminated with explosive residue. The unit is currently operated on an intermittent basis. The unit consists of two decontamination ovens referred to as the tall and low ovens. Each oven is located on a concrete pad.

The ground surface in front of each oven is covered with crushed rock. Ash-like residue mixed in the gravel near the front of each of the ovens has been observed and was the result of past practices. This residue came from the oven floors, which were periodically swept out by the operators. Most of the residue originated from rust flaking off the interior of the ovens' metal walls and doors. This residue from the ovens may have impacted the soils adjacent to the site with explosives and metals.

The contaminants of concern are explosives and metals.

SUMMARY OF CONTAMINANT EVALUATION

Environmental samples were collected at SWMU 83 from surface soils and sediments in drainage ditches. Samples have been analyzed for metals and explosives. Elevated metals contamination (chromium, lead, and zinc) were identified in a limited area. Low levels of explosives were detected but eliminated as contaminants of concern due to their concentrations being significantly below cleanup goals.

Soil/Sediment: Five surface soil samples were collected in January 2000 (Figure 3; USACHPPM, 2000). The samples were analyzed for explosives and metals. There were no explosives detected above remedial action levels. Of the metals, only lead, at 12,000 mg/kg, exceeded the 2004 Environmental Protection Agency (EPA) Region 9 (Region 9) Industrial Preliminary Remediation Goal (PRG) of 800 mg/kg in a soil sample of the runoff drainage way.

In March 2005, 17 surface soil samples were collected from 15 locations along the drainage way (Figure 4) and analyzed for lead and chromium. All the results were below the remedial action levels for lead and chromium.

Due to the elevated metals contamination in the 2000 sampling event, an Interim Measure was performed to remove an area of metals-contaminated soil. In July 2005, the upper one foot of soil was removed from an area 22 feet long by 5 feet wide (Figure 5). Four sidewall and two bottom samples were obtained from the July 2005 excavation and analyzed for lead and chromium (Figure 6). All samples were below background concentrations and Region 9 Residential PRGs.

Testing indicated the excavated soil was classified as a non-hazardous waste. A total of four cubic yards of contaminated soil was approved for disposal at the Allied Waste/BFI Carter Valley Landfill in Church Hill, Tennessee. In September 2005, the soil was transported and disposed at the landfill.

Groundwater/Surface Water: The contamination was limited to surficial soils. Samples of sediments in the ditch did not exhibit contamination. Groundwater and surface water have not been impacted by SWMU 83 activities.

SELECTED REMEDY

The Interim Measure was successful in removing metal-contaminated soil to below relevant regulatory levels and reducing the risk to human health and the environment. No further action is warranted at SWMU 83, Waste Thermal Treatment Units.

REFERENCES

Bay West, 2005. RCRA Facility Investigation/Interim Measures Report, SWMU 83 – Waste Thermal Treatment Units, Holston Army Ammunition Plant, Kingsport, Tennessee, U.S. Army Corps of Engineers, Mobile District, Prepared by Bay West, Inc., September 2005.

U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM), 1997. Survey Phase, RCRA Facility Assessment No. 38-EH-5035-96, Holston Army Ammunition Plant, Kingsport, Tennessee, 8-16 July 1996, USACHPPM, February 1997.

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Statement of Basis
Solid Waste Management Unit 88
WWII Pesticide Washdown Area
HSAAP-26
Kingsport, Tennessee

INTRODUCTION

This Statement of Basis contains a summary of the location, operating history, contaminants detected, interim measures, and remedy selected for Solid Waste Management Unit (SWMU) 88, WWII Pesticide Washdown Area, at the Holston Army Ammunition Plant (HSAAP), Kingsport, Tennessee. In the Army's current Installation Restoration Program (IRP), this site is included in HSAAP-26.

SITE BACKGROUND

SWMU 88 is located at the western end of the shop area of Area B (Figures 1 and 2), south of Road 1966 and Building 105. The WWII Wash Rack (SWMU 53) is located immediately to the north. A drainage ditch is located approximately 100 feet west of the SWMU and a gravel parking/storage area is immediately to the east. Site-wide groundwater monitoring well MW-86 is located south of the SWMU at the toe of the slope; site-wide groundwater monitoring well MW-124 is located to the southeast at the same approximate elevation as SWMU 88. The unit consists of a pit that was filled with 6-inch cobbles. The pit was approximately 20 feet wide by 35 feet long by 2.5 feet deep. The SWMU was used to rinse off pesticide dispersing equipment between the 1940s and the early 1970s.

The contaminants of concern at SWMU 88 are pesticides, herbicides and unknown petroleum products.

SUMMARY OF CONTAMINANT EVALUATION

Environmental samples were collected from soil and groundwater in the vicinity of the SWMU and analyzed for pesticides, polychlorinated biphenyls (PCBs), herbicides, and total petroleum hydrocarbons (TPH). Contamination was present in site soils and monitoring wells in the area.

Soil: RFI activities were completed at the SWMU in May 1997 and August 2004. Four soil samples were collected from two borings during the May 1997 Sampling Visit Phase (USACHPPM, 1998). One boring was completed on the north side of the pit and the second boring was completed on the south side of the pit (Figure 3). The samples were analyzed for pesticides and herbicides. The sample from 6 to 8 feet below ground surface (bgs) in the southern boring was also analyzed for TPH after a fuel odor was detected in the sample. No compounds were detected above the 2004 EPA Region 9 (Region 9) Industrial Preliminary Remediation Goals (PRGs). The only pesticide above the Region 9 Residential PRGs was chlordane in the sample from 6 to 8 feet bgs in the southern boring. Total chlordane in that

sample was 5.24 mg/kg (Region 9 Residential PRG – 1.6 mg/kg). The TPH analysis of that sample indicated a concentration of 4,900 mg/kg. The current TDEC TPH Non-Drinking Water Action Level (TDEC Action Level) for soils with permeability between 10^{-4} to 10^{-6} cm/sec is 500 mg/kg.

Sixteen soil samples were collected from five borings completed at the SWMU in August 2004 (Figure 3). The samples were analyzed for pesticides and herbicides. The only compound exceeding the EPA Region 9 Industrial PRGs was chlordane in two samples from boring H-88-3, completed on the southern side of the pit. The chlordane concentrations ranged from 9.01 mg/kg to 19.12 mg/kg; the Region 9 Industrial PRG is 6.5 mg/kg. Heptachlor was present above the Region 9 Residential PRG in the same two samples and ranged from 0.118 mg/kg to 0.337 mg/kg; the Region 9 Residential PRG is 0.11 mg/kg. Petroleum odors were noted at varying depths in the southern, eastern and central borings at the SWMU. No samples were collected for TPH analysis in 2004.

Soil Remediation: As pesticides and TPH were present above action levels, to reduce human exposure an Interim Measure (IM) was performed to remove pesticide- and TPH-contaminated soil. An area approximately 39 feet by 33 feet was excavated in July 2005 (Figure 4). The depth of the excavation varied from eight feet on the north end to fourteen feet on the south end. Twelve sidewall and seven bottom samples were collected from the excavation and analyzed for pesticides and herbicides. All the pesticides and herbicides were below the Region 9 Industrial PRGs. However, the sample from the eastern area of the northern sidewall (sample 088-SE-014 on Figure 4) contained two pesticides over the Residential PRGs (but below the Industrial PRGs), aldrin (0.035 mg/kg versus PRG of 0.029 mg/kg) and dieldrin (0.043 mg/kg versus PRG of 0.03 mg/kg). The area of boring 088-SE-014, which exhibited two pesticides above their Region 9 Residential PRGs, was not excavated further, because the contaminant levels were below the action levels, the Region 9 Industrial PRGs. All the TPH concentrations were below the TDEC Action Level of 500 mg/kg except for the sample from the southwest bottom of the excavation, which was 516 mg/kg. In September 2005, additional soil was excavated from the southwest corner of the excavation. Two soil samples were collected from one location and analyzed for TPH. The TPH results were below the 500 mg/kg TDEC Action Level.

A total of 310 cubic yards of soil was characterized as a non-hazardous waste. The soil was approved for disposal at the Allied Waste/BFI Carter Valley Landfill in Church Hill, Tennessee. The soil was transported and disposed in September 2005.

Groundwater: There are two groundwater wells downgradient of SWMU 88, namely MW-86 and MW-124. MW-86, installed in 2001, was sampled once a year in 2001, 2003, and 2004, and twice in 2002 as part of the site-wide groundwater RFI. MW-86 was sampled once in 2004 as part of SWMU 88 RFI activities, and twice in 2005 and 2006 as part of site-wide groundwater long-term maintenance (LTM)/long-term operations (LTO) activities. MW-124, installed in 2005, was sampled twice in 2006 as part of site-wide groundwater LTM/LTO activities.

Well MW-86 is located approximately 100 feet south of SWMU 88 (Figure 2). MW-86 was installed in 2001 as part of the site-wide groundwater RFI. In 2001 and 2002, groundwater samples from this well were analyzed for volatile organic compounds (VOCs), semivolatile

organic compounds (SVOCs), metals and explosives. A groundwater sample was analyzed for VOCs and explosives in 2003 and for explosives in 2004. The only analytes detected in any of the site-wide groundwater RFI sampling events were metals in the 2001 and 2002 rounds. All the metals results were below the Region 9 Tap Water PRGs except for arsenic in the sample collected in 2002. The arsenic concentration was below the maximum contaminant level (MCL) for arsenic. The site-wide groundwater report (USACHPPM, 2002) stated that TDEC has indicated that the carcinogenic arsenic PRG is not applicable to the site-wide groundwater investigation.

As part of the site-wide groundwater RFI, groundwater elevation data collected in February 2004 (USACHPPM, 2004a) indicates that the shallow groundwater flow direction in the area of MW-86 and SWMU 88 is to the southeast (Figure 5).

Monitoring well MW-86 was sampled during the August 2004 SWMU 88 RFI. The sample was analyzed for pesticides and herbicides. No hazardous constituents were detected. A temporary well point was installed to the southeast of the SWMU in August 2004. The temporary well never yielded sufficient water to permit sample collection; the temporary well was abandoned in July 2005.

Monitoring well MW-86 was sampled twice in 2005 as part of site-wide groundwater LTM/ LTO activities. The samples were analyzed for pesticides and herbicides. No hazardous constituents were detected.

Monitoring well MW-124 was installed in December 2005 as part of the site-wide groundwater RFI (Figure 2). Wells MW-86 and MW-124 were sampled during the first round of 2006 site-wide groundwater LTM/LTO activities. The samples were analyzed for pesticides, herbicides and TPH. No hazardous constituents were detected.

There are no current uses of groundwater at HSAAP and no future groundwater uses are known or anticipated in the vicinity of SWMU 88. The removal of the contaminated soil at the SWMU has removed the major contributing source of contamination in the downgradient wells. Wells MW-86 and MW-124 will be monitored as part of the site-wide groundwater LTM/LTO program. The wells will be analyzed for pesticides, herbicides, and TPH. Data from these wells will be incorporated into an evaluation of a final remedy for site-wide groundwater under the RFI for Site-Wide Groundwater Area of concern (AOC-GW).

SELECTED FINAL REMEDY

RFI activities have adequately defined contaminant conditions at SWMU 88. The Interim Measure was successful in removing TPH/pesticide-contaminated soil at the site to below relevant regulatory levels. The site remains under government control and in industrial use; any change in usage is unlikely. Therefore, there is no significant risk to human health and the environment under current and foreseeable future use. To prevent uncontrolled human exposure to the contaminants that remain above the Region 9 Residential PRGs, the selected remedy is to establish land use/institutional controls at the site. These controls would consist of excavation restrictions to prevent unauthorized/uncontrolled soil disturbance at the site.

REFERENCES

Bay West, 2006. RCRA Facility Investigation/Interim Measures Report, SWMU 88 – WWII Pesticide Washdown Area, (HSAAP-26), Holston Army Ammunition Plant, Kingsport, Tennessee, FPRI Environmental Remediation Services, Contract W9128F-04-D-0018 Task Order #0001, Bay West, Inc., April 2006.

U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM), 1998. Sampling Visit Phase, RCRA Facility Assessment Release Assessment No. 38-EH-5694-97, Holston Army Ammunition Plant, Kingsport, Tennessee, 12-22 May and 8-19 September 1997, USACHPPM, May 1998.

USACHPPM, 2002. RCRA Facility Investigation Report for Site-Wide Groundwater, April – June 2001 and January 2002, Holston Army Ammunition Plant, Kingsport, Tennessee, EPA ID No. TN5 21-002-0421, USACHPPM Project No. 38-EH-5089-02, USACHPPM, May 2002.

USACHPPM, 2003. RCRA Facility Investigation Report for Site-Wide Groundwater, July 2002 and January 2003, Holston Army Ammunition Plant, Kingsport, Tennessee, EPA ID No. TN5 21-002-0421, USACHPPM Project No. 38-EH-5089-03, USACHPPM, May 2003.

USACHPPM, 2004a. RCRA Facility Investigation Report, Site-Wide Ground-Water Monitoring, February, Holston Army Ammunition Plant, Kingsport, Tennessee, USACHPPM, June 2004.

USACHPPM, 2004b. RFI Work Plan for the WWII Pesticide Rinsate Washdown Area, Holston Army Ammunition Plant (HSAAP), Kingsport, Tennessee, 17-20 August 2004, USACHPPM, July 2004.

Statement of Basis
Solid Waste Management Unit 96
Producer Gas Building, Coal Tar Liquor Storage Tanks
HSAAP-037
Kingsport, Tennessee

INTRODUCTION

This Statement of Basis presents an overview of the environmental investigation and proposed final remedy for soil within Solid Waste Management Unit (SWMU) 96, the Producer Gas Building, Coal Tar Liquor Storage Tanks, at the Holston Army Ammunition Plant (HSAAP) in Kingsport, Tennessee (Figures 1 and 2). This SWMU is under U.S. Army Installation Restoration Program unit HSAAP-037 in the HSAAP Installation Action Plan.

SITE BACKGROUND

SWMU 96 is located in the eastern portion of Area A, on the west side of Building A-10 (Producer Gas Facility), and approximately 200 feet north of the Holston River (Figures 1 and 2). The SWMU consists of the location of two former steel storage tanks and a diked containment area (Figure 3). The diked containment area had 18-in.-high concrete walls and an earthen floor. The tanks were used to store coal tar liquor, which was a byproduct of coal gasification performed in Building 10 from 1943 to January 1993. The Producer Gas Facility converted coal into low-British thermal unit gas to fuel acetic anhydride production furnaces. The coal tar liquor byproduct consisted largely of water and soluble fractions of coal tar from gas scrubbing operations. The coal tar liquor was transferred to the tanks by a pipeline and allowed to evaporate. Heaters were located beneath the tanks to accelerate evaporation. Periodically, accumulated residues were removed and the tanks cleaned. HSAAP removed the tanks and concrete dike in early 1996. Visible soil contamination beneath and adjacent to the tanks was removed to estimated maximum depths of about 7 feet. The excavated area was backfilled with clean clay-rich soil and covered with about 6 inches of gravel. The current and reasonably anticipated future land use at this unit is industrial, government-controlled restricted access.

SUMMARY OF CONTAMINANT EVALUATION

Four phases of environmental investigation were conducted at SWMU 96. These investigations include the 1997 RCRA Sampling Visit Phase (USACHPPM 1997), the 2002 RCRA Facility Investigation (RFI; USACHPPM 2002), and two groundwater and subsurface characterization efforts in October 2002 and August 2003. The latter two investigations were categorized as an interim measures (IM) investigation and an additional IM investigation (USACHPPM 2003b and 2003c). Based on the results of the investigations at SWMU 96, a Corrective Measures Study (CMS) was also prepared (USACHPPM 2003a) in 2003. Furthermore, an IM removal action was performed in 2004. The majority of soil contamination at SWMU 96 was removed during this 2004 IM, consistent with the recommended alternative and goals contained in the CMS.

The 1997 Sampling Visit Phase included sampling of soil from five borings and installation and sampling of three groundwater monitoring wells. The 1997 investigation showed the presence of one semivolatile organic compound (SVOC), benzo(*a*)pyrene, associated with coal tar above its risk-based relevant action level (RAL) in effect at that time in soil at depths of 5 to 7 feet below ground surface (bgs). The maximum benzo(*a*)pyrene detection was 1.9 mg/kg compared to the residential risk-based RAL (0.062 mg/kg) and the industrial risk-based RAL (0.29 mg/kg). The Sampling Visit Phase Report concluded that potential releases from SWMU 96 had occurred and recommended additional investigation under an RFI.

The RFI Phase was performed in February and May 2002 (USACHPPM 2002). A total of 84 soil samples (including field duplicate samples) were collected from 38 borings completed to depths ranging from 8 to 12 feet bgs. Four existing monitoring wells were sampled, and temporary wells were installed in two of the soil borings and sampled. The RFI demonstrated that coal tar-related SVOC concentrations exceeded risk-based RALs (Table 1) at that time for an industrial site at depths below the soil backfill zone placed at the time of tank removal (6 to 8 feet bgs and 11 to 12 feet bgs). The extent of soil contamination was confined to two zones: (1) the vicinity of the former western coal tar liquor tank and bermed enclosure; and (2) along the north and west edges of the northernmost decanter building, extending to the south to the former exhauster building (Figure 3). Groundwater samples did not contain SVOCs above risk-based RALs. However, benzene (maximum detection of 14 ug/L) was detected above its U. S. Environmental Protection Agency (EPA) primary drinking water maximum contaminant level (MCL) of 5 ug/L and arsenic (maximum detection of 5.26 ug/L) was detected above its MCL (5 ug/L) in one well (MW-80).

Table 1. Summary of Semivolatile Organic Compounds Exceeding Industrial Risk-Based Relevant Action Levels at SWMU 96, 2002 RFI Soil Samples

Chemical Compound	Maximum Result (mg/kg)	Residential Risk-Based RAL[a] (mg/kg)	Industrial Risk-Based RAL[a] (mg/kg)
Benzo(*a*)anthracene	11.1	0.62	2.9
Benzo(*b*)fluoranthene	5.04	0.62	2.9
Benzo(*a*)pyrene	4.38	0.062	0.29
Dibenz(*a,h*)anthracene	0.665	0.062	0.29

RAL - 2000 Risk-Based Relevant Action Level
J – Estimated quantity
Bold type indicates exceedance of industrial RAL

The 2002 and 2003 investigations included additional soil and groundwater sampling and a geophysical study (USACHPPM 2003b and 2003c). The 2002 investigation included the collection of nine soil samples (including field duplicate samples) from soil borings drilled to maximum depths of 12 feet bgs and also included installation and sampling of four new monitoring wells, as well as sampling of four existing monitoring wells.

The 2003 investigation included collection and analysis of eight soil samples (including field duplicate samples) from six additional soil borings installed to maximum depths of 12 feet bgs. Three of the soil borings were installed through the floor of the exhauster building. These additional borings further defined the extent of coal tar-related SVOCs above risk-based RALs and showed that SVOCs extended beneath the western portion of the exhauster building floor slab at depths of 11 feet bgs (Figure 3). Three new wells were installed in the upper bedrock zone (depths of about 35 feet bgs) based on geophysical survey results. The three new bedrock wells and eight existing wells were sampled. The additional groundwater investigation did not show SVOCs above risk-based RALs. Benzene was confirmed above its risk-based RAL (MCL of 5 ug/L) in one existing well and arsenic was confirmed above its risk-based RAL (MCL of 5 ug/L) in two wells.

Soil Remediation: In 2004, an interim measure (IM) was conducted by BAE Systems Ordnance Systems, Inc., the HSAAP operating contractor, to remove additional contaminated soil adjacent to and beneath structures associated with Building A-10 (BAE 2004). The former exhauster building and two decanter structures were demolished (Figure 3). Following building demolition activities, approximately 719 cubic yards of coal tar-contaminated soil and debris were removed from beneath and adjacent to the building footprints. Soil was excavated to the top of bedrock (approximate depths ranging from 8 to 10 feet bgs). Soil removal along the north and east boundary of the excavation was limited by the presence of an active rail line and the Building A-10 structural footers, respectively (Figure 3). Contaminated soil and debris were disposed in the HSAAP Class II Industrial Landfill. The main structure of the Gas Producer Building was left intact.

Confirmation sampling (five total samples) of the sidewalls near the bottom of the excavation was performed following the 2004 IM excavation effort. Confirmation sampling results showed that coal tar-related SVOCs were below both 2004 residential and industrial risk-based RALs along the south and west sidewalls. Along the north sidewall and in the northeast corner of the excavation, two SVOCs remained above residential and industrial risk-based RALs:

- benzo(*a*)pyrene in three of the five samples with a maximum concentration of 0.78 mg/kg versus the 2004 residential risk-based RAL of 0.062 mg/kg and the industrial risk-based RAL of 0.21 mg/kg, and
- benzo(*a*)anthracene in one sample (6.8 mg/kg) versus the 2004 residential risk-based RAL of 0.62 mg/kg and the industrial risk-based RAL of 2.1 mg/kg.

Volatile organic compounds were below risk-based RALs in all confirmation samples. RCRA metals were below risk-based RALs or HSAAP background values for soil.

The SWMU 96 RFI and IM investigations adequately characterized the site characteristics and extent of soil and groundwater contamination. The investigation data showed that soil contamination above industrial risk-based RALs extended to, and below, the groundwater table. Migration of SVOCs from contaminated soil into groundwater has occurred, but concentrations were below risk-based RALs. Benzene and arsenic exceeded risk-based RALs in groundwater; however, the extent of groundwater contamination is limited to a few adjacent wells. Most of the identified soil contamination at SWMU 96 was removed by the 2004 IM. Only two SVOCs [benzo(*a*)pyrene and benzo(*a*)anthracene] were documented to remain in soil above residential

and industrial risk-based RALs at the conclusion of the 2004 IM. This remnant of contaminated soil underlies an active rail line and a large building and could not be removed. Subsequent long-term groundwater monitoring following the 2004 IM shows that SVOC levels have remained below risk-based RALs, with the exception of one naphthalene result at well MW-80 in September 2005 (9.1J ug/L), which slightly exceeded its risk-based RAL (6.2 ug/L).

SELECTED FINAL REMEDY

The current and reasonably anticipated future land use at this unit is industrial, government-controlled restricted access. The approved final remedy for SWMU 96 is to maintain the existing land use controls and long-term maintenance that are already being conducted under the LTM/LTO Program. The components of the final remedy include the following:

- access controls (site-specific or facility-wide fencing),
- signs,
- excavation restrictions,
- inspections and maintenance, and
- long-term groundwater monitoring under AOC-GW.

Access controls are currently implemented through existing HSAAP security procedures. Maintenance will include periodic inspections and the removal of coal tar as needed.

REFERENCES

BAE (BAE Systems Ordnance Systems, Inc.) 2004. Interim Measures Report, Solid Waste Management Unit HSAAP-096, Producer Gas Building and Coal Tar Storage Tanks, Holston Army Ammunition Plant, Kingsport, Tennessee, EPA ID No. TN5 21-002-0421, December.

USACHPPM (U. S. Army Center for Health Promotion and Preventive Medicine) 1997. Sampling Visit Phase, RCRA Facility Assessment Release Assessment, Holston Army Ammunition Plant, Kingsport, Tennessee, EPA ID No. TN5 21-002-0421, USACHPPM Project No. 38-EH-5694-97, July.

Statement of Basis
Solid Waste Management Unit 97
Coal Tar Along Rail Corridor from Area A to Area B
HSAAP-08
Kingsport, Tennessee

INTRODUCTION

This Statement of Basis contains a summary of the location, operating history, contaminants detected, interim measures, and remedy selected for Solid Waste Management Unit (SWMU) 97, Coal Tar along Rail Corridor from Area A to Area B, at the Holston Army Ammunition Plant (HSAAP), Kingsport, Tennessee. In the Army's current Installation Restoration Program (IRP), this site is included in HSAAP-08.

SITE BACKGROUND

SWMU 97 encompasses a 3.7-mile rail corridor between Area A and Area B of the HSAAP (Figures 1 and 2). The corridor exits the west side of Plant A and runs between and parallel to Industry Way and the South Fork of the Holston River. It crosses the Holston River (Area A Bridge) and follows the transitional area between the river bottom and slopes of Bays Mountain. There is a bridge that crosses a sluice-way (sluice-way bridge) at the northern end of Bays Mountain. The tracks continue east to cross the Holston River (Area B Bridge) and enter the east side of Area B. 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. Government-acquired easements for this corridor total approximately 86 acres.

SWMU 97 was identified by the TDEC in 1999 as coal tar contamination along the rail corridor connecting Areas A and B of the plant. This unit covers the potential areas along the rail corridor where coal tar may have been indiscriminately dumped in the past. The contaminant of concern is coal tar.

SUMMARY OF CONTAMINANT EVALUATION

As no areas of coal tar were identified when the SWMU was designated, a RFI was completed at SWMU 97. The results of the RFI did not reveal any major areas of coal tar; therefore, no environmental samples were collected at the SWMU.

Soil: The RFI was completed in March 2005 (Bay West, 2005). The RFI consisted of a visual inspection encompassing an area approximately 20 feet on either side of the outer-most tracks. While pieces of coal tar were visible, no large, continuous masses of coal tar were discovered. Visible coal tar was generally less than eight inches in diameter and scattered throughout smaller areas along the tracks. The largest areas of continuous coal tar were less than two feet square. The majority of the scattered coal tar was located within five general areas (Figures 3 and 4).

Due to the presence of coal tar at the SWMU, an Interim Measure was completed in May and July 2005. Approximately two cubic yards of coal tar were removed. Analysis of the excavated material indicated the soil was a non-hazardous waste. The material was approved for disposal at the Allied Waste/BFI Carter Valley Landfill in Church Hill, Tennessee. The material was transported and disposed in September 2005. The coal tar was all surficial and there was no indication of any buried coal tar. As the coal tar was scattered and surficial in nature, no verification soil samples were collected.

Groundwater: The coal tar was limited to the surface of the SWMU. Groundwater has not been impacted by SWMU 97 activities.

SELECTED FINAL REMEDY

The Interim Measure was successful in removing visible coal tar and reducing the risk to human exposure and the environment. No further action is warranted at SWMU 97.

REFERENCES

Bay West, 2005. RCRA Facility Investigation Report, SWMU 97 – Coal Tar along Rail Corridor from Area A to Area B (HSAAP-08), FRPI Environmental Remediation Services, Contract W9128F-04-D-0018 Task Order #0001, Holston Army Ammunition Plant, Kingsport, Tennessee, Bay West, Inc., September 2005.

Bay West, 2006. Interim Measures Report, SWMU 97 – Coal Tar along Rail Corridor from Area A to Area B, HSAAP-08, FRPI Environmental Remediation Services, Contract W9128F-04-D-0018 Task Order #0001, Holston Army Ammunition Plant, Kingsport, Tennessee, Bay West, Inc., January 2006.

Statement of Basis
Solid Waste Management Unit 98
Coal Tar South of Sanitary Landfill
HSAAP-08
Kingsport, Tennessee

INTRODUCTION

This Statement of Basis contains a summary of the location, operating history, contaminants detected, interim measures, and remedy selected for Solid Waste Management Unit (SWMU) 98, Coal Tar South of Sanitary Landfill at the Holston Army Ammunition Plant (HSAAP), Kingsport, Tennessee. In the Army's current Installation Restoration Program (IRP), this site is included in HSAAP-08.

SITE BACKGROUND

SWMU 98 is located south of the road to the former Rock Dam Landfill (located at the south edge of the closed sanitary landfill) and extends south to the Rock Quarry Landfill (Figure 1). SWMU 98 was identified by TDEC in 1999 as coal tar contamination. Coal tar was reportedly dumped indiscriminately on the south side of the road.

SUMMARY OF CONTAMINANT EVALUATION

No specific areas of coal tar were identified when SWMU 98 was designated; therefore, a RFI was completed. The RFI identified ten general areas of scattered coal tar. An IM was completed to remove the coal tar. Environmental samples were collected from soils in excavated areas. The samples were analyzed for semivolatile organic compounds (SVOCs).

Soil: The RFI was completed in March 2005. The RFI consisted of a visual inspection of the south side of the road from the Rock Dam Landfill to the Rock Quarry Landfill. Ten areas were identified during the RFI (Figure 2). These areas consisted of scattered coal tar; most of the coal tar consisted of smaller masses of less than one square foot.

Due to the presence of coal tar, an IM was performed to remove the material. In May 2005, all the visible coal tar was removed from the area. Twenty cubic yards of coal tar and soil were removed during the May 2005 IM. The largest continuous area of coal tar removed was approximately 17 feet long and varied from three to seven feet wide. The next largest areas were two locations each approximately four square feet. The majority of the coal tar was less than twelve inches below grade. One soil sample was collected from the bottom of each of the three largest excavations (Figure 3). The samples were analyzed for SVOCs. All the results were below the 2004 EPA Region 9 (Region 9) Industrial Preliminary Remediation Goals (PRGs) for soils except for three polynuclear aromatic hydrocarbons (PAHs). The Region 9 Industrial PRG for benzo(a)pyrene (0.21 mg/kg) was exceeded at all three excavations. The Region 9 Industrial PRG for benzo(a)anthracene (2.1 mg/kg) was exceeded in two excavations and the Region 9 Industrial PRG for benzo(b)fluoranthene (2.1 mg/kg) was exceeded in one excavation.

In July 2005, an additional fifteen cubic yards of soil were removed from the three areas. One sample was collected from the bottom of each excavation and analyzed for PAHs. There were no PAHs above the method detection limits. The method detection limits were at or below the Region 9 Residential PRGs.

Characterization testing of the excavated material indicated it was a non-hazardous waste. The material was approved for disposal at the Allied Waste/BFI Carter Valley Landfill in Church Hill, Tennessee. The material was transported and disposed in September 2005.

Groundwater: The coal tar was surficial in nature; there have been no indications that groundwater has been impacted as a result of SWMU 98 activities.

SELECTED FINAL REMEDY

The Interim Measure was successful in removing coal tar and coal tar contaminated soil to below relevant regulatory levels and reducing the risk to human health and the environment. No further action is warranted at SWMU 98.

REFERENCE

Bay West, 2006. RCRA Facility Investigation/Interim Measures Report, SWMU 98 – Coal Tar South of Sanitary Landfill, HSAAP-08, Holston Army Ammunition Plant, Kingsport, Tennessee, FPRI Environmental Remediation Services, Contract W9128F-04-D-0018 Task Order #0001,Bay West, Inc., February 2006.

Statement of Basis
Solid Waste Management Unit 103
Coal Tar Site, Ditch at Gas Producer Facility
HSAAP-37
Kingsport, Tennessee

INTRODUCTION

This Statement of Basis contains a summary of the location, operating history, contaminants detected, interim measures, and remedy selected for Solid Waste Management Unit (SWMU) 103, Coal Tar Site, Ditch at Gas Producer Facility at the Holston Army Ammunition Plant (HSAAP), Kingsport, Tennessee. In the Army's current Installation Restoration Program (IRP), this site is included in HSAAP-37.

SITE BACKGROUND

SWMU 103 is located on the south side of the Area A Steam Plant (Building 8) (Figures 1 and 2). The unit consists of a ditch that originally extended from the rear of Building 8, passed to the east of Building 31 (Utility Building), and discharged to the South Fork of the Holston River. An aboveground tank (Raw Water Tank) was installed over a portion of the ditch in the 1970s.

Currently, there is no visual evidence of the ditch between the rear of Building 8 and the Area A property fence located at the top of the bank of the South Fork of the Holston River. The outfall of SWMU 103, a culvert pipe, is located on top of the riverbank. Discharge from the pipe is directed to a drainage swale that runs down to the river.

Little documentation has been found describing the operation of the unit except that the blow down from the coal tar tanks or lines associated with the steam atomizer burners, once located behind Building 8, drained directly on the ground and flowed south to the South Fork of the Holston River. This discharged water may have contained some coal tar and possibly also contaminants leached from the coal tar. This past discharge is evident by the presence of coal tar behind Building 31, adjacent to the installation fence located along the South Fork of the Holston River.

The producer gas facility was closed in 1994 and the coal tar tanks of SWMU 4 were removed in 1996. Constituents of concern

SUMMARY OF CONTAMINANT EVALUATION

Environmental samples were collected at SWMU 103 from soils and sediments in 2000 and 2001 as part of the site RFI. Samples have been analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs) and metals.

Soil/Sediment: Seven soil samples from four borings (H-103-1 through 5) and two riverbed sediment samples (H-103-SED1 and SED2) were collected at the site as part of RCRA Facility Investigation (RFI) activities in December 2000 and January 2001 (Figure 3; USACHPPM 2002). The samples were analyzed for VOCs, SVOCs, and metals. None of the detected VOCs or metals were above the 2004 EPA Region 9 (Region 9) Residential Preliminary Remediation Goals (PRGs). All the detected SVOCs were below the Region 9 Residential PRGs except for four compounds in one sediment sample H-103-SED2). Two of these SVOCs were above their Region 9 Residential PRGs, namely, benzo[a]anthracene (1.9 mg/kg versus PRG of 0.62 mg/kg) and benzo[b]fluoranthene (1.2 mg/kg versus PRG of 0.62 mg/kg). The other two SVOCs that were above their Region 9 Industrial PRGs – benzo[a]pyrene (1.4 mg/kg versus PRG of 0.21 mg/kg) and dibenzo[a,h]anthracene (0.4 mg/kg versus PRG of 0.21 mg/kg). Several areas of visible coal tar were also noted during the RFI activities.

Soil Remediation: Due to the presence of visible coal tar, an interim measure (IM) was performed to remove coal tar along the riverbank from the culvert pipe to the river. In May 2005, visible coal tar was removed in the general area of the SWMU (Figure 4). Four cubic yards of coal tar and soil were removed. All visible coal tar was removed with the exception of two small areas of hard, inert material. These two areas were approximately two feet below the ground surface and were both less than one square foot in size. The material did not yield to hand tools. The use of mechanical equipment to remove the small amount of remaining inert material was determined to be impractical due to: concerns over personnel safety working on steep slope near river and heavy equipment; significantly larger quantity of rock/soil and trees requiring removal than quantity of coal tar to be removed; difficulties in maintaining stability of the riverbank; and, relocation of overhead power lines at the top of the slope. In addition, it was determined that these additional substantial efforts would have resulted in an insignificant beneficial impact to the environment due to the inert nature of the material, coupled with a lack of receptors and the industrial property setting. For these reasons, the decision was made to leave the material in place.

One bottom sample was collected from each of two excavated areas (Figure 4). The samples were analyzed for SVOCs. All SVOCs were below Region 9 Residential PRGs in one of the two samples. The second sample, 103-SE-002, exhibited several polynuclear aromatic hydrocarbons (PAHs) above the Region 9 Industrial PRGs.

In July 2005, an additional six foot by six foot by one foot volume of soil was removed from the area that exceeded the cleanup standards (Figure 4). One and a half cubic yards of soil were excavated. A soil sample was collected from the bottom of the excavation (103-SE-005) and analyzed for PAHs. All PAHs were below their respective Region 9 Residential PRGS except for benzo[a]pyrene which was 0.12J (J is the laboratory designation for an estimated quantity) mg/kg versus a PRG of 0.062 mg/kg.

An additional six foot by six foot by six inches volume of soil was excavated in July 2005 at the area that still exceeded the cleanup standards (Figure 4). Approximately one-half cubic yard was excavated. A soil sample was collected from the bottom of the excavation (103-SE-006) and analyzed for PAHs. All the results were below the Region 9 Residential PRGs.

Characterization testing of the excavated material indicated it was a non-hazardous waste. The material was approved for disposal at the Allied Waste/BFI Carter Valley Landfill in Church Hill, Tennessee. The material was transported and disposed in September 2005.

Groundwater: The coal tar was surficial in nature; ground water has not been impacted by SWMU 103 activities.

SELECTED FINAL REMEDY

The IM was successful in removing visible coal tar and coal tar contaminated soil to below relevant regulatory levels, thereby reducing the risk to human health and the environment. A total of 6 cubic yards of coal tar/soil were removed. Two small areas of hard, inert coal tar-like material remain about two feet below grade at the SWMU. Since this inert material was impractical/unsafe to attempt to remove, and its removal would not create a significant beneficial impact, it was determined to leave this material in place. The selected remedy is to perform semi-annual inspections and implement land use/institutional controls at SWMU 103. The inspections would be performed to monitor for the presence of coal tar at the surface of the site as part of the site-wide long-term monitoring operations program. Coal tar detected at the surface would be removed as needed. An evaluation will be made at the conclusion of the initial three years of monitoring to determine the need to continue the inspections. The land use controls would consist of excavation restrictions to prevent unauthorized/uncontrolled soil disturbance. These controls would prevent human exposure to the coal tar.

REFERENCES

Bay West, 2006. Interim Measures Report, SWMU 103 – Coal Tar Site, Ditch at Gas Producer Facility, HSAAP-37, Holston Army Ammunition Plant, Kingsport, Tennessee, FPRI Environmental Remediation Services, Contract W9128F-04-D-0018 Task Order #0001, Bay West, Inc., February 2006.

U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM), 2002. RCRA Facility Investigation of Solid Waste Management Units HSAAP-004 (Coal Tar Tank Site), HSAAP-014 (Coal Tar Landfill 1) and HSAAP-103 (Building 8 Coal Tar Tanks Drainage Ditch), 4-11 December 2000 and 8-14 January 2001, EPA ID No. TN5-21-002-0421, USACHPPM Project No. 38-EH-1296-01, Holston Army Ammunition Plant, 4509 West Stone Drive, Kingsport, Tennessee, USACHPPM, February, 2002.

Statement of Basis
Solid Waste Management Units 104, 105 and 106
Firing Ranges
HSAAP-30
Kingsport, Tennessee

INTRODUCTION

This Statement of Basis (S/B) contains a summary of the location, operating history, contaminants detected, interim measures, and remedy selected for Solid Waste Management Units (SWMUs) 104, 105, and 106, Firing Ranges, at the Holston Army Ammunition Plant (HSAAP), Kingsport, Tennessee. In the Army's current Installation Restoration Program (IRP), these sites are included in HSAAP-30.

SITE BACKGROUND

SWMU 104: This site is located west of Building 134 at Area B (Figures 1 and 2). The site was used by security police and military personnel in the mid-1960s as a firing range. The U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM) 1997 Environmental Baseline Survey indicated that the range was also used for sensitivity shock tests conducted by firing rifles at one-meter pipes filled with explosives and the evaluation of bazookas, C-4 blocks, and shaped charges loaded with octal from the 1940s to the 1960s (USACHPPM, 1997). Based on this observation, an Ordnance and Explosives Safety Specialist performed a survey in March 2005; no anomalies were detected.

The backstop appeared to be the western face of a borrow pit adjacent to Building 134. The face was estimated to be between 8 and 15 feet high and up to 300 feet long. It is unknown whether the entire face was used as a backstop or if firing range activities were limited to specific areas along the face. At present, the backstop face appears to have been disturbed, which would suggest that soil may have been removed following its use as a range. Soil in the berm is predominantly silts and clays.

The contaminant of concern at this site is lead.

SWMU 105: This site is a former small arms practice range located on the northwest side of the Water Reservoir at Area B (Figures 1 and 3). This site was reportedly constructed in 1984. The bullet backstop consists of a berm constructed of soil that is approximately 40 feet long by 12 feet high. Wooden beams that were used to hold targets remain at the site and are useful in identifying the areas with greatest lead concentrations. Soil in the berm is predominately silts and clays. Lead slugs were observed in the surface soils of the bullet backstop at this site.

The contaminant of concern at this site is lead.

SWMU 106: This site was a former range near the Storm Water Treatment Plant at Area B (Figures 1 and 4). It is reported that this range was used from 1967 to 1983. A review of aerial photographs of the area suggests that this firing range was destroyed during the construction of Building 234. Its location, size and orientation have been determined from historical site aerial photographs. The current location is a relatively flat area that is covered primarily with grass. A portion of the former backstop site is covered with an asphalt road.

The contaminant of concern at this site is lead.

SUMMARY OF CONTAMINANT EVALUATION

Environmental samples were collected at SWMUs 104, 105 and 106 from surface soils. The samples were analyzed for lead. Elevated lead concentrations were identified at SWMU 105.

Soil – SMWU 104: Thirty eight surface soil samples were collected from thirty four locations in March 2005 (Figure 5). The samples were analyzed for total lead. All the lead sample results were below the October 2004 EPA Region 9 (Region 9) Residential Preliminary Remediation Goal (PRG) for lead of 400 mg/kg.

Soil – SMWU 105: Seventeen samples were collected from five borings along the berm in March 2005 (Figure 6). The samples were analyzed for total lead. Three of the five surface samples were above the Region 9 Residential PRG for lead (400 mg/kg) with the highest concentration being 748J (J is laboratory designation for estimated result) mg/kg. This lead concentration is just below the Region 9 Industrial PRG of 800 mg/kg. The samples collected at the one- and two-foot depths were all below the Region 9 Residential PRG of 400 mg/kg.

Soil Remediation – SMWU 105: Due to the presence of lead contamination just below the Region 9 Industrial PRG of 800 mg/kg, an Interim measure (IM) was completed to remove contaminated soil at the backstop. In July 2005, the upper one foot of soil was removed from the backstop face. The area in front of the backstop was also excavated; this area was approximately three feet wide by six inches deep. Fifteen cubic yards of soil were removed. Five soil samples were collected from the newly exposed face of the backstop (Figure 7). These samples were analyzed for total lead. All sample results were below the Region 9 Residential PRG of 400 mg/kg.

Characterization testing of the excavated material indicated it was a non-hazardous waste. The material was approved for disposal at the Allied Waste/BFI Carter Valley Landfill in Church Hill, Tennessee. The material was transported and disposed in September 2005.

Soil – SMWU 106:
Eighteen samples were collected from sixteen locations in the area of the former backstop berm (Figure 4) in March 2005. The samples were analyzed for total lead. All the lead results were below the Region 9 Residential PRG for lead of 400 mg/kg.

Groundwater - All Sites: Due to the surficial nature of the contamination, groundwater has not been impacted by the firing range activities.

SELECTED FINAL REMEDY

The RFI activities at SWMUs 104 and 106 have adequately defined site conditions and indicate that there have been no releases of hazardous constituents to surface soils at the sites.

The Interim Measure completed at SWMU 105 was successful in removing lead-contaminated soil to below relevant regulatory levels and thereby reducing the risk to human health and the environment.

No further action is warranted at SWMUs 104, 105, and 106.

REFERENCES

Bay West, 2006. RCRA Facility Investigation/Interim Measures Report, HSAAP 30 - SWMUs 104, 105, and 106 - Firing Ranges, Holston Army Ammunition Plant, Kingsport, Tennessee, FPRI Environmental Remediation Services, Contract W9128F-04-D-0018 Task Order #0001, Bay West, Inc., February 2006.

U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM), 1997. Environmental Baseline Study No. 38-EH-6956-97, Holston Army Ammunition Plant, Kingsport, Tennessee, 23 June-2 July 1997, USACHPPM, December 1997.

Statement of Basis
Area of Concern-C
Former Underground Storage Tank at Building 105
HSAAP-29
Kingsport, Tennessee

INTRODUCTION

This Statement of Basis summarizes the environmental investigation and the proposed final remedy for the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) at Former Underground Storage Tank at Building 105, Area of Concern-C (AOC-C) at the Holston Army Ammunition Plant (HSAAP) in Kingsport, Tennessee (Figures 1 and 2). AOC-C is included in the US Army's Installation Restoration Program unit HSAAP-29. AOC-C is a gasoline and diesel fueling station located at Building 105 in the north-central portion of Area B (Figure 2). The proposed final remedy for AOC-C is no further action (NFA). The groundwater under AOC-C is being addressed separately as part of HSAAP's final remedy for AOC-GW, Area of Concern Site-Wide Groundwater.

SITE BACKGROUND

The Building 105 Fuel Station was constructed in 1943. Prior to 1994, fuel was stored in two gasoline underground storage tanks (USTs) at the northeast corner of Building 105 and one diesel fuel UST located south of the building (Figure 2). Gasoline- and diesel-dispenser pumps located in the parking lot immediately south of Building 105 were connected to the USTs via underground transfer lines. The USTs and associated dispenser piping were removed in 1994 and replaced with aboveground storage tanks and new underground piping. The dispenser pumps for the former USTs were not relocated.

On January 16, 1990, diesel fuel was discovered seeping through a crack in the pavement along the roadway south of Building 105 (Bay West and SAIC 2005). The leak was abated and contaminated soil was excavated. Inventory review indicated a loss of approximately 106 gal of product. An environmental assessment (EA) of the release was conducted in two phases (in December 1990 and January 1991) by Law Engineering and Environmental Services, Inc., under contract to BAE Systems Inc., (BAE), the HSAAP operating contractor. The EA investigated soil and included installation and sampling of 16 groundwater monitoring wells (12 to 83 ft depths). An Environmental Assessment Report (EAR) documenting these initial investigation activities was prepared by BAE in 1990 (BAE 1990). After completing additional investigation activities, an EAR Addendum was submitted in February 1991 (BAE 1991). Diesel fuel contamination was not found during the EA; however, gasoline contamination was found beneath the fuel station area. The EA documented the extent of gasoline contamination in the soil and the extent of free fuel product in groundwater as limited to the vicinity of the former USTs. Free product was indicated in wells W-2, W-4, W-5, and W-9A during the EA (Figure 2). No free product was observed in these wells following the startup of an in-situ air sparge/soil vapor extraction (IAS/SVE) system, as described below.

Following the EA, a corrective action plan (CAP) was prepared and submitted to TDEC in 1995. The CAP recommended the installation and operation of an IAS/SVE system. The system was designed and installed and operations began in August 1995. Site status monitoring reports were prepared every 6 months. During IAS/SVE operations between January 1996 and February 2000, nine monitoring events were conducted at selected wells. Benzene, toluene, ethylbenzene, and xylenes (BTEX) data from the site status monitoring indicated that the IAS/SVE system did not substantially reduce dissolved-phase petroleum contaminants. In August 2000, TDEC directed HSAAP to cease operation of the remediation system (USACHPPM 2004).

An RFI was initiated as part of the 2004 Facility Action Plan (Bay West and SAIC 2005). The purpose of the RFI was to determine the nature and extent of petroleum as a source of contamination to groundwater, and if soil and groundwater contamination was adversely impacting human health and the environment. The RFI incorporated historical data and BTEX data collected by the Army in 2004 from six existing wells and three temporary wells installed south of AOC-C. The RFI also calculated a site-specific cleanup level (SSCL) for benzene following TDEC UST risk-based guidance. The TDEC risk-based SSCL model indicated that AOC-C was eligible for closure under TDEC Rule 1200-1-15-.06.

The RFI recommended interim measures (IM) consisting of the removal of the IAS/SVE system and plugging and abandonment (P&A) of associated monitoring wells. The RFI also recommended installation of one to two new wells to adequately characterize the downgradient extent of contamination. To obtain closure consistent with TDEC Rule 1200-1-15-.06 requirements, the RFI recommended monitoring of three source area wells (W-12, W-13, and W-15) to evaluate contaminant concentrations with respect to the SSCL for benzene. Consistent with UST closure requirements, four semiannual sampling events were recommended to assess benzene concentrations with respect to the SSCL. Groundwater samples were specified for BTEX and total petroleum hydrocarbon (TPH) analyses.

The IM recommendations were approved by TDEC on October 18, 2005. Removal of the IAS/SVE system and P&A of eight associated monitoring wells was completed on April 4, 2006 (Figure 2). A detailed description of the system decommissioning and well P&A activities is provided in the IM Report completed in September 2006 (Bay West and SAIC 2006). To fulfill RFI recommendations, installation and sampling of two new monitoring wells (GW-123 and GW-124) downgradient of AOC-C was completed in January 2006 as part of Groundwater Area of Concern (AOC-GW) RFI field activities (Bay West and SAIC 2007b). The first two semiannual monitoring events for wells W-12, W-13, and W-15 were conducted in April and September 2006 (Bay West and SAIC 2007c). A request was submitted to TDEC to change the sampling frequency from semiannual to quarterly to accelerate the IM performance monitoring phase of work. TDEC approved the change to quarterly sampling and the remaining two sampling events were completed in December 2006 and March 2007 (Bay West and SAIC 2007a).

SUMMARY OF CONTAMINANT EVALUATION

RFI results showed that within AOC-C, benzene, toluene, trimethylbenzene isomers, and naphthalene in groundwater were above risk-based screening levels. Total and filtered lead and methyl tertiary butyl ether were not detected in any of the wells sampled during the RFI.

Assessment of the downgradient extent of contamination showed that petroleum-related volatile organic compounds and semivolatile organic compounds were not detected in the three temporary RFI wells installed in 2004 immediately south of AOC-C (Figure 2). TPH was detected in only one of the temporary wells at an estimated concentration of 0.41 mg/L. Samples collected from wells MW-123 and MW-124 (Figure 2) did not contain detectable BTEX or TPH. These data effectively delineated the downgradient extent of contamination associated with AOC-C.

Benzene results from the four IM monitoring events at wells W-12, W-13, and W-15 did not exceed the SSCL of 14,000 µg/L established in the RFI Report (Bay West and SAIC 2005). The IM monitoring results showed the highest BTEX and TPH concentrations at well W-15, which is consistent with results observed in 2004 and 2005. RFI data collected from AOC-C monitoring wells indicate that the concentrations of petroleum-related contaminants have decreased at AOC-C over time, but still remain above risk-based screening levels. Data from wells W-12, W-13, and W-15 show a distinct reduction of BTEX levels since IM were completed in April 2006. Any residual contamination in groundwater above risk-based screening levels will be addressed under AOC-GW.

PROPOSED FINAL REMEDY

Available BTEX and TPH concentration data collected from AOC-C monitoring wells W-12, W-13, and W-15 over the past 13 years indicate that concentrations of petroleum-related contaminants have decreased at AOC-C over time, especially since IM was completed in April 2006. Samples collected at AOC-C from monitoring wells W-12, W-13, and W-15 during the four most recent sampling events all indicate benzene at levels below the SSCL (14,000 µg/L), but still remain above risk-based screening levels. These data fulfill the requirements for AOC-C closure consistent with TDEC Rule 1200-1-15-.06. Residual contamination is limited to within the AOC. No groundwater use exists within Area B of HSAAP and no off-site groundwater or surface water receptors exist, which would be impacted by residual contaminants within AOC-C.

Based on RFI and IM monitoring results, a proposed final remedy of NFA is recommended for AOC-C. Because of the site-specific conditions, TDEC does not find it necessary to evaluate any other remedial alternatives. Any residual contamination in groundwater above risk-based screening levels will be addressed under AOC-GW.

REFERENCES

BAE (BAE Systems, Inc.) 1990. Environmental Assessment Report, Building 105 Fuel Facility, Holston Army Ammunition Plant, Kingsport, Tennessee.

BAE 1991. Environmental Assessment Report Addendum, Building 105 Fuel Facility, Holston Army Ammunition Plant, Kingsport, Tennessee.

Bay West and SAIC (Bay West, Inc., and Science Applications International Corporation) 2005. RCRA Facility Investigation Report for AOC-C, Former UST at Building 105, September 2005, Holston Army Ammunition Plant, Kingsport, Tennessee, FPRO Contract W9128F-04-D-0018, Task Order 0001, BW040296, February.

Bay West and SAIC 2006. Interim Measures Report, Area of Concern-C, Former Underground Storage Tank At Building 105, Area B: In-Situ Air Sparging/Soil Vapor Extraction System Decommissioning and Well Plugging and Abandonment, HSAAP-29, Holston Army Ammunition Plan, Kingsport, Tennessee, Contract W9128F-04-D-0018, Task Order 0001, Final, September.

Bay West and SAIC 2007a. RCRA Facility Investigation Report Addendum for AOC-C, Former UST at Building 105, May 2007, Holston Army Ammunition Plant, Kingsport, Tennessee, Contract W9128F-04-D-0018, Task Order 0001, BW040296, May.

Bay West and SAIC 2007b. RCRA Facility Investigation Report for AOC-GW, Site-Wide Groundwater, HSAAP-33, Holston Army Ammunition Plant, Kingsport, Tennessee, Contract W9128F-04-D-0018, Task Order 0001, BW040296, March.

Bay West and SAIC 2007c. Fiscal Year 2006 Long-Term Monitoring/Long-Term Operations Report, Holston Army Ammunition Plant, Kingsport, Tennessee, Contract W9128F-04-D-0018, Task Order 0001, Draft, April.

USACHPPM (U. S. Army Center for Health Promotion and Preventive Medicine - Ground Water and Solid Waste Program) 2004. RCRA Facility Investigation (RFI) Work Plan, Solid Waste Management Unit HSAAP-052, Vehicle Wash Pad Inside Building 105 and AOC-C, Leaking UST B-105, Service Station, HSAAP, Kingsport, Tennessee, USACHPPM Project No. 38-EH-01SH-04, August

Statement of Basis
Area of Concern - F
TPH in Soil Near Manganese Ore Piles
HSAAP-38
Kingsport, Tennessee

INTRODUCTION

This Statement of Basis contains a summary of the location, operating history, contaminants detected, interim measures, and remedy selected for TPH in Soil near Manganese Ore Piles, Area of Concern-F (AOC-F) at the Holston Army Ammunition Plant (HSAAP), Kingsport, Tennessee. In the Army's current Installation Restoration Program (IRP), this site is included in HSAAP-38.

SITE BACKGROUND

AOC-F is an area located to the east of a former manganese ore pile and south of the BAE Systems railroad track (Figures 1 and 2). The area was previously covered with manganese ore and is identified by remnants of the ore. Several manganese ore piles were stored in Area B. The ore is owned by the US General Services Administration (GSA) and had been stockpiled at HSAAP since the 1950s. A majority of the ore was removed in the mid-1980s and the remaining ore was removed in March 2005. AOC-F was first identified in 1997 by U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM) during sampling to evaluate the potential for metals migration into the subsurface.
The contaminants of concern at AOC-F are metals and total petroleum hydrocarbons (TPH).

SUMMARY OF CONTAMINANT EVALUATION

Environmental samples were collected from surface and subsurface soils at AOC-F. Samples have been analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), TPH, and total metals. Elevated manganese and TPH concentrations were identified.

Soils: In 1997, four soil samples were collected from two locations (Figure 2; USACHPPM, 1998). The samples were analyzed for metals. There were no hazardous metals detected above the 2004 EPA Region 9 (Region 9) Residential Preliminary Remediation Goals (PRGs).

The 1997 soil sample collected adjacent to the southwestern ore pile from three to four feet below grade was analyzed for TPH due to the detection of a petroleum-like odor during sample collection. The analytical results indicated a TPH concentration of 18,000 mg/kg. This concentration is above the TDEC TPH Non-Drinking Water Action Level (TDEC Action Level) for soils with permeabilities between 10^{-4} to 10^{-6} cm/sec of 500 mg/kg.

Four soil samples were collected from four borings in the vicinity of southwestern pile and 1997 soil boring in November 2000 (Figure 3). All 4 samples were analyzed for TPH. One sample was

also analyzed for VOCs and SVOCs. The VOCs detected were all below the Region 9 Residential PRGs. No SVOCs were detected. The highest TPH concentration was 66 mg/kg, which was below the TDEC Action Level of 500 mg/kg.

In October 2001, 40 soil samples were collected from 20 borings and analyzed for TPH (Figure 3). Five soil samples were also analyzed for VOCs. The samples were collected from varying depths up to 6 to 6.5 feet below grade. All detected VOC compounds were less than the Region 9 Residential PRGs. Four samples exhibited TPH concentrations above the TDEC Action Level of 500 mg/kg; the concentrations ranged from 882 mg/kg to 10,400 mg/kg.

Due to the TPH contamination in the soils, an IM was completed In May 2005. The area shown in Figure 4 was excavated. Ninety cubic yards of soil were removed. Eight bottom and seven sidewall samples were collected from the excavation and analyzed for TPH. All the results were below the TDEC Action Level (500 mg/kg) except for a sample on the west sidewall.

In July 2005, additional soil was removed in the area of the sidewall sample that exceeded the TDEC Action Level (Figure 5). The soil was removed to a depth of four feet below grade. Ten cubic yards of soil was excavated. One sample and a quality control duplicate were collected from the midpoint of the newly excavated sidewall. The samples were analyzed for TPH. The sample results were below the TDEC Action Level.

Characterization testing of the excavated soil indicated the material was a non-hazardous waste. The soil was approved for disposal at the Allied Waste/BFI Carter Valley Landfill in Church Hill, Tennessee. The material was transported and disposed in September 2005.

Groundwater: Ground water was not encountered during RFI or IM activities; there is no evidence that ground water has been impacted by AOC-F activities.

SELECTED FINAL REMEDY

The Interim Measure was successful in removing TPH-contaminated soil to below relevant regulatory levels and thereby reducing the risk to human health and the environment. No further action is required at AOC-F.

REFERENCES

Bay West, 2006. RCRA Interim Measures Report, AOC-F – TPH in Soil near Manganese Ore Piles, (HSAAP-38), Holston Army Ammunition Plant, Kingsport, Tennessee, FPRI Environmental Remediation Services, Contract W9128F-04-D-0018 Task Order #0001, Bay West, Inc., February 2006.

U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM), U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM), 1997. Environmental Baseline Survey No. 38-EH-6956-97, Holston Army Ammunition Plant, Kingsport, Tennessee, 23-June – 2 July 1997, USACHPPM, December 1997.

USACHPPM, 1998. Sampling Visit Phase RCRA Facility Assessment Release Assessment No. 38-EH-5694-97, Holston Army Ammunition Plant, Kingsport, Tennessee, 12-22 May and 8-19 September 1997, USACHPPM, May 1998.

USACHPPM, 2002. Additional Confirmatory Sampling Report for the Holston Army Ammunition Plant (HSAAP), Kingsport, Tennessee, 13-16 November 2000 and 24-27 October 2001, USACHPPM Project No. 38-EH-7977-02, USACHPPM, February 2002

Statement of Basis
Area of Concern – AOC-GW
Site-Wide Groundwater
HSAAP-33
Kingsport, Tennessee

INTRODUCTION

This Statement of Basis summarizes the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) and the proposed final remedy for Area of Concern - Site-Wide Groundwater (AOC-GW) at the Holston Army Ammunition Plant (HSAAP) in Kingsport, Tennessee (Figure 1). The U. S. Environmental Protection Agency (EPA) ID for HSAAP is TN521-002-0421. AOC-GW is included in the HSAAP Installation Action Plan as unit HSAAP-33. AOC-GW addresses groundwater contamination issues throughout the installation. The proposed final remedy for AOC-GW is monitoring and institutional controls.

SITE BACKGROUND

AOC-GW was originally established as an administrative unit under Solid Waste Management Unit (SWMU)-50 (Former Solvent Burn Tank) in the RCRA Post-Closure Corrective Action Order for HSAAP. This unit addresses groundwater contamination issues throughout the installation. AOC-GW includes groundwater associated with releases at the individual SWMUs known or suspected to be sources of groundwater contamination. Additionally, AOC-GW includes groundwater in all of the industrialized portions of the Area A and Area B production areas of HSAAP that are not associated with specific SWMUs.

For the purposes of the AOC-GW RFI, Area B of HSAAP was subdivided into two areas based on geography and the principal types of activities that have been conducted in each. These two areas are: (1) the Area B Landfill Area located in the westernmost portion of HSAAP, and (2) the Area B explosives production and shop areas located in the industrialized portion of Area B. The Area B explosives production area encompasses about 500 acres in the central industrialized portion of Area B and includes all of the former and current explosives production facilities. The shop area of Area B is located in the northern industrialized portion of Area B and is distinguished from the explosive production area in that explosives have not been manufactured or routinely handled in this part of HSAAP. The shop area includes maintenance and equipment storage facilities, administrative buildings, two closed landfills, and two former sodium nitrate ponds. Table 1 on the following page includes a summary of the source areas and units addressed under AOC-GW.

Groundwater at HSAAP is present in the unconsolidated soil overlying bedrock and the sedimentary bedrock units. The unconsolidated soil at HSAAP is mostly clay- and silt-rich sediments deposited as terraces over time by the Holston River. The underlying bedrock is shale throughout most of HSAAP. Bedrock in a small area in the northwest portion of Area B is dolostone. Groundwater flow in all of HSAAP is ultimately to the Holston River.

Table 1. Summary of AOC-GW Source Areas and Component SWMUs

Area	Site	Description
Area A	SWMU 96	Gas Producer Coal Tar Storage Tanks
Area B - Landfill Area	SWMUs 19 and 29	Construction Debris Landfill and Sedimentation Pond
	SWMU 20	Rock Quarry Landfill
	SWMU 25	Area B Tar Burial Site
Area B - Explosives Production and Shop Areas	AOC-C	Former USTs at Building 105 (Fuel Station)
	Explosives Production Area	Former and Active Explosive Production and Support Facilities
	SWMU 18	Closed Sanitary Landfill
	SWMU 24	Fly Ash Burial/Coal Tar at Building 200
	SWMU 35	Unlined Spill Pond
	SWMUs 38 and 39	Fly Ash Landfill and Former Sodium Nitrate Ponds
	SWMU 50	Former Solvent Burn Tank
	SWMUs 77/78/86/87	Pesticide Areas Near Building 148 (UST, washdown station, septic tank, drainfield)
	SWMU 88	WWII Pesticide Washdown Area

AOC - Area of concern.
AOC-GW - Area of Concern, Site-Wide Groundwater.
SWMU - Solid waste management unit.
UST - Underground storage tank.
WWII - World War II.

Throughout most of Area A and Area B at HSAAP, groundwater primarily moves along the contact between the unconsolidated soil and the top of the shale bedrock where more sandy and permeable sediments have accumulated. Groundwater movement also can occur in the uppermost part of the shale bedrock where weathering and fracturing is greatest. The rate of groundwater flow varies throughout HSAAP depending on the composition of the subsurface materials. Groundwater flow tends to be faster in the northern part of the installation and slower in the southern part near the Holston River because the water table gradient decreases along the river floodplain. In the northwestern portion of Area B, the groundwater table is much deeper within the dolostone bedrock and, with the exception of specific fractures, groundwater flow is very slow.

Groundwater is not used within HSAAP for potable or industrial purposes. A municipal water supply is provided by the city of Kingsport, Tennessee, for potable use by HSAAP and the surrounding communities. HSAAP and other large industrial facilities in the area obtain water for industrial uses from the Holston River. State inventories show the closest downgradient groundwater wells for domestic uses are located approximately 5 miles to the southwest of HSAAP and are south of the Holston River.

Multiple historical groundwater investigations and compliance monitoring programs have been conducted at HSAAP. These investigations found groundwater contamination associated with some individual SWMUs and in some portions of the industrialized production areas of HSAAP. Key historical investigations and additional data collected under the RFI phase of work are discussed in the AOC-GW RFI Report (Bay West and SAIC 2007a).

At least 220 permanent monitoring wells and temporary well points have been sampled at HSAAP as part of confirmatory investigations and AOC-GW RFI efforts conducted since 2000. Most sampling was performed during investigations from 2001 to 2006. Confirmatory sampling of groundwater at selected sites was conducted in 2000 (USACHPPM 2000). AOC-GW RFI activities began in federal fiscal year (FY) 2001 and concluded in FY 2006. Five site-wide groundwater sampling events were performed between FYs 2001 and 2004 (USACHPPM 2003a, 2003b, 2004a). Additionally, two phases of investigation were performed in 2003 and 2004 to characterize groundwater and subsurface geology in the Area B explosives production area (USACHPPM 2004b and 2004c). The most recent FYs 2005 and 2006 phases of investigation evaluated the most likely groundwater flow pathways (along the top of bedrock, adjacent to surface ditches, and along underground utility routes) by installing additional wells. The recent phases of investigation also evaluated long-term contaminant trends and evaluated the factors affecting fate and migration of contaminants (Bay West and SAIC 2007a). Monitoring wells sampled over the course of previous AOC-GW investigations in Area A, the Area B Landfill Area, and the Area B explosives production and shop areas are shown in Figures 2 through 4.

SUMMARY OF CONTAMINANT EVALUATION

The environmental investigations for AOC-GW and its component units are fully discussed in the AOC-GW RFI Report (Bay West and SAIC 2007a), as well as site-specific RFIs for individual SWMUs, as applicable. The key contaminants of interest and findings of the AOC-GW RFI are summarized below. Contaminants of interest were identified in the RFI by comparing chemical concentrations in groundwater to risk-based screening criteria (RBSC). These RBSC include Safe Drinking Water Act maximum contaminant levels (MCLs) or, where MCLs are not available, other risk-based levels, which were calculated considering unrestricted residential use of groundwater as a potable water supply (e.g., drinking, showering, etc.). Table 2 summarizes the key contaminants of interest for AOC-GW. Groundwater at HSAAP is not currently used as a potable or industrial water supply, nor is future use planned. Because groundwater is not used at HSAAP, there is no direct exposure.

Area A: A total of 12 groundwater monitoring wells were sampled in Area A as part of site-wide groundwater investigations between 2000 and 2006 (Figure 2). The contaminants of interest in Area A are semivolatile organic compounds (SVOCs) sourced from coal tar and releases of volatile organic compounds from former industrial operations. As shown on Table 2, naphthalene, benzene, and methylene chloride were detected above their RBSC in the vicinity of the former Producer Gas Facility (SWMU 96). A low percentage of detected concentrations exceeded RBSC. All but one detected value above RBSC occurred in well MW-80. One methylene chloride result from well MW-79 in 2005 exceeded its MCL. The concentrations of these contaminants of interest in groundwater have remained generally stable over the past 6 years and the extent of the contaminants is limited to the vicinity of the SWMU where the release occurred.

Area B Landfill Area: Fourteen groundwater monitoring wells were sampled in the Area B Landfill Area during confirmatory sampling in 2000 and site-wide groundwater investigations between 2001 and 2006 (Figure 3). Two of these wells (MW-68 and MW-68B) at SWMU 20 (Rock Quarry Landfill) were also sampled during a RCRA preliminary investigation in 1997. The contaminants of interest detected in groundwater above RBSC in the Area B Landfill Area are RCRA metals, SVOCs, and explosives (Table 2). A survey of this portion of Area B was conducted to identify whether any springs or seeps existed where groundwater contaminants may be entering the Holston River. No springs or seeps were found during the survey. A summary of the nature and extent of contaminants of interest in this portion of Area B is as follows:

- Arsenic and chromium were infrequently detected above their RBSC (Table 2). Arsenic was detected above its RBSC in two samples: (1) a sample collected in 2000 from well MW-48 at SWMUs 19/29 (Construction Debris Landfill/Sedimentation Pond), and (2) a sample collected in 1997 from well MW-68B at SWMU 20 (Rock Quarry Landfill). Chromium was detected once above its RBSC in a 2004 sample collected from well MW-113 at SWMU 20 (Rock Quarry Landfill). Lead was detected once above its federal treatment technique action level in a field duplicate sample collected in 2005 from well MW-117 downgradient of SWMUs 19/29.
- Six SVOCs were detected above RBSC in the Area B Landfill Area (Table 2). Five of these SVOCs were detected only in one well (MW-48) in the immediate vicinity of SWMUs 19/29 (Construction Debris Landfill/Sedimentation Pond). The five SVOCs are dibenzofuran, fluorene, 2-methylnapthalene, naphthalene, and n-nitrosodiphenylamine (Table 2). Investigations have shown the extent to be limited and none of the chemicals have been detected above RBSC in wells a short distance further downgradient (e.g., wells MW-114, MW-115, and MW-116; Figure 3). In addition to these five SVOCs, bis(2-ethylhexyl)phthalate was detected in about 50% of the samples collected from Area B Landfill Area wells. Detections above RBSC occurred in both upgradient (e.g., well MW-55) and downgradient wells and the compound was not consistently detected above RBSC at any specific location.
- One explosive compound [cyclotrimethylenetrinitramine (RDX)] has been consistently detected above its RBSC in one well (MW-68; Figure 3) at the downgradient boundary of SWMU 20 (Rock Quarry Landfill) since 1997. RDX concentrations observed in this well since 2002 have been decreasing.

Area B Explosives Production and Shop Areas: Based on available data records, at least 194 groundwater monitoring locations have been sampled as part of RCRA investigations in the Area B Production and Shop Areas since 2000. Additional monitoring was performed at the Building 105 Fuel Station (AOC-C) as part of earlier studies. The contaminants of interest in the Area B explosives production and shop areas are explosive compounds, mercury, pesticides and herbicides, and fuel-related chemicals (Table 2). A summary of the nature and extent of contaminants of interest for the various source areas in this portion of Area B is outlined below.

The explosive compound RDX is the key contaminant of interest in the 500-acre Area B explosives production area. RDX is the key contaminant of interest in the area because it has the greatest extent and concentrations exceed its RBSC in more locations than other explosives compounds. Few detections of other explosive compounds have exceeded RBSC (Table 2).

The RFI focused on the current extent of RDX in groundwater and its potential for future migration off-site or to surface water receptors such as the Holston River. Key findings of the RFI with respect to RDX in the Area B explosives production area include:

- Investigations show contamination from legacy sources is limited to the Area B explosives production area and the vicinity of some isolated SWMUs (e.g., SWMU 35).
- About one-half of the Area B explosives production area wells sampled since 2000 (61 of 134 locations) contained detectable RDX. The majority of the detected RDX values (about 66%) exceed the RBSC (Table 2). RDX does not occur as a large continuous plume; rather, it is present in groundwater as discontinuous zones and smaller areas of contamination resulting from releases at multiple points over time.
- Contaminant trends within the production area are generally stable.
- A combination of low groundwater flow rates, dispersion, and natural attenuation processes contribute to the lack of significant RDX migration.
- Migration of contaminants from the Area B explosives production area sources to surface water ditches or the Holston River has not occurred to date.
- Computer models show that RDX in groundwater is not expected to migrate from the central part of the explosives production area to the Holston River at concentrations above its RBSC within a 500-year model timeframe.
- Migration of RDX beyond HSAAP is not a foreseeable condition because the Holston River is a regional hydraulic boundary for all of Areas A and B.

Groundwater contaminants other than explosives are primarily related to individual SWMUs in the shop area of Area B. A summary of the RFI results with respect to these other contaminants includes the following:

- Mercury has been consistently detected below its RBSC, but above its EPA lifetime health advisory (LHA) level and MCL (2 ug/L), in groundwater in one well (MW-70) at SWMU 18 (Former Sanitary Landfill) located at the northwest edge of the shop area (Figure 4). Mercury has not been observed in any other downgradient well at this SWMU. Concentrations have remained stable over the past 6 years of monitoring.
- Pesticide contamination occurs in the vicinity of four small co-located SWMUs (SWMUs 77/78/86/87 and pesticide areas near Building 148) in the shop area (Figure 4). One pesticide compound (dieldrin) was detected above its RBSC in two wells (MW-73 and MW-75) at these SWMUs. Remedial actions to remove pesticide- and herbicide-contaminated soil at these SWMUs was completed in 2005 and groundwater concentrations have remained stable since that time.
- One herbicide (bromacil) has been consistently detected above its LHA in one well (MW-86) in the vicinity of SWMU 88 in the shop area (Figure 1). Bromacil concentrations in groundwater at this well have remained stable.
- Fuel compounds (benzene, toluene, ethylbenzene, xylenes, and naphthalene) have consistently exceeded RBSC in the immediate vicinity of the Building 105 Fuel Station located in the eastern portion of the shop area (Table 2). Additional fuel-related chemicals and other organic chemicals have been occasionally detected above RBSC. Monitoring has been conducted under various programs at the Fuel Station since 1990.

The more recent data collected since 2000 show the following chemicals exceeded RBSC: benzene in nine wells, naphthalene in five wells, and toluene in four wells. All of these wells were within the interior of the SWMU. Ethylbenzene and total xylenes exceeded their respective RBSC in one well (W15). Overall, contaminant levels have decreased since underground fuel storage tanks were removed in 1994 and the extent of contamination was shown during the RFI to be limited to the immediate Fuel Station vicinity. Four additional monitoring events were completed following completion of interim remedial measures in 2005. These most recent data show additional contaminant reductions since the completion of the interim measures. Concentrations of fuel-related chemicals (e.g., benzene) remained below the risk-based site-specific cleanup level developed consistent with TDEC underground storage tank requirements.

Although the RFI focused on RDX contamination in the explosives production area, its general conclusions regarding contaminant fate and transport also apply to other contaminants at SWMUs in Area B (e.g., landfill areas) and Area A. RDX can migrate easily in groundwater, does not readily bind to soil or rock in the aquifer, nor does it easily degrade. The RFI showed that RDX levels are generally stable and that groundwater is not currently, or anticipated to be, a source of contamination to surface water. The RFI data show that RDX migration off-site has not occurred to date and that migration is limited. The metals, SVOCs, and pesticides observed near SWMUs in other areas of HSAAP are more likely to be bound up in soil and are less likely to migrate in groundwater than RDX. The Holston River is a regional hydraulic boundary for all of Areas A and B. The findings indicate migration of these other contaminants of interest to surface water bodies or beyond HSAAP is also not anticipated.

SELECTED FINAL REMEDY

The proposed final remedy for AOC-GW is: (1) monitoring and (2) institutional controls. The rationale, goals, and components of the remedy are described in the following sections.

Rationale: Source removals and source control actions have been completed at all SWMUs and have mitigated the further release of contaminants to groundwater. Ongoing long-term operations at source areas to maintain landfill caps reduce the potential for additional releases to groundwater. The extent of contaminant migration away from source areas is limited. Groundwater contamination is not currently impacting surface water. The RFI results show a low likelihood of future groundwater contaminant migration to the Holston River. There is no potential for off-site migration of contamination in groundwater because the Holston River is the endpoint and receptor for all groundwater flow from HSAAP. The current and reasonable foreseeable land use is government-controlled, restricted-access under active military mission. HSAAP and the surrounding community is serviced by a public water supply and no current groundwater use exists within Areas A or B of HSAAP. No future groundwater use is planned. Based on these considerations, exposures to groundwater contaminants and migration of contaminants are limited and a final remedy of monitoring and institutional controls is both protective and appropriate.

Goals: Short and long-term protection goals for the proposed final remedy were developed consistent with EPA RCRA corrective action guidance (EPA 2002). These goals are outlined in Table 3. Intermediate goals are facility-specific environmental conditions or measures supporting

progress toward long-term goals. No intermediate goals were developed for the proposed final remedy because the objectives have already been fulfilled through completed source removals and interim measures for individual SWMUs. In addition, HSAAP instituted a site-wide Long-Term Monitoring Program in 2001, which has provided an extensive baseline for groundwater quality conditions against which future monitoring data can be compared.

Table 3. Protectiveness Goals for AOC-GW Final Proposed Remedy

Short-Term Goals	Long-Term Goals
1. Ensure that humans are not currently exposed unacceptable levels of contamination.	1. Prevent future exposures to groundwater protect human health.
2. Ensure that contaminated groundwater is migrating above levels of concern beyond current extent.	2. Ensure that groundwater contaminants do impact surface water at the Holston River.
	3. Control source(s) of release by continu current operations and maintenance activities source-term SWMUs and through groundwa monitoring.

AOC-GW = Area of Concern - Site-Wide Groundwater.
SWMU = Solid waste management unit.

Monitoring: Long-term groundwater monitoring will be conducted to attain both short- and long-term goals for the proposed final remedy. To address short-term goals, groundwater monitoring will be performed to identify changes in groundwater quality at or near prior release locations. In areas near prior release locations, monitoring will be performed and institutional controls maintained until contaminant concentrations fall below RBSC. To address long-term goals, monitoring will also be performed in areas downgradient of the prior release locations to verify that migration of contaminants will not impact the water quality of the Holston River.

Corresponding to these objectives, wells selected for monitoring belong in two categories: (1) interior wells and (2) boundary wells. Interior wells are located within, or adjacent to, prior source areas to monitor changes in contaminant concentrations over time. Boundary wells monitor the installation perimeter near the Holston River into which groundwater from HSAAP ultimately flows. The monitoring wells to be sampled and the target analytes are identified in the Corrective Measures Report (Bay West and SAIC 2007b).

Institutional Controls: The institutional controls component of the proposed final remedy addresses both short- and long-term goals by preventing current and future exposures to unacceptable levels of contamination. Institutional controls applicable to AOC-GW are already in place at HSAAP to exclude access to, or use of, contaminated groundwater. Depending on site conditions, controls may include: (1) Safety/Dig Permit procedures and/or (2) signs, fencing, and other physical barriers. Safety/Dig Permits are required by existing HSAAP safety procedures and Environmental Management System and apply to any excavation greater than 1 ft in depth. The Safety/Dig Permit process ensures that no well would be installed or soil and ground covering disturbed without the knowledge and approval of the Army and TDEC, as necessary.

Costs: A cost estimate was developed for the proposed final corrective measures for AOC-GW based upon the initial (capital) costs to implement the remedy and the costs for annual operations and maintenance (O&M). The capital cost for implementation of the final remedy is $12,000. Implementation costs include initial upgrades to the monitoring well network and dedicated sampling equipment investment. There are no capital costs for institutional controls (signage, fencing, Safety/Dig Permit procedures, etc.) because they are already in place at HSAAP. The costs for O&M include regular well inspection and maintenance (as required), groundwater sampling and analysis for 27 wells, annual reporting over a 30-year period, and any required well plugging and abandonment at the conclusion of the remedy. Table 4 outlines the estimated number of wells, types of analyses, and sampling frequency used as assumptions for developing O&M costs. The total present net cost over the lifetime of the remedy is approximately $1,984,726.00.

Table 4. Summary of Long-Term Monitoring Locations for AOC-GW

Area [a]	Type of Well	# of Wells	Parameters	Sampling Frequency
Area A	Boundary	4	SVOCs, VOCs	Semiannual
Area B - Landfill Area	Boundary	1	RCRA metals, RDX, RDX degradation compounds	Semiannual
		3	SVOCs, RCRA metals	Semiannual
	Interior/ Source Trends	1	SVOCs, RCRA metals	Semiannual
	Upgradient	1	SVOCs, RCRA metals	Biannual
Area B - Explosives Production and Shop Areas	Boundary	6	RDX	Biannual
		5	RDX	Annual
		1	BTEX, RDX	Annual
	Interior/ Source Trends	1	Bromacil	Annual
		1	Mercury	Annual
		2	Pesticides	Annual
		1	RDX, RDX degradation compounds	Annual
TOTAL LONG-TERM WELLS:		**27**		

[a] Areas selected based on hydrogeologic considerations (bedrock stratigraphy and flow regime) and geographic proximity.
AOC-GW = Area of Concern – Site-Wide Groundwater.
BTEX = Benzene, toluene, ethylbenzene, xylenes.
RCRA = Resource Conservation and Recovery Act.
RDX = Cyclotrimethylenetrinitramine.
SVOC = Semivolatile organic compound.
VOC = Volatile organic compound.

REFERENCES

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Statement of Basis
Area of Concern - I
Building 8 Explosives Testing Area
HSAAP-38
Kingsport, Tennessee

INTRODUCTION

This Statement of Basis contains a summary of the location, operating history, contaminants detected, interim measures, and remedy selected for Area of Concern-I (AOC-I) – Building 8 Explosives Testing Area at the Holston Army Ammunition Plant (HSAAP), Kingsport, Tennessee. In the Army's current Installation Restoration Program (IRP), this site is included in HSAAP-38.

SITE BACKGROUND

AOC-I is located to the northeast of Building 8 (Main Laboratory Building) and Building 8A (Laboratory Annex) (Figures 1 and 2). The site was apparently used from the 1940s until the mid-1990s to perform quality assurance demonstration testing of small quantities of explosives. The test was performed semi-weekly from April through October. A 70-gram pellet of TNT and a 70-gram pellet of Composition B were detonated at each demonstration. The tests were conducted to demonstrate and evaluate metal indentation or penetration. Building 8E is a roofed concrete cinderblock structure. The charge was placed on a metal plate outside and immediately southeast of the building. A video-taped detonation demonstration is part of the computer-based safety presentation at Building 6 at HSAAP.

The contaminants of concern at AOC-I are explosives and metals.

SUMMARY OF CONTAMINANT EVALUATION

Environmental samples were collected at AOC-I from surface soils. Samples have been analyzed for explosives and total metals. Elevated lead was identified in the area where the tests were conducted.

Soils: Three surface soil samples were collected in January 2000 (USACHPPM, 2000). One soil sample was collected immediately adjacent to Building 8E and two soil samples were collected southeast of the building (Figure 2). The samples were analyzed for explosives and total metals. There were no explosives detected above the remedial action levels.The only metal that exceeded the Region 9 Residential PRG (400 mg/kg) was lead at 5,400 mg/kg; this concentration also exceeded the Region 9 Industrial PRG of 800 mg/kg.

Eight surface soil samples were collected from seven locations in March 2005 to define the extent of contamination (Figure 3). The samples were analyzed for total lead. There were no detections above the Region 9 Residential PRG of 400 mg/kg.

Due to the elevated lead concentration in the 2000 sampling event, an IM was performed. In July 2005, the upper one foot of soil was excavated from a nine foot by eight foot area surrounding of the elevated 2000 soil sample (Figure 4). Six soil samples were collected from the bottom of the July 2005 IM excavation and analyzed for total lead. All the samples were below the 2004 EPA Region 9 Residential PRG for lead of 400 mg/kg.

Characterization testing indicated the excavated soil was a non-hazardous waste. A total of 2 ½ cubic yards of soil was approved for disposal at the Allied Waste/BFI Carter Valley Landfill in Church Hill, Tennessee. In September 2005, the soil was transported and disposed at the landfill.

Groundwater: The contamination was confined to surficial soils. Ground water has not been impacted by AOC-I activities.

SELECTED FINAL REMEDY

The Interim Measure was successful in removing lead-contaminated soil to below relevant regulatory levels and thereby reducing the risk to human health and the environment. No further action is required at AOC-I.

REFERENCES

Bay West, 2006. RCRA Facility Investigation/Interim Measures Report, AOC-I – Building 8 Explosives Testing Area, (HSAAP-38), Holston Army Ammunition Plant, Kingsport, Tennessee, FPRI Environmental Remediation Services, Contract W9128F-04-D-0018 Task Order #0001, Bay West, Inc., January 2006.

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Statement of Basis
Area of Concern - O
Coal Tar Near Building 20
HSAAP-38
Kingsport, Tennessee

INTRODUCTION

This Statement of Basis contains a summary of the location, operating history, contaminants detected, interim measures (IM), and remedy proposed for Coal Tar near Building 20, Area of Concern–O (AOC-O), at the Holston Army Ammunition Plant (HSAAP), Kingsport, Tennessee. In the Army's current Installation Restoration Program (IRP), this site is included in HSAAP-38. The proposed final remedy for AOC-O is no further action (NFA).

SITE BACKGROUND

AOC-O is located in HSAAP Area A and is situated between the west wall of Building 20 and Plant Road 917N (Figures 1 and 2). AOC-O was identified in 2005 by HSAAP personnel upon discovering visible coal tar on the west side of Building 20. AOC-O is approximately 100 feet long by 30 feet wide (Figure 3). There is no information on any historical activities that may have taken place specifically at AOC-O.

The contaminant of concern at AOC-O is coal tar.

SUMMARY OF CONTAMINANT EVALUATION

An RFI was completed to determine the extent of coal tar contamination. The RFI consisted of the soil borings with visual examination of soil samples. An IM was completed to remove surficial coal tar and coal tar-contaminated soil. Two soil samples were analyzed for semi-volatile organic compounds (SVOCs).

Soils: Ten soil borings were completed in July 2006. The depth of the borings ranged from four to ten feet below grade, with the exception of one boring, which reached refusal at one foot below grade. The borings were continuously sampled. The soil was logged and visually inspected for the presence of coal tar. No samples were collected for laboratory analysis. Coal tar was not detected in any borings below four inches below grade.

Due to the presence of visible coal tar at the site, an IM was performed to remove coal tar and contaminated soil. In July 2006, approximately 1.5 cubic yards of coal tar and coal tar-contaminated soil were excavated from AOC-O. Scattered pieces of coal tar were picked up by hand or shovel and was placed in a lined roll-off container. One verification sample and a blind duplicate sample were collected from the bottom of one of the excavated areas (Figure 4) and analyzed for SVOCs. There were no SVOCs detected above the residential risk-based screening criteria. The excavated material was transported offsite for disposal at the Allied Waste/BFI Carters Valley Landfill as a non-hazardous waste in July 2006.

SELECTED FINAL REMEDY

RFI activities have adequately defined contaminant conditions at AOC-O. The IM was successful in removing coal tar and coal tar contaminated soil to below risk-based screening criteria, thereby providing protection to human health and the environment. No further action is warranted at AOC-O.

REFERENCE

Bay West, 2007. RCRA Facility Investigation/Interim Measures Report, AOC-O – Coal Tar near Building 20, (HSAAP-AOC-O), ERS Contract W9128F-04-D-004,Task Order CK01, Holston Army Ammunition Plant, Kingsport, Tennessee, Revised Final, September.