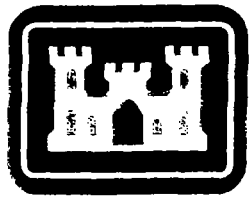

U.S. Army Corps of Engineers

New England District
Waltham, Massachusetts

CONTAMINATED SOIL REMOVAL - PHASE II
AREA OF CONTAMINATION (AOC) 69W
ELEMENTARY SCHOOL
DEVENS, MA.

FINAL
ACTION MEMORANDUM

Contract/Purchase Order No.
DACW33-95-D-0004
Delivery Order No. 0004
DCN: VRA-120197-AAJX

December 1997

Printed on recycled paper

WESTON
MANAGERS DESIGNERS CONSULTANTS

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DEVENS, MASSACHUSETTS

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Prepared for

U.S. ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT
424 Trapelo Road
Waltham, Massachusetts 02254-9149

Prepared by

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Devens, Massachusetts 01433

WO No.: 03886-118-204-0910-00

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EXECUTIVE SUMMARY

The purpose of this Action Memorandum is to document the decision to perform a time-critical removal action in accordance with the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) of 1980, as amended, at Area of Contamination (AOC) 69W, at Devens, Massachusetts.

AOC 69W is located on the northern portion of the Main Post of the former Fort Devens near the northeast corner of the intersection of MacArthur Avenue and Antietam Streets. AOC 69W is comprised of the former Fort Devens Elementary School (Building 215) and the associated parking lot and adjacent lawn, extending approximately 300 feet northwest to Willow Brook which runs along MacArthur Avenue (see Figure 2-1).

Field and off-site analytical data indicate two areas of fuel-related soil contamination at AOC 69W. The larger area of contamination extends from a boiler room, located at the northwest corner of the school building, to a 250-gallon underground concrete vault, located in a wooded area approximately 300 feet northwest of the school. The contamination is attributed to a 1972 release of fuel oil from piping between the current 10,000-gallon underground storage tank (UST) and the northwest corner boiler room. It has been estimated that between 7,000 to 8,000 gallons of fuel oil were released into soil and groundwater.

As a result of the release, a "skimmer system" was installed in 1972 to remove oil from the source area and presumably from near surface soils in the grassy area north of the school, consisting of a pipeline from the northwest corner boiler room to the aforementioned concrete vault. The concrete vault collected oil water and was pumped out approximately every three months. Sometime after 1986, the concrete vault was filled with crushed stone.

The other identified area of soil contamination is located adjacent to the northeast corner of the school building, outside of the original boiler room. This contamination has been attributed to the 1978 release of fuel oil due to ruptured piping near the old boiler room. An excavation at the time

of the release revealed fuel oil emanating from beneath the school. Between 7,000 to 8,000 gallons of fuel oil were estimated to have been released to soil and groundwater during this incident.

A time-critical removal action shall be conducted to remove the existing 10,000 gallon UST, the 250-gallon underground concrete vault, approximately 305 linear feet of piping, and associated petroleum-contaminated soils. This removal action is intended to reduce risks to human health and the environment by removal of the contaminated soils, and to reduce future groundwater contamination levels. Approximately 1,200 cubic yards of petroleum-contaminated soil is estimated to be removed and disposed of appropriately, along with the UST, the concrete vault and related appurtenances.

The removal action is consistent with the National Contingency Plan and site conditions meet the criteria (40 CFR 300.415) for a removal action. The removal action is being performed to enhance public welfare and is expected to reduce future risks of groundwater contamination at the site.

1. PURPOSE

The purpose of this Action Memorandum is to document the decision to perform a time-critical removal action in accordance with the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) of 1980, as amended, at the former Fort Devens Elementary School, Area of Contamination (AOC) 69W. The removal action entails removal of a 10,000 gallon underground storage tank (UST), a 250-gallon underground concrete vault, approximately 305 linear feet of underground piping and an estimated 1,200 cubic yards of associated petroleum-contaminated soils. This Action Memorandum was prepared in accordance with current U.S. Environmental Protection Agency (USEPA) guidance (USEPA, 540/P-90/004, December 1990).

Quality Control Documentation Forms are presented as Attachment 1. A Site Safety and Health Plan (SSHP), including a Site Specific Health and Safety Plan, has been developed for the site in conformance with previous SSHP submittals.

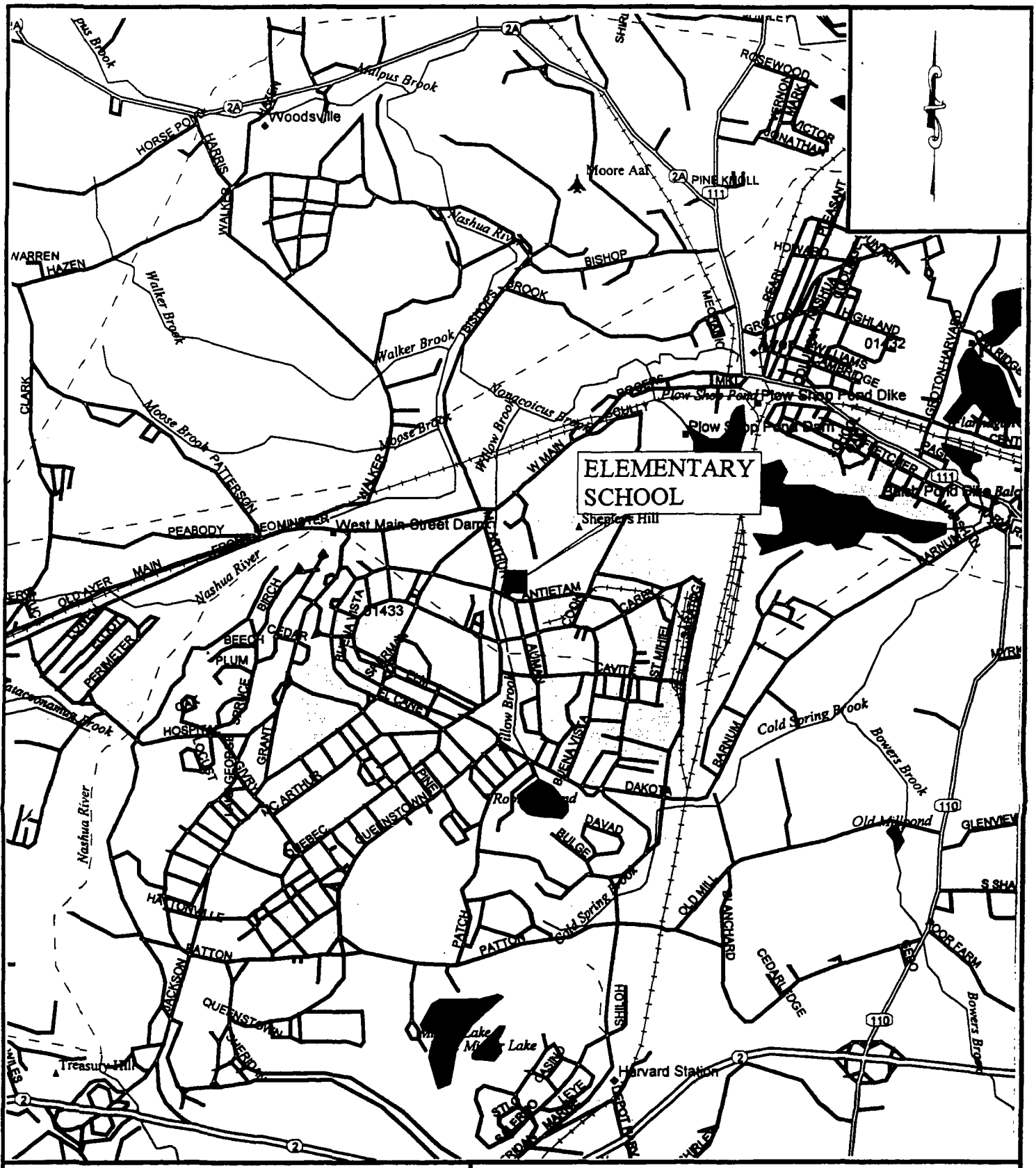
2. SITE CONDITIONS AND BACKGROUND

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) states that a removal action may be conducted at a site where a threat to human health and welfare or the environment is established. An appropriate removal action is taken to abate, minimize, stabilize, mitigate, or eliminate the release or threat of release at the site. The following paragraphs describe Devens (formerly called Fort Devens) and the conditions of the soils at the former Fort Devens Elementary School site (hereafter referred to as AOC 69W).

2.1 SITE DESCRIPTION

AOC 69W is located on the northern portion of the Main Post of the former Fort Devens (hereafter called Devens), near the northeast corner of MacArthur Avenue and Antietam St. (Figure 2-1). Fort Devens is located within the towns of Ayer, Harvard, Lancaster, and Shirley, Massachusetts, and comprises approximately 9,280 acres. Fort Devens was used for a variety of U.S. military training missions from 1917 until 1996. In 1991 the installation was selected for cessation of operations and closure under Public Law 101-510, the Base Realignment and Closure (BRAC) Act of 1990. On 21 December 1989, Fort Devens was placed on the National Priorities List (NPL) pursuant to CERCLA.

According to the Draft Remedial Investigation (RI) Report for AOC 69W prepared by ABB Environmental Services, Inc. (ABB-ES May 1997), various historical site plans for the former Fort Devens Elementary School indicated that heating oil for the Elementary School was provided by a 10,000 gallon UST located in what is now the school courtyard. In 1972, an addition was added to the school resulting in the current condition of the building. As part of the addition, a new boiler room was added to complement the existing boiler. The 10,000 gallon UST, located in what is now the courtyard, and associated piping were removed and a new 10,000 gallon UST was installed under the parking lot on the north side of the school (Figure 2-2). A review of historical records and a series of personal interviews, conducted by ABB during the Draft RI Report, indicated that there have been two separate releases of fuel oil at AOC 69W, the first in 1972 and the second in 1978 (ABB-ES, May 1997).



AREA OF CONTAMINATION 69W
ELEMENTARY SCHOOL
DEVENS, MASSACHUSETTS

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASSACHUSETTS

LOCATION MAP

WESTON
MANAGERS DESIGNERS/CONSULTANTS
MANCHESTER NEW HAMPSHIRE

DRAWN D.C.C.
DATE NOV 97
FIGURE NO. 2-1

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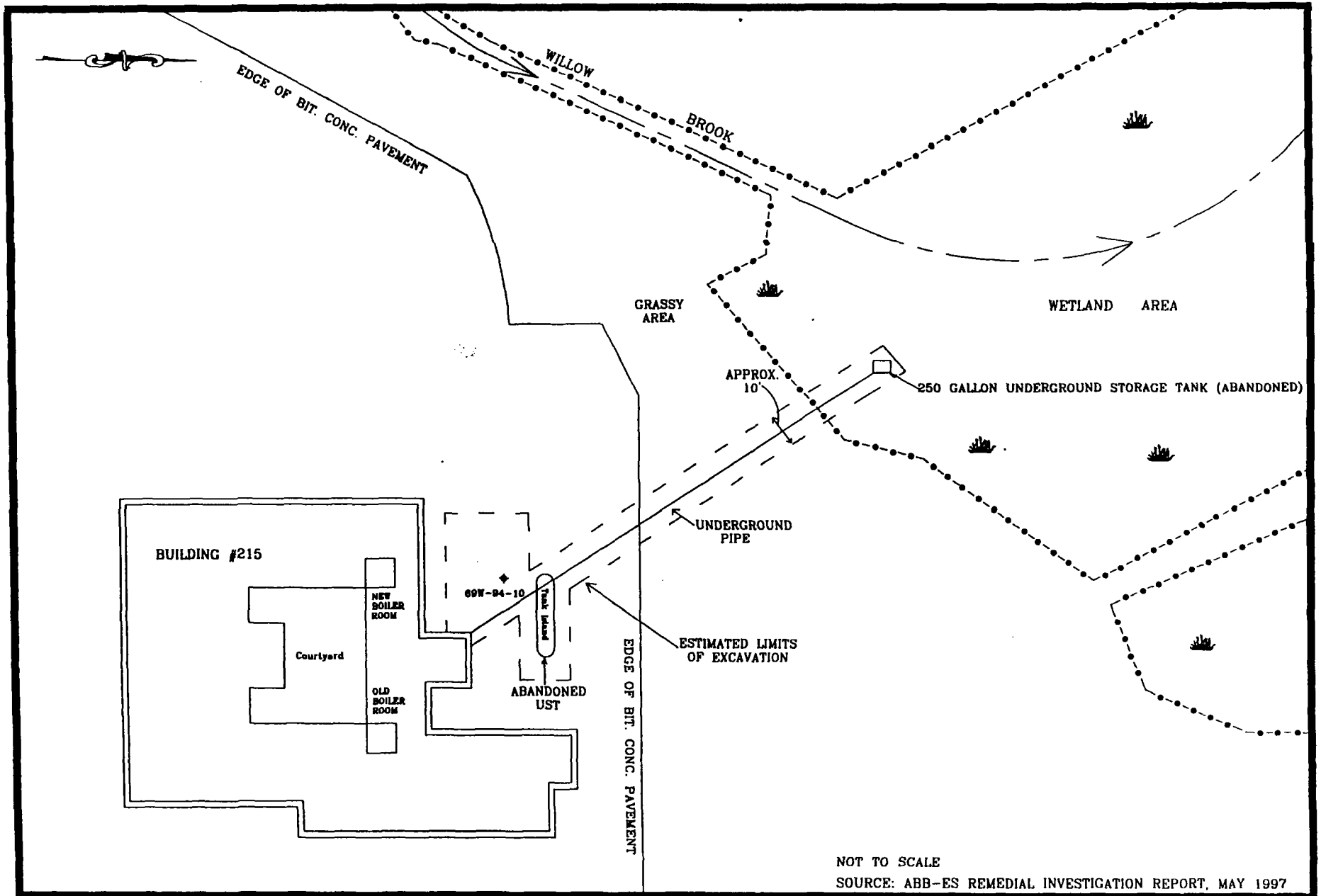


LOCATION MAP

AREA OF CONTAMINATION 69W
ELEMENTARY SCHOOL
DEVENS, MASSACHUSETTS

FIGURE 2-2

WESTON MANAGERS DESIGNERS/CONSULTANTS

The 1972 fuel oil release was due to a crimp in the piping which ran from the new 10,000 gallon UST to the new boiler room. It has been estimated that approximately 7,000 to 8,000 gallons of fuel oil were released into soil and groundwater prior to repair of the piping. The exact location of the release is unknown; however, contaminant distributions suggest that the release was in the vicinity of the newer boiler room.

As a result of the fuel oil release, a "skimmer system" was installed next to the UST in either late 1972 or early 1973. The nature and exact location of the system are unclear; however, some evidence suggests that the system was little more than a french drain. It is known that the system was connected to, or possibly comprised of, a pipe buried approximately three feet below ground surface extending from the vicinity of the UST to a buried 250 gallon concrete vault located approximately 250 feet to the northwest. The concrete vault collected oily water and was pumped out approximately every three months. Sometime after 1986, the concrete vault was filled with crushed rock.

The 1978 fuel oil release resulted from a failed piping connection from fuel oil pipes leading to the old boiler room. Approximately 7,000 to 8,000 gallons of fuel oil were released into soil and groundwater during the 1978 incident. A large area was excavated on the north side of the school adjacent to the loading dock in an attempt to locate the source of the release. Reports indicate that the excavation collected residual oil for one month before the damaged piping was found and replaced. Shortly after the release an oily sheen was reported in Willow Brook and the associated wetlands to the north of the school. Following the spill, 2,600 gallons of residual oil were pumped from the concrete vault.

The decision to remove the existing 10,000 gallon UST, the 250 gallon concrete vault and associated piping and petroleum-contaminated soil, thereby, removing the source of the contamination in the soil and groundwater at AOC 69W, is documented in this Action Memorandum.

2.2 OTHER ACTIONS TO DATE

Previous actions at AOC 69W are discussed in detail in reports compiled by ABB-ES (ABB-ES, May 1997). A brief summary of the actions taken to date is provided below.

2.2.1 Arthur D. Little, Inc. AREE 69 Evaluation (AREE 69W)

In July of 1993, Arthur D. Little, Inc. (ADL) investigated the former Fort Devens Elementary School, which at that time was designated as Area Requiring Environmental Evaluation (AREE) 69W. The investigation was conducted as part of the basewide AREE 69 (Past Spill Sites) evaluation. The investigation focused on the 1978 fuel oil release and was comprised of a document review and site visit. The study concluded that there was a potential for fuel oil contamination in the soil and groundwater (ADL, 1995)

Further investigation was performed by ADL at AREE 69W from March through June of 1994. The investigation involved sampling, field screening, and laboratory analysis of surface soil, subsurface soil, groundwater, surface water, and sediment, and a geophysical survey to locate subsurface utilities.

2.2.1.1 Surface Soil

Soil samples were collected at depths between 0 and 1 foot below ground surface (bgs), from the north and northwest areas of the parking lot of the Elementary School, and were field screened for total petroleum hydrocarbons (TPHC) and for benzene, toluene, ethylbenzene and xylene (BTEX). The sample with the highest TPHC concentration was sent for offsite analyses for TPHC, volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), inorganic compounds and total organic carbon (TOC).

TPHC field screening results ranged from 9.5 parts per million (ppm) to 131 ppm. The highest concentration was detected in a sample collected approximately 150 feet northwest of the UST, in the vicinity of the pipeline connected to the concrete vault. No BTEX concentrations were detected during field screening. Offsite laboratory analyses did not detect compounds at concentrations exceeding Massachusetts Contingency Plan (MCP) Method 1 S-1/GW-1 Standards. Carcinogenic polycyclic aromatic hydrocarbons (cPAHs) detected in the surface soils at the site consisted of benzo(a)anthracene and chrysene at a combined concentrationof 0.29 ppm (ABB-ES, May 1997).

2.2.1.2 Subsurface Soil

As part of the ADL subsurface investigation, soil samples were collected during the installation of groundwater monitoring wells and during a Geoprobe® investigation at the site. During the first round of Geoprobe sampling, the subsurface samples were collected from 0 to 2 feet bgs and from 3 to 5 feet bgs at 16 locations and were field screened for TPHC and BTEX. Of the 32 samples analyzed in the field, three samples exhibiting the highest TPHC concentrations and one sample with the lowest TPHC concentration, were submitted for laboratory analysis of Project Analyte List (PAL) VOC, PAL SVOCs, TPHC, PAL inorganics and Total Organic Carbon (TOC) analysis. During the second Geoprobe sampling round, nine additional locations were investigated. Subsurface soil samples were collected from a depth of 3 to 5 feet bgs and field screened for TPHC.

Subsurface soil samples were collected at depth intervals of 0 to 2 feet, 2 to 4 feet, and 11 to 13 feet bgs during the monitoring well installation effort. These samples were screened in the field for TPHC and BTEX. The samples from the 2 to 4 and 4 to 6 foot depth intervals were submitted for laboratory analysis of TPHC, PAL VOCs, PAL SVOCs, PAL inorganics, and TOC analysis.

TPHC concentrations in soils collected with the Geoprobe® and from monitoring well soil borings ranged from 7.5 ppm to 15,500 ppm at varying depths. The maximum TPH concentration was detected in the vicinity of the UST, at a depth between 3 to 5 feet bgs.

SVOC analytical results from the samples collected at depths greater than 2 feet bgs indicated benzo(b)fluoranthene at concentrations exceeding the Massachusetts Department of Environmental Protection (MADEP) Massachusetts Contingency Plan (MCP) S-2/GW-1 Standards. Benzo(b)fluoranthene was detected at 0.75 ppm, adjacent to the northern side of the UST, at a depth between 3 to 5 feet bgs.

ABB concluded that based on the field screening and laboratory analysis results, TPHC and cPAH soil contamination appears to be concentrated in the area of the existing UST (the presumed source area), and may have migrated downgradient towards Willow Brook (ABB-ES, May 1997).

2.2.1.3 Groundwater

Groundwater samples were collected from each Geoprobe® location and from the six newly installed groundwater monitoring wells. Sixteen groundwater samples were collected during the first Geoprobe® sampling round and were field screened for TPHC and BTEX. Filtered and non-filtered groundwater samples collected during the second Geoprobe® sampling round were field screened for TPHC.

Field screening results from the 25 Geoprobe® groundwater samples indicated that TPHC was present in groundwater. BTEX was not detected. Five sample locations from the first Geoprobe® sampling round exhibiting the highest field screening TPHC concentrations were resampled and submitted to the laboratory for analysis of PAL VOCs, PAL SVOCs, TPHC and water quality parameters. No samples from the second Geoprobe sampling round were sent for laboratory analysis. Results indicated that TPHC, inorganic analytes (arsenic, lead, antimony, beryllium, chromium, and nickel), and organic compounds (1,1-dichloroethene, benzene, carbon tetrachloride, chloroform, tetrachloroethene, trichloroethene, 2-methyl naphthalene, and naphthalene) were detected at concentrations exceeding MCP Method 1 GW-1 Standards. Most of these exceedances occurred at locations in the vicinity and downgradient of the UST. No cPAHs were detected in the Geoprobe groundwater samples.

The six monitoring wells installed at the site confirmed the results of the Geoprobe® investigation. Groundwater samples were submitted for analysis of TPHC, PAL VOCs, PAL SVOCs, unfiltered inorganics and water quality parameters. Results indicated that TPHC, arsenic, beryllium, cadmium, chromium, lead, nickel, 2-methyl naphthalene, acenaphthene, and naphthalene were detected at concentrations exceeding MCP Method 1 GW-1 Standards. No cPAHs were detected in the groundwater samples.

Groundwater sample results indicate that the area around the UST has the greatest number of compounds exceeding MCP Standards. Groundwater northwest of the UST was also found to have elevated concentrations of inorganics and TPHC, suggesting that contaminants have potentially migrated downgradient of the UST location.

2.2.1.4 Surface Water and Sediment

Surface water and sediment samples were collected from two locations in Willow Brook. One sample location was placed in line with the inferred plume migration pathway indicated by the Geoprobe survey, and the other was placed upstream of this area. Samples were analyzed for TPHC, PAL VOCs, PAL SVOCs, unfiltered inorganics, and water quality parameters.

The results indicated the presence of cPAHs in both sediment samples, and TPHC in one sample. Specifically, the cPAHs benzo(a)anthracene, chrysene, benzo(b)fluoranthene, and benzo(k)fluoranthene were detected. Total cPAHs in the upstream sample barely exceeded 7.0 ppm. Total cPAHs in the downstream sample were an order of magnitude less than the clean-up values. Other PAHs and metals were detected in both samples.

TPHC and cPAHs were not detected in surface water samples.

2.2.2 Remedial Investigation by ABB-ES

2.2.2.1 RI Field Analytical Soil Results.

Soil samples were collected during the RI in 1995 and 1996 from TerraProbe^{SM} points, soil borings, and test pits. Soil samples were subjected to on-site analysis for BTEX, select VOCs, gasoline range organics (GRO), and TPHC. Select samples were also analyzed for diesel range organics (DRO). Soil samples were generally collected from near ground surface, a midpoint, and the water table as exploration conditions allowed. Selected soil samples were also subjected to off-site laboratory analyses for PAL VOCs, SVOCs, inorganics, and TPHC.

In general, on-site analyses detected VOCs and TPHCs in a number of soil samples. The majority of the VOC detections were the petroleum related compounds toluene, chlorobenzene, ethylbenzene, and xylenes. The highest detected total and individual concentrations of these compounds were found within 50 feet south and southwest of the UST. However, none of these compound concentrations exceeded the applicable MCP S-1/GW-1 regulatory standards.

The maximum detected TPHCs concentration was 7,700 ppm at 6 feet bgs approximately 50 feet southwest of the UST. The most significant detections (i.e., in excess of 500 ppm) were located in the area of the underground "skimmer system" which leads from the school to the 250 gallon underground holding tank located approximately 300 feet to the northwest. The "skimmer system" that was installed in 1972 appears to have acted as a conduit for migration of TPHC soil contamination.

2.2.2.2 RI Off-Site Analytical Soils Results.

Selected soil samples from the 1995 RI work were subjected to laboratory analysis to provide off-site confirmation of the on-site analysis. Analyses were performed for PAL VOCs, SVOCs, inorganics, and TPHC.

Arsenic, beryllium, calcium, cobalt, copper, iron, magnesium, manganese, mercury, nickel, selenium, sodium, and zinc were detected at levels in excess of established Devens background concentrations. The greatest number of exceedances were observed at depths ranging from 4 to 7 feet bgs along the downgradient pathway from the UST to Willow Brook.

Detected VOCs were comprised primarily of the fuel related compounds toluene, ethylbenzene, and xylene (TEX). The maximum observed concentration of total TEX was 0.48 ppm (ethylbenzene and xylenes only) at 7 feet bgs in the vicinity of the UST. A number of SVOCs were identified in both surficial and subsurface soils at AOC 69W. The highest observed concentrations of the PAHs were observed in subsurface soils immediately adjacent to the school building near the new boiler room and in surficial soils in the grassy area north of the school. These SVOC concentrations were shown to be coincident with the pipe leading from the school to the concrete vault.

TPHC were detected in seventeen of the samples collected for off-site analysis. The TPHC concentration was 14,400 ppm at 7 feet bgs, approximately 50 feet south of the UST. The remainder of the TPHC concentrations in excess of 500 ppm were primarily located between 5 to 7 feet bgs (the varying depth to groundwater) along the pipeline from the new boiler room to the concrete vault.

In August of 1996, additional investigation was conducted involving installation of soil borings/monitoring wells in the school courtyard and inside each boiler room. One soil boring and one monitoring well were installed in the school courtyard and a monitoring well was installed in each of the school's two boiler rooms. A total of nine soil samples were collected from these explorations and analyzed at off-site laboratories for extractable petroleum hydrocarbons (EPH) and volatile petroleum hydrocarbons (VPH) parameters, TPHC, and TOC for the screened interval of the monitoring wells.

Analysis for EPH/VPH yielded one detection. The 9 feet bgs sample from the boring advanced in the new boiler room yielded a concentration of 560 ppm for the n-C 9 to n-C 18 range aliphatics and 110 ppm for the n-C 19 to n-C 36 range aliphatics. Aromatics in the n-C 10 to n-C 22 range were identified at 120 ppm. None of the targeted PAHs were detected above the reporting limits. VPH analysis showed the same sample to contain 4,100 parts per billion (ppb) for VPH compounds including 270 ppb for the n-C 5 to n-C 8 aliphatic range, 8,300 ppb for the n-C 9 to n-C 12 aliphatics, and 3,500 ppb for the n-C 9 to n-C 10 aromatics. None of the targeted VOCs were detected above reporting limits.

Two of the nine soil samples contained detectable levels of TPHC. The 9 feet bgs sample from the new boiler room boring contained 1,740 ppm of TPHC and the sample collected from the courtyard boring at 6 feet bgs indicated a TPH concentration of 57.5 ppm.

2.2.2.3 Summary of Soil Impacts

Field and off-site analytical data from the 1995 and 1996 RI field investigations indicated two areas of fuel-related soil contamination at AOC 69W. The larger area extends from the new boiler room to the underground concrete vault in the wooded area, approximately 300 feet northwest of the school. The contamination is attributed to the 1972 release of fuel oil from piping between the 10,000 gallon UST and the new boiler room. Analytical data and visual evidence suggest that the release may have been inside or near the new boiler room.

As a result of the release, a "skimmer system" was installed in 1972 to remove oil from the source area and presumably from near surface soils in the grassy area north of the school. Contaminant

distributions indicate that the underground piping associated with this system may have acted as a conduit for contaminant migration. Detected contaminants are primarily TPHC and PAHs at approximately 6 to 10 feet bgs adjacent to the school and 0 to 4 feet bgs downgradient in the grassy area and vicinity of the 250 gallon underground concrete vault. Observed subsurface contaminants were identified primarily at or near the water table. Surficial downgradient contamination is attributed to sorption during times of high water levels.

The other identified area of soil contamination is located adjacent to the school building outside of the old boiler room. This contamination has been attributed to the 1978 release of fuel oil due to ruptured piping near the old boiler room. An excavation at the time of the release revealed visible fuel oil contamination emanating from underneath the school. Analytical data indicates that the contaminants are primarily TPHC at depths of 4 to 7 feet bgs and does not appear to be migrating to downgradient soils.

2.2.2.4 RI Groundwater Results

Groundwater sampling and analysis for the RI included field analytical testing of water samples collected from TerraProbe[SM] borings in 1995 as well as the off-site laboratory analysis for three rounds of RI groundwater sampling (two rounds in conjunction with the 1995 field effort and one round of low-flow sampling as part of the 1996 field effort).

2.2.2.5 RI Field Analytical Groundwater Results.

A total of 29 groundwater samples were collected from the TerraProbe[SM] points and analyzed in the field for BTEX, select VOCs, and GRO for select samples.

Seven samples contained one or more of the fuel related contaminants chlorobenzene, ethylbenzene, and xylenes. The majority of detections were from TerraProbes[SM] adjacent to the north side of the school building. The highest observed concentrations were ethylbenzene at 73 ppb and xylene at 120 ppb from the same groundwater sample. Concentrations were generally in the low part-per-billion range (<50 ppb).

2.2.2.6 RI Groundwater Off-Site Laboratory Analytical Sample Results.

Two rounds of groundwater sampling were conducted on all 10 of the on-site monitoring wells in 1995 and 1996, except for one (69W-94-09) which was destroyed by a snow plow between Rounds 1 and 2. Groundwater samples were analyzed for PAL VOCs, SVOCs, total and filtered PAL inorganics, pesticides/PCBs, TPHC, TDS, and water quality parameters.

Several inorganic analytes were detected above the calculated Devens background concentrations in groundwater. Arsenic, calcium, iron, manganese, potassium, and sodium were detected above background in the filtered samples. All of the above inorganic analytes, as well as copper, were detected above background in one or more of the unfiltered samples. The greatest numbers of background exceedances, in both Rounds 1 and 2, were observed in samples from monitoring wells 69W-94-10 and 69W-94-13, located approximately 25 feet southwest and 100 feet north of the UST, respectively. These were also the only wells to have inorganics concentrations in excess of Maximum Contaminant Levels (MCLs). The arsenic was believed, by ABB-ES, to be due to reducing conditions in the aquifer and the reducing conditions are attributed to the aerobic degradation of the fuel oil contamination.

VOCs were observed in these samples at total concentrations of 20 ppb or less. SVOC compounds were detected at a maximum concentration of 1,380 ppb in Round 1 and 1,500 ppb in Round 2. None of the Rounds 1 or 2 groundwater samples contained detectable levels of PCBs. Monitoring well 69W-94-10 was the only location to contain TPHCs in both Rounds 1 and 2 (159,000 ppb and 228,000 ppb respectively). TPHC detections in other samples were at significantly lower levels during these two rounds (maximum 1,960 ppb).

A third round of groundwater samples were collected from six monitoring wells as part of the 1996 field effort to delineate potential source areas. The monitoring wells were sampled following USEPA low-flow (minimum stress) purging and sampling protocols (USEPA, 1996). Sampled wells included the three newly installed courtyard and boiler room monitoring wells as well as the existing monitoring wells three of the six existing wells. Groundwater samples were analyzed for EPH/VPH, TPHC (method 418.1), water quality parameters, TDS, and TOC.

Three of the monitoring wells contained measurable levels of VPH. Monitoring well 69W-94-10 exhibited the highest concentration of total VPH. The total VPH concentration consisted of 17 ppb of the n-C 5 to n-C 8 aliphatics, 550 ppb of the n-C 9 to n-C 12 aliphatics, and 790 ppb of the n-C 9 to n-C 10 aromatic range. This sample also contained the only detections of targeted VOCs: 35 ppb of ethylbenzene and 94 ppb of naphthalene.

EPH compounds were detected in monitoring well 69W-94-10 only. Total EPH compound concentrations were comprised of 590 ppb of the n-C 9 to n-C 18 range aliphatics and 710 ppb of the n-C 10 to n-C 22 range aromatics. Targeted PAH (SVOC) analytes consisted of 89 ppb of 2-methylnaphthalene, 45 ppb of naphthalene, and 15 ppb of acenaphthene. TPHCs were below detection limits in all of the Round 3 samples.

2.2.2.7 Summary of Groundwater Impacts

The RI found that fuel related VOCs, SVOCs, and TPHC comprise the observed groundwater contaminants at AOC 69W. Varying degrees of groundwater contamination, as identified by field and off-site analysis, were observed to extend from the new boiler room towards the concrete vault, located approximately 300 feet to the northwest. The area of groundwater contamination is coincident with the underground pipe associated with the "skimmer system" installed in response to the 1972 fuel oil release. Contaminant concentrations are highest between the new boiler room and monitoring well 69W-94-13, which is also the area of highest observed soil concentrations.

The RI results did not show any significant groundwater contamination associated with the 1978 fuel oil release in the vicinity of the old boiler room. Low levels of chlorinated VOCs were detected during the 1995 field analysis and Round 1 sampling groundwater sampling; however, there were no chlorinated VOCs detected during the Round 2 groundwater sampling effort. The source of the chlorinated VOCs is unknown; however, the source is not suspected to be on-site.

2.2.2.8 RI Sediment

Sediment samples were collected from six locations within Willow Brook in the vicinity of AOC 69W. The inorganic analytes arsenic, calcium, chromium, cobalt, and manganese were all detected at levels in excess of established Devens background concentrations for soil. The greatest number

of background exceedances were observed in the surficial and 2 feet bgs samples at an upgradient 350 feet northwest of the UST.

SVOCs, pesticides, and TPHCs were all observed in a number of the sediment samples. The maximum observed concentration of total SVOCs (27.7 ppm) was observed at 2 feet bgs in a sample collected in the wetland, approximately 50 feet north and downgradient of the concrete vault. The highest levels of total pesticides, as well as the highest individual concentrations, were found in an upgradient surficial sediment sample, collected approximately 350 feet southwest of the UST. This sample was found to contain 2.1 ppm of 4,4'-DDD, 0.081 ppm of 4,4'-DDE, 0.4 ppm of 4,4'-DDT, 0.013 ppm of alpha chlordane, 0.024 ppm of gamma chlordane, 0.06 ppm of dieldrin, and 0.05 ppm of endosulfan II. The lack of detections at depth as well as the highest concentrations being found in a sample location that is bordered by a maintained lawn suggests that the pesticides are not site related.

The three highest concentrations of TPHC were observed in the three upgradient surficial samples at concentrations ranging from 386 to 1,230 ppm. The location of the highest concentration being approximately 350 feet southwest of the UST. The highest concentration of TPHC in the downgradient samples was 287 ppm. This sample was collected approximately 150 feet north of the underground concrete vault. Petroleum fingerprinting indicated that the TPHC detections were comprised primarily of gasoline and diesel patterns. For much of its course Willow Brook is bordered by maintained lawn adjacent to MacArthur Avenue. The elevated TPHC concentrations at the upgradient locations are attributed to refueling and operation of lawn care equipment. In addition, the stream bed is lined with chunks of asphalt.

2.3 STATE AND LOCAL AUTHORITIES' ROLES

This Action Memorandum for AOC 69W at Devens, Massachusetts, will be submitted to the USEPA New England Region and to the Massachusetts Department of Environmental Protection (MADEP) for review.

3. THREATS TO HUMAN HEALTH OR WELFARE OR THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES

Section 300.415 of the NCP outlines factors to be considered in establishing the appropriateness of a removal action. This section evaluates factors for AOC 69W.

3.1 THREATS TO PUBLIC HEALTH OR WELFARE

3.1.1 Actual or Potential Exposure to Hazardous Substances or Pollutants or Contaminants By Nearby Populations or the Food Chain

To enhance public welfare, this Action Memorandum outlines the removal a 10,000 gallon UST, approximately 305 linear feet of associated piping, a 250-gallon underground concrete vault and an estimated 1,200 cubic yards of soil contaminated with petroleum-related compounds.

Human health risks associated with exposure to AOC 69W will be evaluated by ABB-ES as part of the ongoing RI effort.

There is currently no USEPA Region I maximum concentration for TPH in soil. The maximum TPH soil concentration is currently above the MADEP MCP Method 1 S-2/GW-1 criteria for TPH. Additionally, some inorganic analytes in soil and groundwater also showed exceedance for MCP Method 1 S-1/GW-1. Therefore, the contaminated soils associated with the previous releases at the site are conservatively presumed to pose a potential human health risk.

3.1.2 Actual or Potential Contamination of Drinking Water Supplies

Groundwater monitoring wells were installed at AOC 69W as part of the AREE 69W evaluation by ADL and as part of the RI. The depth to groundwater at AOC 69W is approximately 8 ft. below ground surface (bgs) at the Elementary School and 4 ft. bgs at the concrete vault near Willow Brook, which does not contribute water significantly to any drinking water supply wells in the area. Currently no known drinking water supply wells have been affected by the contamination associated with AOC 69W.

3.1.3 Hazardous Substances, Pollutants, or Contaminants in Drums, Barrels, Tanks, or Other Bulk Storage Containers That May Pose a Threat of Release

Other than known residual soil and groundwater contamination from the UST, underground piping and the underground concrete vault, no hazardous substances, pollutants, or contaminants in drums, barrels, tanks, or other bulk storage containers that may pose a threat of release have been identified at or near AOC 69W.

3.1.4 High Levels of Hazardous Substances or Pollutants or Contaminants in Soils Largely At or Near the Surface That May Migrate

Elevated concentrations of TPH are present in soils at depths between 0 to 7 feet bgs. However, this contamination is under asphalt paving and does not allow direct contact with TPH contamination for humans.

3.1.5 Weather Conditions That May Cause Hazardous Substances Or Pollutants Or Contaminants To Migrate Or Be Released

One weather condition that is likely to cause migration of contaminants at AOC 69W is heavy precipitation. Heavy precipitation is likely to infiltrate subsurface soils around the UST location outside the paved areas and/or raise the groundwater table thus flushing residual contaminants from the remaining contaminated soil.

3.1.6 Threat of Fire Or Explosion

No threat of fire or explosion associated with AOC 69W has been identified.

3.2 THREATS TO THE ENVIRONMENT

3.2.1 Actual or Potential Exposure to Hazardous Substances or Pollutants or Contaminants By Nearby Populations or the Food Chain

Ecological risks associated with soil contamination at AOC 69W have not been evaluated at the time of preparation of this Action Memorandum; however, based on the previous documentation of

oily sheens on Willow Brook, residual contamination in soil at AOC 69W may pose a potential risk to nearby populations or the food chain.

3.2.2 Actual or Potential Contamination of Sensitive Ecosystems

Sensitive ecosystems in the vicinity is the wetland area to the northwest of the Elementary School parking lot adjacent to Willow Brook. The residual contamination in soil at AOC 69W poses a potential for contamination of groundwater discharging into Willow Brook seasonally.

3.2.3 Hazardous Substances, Pollutants, or Contaminants in Drums, Barrels, Tanks, or Other Bulk Storage Containers That May Pose a Threat of Release

Other than known residual soil and groundwater contamination from the UST, underground piping and the underground concrete vault, no hazardous substances, pollutants, or contaminants in drums, barrels, tanks, or other bulk storage containers that may pose a threat of release have been identified at or near AOC 69W.

3.2.4 High Levels of Hazardous Substances or Pollutants or Contaminants in Soils Largely At or Near the Surface That May Migrate

Elevated concentrations of TPH are present in soils at depths between 0 to 7 feet bgs. Previous investigations indicate that there has been migration of contamination. The removal action proposed at AOC 69W is expected to minimize the risks posed by the contaminated soils.

3.2.5 Weather Conditions That May Cause Hazardous Substances Or Pollutants Or Contaminants To Migrate Or Be Released

One weather condition that is likely to cause migration of contaminants at AOC 69W is heavy precipitation. Heavy precipitation is likely to infiltrate subsurface soils around the UST location outside the paved areas and/or raise the groundwater table thus flushing residual contaminants from the remaining contaminated soil.

3.2.6 Threat of Fire Or Explosion

No threat of fire or explosion associated with AOC 69W has been identified.

4. ENDANGERMENT DETERMINATION

A time-critical removal action, to facilitate the removal of the contaminated soil associated with the 10,000-gallon UST, underground piping and an underground concrete vault at AOC 69W, has been identified. Actual or threatened releases of pollutants and contaminants from this site, if not addressed by implementing the response action selected in this Action Memorandum, may endanger human health and welfare and/or present a risk to the environment.

5. PROPOSED ACTIONS AND ESTIMATED COSTS

5.1 PROPOSED ACTION

5.1.1 Proposed Action Description

The response action to be performed at AOC 69W involves the removal of a 10,000 gallon UST used to store heating oil for the boiler room of the former Fort Devens Elementary School, a 250-gallon underground concrete vault, approximately 305 linear feet of underground pipe, and an estimated 1,200 cubic yards of soil contaminated with petroleum-related compounds. The removal action is expected to provide compliance with Applicable or Relevant and Appropriate Requirements (ARARs) regarding removal of abandoned USTs and to reduce risks posed by contaminated soils and future groundwater contamination levels. The results of the removal action will be incorporated into the ongoing RI by ABB-ES at AOC 69W.

5.1.1.1 Mobilization/Site Preparation

Mobilization Documents

This Action Memorandum documents the decision to perform contaminated soil removal at AOC 69W, and describes the technical approach and objectives for the work.

The Site Safety and Health Plan (SSHP) was developed in accordance with 29 CFR 1910.120(b)(4), EM 385-1-1, and previous SSHPs prepared for work at Devens. The SSHP establishes safety guidelines for the work operations, and includes key personnel, medical surveillance, training, site control, hazardous waste operations, equipment operations, personal protection, and construction safety.

The SSHP will be reviewed and approved by a Certified Industrial Hygienist (CIH) at WESTON. The SSHP is a separate stand-alone document to be used in conjunction with this Action Memorandum.

Site Preparation

Prior to excavation activities, WESTON will obtain a DIG-SAFE number and coordinate utility clearances and all field work with appropriate DCC and Devens personnel.

Erosion control measures will be implemented using silt screen fencing and hay bales to be positioned downgradient of excavation activities and along the surface water pathway from the site.

Temporary facilities, including a portable steel (or equivalent) decontamination pad, will be established at the site.

Health and safety equipment such as fire extinguishers, first aid kits, eye wash station, and mobile communications will be assembled, checked for integrity and condition, and shipped to the site. Communications will be provided via wireless radio.

A construction safety work fence will be erected around the site work and staging area to prevent unauthorized access to the area. Appropriate construction area work signs will be posted.

Excavation of contaminated soil will be accomplished using a Caterpillar (CAT) 330 excavator and/or CAT 426 backhoe. Removal of the 10,000 gallon UST will be accomplished using the CAT 330 Excavator.

5.1.1.2 UST and Soil Removal

During site mobilization activities, the Devens Fire Chief will be escorted to the site to appraise him of the UST removal and safety measures in place for the removal action. A Fire Department permit for the UST removal will be secured prior to commencement of intrusive activities. The UST removal will be conducted according to applicable local, State, and Federal regulations.

The tank island, bumper posts, and asphalt in the area of the 10,000 gallon UST will be removed. Due to the large size of the tank, confined space entry will be performed to clean the tank bottoms and sludge after the product has been pumped out. After the tank has been cleaned and inerted, it

will be removed from the ground and inspected by the Devens Fire Chief. The tank will be disposed of at an approved tank disposal facility, based upon approval by the Devens Fire Chief.

The soil removal action will consist of excavating an estimated 1,200 cubic yards of petroleum-contaminated soil. The boundaries of the excavation are shown in Figure 2-2. A trench 10 feet wide will be excavated along a straight line from the 250-gallon underground concrete vault to the UST. The depth of excavation will be to groundwater which is expected to be 8 feet bgs at the Elementary School to 4 feet bgs at the concrete vault. The direction of the excavation will follow the underground piping from the school building to the concrete vault. Additional excavation will be conducted around a hot-spot adjacent to the Elementary School building at the location of monitoring well 69W-94-10.

Adequate engineering controls such as barricades, dust minimization, erosion controls, sloping of sidewalls will be administered during excavation activities.

Any oily sheen or product floating on groundwater during excavation activities will be removed either using a vacuum truck or sorbent pads and booms.

5.1.1.3 Soil Staging

Excavated soil will be field-screened for TPH using a Non-Dispersive Infrared Spectrometer (NDIR). The cleanup goals for the site is to meet MADEP MCP Method 1 S-1/GW-1 Standards for EPH/VPH. The actual number of excavated soil samples required to be representative will be determined by field observations, such as soil staining and odor.

Based on VOC concentrations detected in subsurface soil and groundwater samples during previous investigations at the site, the NDIR field test may yield high TPH results. As a conservative measure, a goal of 1,000 ppm TPH will be used for field screening. Should confirmatory analytical data for soil samples, submitted for laboratory analysis based on NDIR results, indicate elevated EPH/VPH concentrations above the applicable S-1/GW-1 action levels, the NDIR field screen results will be adjusted to correlate with those confirmation samples that yielded results below the applicable action levels. Those soils for which field screening results indicate TPH concentrations

above 1,000 ppm, or the revised action level, will be staged in a separate stockpile from the clean excavated soil in an area adjacent to the excavation.

Excavated soils will be field screened at a frequency of one sample per 25 to 30 tons (approximately 15 to 20 cubic yards) of soil removed from the UST and concrete vault areas. Soils from the piping excavation shall be field screened at a frequency of one sample per 60 to 75 tons (approximately 40 to 50 cubic yards). Waste characterization samples will be collected from the contaminated soils stockpile at a frequency of one sample per 100 cubic yards.

5.1.1.4 Soil Disposal

Excavated soil that is not contaminated based on field screening using the NDIR will be reused as backfill material for the excavation. Contaminated soil will be stockpiled in the Elementary School parking lot and disposed of at an approved disposal facility after waste characterization analyses are performed on the contaminated stockpiles. These samples will be collected at a frequency of one sample per 100 cubic yards.

Soil samples collected for waste characterization will undergo the following laboratory analyses:

- Volatile Organic Compounds (VOCs) (Method 8260)
- Semivolatile Organic Compounds (SVOCs) (Method 8270)
- Corrosivity (Method 1110)
- Reactivity (Methods 7.3.3.2, 7.3.4.2)
- Ignitability (Method 1010)
- Priority Pollutant Metals (Method 6010/7061)
- Total Petroleum Hydrocarbons (TPH) (Method 8015)
- Total PCB/Pesticides (Method 8081)
- Full TCLP (Method 1311)

Appropriate Quality Assurance/Quality Control (QA/QC) samples, including duplicates, trip blanks, rinsate blanks, and matrix spike/matrix spike duplicate (MS/MSD) samples, will also be collected for laboratory analysis to evaluate the integrity of the data.

Asphalt removed during excavation activities will be disposed at an asphalt recycling facility. Concrete debris from the tank island at the UST location and the concrete vault will be disposed of at an offsite facility depending upon TPH contamination in the concrete debris.

Contaminated rinse waters from decontamination of UST, personal protective equipment, oily sorbent pads/booms, will be properly containerized, characterized and disposed at an offsite licensed disposal facility.

5.1.1.5 Confirmation Soil Sampling

Based on indication from NDIR field screening results that removal action objectives (as described in Section 5.1.1.3) have been met or excavation can no longer continue due to hindrance from groundwater or on-site structures, confirmation composite soil samples will be collected and analyzed for EPH and VPH Deluxe at an offsite laboratory. It is estimated that five composite samples (one from each sidewall and one from the floor) will be collected from the UST and concrete vault excavation, for a total of ten samples. One floor and two sidewall samples will be collected from every 50 linear feet of the piping excavation. Each composite sample will be made-up of a minimum of four grab samples. Soil confirmation samples will be packaged and shipped via overnight delivery to a CENAE-certified off-site laboratory for analysis. Appropriate QA/QC samples, including field blanks, duplicate samples, and MS/MSD samples, will also be collected for laboratory analysis to evaluate the integrity of the data.

5.1.1.6 Site Restoration

Once analytical results for confirmation soil samples indicate cleanup goals have been met, the excavation will be backfilled, compacted to achieve adequate compaction for both the paved area in the parking lot and the grassy area per CENAE Specifications. The parking lot areas disturbed by the excavation will be restored by applying new asphalt pavement as specified in Sections 02575 and 02576, Construction Solicitation and Specifications, Contaminated Soil Removal - Phase II, Various Sites, Devens, MA., April 1996.

5.1.1.7 Demobilization

Once the removal action is completed, waste materials are disposed of at an offsite disposal facility and site restoration is completed, personnel, equipment, and any related temporary facilities will be demobilized from the AOC 69W site.

5.1.1.8 Quality Control Documentation

All field activities affecting quality control will be performed in accordance with documented procedures and requirements identified in the CENAE Scope of Work (Appendix AB). During all field activities, WESTON will use the following reporting formats:

- Daily Inspection Report
- Field Safety Inspection Checklist

Sample forms are contained in Attachment 1. These reports will be used to document quality control activities. WESTON's Field Supervisor will maintain a field logbook of inspection and work progress. This daily logbook will be used in preparing the Daily Inspection Report form which will be signed and dated by the Field Supervisor. Field documentation records will be kept on-site and the Daily Inspection Report for the previous day's activities will be submitted to the Contracting Officer's Representative (COR) on a daily basis.

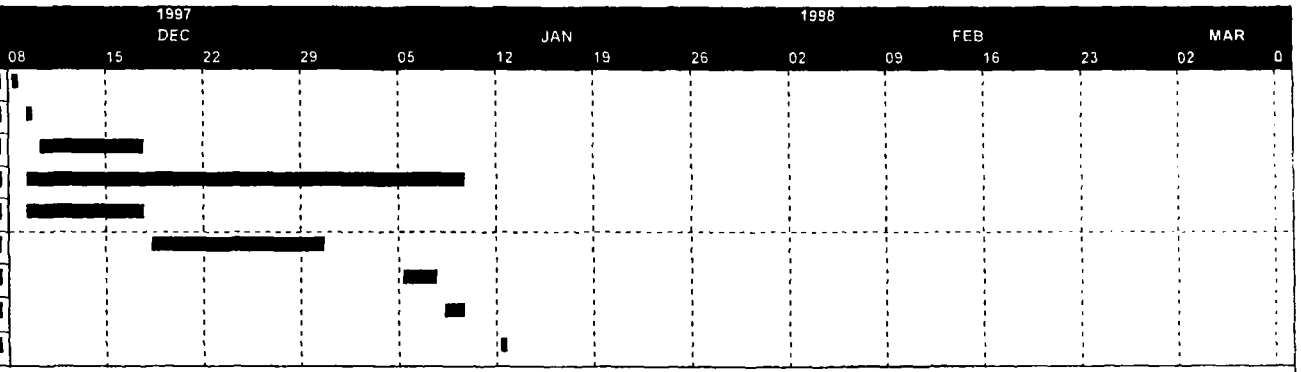
The Daily Inspection Report includes:

- Contractors/subcontractors and responsibilities.
- Location, personnel, and description of work progress for each day.
- Equipment used.
- Safety evaluations including a description of inspections, test data and results, and any corrective actions.

5.1.1.9 Project Schedule

The Project Schedule is organized by the tasks outlined in the CENAE Scope of Work (Appendix AB). A preliminary version of the Project Schedule is presented in Figure 5-1. The project

Act ID	Description	Orig Dur
0920	Mobilization and Site Preparation	1d
0930	UST Cleaning and Removal Activities	1d
0940	Excavation Activities	6d
0950	Air Monitoring	20d
0960	Sampling and Analysis	7d
0970	Off-site Analytical	7d
0980	Backfill and Compaction	3d
0990	Transport of Contaminated Soils	2d
1000	Demobilization	1d



ROY F. WESTON, INC.
AOC 69W REMOVAL ACTION
DEVENS, MASSACHUSETTS

schedule will be updated, as necessary, throughout the project.

PROJECT SCHEDULE FOR FIELD ACTIVITIES

Mobilization and Site Preparation	1 Day*
UST Cleaning and Removal Activities	1 Day
Construction Activities (includes backfilling and site restoration)	9 Days
Air Monitoring	Duration
Sampling and Analysis (in conjunction with UST Removal and soil excavation)	10 Days
Off-site Analytical	7 Days
Transport of Contaminated Soils	2 Days
Demobilization	1 Day

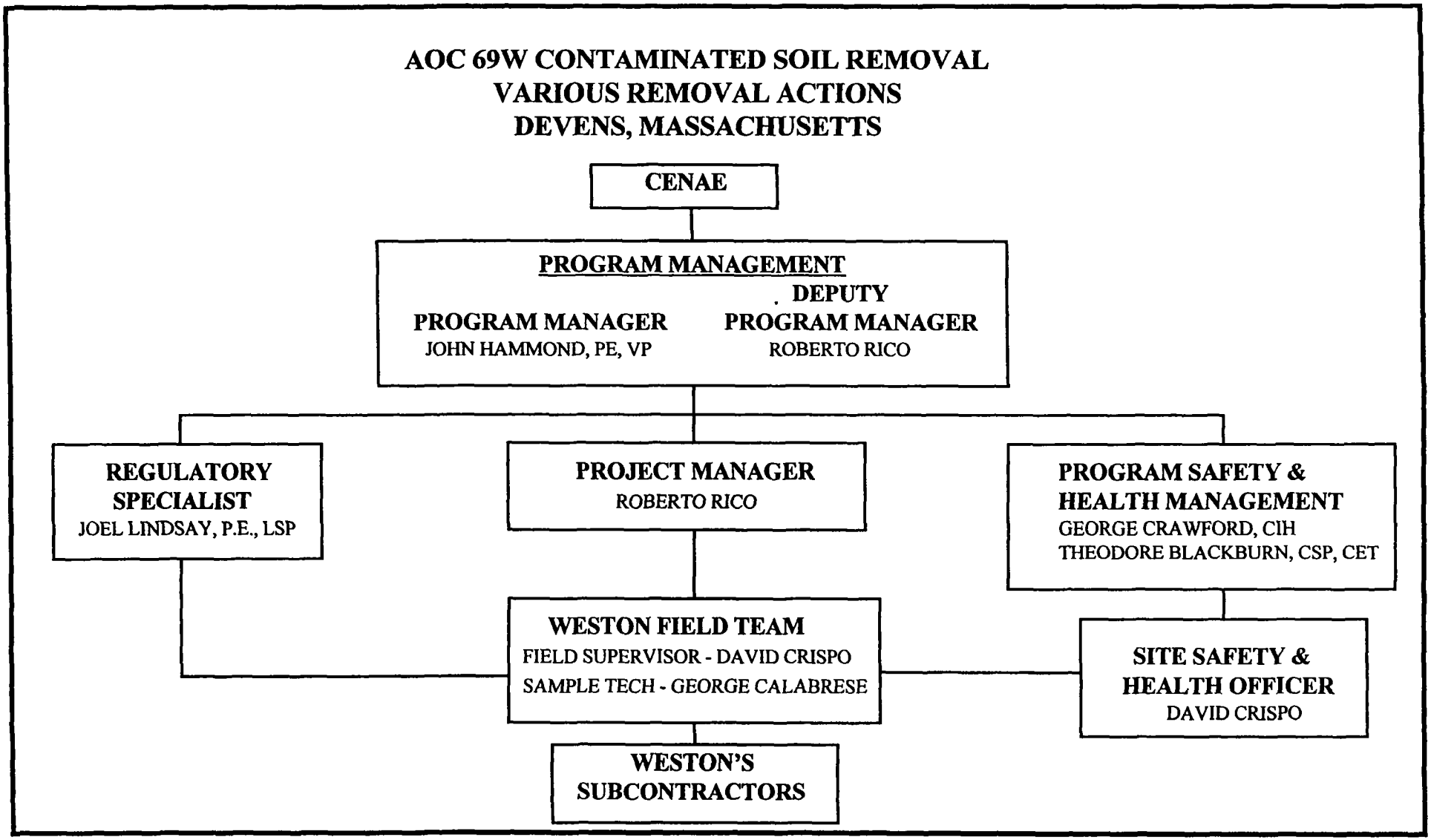
* Days represents total days required for completion of task. It is understood that some tasks may overlap or occur concurrently.

5.1.1.10 Project Personnel

This section highlights key personnel, the organizational structure, and the chain of command applicable to this project. Figure 5-2 depicts the key WESTON personnel and the Project Team's organization chart for the soil removal at AOC 69W. The WESTON field staff will include a Field Supervisor, a Site Quality Control (QC) Systems Manager/ Site Safety and Health Officer, and a Field Sampling Technician. It is anticipated that more than one position can be held by a single field team member. Equipment operators and technicians will be provided on an as-needed basis.

Figure 5-2

Organizational Chart



5.1.2 Contribution To Remedial Performance

The removal of petroleum contaminated soils from AOC 69W eliminates potential risks to human health from contaminated soil resulting from previous fuel oil releases at the site. The removal action contributes to the reduction of overall site risks.

5.1.3 Description of Alternative Technologies

AOC 69W consists of localized contamination of petroleum in soil and groundwater. Removal and disposal of the UST, the underground concrete vault, and contaminated soil is the most feasible and efficient method of remediation at this site. Because this removal action, and other similar removal actions addressed under this program, are time-critical actions, alternative remedial technologies were not considered.

5.1.4 Engineering Evaluation/Cost Analysis

Because the removal action at AOC 69W is considered time-critical, an Engineering Evaluation/Cost Analysis was not prepared.

5.1.5 Applicable or Relevant And Appropriate Requirements

Applicable or Relevant and Appropriate Requirements (ARARs) are federal and state public health and environmental requirements used to (1) evaluate the appropriate extent of site cleanup, (2) scope and formulate removal action alternatives, and (3) govern the implementation and operation of a selected removal action. CERCLA and the NCP require removal actions to attain ARARs to the greatest extent practicable. To determine practicability, factors such as the urgency and scope of the remedial action should be considered.

ARARs were identified for AOC 69W by ABB-ES in the Draft RI Report, dated May 1997. ARARs pertaining to sufacewater at the site include the US Environmental Protection Agency (USEPA) MCLs and the current version of the USEPA Region III risk-based concentrations (RBCs). Groundwater ARARs at the site include the Massachusetts MCLs (MMCLs), Massachusetts Class I groundwater quality standards, and/or USEPA Region III RBCs for tap

water. The above requirements are only applicable if groundwater remediation efforts are planned for the site; however, no such actions are anticipated as part of this removal action.

ARARs for soil screening levels at AOC 69W include the USEPA Region III RBC documents. The provisions of the MCP, 310 CMR 40.0000 are mostly administrative in nature and, therefore, do not have to be complied with in connection with the response action selected for AOC 69W. However, MCP Method 1 does contain promulgated numerical standards, and may be an ARAR if the method is selected for the site. MCP Method 1 S-2/GW-2 regulatory standards have been selected for AOC 69W and is considered an ARAR

5.2 ESTIMATED PROJECT COST

The removal actions described in this Action Memorandum for AOC 69W are estimated to cost approximately One Hundred Fifty Thousand Dollars ($150,000.00).

6. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

If the removal action is not taken, the release may cause an impact to human health or the environment.

7. OUTSTANDING POLICY ISSUES

No outstanding policy issues relative to this Action Memorandum were identified.

8. ENFORCEMENT

The Department of the Army (DA) is the lead agency for Devens. The removal action will not be financed through CERCLA (Superfund); all funding will be provided by the Department of Defense (DOD) through DA. Therefore, enforcement strategies do not apply to this removal action.

9. RECOMMENDATION

This decision document represents the selected removal action for AOC 69W at Devens, Massachusetts, and was developed in accordance with CERCLA, as amended. The removal action is consistent with the NCP and site conditions meet the criteria (40 CFR 300.415) for a removal action. The removal action is expected to provide compliance with ARARs regarding removal of abandoned USTs and to reduce risks posed by contaminated soils, and to reduce future groundwater contamination levels. Therefore, the soil removal action is recommended.

James C Chambers — 10 Dec 97

James C. Chambers
BRAC Environmental Coordinator
U.S. Army Devens Reserve Forces Training Area

Date

10. REFERENCES

1. ABB Environmental Services, Inc., *Draft Remedial Investigation Report, Area of Contamination (AOC) 69W, Devens, Massachusetts*, Vols I and II. May 1997.

2. Arthur D. Little, Inc., *Past Spill Sites (AREE 69) Supplemental Site Evaluation Data Package, Base Realignment and Closure Environmental Evaluation, Fort Devens, Massachusetts*, October 1994.

3. Massachusetts Department of Environmental Protection, *Massachusetts Contingency Plan, 310 CMR 40.0000*, September 1996 and Proposed Revisions , January 1997.

5. Code of Federal Regulations, 40 CFR Part 300

CONTAMINATED SOIL REMOVAL - PHASE II
AREA OF CONTAMINATION (AOC) 69W
ELEMENTARY SCHOOL
DEVENS, MASSACHUSETTS

FIELD SAMPLING AND ANALYSIS PLAN
ADDENDUM

Contract No. DACW33-95-D-0004
Delivery Order 0004
DCN: VRA-120197-AAJY

December 1997

Prepared for

U.S. ARMY CORPS OF ENGINEERS
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Prepared by

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Devens, Massachusetts 01433

WO No.: 03886-118-204-0910-00

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1. PROJECT DESCRIPTION

This Field Sampling and Analysis Plan (FSAP) Addendum was prepared by Roy F. Weston, Inc. (WESTON®) for removal action activities that will be performed at Area of Contamination (AOC) 69W, for the New England District, Corps of Engineers (CENAE). AOC 69W is the location of the former Fort Devens Elementary School situated at the intersection of MacArthur Avenue and Antietam Street, Devens, Massachusetts. Devens is located in Middlesex and Worcester Counties in the Towns of Ayer, Harvard, Lancaster, and Shirley, Massachusetts.

The Scope of Work for this project is to remove the existing 10,000 gallon UST, the 250-gallon underground concrete vault, approximately 305 linear feet of piping, and associated petroleum-contaminated soils related to the AOC 69W site.

As part of completion of the activities outlined above, field screening and off-site laboratory analyses of soil samples is to be conducted at AOC 69W to delineate preliminary removal limits and properly segregate soil stockpiles. Off-site laboratory analyses of samples from the sidewalls and floors (if accessible) of the proposed excavation areas will be performed for confirmation of cleanup. In addition, selected samples will be collected in triplicate and sent to a CENAE certified off-site laboratory for quality control (QC) purposes. The collection, analytical, and quality assurance/quality control (QA/QC) procedures for these samples are detailed in the original March 1996 FSAP titled *Contaminated Soil Removal Various Sites - Phase II, DCN No. VRA-032896-AABA*. WESTON and WESTON's subcontractors will perform the FSAP tasks in accordance with WESTON's *Site Specific Health and Safety Plan* dated November 1997, which will be reviewed by CENAE prior to beginning field activities.

2. CHEMICAL DATA QUALITY OBJECTIVES - GENERAL DISCUSSION

The objectives of the AOC 69W removal activities are to remove the existing 10,000 gallon UST, the 250-gallon underground concrete vault, approximately 305 linear feet of piping, and associated petroleum-contaminated soils as described in the November 1997 Action Memorandum for *Contaminated Soil Removal - Phase II, Various Removal Actions, AOC 69W, Elementary School, Devens, Massachusetts,* prepared by WESTON for CENAE.

The chemical data obtained during this effort will be used for the following purposes:

- To identify and segregate potentially contaminated soils during excavation.
- To characterize potentially contaminated soil for disposal.
- To characterize soil conditions following remediation in such a way as to confirm that soils have been remediated to the required levels [500 parts per billion (ppb) for PCE].

A summary of the proposed sampling locations and rationale for the sampling is provided in Table 2-1.

Analytical data test results and copies of field log entries for each sampling event shall be submitted to the addresses below within 21 days of sample collection.

- U.S. Army Corps of Engineers
  CENAE-ED-EH
  Bldg. 112 South (Applebee)
  424 Trapelo Road
  Waltham, MA 02254-9149
  (617) 647-8227
  (617) 647-8614 (fax)
  ATTN: Mr. Mark R. Applebee

Table 2-1

Proposed Sampling Rationale

Location	Matrix	Frequency	Estimated Total # Samples Lab/dup./QA	Analyses	Objectives	Criteria
AOC 69W UST Removal	Excavated soil (field screening)	1 sample/20 cubic yards	10/NA/NA	Field Screen (NDIR)	For differentiating non-contaminated and potentially contaminated soils.	>1,000 ppm total TPH
	Confirmation soil samples	1 composite sample from excavation bottom; 4 composite samples side walls	5/1/1	EPH/VPH Deluxe	To ensure clean-up levels have been achieved	≥ MADEP S-1/GW-1 standards, continue excavation. < MADEP S-1/GW-1 standards, backfill excavation.
AOC 69W Vault Removal	Excavated soil (field screening)	1 sample/20 cubic yards	10/NA/NA	Field Screen (NDIR)	For differentiating non-contaminated and potentially contaminated soils.	>1,000 ppm total TPH
	Confirmation soil samples	1 composite sample from bottom; 4 composite samples from side walls	5/1/1	EPH/VPH Deluxe	To ensure clean-up levels have been achieved	
AOC 69W Pipeline Removal	Excavated soil (field screening)	1 sample/60 cubic yards	15/NA/NA	Field Screen (NDIR)	For differentiating non-contaminated and potentially contaminated soils.	>1,000 ppm total TPH
	Confirmation soil samples	1 composite sample from excavation bottom; 2 composite sidewall samples every 50 feet	18/1/1	EPH/VPH Deluxe	To ensure clean-up levels have been achieved collecting confirmation samples.	≥ MADEP S-1/GW-1 standards, continue excavation. < MADEP S-1/GW-1 standards, backfill excavation.

Table 2-1 (Continued)

Proposed Sampling Rationale

Location	Matrix	Frequency	Estimated Total # Samples Lab/dup./QA	Analyses	Objectives	Criteria
Contaminated Stockpile	Excavated contaminated stockpiled soil (for waste characterization analyses)	1 composite/100 yd^3	6/0/0	VOC; SVOC; RCRA Characteristics; Total Metals; TPH, Pesticides/PCBs; Full TCLP	Store at Temporary Storage Facility (Bldg 202) under permanent disposal under Devens landfill consolidation project.	Only RCRA-non-hazardous soil may be stockpiled at Soil Storage Facility.

dup. = Duplicate Sample.
ppm = Parts Per Million.
ppb = Parts Per Billion.
EPH = Extractable Petroleum Hydrocarbons.
VPH = Volatile Petroleum Hydrocarbons.
VOC = Volatile Organic Compound.
TPH = Total Petroleum Hydrocarbons (418.1).
SVOC = Semivolatile Organic Compound
RCRA = Resource Conservation and Recovery Act.
NA = Not Applicable

3. CONTRACTOR PROJECT ORGANIZATION AND FUNCTIONAL AREA RESPONSIBILITIES

3.1 PROJECT PERSONNEL

WESTON will provide a staff of experienced administrative, construction, and technical professionals to serve as the key personnel for this project. These personnel were selected for their management and technical abilities. Please refer to the November 1997 Action Memorandum for the *Contaminated Soil Removal - Phase II, Various Removal Actions, AOC 69W, Elementary School, Devens, Massachusetts*, prepared by WESTON for CENAE, for a description of project personnel and organizational chart.

3.2 LABORATORY RESPONSIBILITIES

WESTON will subcontract Alpha Analytical Services (AAS) for off-site laboratory services for confirmation samples. AAS is not a U.S. Army Corps of Engineers, Missouri River Division (USACE-MRD) certified laboratory; however, the analytical services to be provided by AAS (EPH and VPH) do not require USACE-MRD quality control oversight. Waste characterization of stockpiled soils will be performed by Katahdin Analytical Services (KAS). KAS is a U.S. Army Corps of Engineers, Missouri River Division (USACE-MRD) certified laboratory. Laboratory quality control procedures and responsibilities will be in accordance with the CENAE-approved quality assurance plans and this FSAP. WESTON will be responsible for collection and field screening of all samples required for completion of this project. Katahdin Analytical Services will be responsible for off-site analyses of the samples and data reporting. WESTON will also be responsible for collection of samples to be sent to an authorized CENAE laboratory for QA analyses.

4. FIELD ACTIVITIES

The field activities that involve chemical data acquisition anticipated during this work are as summarized below:

Activity	Sampling and Analysis
Excavation Field Screening	On-site analysis using NDIR as an initial indicator of concentrations below regulatory cleanup standards.
Confirmatory Soil Sampling	Off-site analysis of confirmatory soil samples in order to determine excavated areas to be below regulatory cleanup standards.
Waste Characterization Soil Sampling	Off-site analysis of stockpiled soil for waste characterization analysis in order to determine potentially hazardous constituents within soil for adequate disposal purposes.

4.1 SAMPLING EQUIPMENT

Sampling equipment is outlined in the WESTON April 1996 FSAP titled *Contaminated Soil Removal Various Sites - Phase II for Fort Devens, Massachusetts, DCN: VRA-032896-AABA.*

4.2 SAMPLING LOCATIONS

The Action Memorandum for AOC 69W, dated November 1997, describes the locations where environmental sampling shall be performed.

4.2.1 Soil Sampling

Soil sampling procedures are outlined in the FSAP dated April 1996 titled *Contaminated Soil Removal Various Sites - Phase II for Fort Devens, Massachusetts, DCN: VRA-032896-AABA.*

Table 4-1

Quality Assurance/Quality Control Sampling Summary

Location	# of Field Samples	Analyses	Trip Blank	MS/MSD	Field Duplicates	Rinsate Blank	QA	Total
Soil								
Confirmatory	28	EPH/VPH	3	1/1	3	1	3	39
Waste Characterization	6	VOCs	0	0	0	0	0	6
	6	SVOCs	0	0	0	0	0	6
	6	Pestidices/PCBs	0	0	0	0	0	6
	6	TPH	0	0	0	0	0	6
	6	Total Metals	0	0	0	0	0	6
	6	Full TCLP	0	0	0	0	0	6
	6	RCRA Charact.	0	0	0	0	0	6

EPH = Extractable Petroleum Hydrocarbons
VPH = Volatile Petroleum Hydrocarbons
VOCs = Volatile Organic Compounds
SVOCs = Semi-Volatile Organic Compounds
PCBs = Polychlorinated Biphenyls
TCLP = Toxicity Characteristic Leaching Procedure
RCRA = Resource Conservation and Recovery Act

Table 4-2

Sample Containers, Preservatives, and Holding Times

Matrix	Parameter	Container	Preservation	Maximum Hold Times	
				Extraction	Analysis
Soil	EPH	16 oz. glass	ice to 4°C	14 days	28 days
Soil	VPH	2 x 40 ml glass	methanol	7 days	14 days
Soil	VOCs	2 x 40 ml glass no headspace	ice to 4°C	---	14 days
Soil	SVOCs	1 x 8 oz. glass 3/4 full	ice to 4°C	14 days	40 days
Soil	TPH	1 x 8 oz. glass 3/4 full	ice to 4°C	---	28 days
Soil	Pesticides/PCBs	1 x 8 oz. glass	ice to 4°C	14 days	40 days
Soil	Ignitability; Reactivity; Corrosivity	1 x 8 oz. glass 3/4 full	ice to 4°C	--- --- ---	28 days 14 days immediately
Soil	Total Metals; PPMetals	1 x 8 oz. glass 3/4 full	ice to 4°C	---	6 mos. Hg in 28 days
Soil	TCLP, SVOCs;	1 x 8 oz. glass 3/4 full	ice to 4°C	14 days	40 days
Soil	TCLP Metals	1 x 16 oz. glass ¾ full	ice to 4°C	28 days	28 days
Aqueous	VOCs	2 x 40 ml glass no headspace	ice to 4°C pH<2	---	28 days

EPH = Extractable Petroleum Hydrocarbons
VPH = Volatile Petroleum Hydrocarbons
VOCs = Volatile Organic Compounds
SVOCs = Semi-Volatile Organic Compounds
PCBs = Polychlorinated Biphenyls
TCLP = Toxicity Characteristic Leaching Procedure