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U.S. ARMY ENGINEER DIVISION
HUNTSVILLE, ALABAMA

SECTION C - TECHNICAL SPECIFICATIONS REMOVAL ACTION AT 5 SWMUs FOR VOLATILE ORGANIC CHEMICALS

MARCH 1995

PARSONS ENGINEERING SCIENCE, INC.

Prudential Center • Boston, Massachusetts 02199-7697 • (617) 859-2000 • Fax: (617) 859-2043

March 28, 1995

Commander
U.S. Army Corps of Engineers
Huntsville Division
ATTN: Ms. Dorothy Richards (CEHND-PM-ED)
4820 University Square
Huntsville, Alabama 35816

SUBJECT: **Huntsville COE/Contract DACA87-92-D-0022 Delivery Order 39, Plans and Specifications for Decision Documents at SWMUs, SEAD-25, 38, 39, 40 and 41 at the Seneca Army Depot Activity, Romulus, New York**

Dear Ms. Richards:

Enclosed are two copies of the draft plans and specifications for Delivery Order 39, Preparation of Plans and Specifications for Decision Documents at SWMUs, SEAD-25, 38, 39, 40 and 41, located at the Seneca Army Depot Activity (SEDA), Romulus, NY. The work to be performed is described in the Statement of Work (SOW) for Delivery Order 29 of the above referenced contract.

Parsons Engineering Science, Inc. (Parsons ES) appreciates the opportunity to provide you with these plans and specifications. Please do not hesitate to contact me at (617) 859-2492 should you have any questions.

Sincerely,

PARSONS ENGINEERING SCIENCE, INC.

Michael Duchesneau, P.E.
Project Manager

MND/ct
Enclosure

cc: Mr. Randall Battaglia, SEDA
Mr. Keith Hoddinott, USACHPPM (Prov.)
Mr. William Thayer, CENAB
Dr. Kathleen Buchi, USAEC
Ms. Carla Struble, USEPA
Mr. Kamal Gupta, NYSDEC

U.S. ARMY CORPS OF ENGINEERS
HUNTSVILLE DIVISION

PLANS AND SPECIFICATIONS FOR REMOVAL ACTIONS AT SEAD-25, SEAD-38, SEAD-39, SEAD-40 AND SEAD-41 SENECA ARMY DEPOT ACTIVITY ROMULUS, NEW YORK

CONTRACT NUMBER DACA87-92-D-0022

Prepared By:

Parsons Engineering Science, Inc.
Prudential Center
Boston, Massachusetts

SECTION C
WORK STATEMENT

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SECTION 1
BACKGROUND

1.1 PROJECT LOCATION

Seneca Army Depot Activity (SEDA) is located in Romulus, New York, in Seneca County. The installation is bounded by State Route 96A (to the west) and State Route 96 (to the east). The cities of Geneva and Rochester are located to the northwest; Syracuse is to the northeast and Ithaca is located to the south. The subject of this source removal action is five Solid Waste Management Units (SWMUs) with volatile and/or semi-volatile organic compounds in the soils. These are the Fire Demonstration and Training Pad (SEAD-25) and four boiler blowdown leaching pits (SEAD-38, 39, 40, and 41).

1.2 PROJECT DESCRIPTION

1.2.1 Site Description

1.2.1.1 SEAD-25 The Fire Training and Demonstration Pad is located in the east-central portion of SEDA. It is characterized by a small (100 by 100 feet) sparsely vegetated square pad, the surface of which is mostly composed of crushed shale. The site is bound to the east by Administration Avenue beyond which is open grassland covered by deciduous trees, to the south by Ordnance Drive beyond which is an open grassland and a stand of coniferous trees, to the west by grassland and conifers, and to the north by grassland and a baseball field.

Locally, the topography on-site slopes gently in all directions away from the center of the pad. Regionally, the topography slopes to the south-southwest. West of SEAD-25 the topography slopes to the west toward a small drainage ditch located approximately 325 feet from the site. A drainage swale parallels Administration Drive and divides in the southeastern portion of the site where part of it continues under Ordnance Drive via a conduit and part is directed west into another drainage ditch which parallels Ordnance Drive. Surface water run-off flows

off-site via the drainage swales that are present approximately 100 feet to the east and south along roads, and approximately 325 feet to northwest of the pad.

A crushed shale road provides access to the site from the east on Administration Avenue; the road continues west of the pad and loops south to intersect with Ordnance Drive. Within SEDA, vehicular and pedestrian access to the site is not restricted. The Fire Training and Demonstration Pad (SEAD-25) was in use since the late 1960s. In the past, the pad was used for fire control training. The site layout is shown on Figure 1.

1.2.1.2 **SEAD-38** Building 2079 is an abandoned boiler plant located in the southwest portion of SEDA. The blowdown leaching area that comprises SEAD-38 is located to the northwest of Building 2079. Currently, a leach pit is not visible. A drainage pipe that originates in Building 2079 is suspected to have carried blowdown liquids from the boiler plant to a roadside drainage ditch that is located approximately 100 feet to the north of Building 2079 and drains to the west. A smaller drainage ditch originates approximately 100 feet to the west of Building 2079 and drains to the northwest into the larger roadside drainage ditch. The area between the boiler plant and the larger drainage ditch is a relatively level, grassy field. A 60-foot diameter water tank lies between Building 2079 and the smaller drainage ditch. The site layout for SEAD-38 is shown on Figure 2.

From the time the boilers were installed until 1979 or 1980, when all blowdown points were connected to the sanitary sewer system, the boilers discharged a total of 400 to 800 gallons per day. The flow appears to have drained partly into nearby drainage ditches and partly into the ground. Boiler blowdown, consisting of condensed steam, may have contained small amounts of normal additives such as tannins, caustic soda (sodium hydroxide), and sodium phosphate that were used to reduce corrosion and scale in the boiler.

1.2.1.3 **SEAD-39** Building 121 is an active boiler plant located in the administrative area of the SEDA. The blowdown leaching area that comprises SEAD-39 is located immediately to the north of Building 121. Currently, a leach pit is not visible. Fifty feet to the north of Building 121 is Center Street which runs east-west. The land surface to the north of the building is grass covered and is slightly mounded between the building and the street. There are no depressions on the lawn where the blowdown liquid would accumulate. The site layout for SEAD-39 is shown on Figure 3.

From the time the boilers were installed until 1979 or 1980, when all blowdown points were connected to the sanitary sewer system, the boilers discharged three times every 24 hour period for a total of 400 to 800 gallons per day. The flow appears to have drained partly into the storm sewer system and partly into the ground. Boiler blowdown, consisting of condensed steam, may have contained small amounts of normal additives such as tannins, caustic soda (sodium hydroxide), and sodium phosphate that were used to reduce corrosion and scale in the boiler.

1.2.1.4 **SEAD-40** Building 319 is an active boiler plant located on First Street SEDA. The blowdown leaching area that comprises SEAD-40 is located in a drainage ditch next to the railroad tracks to the north of Building 319. Currently, a leach pit is not visible. A drainage pipe originating in Building 319 is suspected to have carried blowdown liquids into the drainage ditch. The drainage ditch originates at the mouth of the pipe approximately forty feet northeast of Building 319. The drainage ditch continues for approximately 400 feet and eventually levels into a grassy field. The ground surface to the north of Building 319 and to the west of the drainage ditch is covered with asphalt. The site layout for SEAD-40 is shown on Figure 4.

From the time the boilers were installed until 1979 or 1980, when all blowdown points were connected to the sanitary sewer system, the boilers discharged three times every 24 hour period for a total of 400 to 800 gallons per day. The flow drained partly into the storm drainage system and partly into the ground. Boiler blowdown, consisting of condensed steam, may have contained small amounts of normal additives such as tannins, caustic soda (sodium hydroxide), and sodium phosphate that were used to reduce corrosion and scale in the boiler.

1.2.1.5 **SEAD-41** Building 718 is an abandoned boiler plant located in the northern end of SEDA. The blowdown leaching area that comprises SEAD-41 is suspected to be a drainage ditch located approximately 20 feet west of Building 718. All surface discharge from the west side of the building would flow into this ditch. Thirty feet to the north of Building 718 is a street which runs east-west. The drainage ditch is relatively steep-sided near the building and primarily drains to the north where it joins a roadside drainage ditch. Some runoff in the ditch would flow to the southwest where the drainage ditch is cut off by a crushed gravel road leading southwest away from Building 718. The site layout for SEAD-40 is shown on Figure 5.

From the time the boilers were installed until 1979 or 1980, when all blowdown points were connected to the sanitary sewer system, the boilers discharged three times every 24 hour period for a total of 400 to 800 gallons per day. The flow drained partly into drainage systems through the ditches and partly into the ground. It is unknown whether the blowdown liquid was discharged directly into the ditch to the west of Building 718, or whether it was discharged next to the building and flowed into the ditch. Boiler blowdown, consisting of condensed steam, may have contained small amounts of normal additives such as tannins, caustic soda (sodium hydroxide), and sodium phosphate that were used to reduce corrosion and scale in the boiler.

1.2.2 Previous Investigations

These removal actions are being conducted by the Army under the requirements of the Comprehensive Environmental Responsibility, Compensation, and Liability Act (CERCLA), as amended. The sites have been the subject of several previous investigations. The analytical results from these previous investigations follow.

1.2.2.1 SEAD-25 In 1993, an Expanded Site Inspection (ESI) was performed at SEAD-25 to determine if a release had occurred. A geophysical survey involving seismic refraction profiles was performed to determine the direction of groundwater flow. A total of six soil borings were advanced, five within the area of the pad and one to the east of the pad to obtain background soil quality data. Two to three samples from each boring (a total of 17 samples) were submitted for chemical analysis. A total of three monitoring wells were installed in the till/weathered shale aquifer. One monitoring well was installed in a presumed upgradient location relative to the pad to obtain background water quality data, while the remaining two wells were installed adjacent to and downgradient of the pad to determine if hazardous constituents have migrated from SEAD-25. One sample from each of the wells (a total of 3 samples) was submitted for chemical analysis. The sample locations are shown in Figure 1. The analytical data collected during the ESI for SEAD-25 are presented in Table 1.

All the samples were analyzed for the following: the Target Compound List (TCL) volatile organic compounds (VOCs) [including methyl tertiary butyl ether (MTBE)], semivolatile organic compounds (SVOCs), and pesticides/polychlorinated biphenyls (PCBs) and Target

Analyte List (TAL) metals and cyanide according to the New York State Department of Environmental Conservation (NYSDEC) Contract Laboratory Program (CLP) Statement of Work (SOW). Herbicides were analyzed by Environmental Protection Agency (EPA) Method 8150, nitrates were analyzed by EPA Method 352.2, and total recoverable petroleum hydrocarbons (TRPH) were analyzed by EPA Method 418.1.

There is evidence that surface and subsurface soils on the burning pad have been impacted by a variety of constituents. VOCs, primarily benzene, toluene, ethylbenzene and xylenes (BTEX) with lesser amounts of chlorinated compounds, are present in both surface and subsurface soils in the western half of the burning pad. The soil samples collected from SB25-3 and SB25-5 contained the greatest concentration of contaminants. Five samples had xylene concentrations in excess of the Technical and Administrative Guidance Manual (TAGM) value, 3 samples had acetone concentrations in excess of the TAGM value, and 2 samples had methylene chloride concentrations in excess of the TAGM value. In addition, benzene, toluene, and ethylbenzene were each present in one sample that exceeded the TAGM value. Three polynuclear aromatic hydrocarbons (PAHs) were found in 1 sample at concentrations exceeding the TAGM value. While a variety of samples were found to contain metals at concentrations that exceed the associated TAGM or site background values, most of the concentrations exceeded the TAGM value only slightly. Lead, the only exception, exceeded the TAGM concentration in samples that also contained elevated concentrations of BTEX and PAHs suggesting that leaded petroleum may have been used. Elevated TRPH concentrations correspond with the presence of BTEX and PAHs. Pesticides, herbicides and one PCB compound were detected in a small percentage of the soil samples, but none exceeded any of the respective TAGM values.

There is evidence that groundwater in the western portion of the pad has been impacted by similar constituents as the soil from this area. A total of 9 VOCs (BTEX and chlorinated compounds) and SVOCs were detected in groundwater immediately west and south of the pad at concentrations that exceeded the NYSDEC class GA groundwater standard; the highest concentrations were detected on the southern side. No pesticide, PCB or herbicide compounds were detected. Metals released as a result of site activities are not believed to have adversely impacted groundwater. Only iron, magnesium, manganese and sodium were detected at concentrations exceeding the standards. TRPH was detected in groundwater samples collected from wells on the western and southern sides of the pad. NYSDEC does

not currently have a TRPH groundwater guidance value, however, TRPH is considered to be an indicator of petroleum impacts.

1.2.2.2 **SEAD-38** A limited sampling program was performed in 1993 and 1994 to obtain evidence of a release. One soil boring was advanced in the larger drainage ditch north of Building 2079. The soil boring was located at the mouth of a drainage pipe that originates in Building 2079 and is suspected to have transmitted blowdown liquids. The boring was terminated in weathered bedrock at 6.3 feet below grade at spoon refusal. The water table was not encountered. No volatiles were detected with the field screening instrument, and no staining of the soil was observed, so the deepest sample with sufficient volume (2-4') was submitted to the lab for chemical analysis. One surface soil sample (0-2") was collected from the roadside drainage ditch downstream of the soil boring location and one surface soil sample was collected from the grassy field between Building 2079 and the larger drainage ditch. Two surface soil samples were collected from the edge of the smaller drainage ditch to the west of Building 2079. Chemical analyses consisted of pH analyzed by Environmental Protection Agency (EPA) Method 9045 and total recoverable petroleum hydrocarbons (TRPH) by EPA Method 418.1. The sample locations are shown in Figure 2. Soil analytical data collected during the site evaluation is presented in Table 2.

Petroleum hydrocarbons were detected in the subsurface soil sample and all four of the surface soil samples. Surface soil samples SS38-2 and SS38-4 contained 104 and 110 ppm of TRPH, respectively, and surface soil samples SS38-1 and SS38-3 contained significantly higher concentrations of 1840 and 1940 ppm, respectively. The subsurface soil sample SB38-1 contained 85 ppm TRPH. The pH of the soil samples ranged from 7.35 to 7.47 in the surface soil samples and was 8.93 in the subsurface soil sample. The detection of petroleum hydrocarbons in all of the samples show that a release did occur. The low concentration of petroleum hydrocarbons in the subsurface sample suggests that the petroleum hydrocarbon impacts diminish with depth.

1.2.2.3 **SEAD-39** A limited sampling program was performed in 1993 and 1994 to obtain evidence of a release. One soil boring was advanced midway between the building and the street directly to the north of the northeast corner of Building 121. The boring was terminated in weathered bedrock at split-spoon refusal, 5.7 feet below grade. The water table was encountered 5.2 feet below grade. No volatiles were detected with the field screening

instrument, and no stained soil was observed, so the sample collected above the water table (3-5') was submitted to the lab for chemical analysis. The top six inches of the ground is filled topsoil which accounts for the mounding of the ground surface between the building and Center Street. Because of the mounding, surface soil samples would not be representative of impacts caused by the blowdown liquids because the ground surface is at a higher elevation than the discharge point for the blowdown liquid. Instead of collecting surface soil samples, soil samples were collected from driving a split-spoon from 0-2' at four locations surrounding the soil boring. One sample was collected from each split-spoon sample. Chemical analyses consisted of pH analyzed by Environmental Protection Agency (EPA) Method 9045 and total recoverable petroleum hydrocarbons (TRPH) by EPA Method 418.1. The sample locations are shown in Figure 3. Soil analytical data collected during the limited site evaluation are presented in Table 3.

Petroleum hydrocarbons were detected in all of the soil samples collected from SEAD-39. All of the soil samples, with the exception of SS39-1 contained TRPH concentrations less than 100 ppm. SS39-1 contained 118 ppm TRPH. The pH of the soil samples ranged from 7.9 to 8.9. The detection of petroleum hydrocarbons in all of the samples show that a release did occur, however, the concentrations detected in the samples were low. The approximate area of soil that appears to be impacted is 20 feet by 50 feet.

1.2.2.4 **SEAD-40** A limited sampling program was performed in 1993 and 1994 to obtain evidence of a release. One soil boring was advanced in the ditch at the mouth of the drainage pipe. The boring was terminated in weathered bedrock at spoon-spoon refusal, 5.8 feet below grade. The water table was not encountered. No volatiles were detected with the field screening instrument, and no stained soil was observed, so the deepest sample collected (4-6') was submitted to the lab for chemical analysis. Four surface samples (0-2") were also collected. One surface sample was collected at the mouth of the drainage pipe near SB40-1, another was collected between Building 319 and the drainage ditch, and the remaining two were collected in the drainage ditch approximately 100 and 120 feet downstream of the origin of the ditch. Chemical analyses consisted of pH analyzed by Environmental Protection Agency (EPA) Method 9045 and total recoverable petroleum hydrocarbons (TRPH) by EPA Method 418.1. The sample locations are shown in Figure 4. Soil analytical data collected during a preliminary site evaluation is presented in Table 4.

Petroleum hydrocarbons were detected in all of the soil samples collected from SEAD-40. The subsurface sample SB40-1.1 and the surface soil sample SS40-3 contained 1270 and 1640 ppm petroleum hydrocarbons, respectively. The surface soil samples SS40-1, SS40-2, and SS40-4 contained 300, 420 and 680 ppm petroleum hydrocarbons, respectively. The pH of the soil samples ranged from 7.29 to 7.86. The detection of petroleum hydrocarbons in all of the samples show that a release did occur. The subsurface soil sample demonstrates that at the mouth of the drainage pipe, the petroleum impacts have penetrated to six feet. The surface soil samples collected show that the petroleum impacts persists downstream of the point at which the blowdown liquids were discharged.

1.2.2.5 **SEAD-41** A limited sampling program was performed in 1993 and 1994 to obtain evidence of a release. One soil boring was advanced in the drainage ditch immediately to the west of where the blowdown liquids were suspected to have been discharged from Building 718. The boring was terminated in weathered bedrock at split-spoon refusal, 6.3 feet below grade. The water table was encountered 4.0 feet below grade. No volatiles were detected with the field screening instrument, and no stained soil was observed, so the sample collected above the water table (2-4') was submitted to the lab for chemical analysis. Another soil sample was submitted from the 0-2' interval. Because of the steep sides of the drainage ditch, surface soil samples collected near the ditch would not be representative of impacts caused by the blowdown liquids because the ground surface is at a higher elevation than the elevation at which the blowdown liquids were probably being discharged. Instead of collecting surface soil samples, soil samples were collected from driving a split-spoon from 0-2' at three locations surrounding the soil boring. One sample was collected from each split-spoon sample. Chemical analyses consisted of pH analyzed by Environmental Protection Agency (EPA) Method 9045 and total recoverable petroleum hydrocarbons (TRPH) by EPA Method 418.1. The sample locations are shown in Figure 5. Soil analytical data collected during a preliminary site evaluation is presented in Table 5.

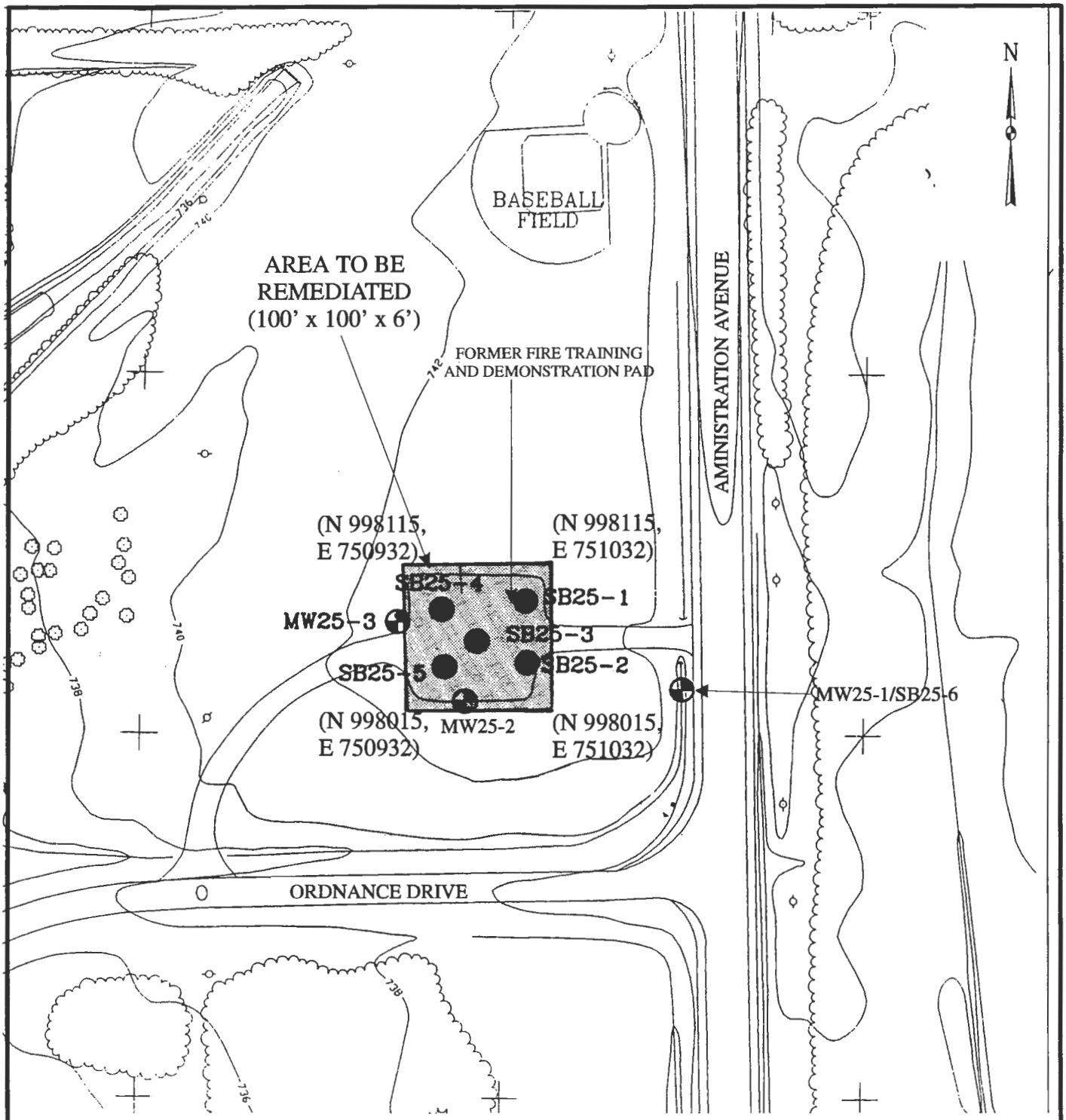
Petroleum hydrocarbons were detected in all of the soil samples collected from SEAD-41. The surface soil samples SS41-1 and SS41-3 contained 144 and 300 ppm of TRPH, respectively. The surface soil samples SS41-2 and SS41-4 contained significantly less at 40 and 70 ppm TRPH, respectively. The subsurface soil sample SB41-1 contained 66 ppm TRPH. The pH of the soil samples ranged from 8.19 to 8.74. The detection of petroleum

hydrocarbons in all of the samples show that a release did occur. The surface samples collected nearest the point that the blowdown liquids were suspected of being discharged contained the greatest concentration of petroleum hydrocarbons. The subsurface sample collected in this area and the surface samples collected in the ditch in the two directions of flow in the ditch contained relatively low concentrations of petroleum hydrocarbons. From these results, it appears that the extent petroleum-impacted soil is localized in the ditch at the suspected point of release of the blowdown liquids.

1.2.3 Description of Affected Media

1.2.3.1 Soils The extent of the soil to be treated during this removal action is shown on Figures 1 through 5. There are approximately 2,300 cubic yards of soil to be excavated, transported to the Ash Landfill Low Temperature Thermal Desorption (LTTD) soil treatment unit and treated. The majority of affected soil, approximately 2,200 cubic yards, is located at SEAD-25.

1.2.3.2 Wastewaters There are two sources of wastewater at these sites that must be handled during the removal action; groundwater and precipitation. The total quantity of groundwater and precipitation to be disposed of is estimated to range from 15,000 to 25,000 gallons. This estimate is based on a total of 8 to 10 gallons of water per cubic yard of soil excavated.



DIRECTIONS TO LOW TEMPERATURE THERMAL DESORPTION (LTTD) FACILITY: From SEAD-25, go south on Administration Avenue - Turn right onto 3rd Street - Proceed through Post 5 - Go straight through the first intersection and go all the way to the end of th eroad - Turn right then left onto Smith Farm Road. The LTTD facility is approximately 300 yards down on the right.

LEGEND

- MONITORING WELL LOCATION
- SOIL BORING LOCATION
- (N 998115, E 750932) NEW YORK STATE PLANE N/E COORDINATES

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PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY

PREPARATION OF PLANS FOR REMOVAL ACTION SEAD-25

DEPT. ENVIRONMENTAL ENGINEERING | DWG NO. 727023-02001

FIGURE 1

REMOVAL ACTION PLAN

SCALE 1" = 100' | DATE MARCH 1995

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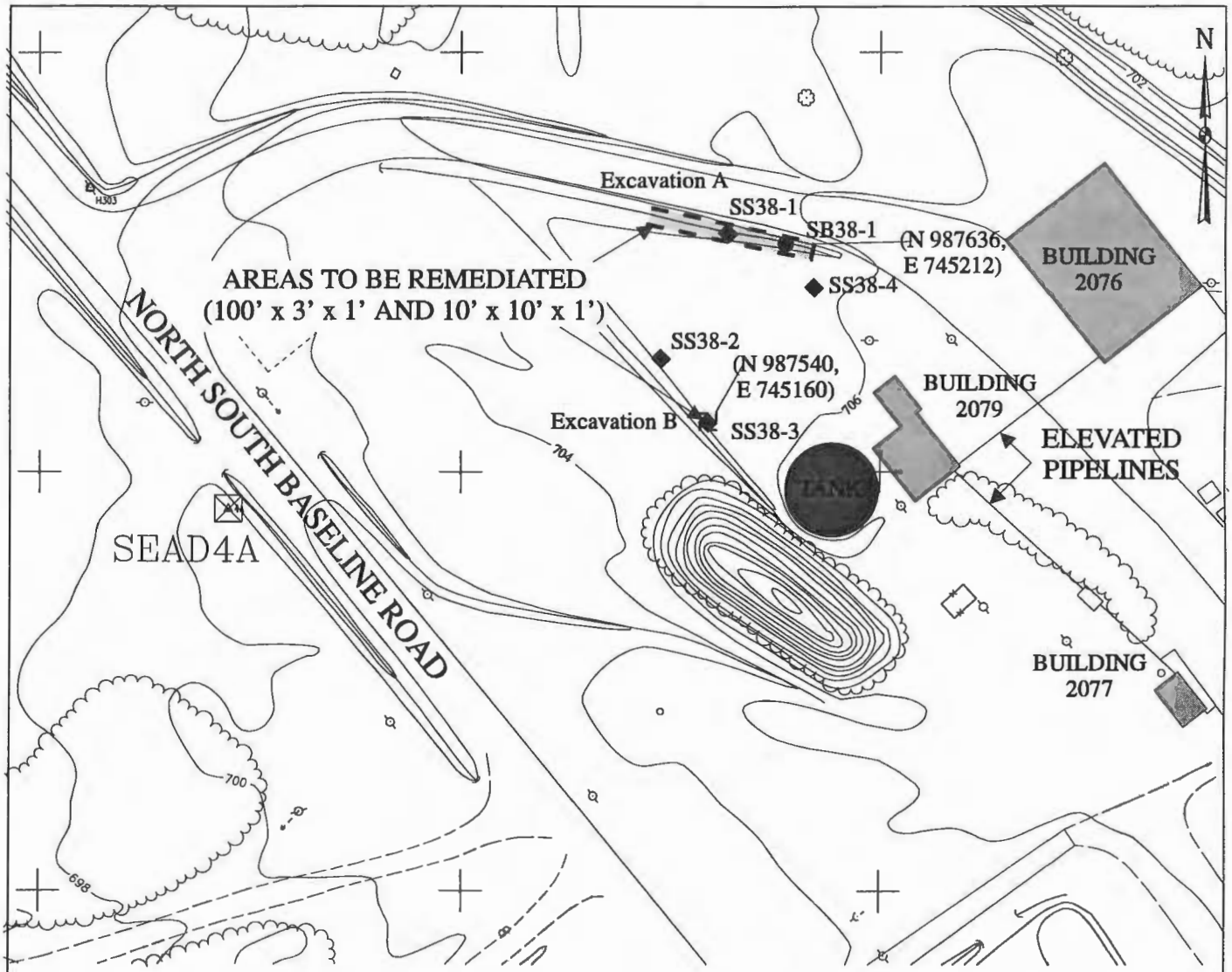

DIRECTIONS TO THE LOW TEMPERATURE THERMAL DESORPTION FACILITY: From SEAD-38, go north on the North South Baseline Road and turn left onto Smith Farm Road. The Ash Landfill is approximately 300 yards down on the right hand side.

LEGEND

- ● SOIL BORING LOCATION
- ◆ SURFACE SOIL SAMPLE
- (N 987636, E 745212) NEW YORK STATE PLANE N/E COORDINATES
- ⊠ SURVEY MONUMENT
- TELEPHONE POLE

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CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY

PREPARATION OF PLANS FOR REMOVAL ACTION SEAD-38

DEPT.	DWG NO.
ENVIRONMENTAL ENGINEERING	727023-02001

FIGURE 2

REMOVAL ACTION PLAN

SCALE	DATE
1" = 100'	MARCH 1995

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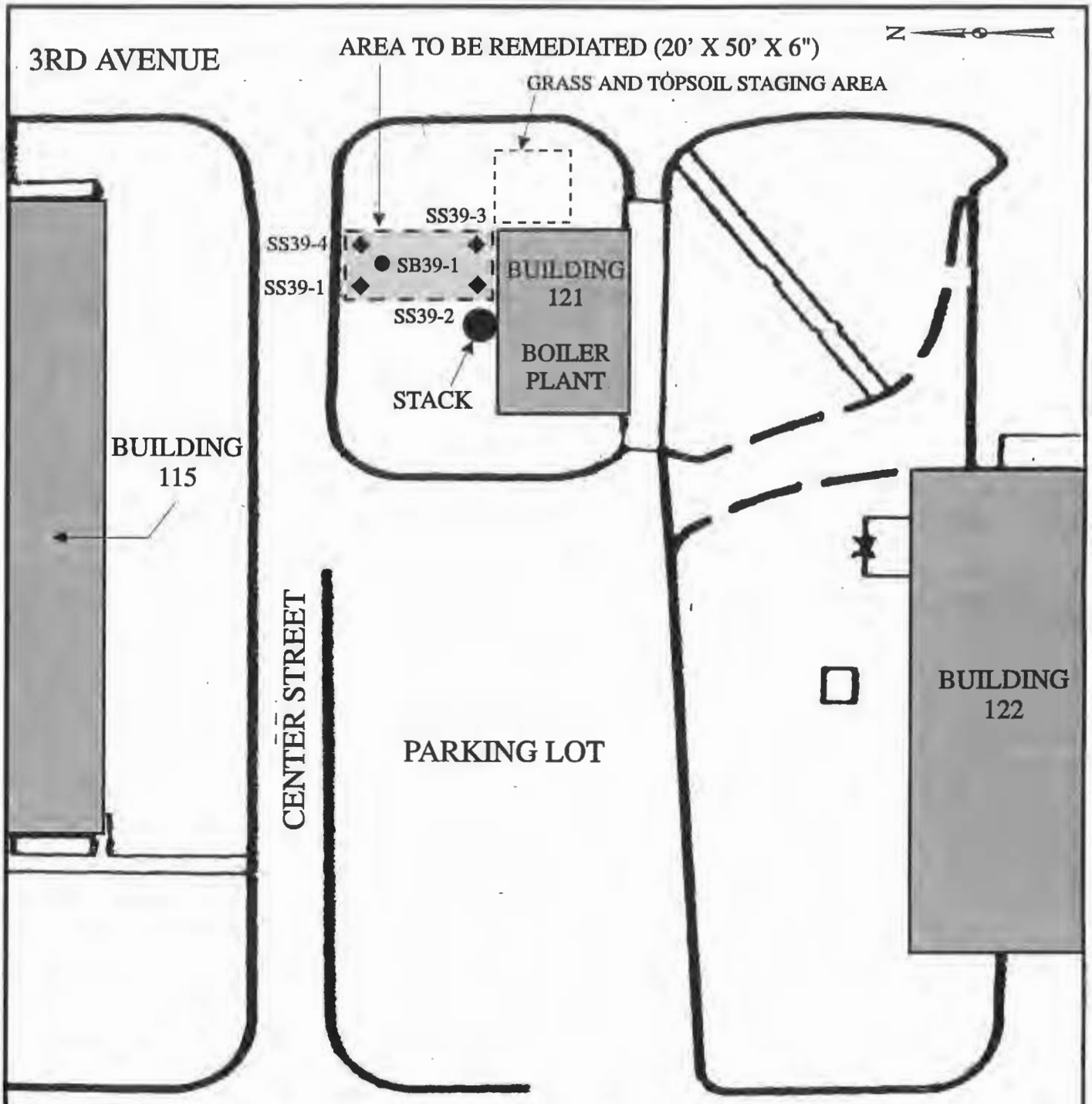

DIRECTIONS TO THE LOW TEMPERATURE THERMAL DESORPTION (LTTD) FACILITY: From Center Street, take left onto Administration Avenue - Take right onto 3rd Street - Proceed through Post 5 - Go straight across the first intersection and go all the way to the end of the road - Turn right and then turn at the first left onto Smith Farm Road. The LTTD facility is approximately 300 yards down on the right.

LEGEND

◆ SURFACE SOIL SAMPLE

● SOIL BORING LOCATION

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CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY

PREPARATION OF PLANS FOR REMOVAL ACTION SEAD-39

DEPT: ENVIRONMENTAL ENGINEERING | DWG NO.: 727023-02001

FIGURE 3

REMOVAL ACTION PLAN

SCALE: 1" = 50' | DATE: MARCH 1995

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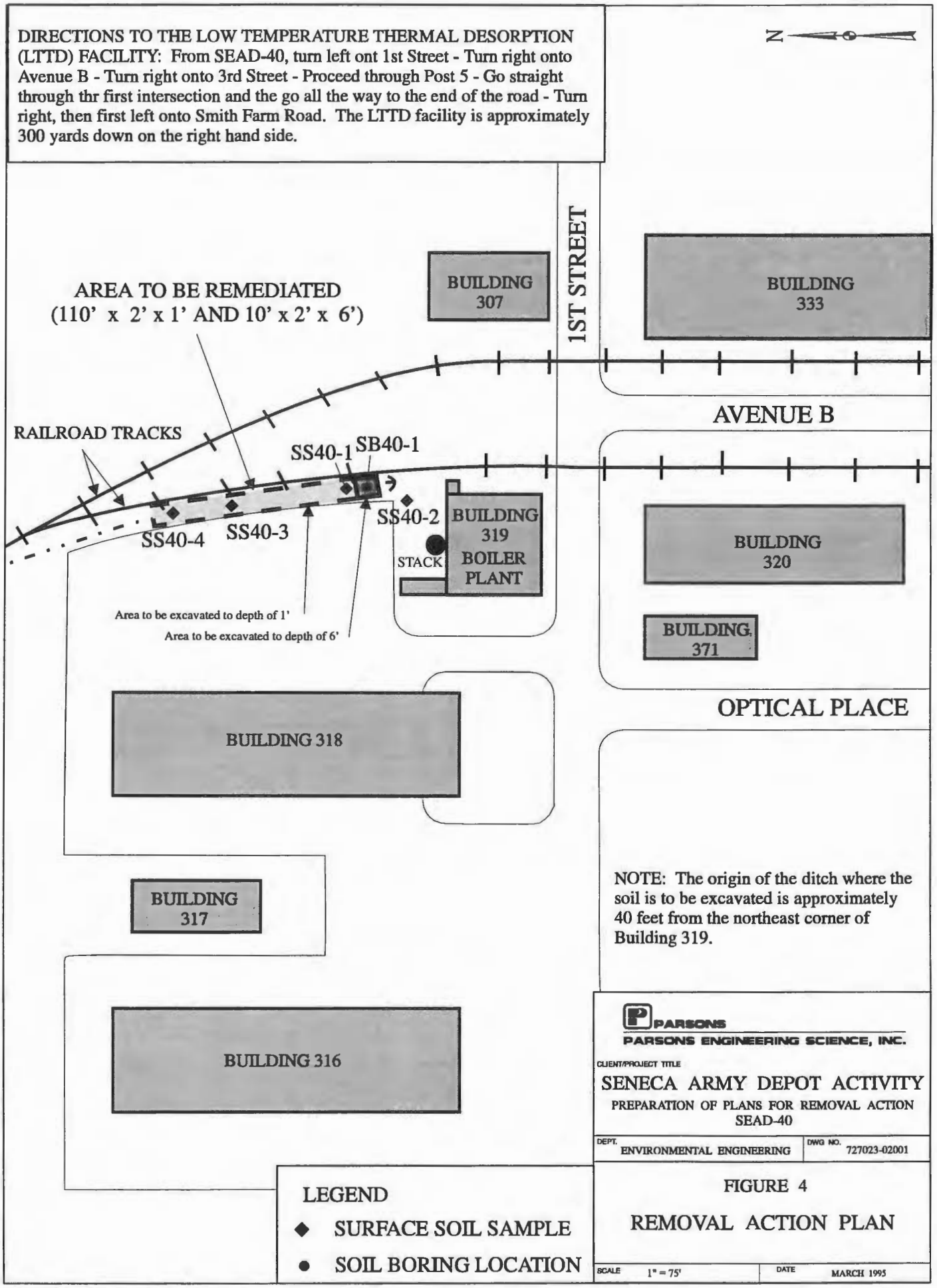
DIRECTIONS TO THE LOW TEMPERATURE THERMAL DESORPTION (LTTD) FACILITY: From SEAD-40, turn left ont 1st Street - Turn right onto Avenue B - Turn right onto 3rd Street - Proceed through Post 5 - Go straight through thr first intersection and the go all the way to the end of the road - Turn right, then first left onto Smith Farm Road. The LTTD facility is approximately 300 yards down on the right hand side.



NOTE: The origin of the ditch where the soil is to be excavated is approximately 40 feet from the northeast corner of Building 319.

LEGEND

◆ SURFACE SOIL SAMPLE

● SOIL BORING LOCATION

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SENECA ARMY DEPOT ACTIVITY

PREPARATION OF PLANS FOR REMOVAL ACTION SEAD-40

DEPT.	DWG NO.
ENVIRONMENTAL ENGINEERING	727023-02001

FIGURE 4

REMOVAL ACTION PLAN

SCALE	DATE
1" = 75'	MARCH 1995

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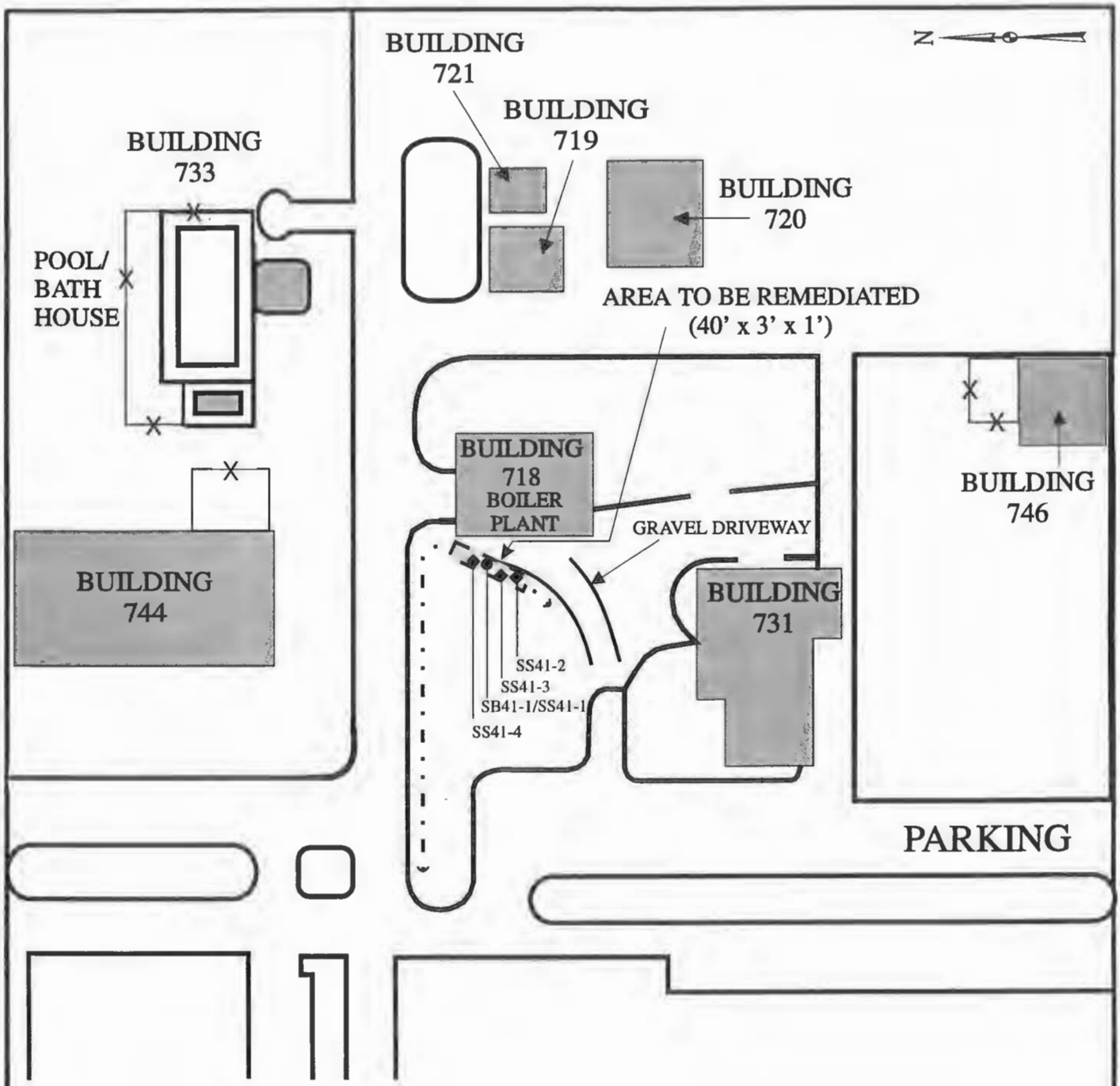

DIRECTIONS TO THE LOW TEMPERATURE THERMAL DESORPTION (LTTD) FACILITY: From SEAD-41, proceed west to the gate adjacent to Post 3 - Turn left onto the North South Baseline Road - Turn right ont Smith Farm Road. The LTTD facility is approximately 300 yards down on the right.

LEGEND

- ◆ SURFACE SOIL SAMPLE
- ● SOIL BORING LOCATION

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SENECA ARMY DEPOT ACTIVITY

PREPARATION OF PLANS FOR REMOVAL ACTION SEAD-41

DEPT. ENVIRONMENTAL ENGINEERING | DWG NO. 727023-02001

FIGURE 5

REMOVAL ACTION PLAN

SCALE 1" = 100' | DATE MARCH 1995

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TABLE 1

GROUNDWATER ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-25 EXPANDED SITE INSPECTION

COMPOUND	MATRIX LOCATION SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	NY AWQS CLASS GA (a)	NO. ABOVE CRITERIA	WATER SEAD-25 02/06/94 MW25-1 210541	WATER SEAD-25 02/06/94 MW25-4 210543 MW25-1DUP	WATER SEAD-25 02/05/94 MW25-2 210480	WATER SEAD-25 11/15/93 MW25-3 204633, 204658
VOLATILE ORGANICS									
1,1-Dichloroethene	ug/L	1	33.3%		5	10 U	10 U	1 J	10 U
1,1-Dichloroethane	ug/L	8	66.7%	NA	NA	10 U	10 U	8 J	3 J
1,2-Dichloroethene (total)	ug/L	25	66.7%	5	1	10 U	10 U	25	2 J
Chloroform	ug/L	17	33.3%	7	1	10 U	10 U	17	10 U
1,1,1-Trichloroethane	ug/L	36	33.3%	5	1	10 U	10 U	36	10 U
Trichloroethene	ug/L	10	33.3%	5	1	10 U	10 U	10	10 U
Benzene	ug/L	780	66.7%	0.7	2	10 U	10 U	780	30
Tetrachloroethene	ug/L	1	33.3%	5	0	10 U	10 U	1 J	10 U
Toluene	ug/L	560	66.7%	5	2	10 U	10 U	560	8 J
Ethylbenzene	ug/L	110	66.7%	5	2	10 U	10 U	110	18
Xylene (total)	ug/L	2500	66.7%	5	2	10 U	10 U	2500	82
MTBE	ug/L		0.0%			ND	ND	Not Analyzed	ND
SEMIVOLATILE ORGANICS									
Phenol	ug/L	56	33.3%	NA	NA	10 U	10 U	56	11 U
2-Methylphenol	ug/L	23	33.3%	NA	NA	10 U	10 U	23 J	11 U
4-Methylphenol	ug/L	42	33.3%	NA	NA	10 U	10 U	42	11 U
2,4-Dimethylphenol	ug/L	86	33.3%	NA	NA	10 U	10 U	86	11 U
Naphthalene	ug/L	86	33.3%	10	1	10 U	10 U	86	11 U
2-Methylnaphthalene	ug/L	37	33.3%	NA	NA	10 U	10 U	37	11 U
Fluorene	ug/L	1	33.3%	50	0	10 U	10 U	1 J	11 U
METALS									
Aluminum	ug/L	2260	100.0%	NA	NA	894 J	1870 J	53.3 J	2260
Antimony	ug/L	36.3	66.6%	3	2	24.9 J	36.3 J	22.4 J	52.7 U
Arsenic	ug/L	3.8	33.3%	25	0	1.4 U	1.4 U	3.8 J	1 U
Barium	ug/L	121	100.0%	1000	0	115 J	121 J	74.1 J	54 J
Beryllium	ug/L	0.31	33.3%	3	0	0.4 U	0.4 U	0.4 U	0.31 J
Calcium	ug/L	145000	100.0%	NA	NA	142000	145000	143000	119000
Chromium	ug/L	5	66.7%	50	0	2.8 J	2.6 U	2.6 U	5 J
Cobalt	ug/L	7.9	33.3%	NA	NA	4.4 U	4.4 U	4.4 U	7.9 J
Copper	ug/L	4.4	33.3%	200	0	3.1 U	3.1 U	3.1 U	4.4 J
Iron	ug/L	4150	100.0%	300	4	1300 J	3200 J	3730	4150
Lead	ug/L	NA	100.0%	25	0	3	2.7 J	2 J	3
Magnesium	ug/L	48000	100.0%	35000	1	26100	26900	48000	22000
Manganese	ug/L	2440	100.0%	300	2	213	241	1330	2440
Mercury	ug/L	0.05	33.3%	2	0	0.05 J	0.05 J	0.04 U	0.07 UJ
Nickel	ug/L	11.5	100.0%	NA	NA	4.4 J	6.8 J	4.7 J	11.5 J
Potassium	ug/L	9950	100.0%	NA	NA	906 U	1010 J	9950	4170 J
Selenium	ug/L	0.73	33.3%	10	0	0.73 J	0.7 U	0.7 U	0.8 U
Sodium	ug/L	NA	100.0%	20000	2	52900	54100	13100	11500
Vanadium	ug/L	5.4	33.3%	NA	NA	3.7 U	3.7 U	3.7 U	5.4 J
Zinc	ug/L	31.3	100.0%	300	0	12.4 J	20.2	31.3	20
OTHER ANALYSES									
Nitrate/Nitrite-Nitrogen	mg/L	0.17	66.7%	10	0	0.16	0.17	0.01 U	0.07
Total Petroleum Hydrocarbons	mg/L	2	66.7%	NA	NA	0.4 U	0.4 U	2	1.6
pH	standard units	7.52	NA			7.01		7.08	7.52
Specific Conductivity	umhos/cm	600	NA			600		600	510
Turbidity	NTU	56.4	NA			56.4		3.6	2.2

NOTES:

a) NY State Class GA Groundwater Regulations
b) NA = Not Available
c) U = compound was not detected
d) J = the report value is an estimated concentration
e) UJ = the compound was not detected; the associated reporting limit is approximate
f) R = the data was rejected in the data validating process
g) ND = not detected

H:\ENG\SENECA\7SWMU\TABLES\SD25GWTF.WK3

TABLE 1 (continued)

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-25 EXPANDED SITE INSPECTION

ID	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-25 0-2 12/03/93 SB25-1.1 206050	SOIL SEAD-25 4-6 12/03/93 SB25-1.3 206051	SOIL SEAD-25 6-8 12/03/93 SB25-1.4 206052	SOIL SEAD-25 0-2 12/03/93 SB25-2.1 206053	SOIL SEAD-25 0-2 12/03/93 SB25-2.4 206057 SB25-2.1DUP	SOIL SEAD-25 2-4 12/03/93 SB25-2.2 206055	SOIL SEAD-25 4-6 12/03/93 SB25-2.3 206056	SOIL SEAD-25 0-2 12/03/93 SB25-3.1 206058	SOIL SEAD-25 2-4 12/03/93 SB25-3.2 206059
	ug/kg	390	11.8%	100	2	11 U	11 U	11 U	11 U	11 U	19 U	11 U	52 U	12 U
	ug/kg	2800	52.9%	200	3	11 U	11 U	11 U	11 U	11 U	39	24	52 U	40
al)	ug/kg	310	5.9%	300(d)	1	11 U	11 U	11 U	11 U	11 U	19 U	11 U	52 U	12 U
	ug/kg	9	11.8%	300	0	11 U	11 U	11 U	2 J	11 U	19 U	11 U	52 U	12 U
	ug/kg	10	17.6%	300	0	11 U	11 U	11 U	11 U	11 U	10 J	11 U	52 U	8 J
	ug/kg	170	5.9%	800	0	11 U	11 U	11 U	11 U	11 U	19 U	11 U	170	12 U
	ug/kg	280	11.8%	700	0	11 U	11 U	11 U	11 U	11 U	19 U	11 U	38 J	12 U
	ug/kg	100	11.8%	60	1	11 U	11 U	11 U	11 U	11 U	19 U	11 U	100	12 U
	ug/kg	4500	29.4%	1500	1	11 U	11 U	11 U	11 U	11 U	19 U	11 U	840	4 J
	ug/kg	17000	35.3%	5500	1	11 U	11 U	11 U	11 U	11 U	19 U	6 J	370	12 U
	ug/kg	30000	58.8%	1200	5	11 U	11 U	11 U	11 U	11 U	19 U	37	4100 J	49
	ug/kg	6.4	5.9%	NA	NA	5.4 U	5.5 U	5.5 U	5.4 U	5.5 U	5.4 U	5.5 U	5.3 U	6 U
	ug/kg	5400	5.9%	NA	NA	5700 U	5400 U	5500 U	5400	5500 U	5400 U	5500 U	5300 U	6000 U
NICS														
	ug/kg	4300	47.1%	13000	0	720 U	380 U	500 U	350 U	500 U	390 J	250 J	1100 J	400 U
	ug/kg	8900	64.7%	36400	0	55 J	380 U	500 U	40 J	51 J	5100	2800 J	4700 J	400 U
	ug/kg	32	5.9%	41000	0	720 U	360 U	500 U	350 U	500 U	3600 U	3600 U	6900 U	400 U
	ug/kg	300	11.8%	50000 *	0	720 U	360 U	500 U	350 U	500 U	300 J	220 J	6900 U	400 U
	ug/kg	1900	47.1%	50000 *	0	720 U	380 U	500 U	350 U	500 U	3800 U	620 J	910 J	400 U
e	ug/kg	1500	17.6%	50000 *	0	720 U	380 U	500 U	350 U	500 U	960 J	870 J	1500 J	400 U
	ug/kg	4800	70.6%	50000 *	0	720 U	360 U	500 U	350 U	65 J	1400 J	1200 J	2500 J	400 U
	ug/kg	42	5.9%	50000 *	0	720 U	360 U	500 U	350 U	500 U	3600 U	3600 U	6900 U	400 U
	ug/kg	26	5.9%	50000 *	0	720 U	380 U	500 U	350 U	500 U	3600 U	3600 U	6900 U	400 U
	ug/kg	570	11.8%	50000 *	0	720 U	380 U	500 U	350 U	500 U	3600 U	3600 U	6900 U	400 U
	ug/kg	950	23.5%	50000 *	0	720 U	360 U	500 U	350 U	500 U	3600 U	3600 U	380 J	400 U
	ug/kg	230	11.8%	220	1	720 U	360 U	500 U	350 U	500 U	3600 U	3600 U	6900 U	400 U
	ug/kg	350	11.8%	400	0	720 U	360 U	500 U	350 U	500 U	3600 U	3600 U	6900 U	400 U
ate	ug/kg	480	35.3%	50000 *	0	180 J	63 J	90 J	25 J	49 J	3600 U	3600 U	480 J	30 J
	ug/kg	240	5.9%	1100	0	720 U	360 U	500 U	350 U	500 U	3600 U	3600 U	6900 U	400 U
	ug/kg	280	5.9%	1100	0	720 U	360 U	500 U	350 U	500 U	3600 U	3600 U	6900 U	400 U
	ug/kg	250	5.9%	61	1	720 U	360 U	500 U	350 U	500 U	3600 U	3600 U	6900 U	400 U
	ug/kg	170	5.9%	3200	0	720 U	360 U	500 U	350 U	500 U	3600 U	3600 U	6900 U	400 U
	ug/kg	72	5.9%	14	1	720 U	380 U	500 U	350 U	500 U	3600 U	3600 U	6900 U	400 U
	ug/kg	200	11.8%	50000 *	0	720 U	360 U	500 U	350 U	500 U	3600 U	3600 U	6900 U	400 U

TABLE 1 (continued)

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-25 EXPANDED SITE INSPECTION

ID	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-25 0-2 12/03/93 SB25-1.1 206050	SOIL SEAD-25 4-6 12/03/93 SB25-1.3 206051	SOIL SEAD-25 6-8 12/03/93 SB25-1.4 206052	SOIL SEAD-25 0-2 12/03/93 SB25-2.1 206053	SOIL SEAD-25 0-2 12/03/93 SB25-2.4 206057 SB25-2.1DUP	SOIL SEAD-25 2-4 12/03/93 SB25-2.2 206055	SOIL SEAD-25 4-6 12/03/93 SB25-2.3 206056	SOIL SEAD-25 0-2 12/03/93 SB25-3.1 206058	SOIL SEAD-25 2-4 12/03/93 SB25-3.2 206059
	ug/kg	2.9	11.8%	20	0	1.8 UJ	1.6 U	1.8 U	1.8 U	1.8 U	1.8 U	1.9 U	2.8 J	2 U
	ug/kg	2.5	5.9%	900	0	1.8 UJ	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.9 U	2.5 J	2 U
	ug/kg	4.8	11.8%	2100	0	3.6 UJ	3.6 U	3.6 U	3.5 U	3.6 U	3.6 U	3.6 U	4.3	4 U
	ug/kg	3.4	11.8%	100	0	3.6 UJ	3.6 U	3.6 U	3.5 U	3.6 U	3.6 U	3.6 U	3.4 J	4 U
	ug/kg	4.3	11.8%	2100	0	3.6 UJ	3.6 U	3.6 U	3.5 U	3.6 U	3.6 U	3.6 U	3.4 J	4 U
	ug/kg	3.7	5.9%	NA	NA	3.6 UJ	3.6 U	3.6 U	3.5 U	3.6 U	3.6 U	3.6 U	3.7 J	4 U
	ug/kg	2.5	11.8%	540	0	1.8 UJ	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.9 U	1.8 U	2 U
	ug/kg	130	17.6%	1000(a)	0	36 UJ	36 U	36 U	35 U	36 U	36 U	36 U	35 U	40 U
	mg/kg	23600	100.0%	15523	4	9720	10800	8730	9370	7330	9140	8640	6160	18600
	mg/kg	2.5	5.9%	5	0	9.9 UJ	9.1 UJ	7.1 UJ	7.6 UJ	8.7 UJ	7.8 UJ	6.6 UJ	9.2 UJ	12 UJ
	mg/kg	12.2	100.0%	7.5	6	4.7	3.8	4.7	4.1	5.4	3.5	3.4	2.4	5
	mg/kg	160	100.0%	300	0	25 J	62.4	55.5	36.7	32.7 J	57.1	60.3	82.3	111
	mg/kg	1.1	100.0%	1	1	0.45 J	0.52 J	0.38 J	0.49 J	0.48 J	0.43 J	0.36 J	0.42 J	0.65 J
	mg/kg	0.73	22.2%	1	0	0.62 U	0.57 U	0.44 U	0.48 U	0.64 J	0.47 U	0.73	0.58 U	0.75 U
	mg/kg	195000	100.0%	120725	5	53800	67300	59100	112000	192000	70800	81800	195000	2760
	mg/kg	30.4	100.0%	24	4	16	17.6	14.8	15.4	11.5	14.5	15.8	11.9	25.2
	mg/kg	16.8	100.0%	30	0	9.7	9.8	8.7	10.5	9.8	8.2	7.2	6.3 J	15.8
	mg/kg	35.7	100.0%	25	3	17	15.6	15.6	14.7	14.4	21.6	23.3	16.3	7.6
	mg/kg	54600	100.0%	28986	4	20400	22100	21100	19100	14400	18700	16800	11900	54600
	mg/kg	291	100.0%	30	6	21.7 J	7.1 J	11.5 J	26.8 J	42.6 J	13.7 J	14.2 J	291 J	15.8 J
	mg/kg	22800	100.0%	12308	7	6350	19600	12300	8590	12300	12800	21000	11300	3980
	mg/kg	776	100.0%	759	1	394	469	435	450	444	464	407	384	622
	mg/kg	0.96	58.3%	0.1	1	0.06 J R	0.05 J R	0.07 J R	0.06 J R	0.03 J	0.03 J	0.05 J R	0.03 J	0.08 J R
	mg/kg	47.8	100.0%	37	3	27.1	27.1	23.6	46.4	23	35.3	23.7	17.5	21.7
	mg/kg	3250	100.0%	1548	5	844 J	1230	877	916	1370	979	1230	1420	1730
	mg/kg	2.3	52.9%	2	1	0.24 UJ	0.23 UJ	0.19 UJ	0.17 UJ	0.21 UJ	0.12 UJ	0.18 UJ	0.15 UJ	0.2 UJ
	mg/kg	269	100.0%	114	12	108 J	156 J	126 J	128 J	181 J	128 J	157 J	180 J	55 J
	mg/kg	0.79	41.2%	0.3	6	0.26 U	0.25 U	0.2 U	0.18 U	1.2 U	0.13 U	0.2 U	0.81 U	0.21 U
	mg/kg	40.8	100.0%	150	0	12.2	16	13.2	12.4	11.5	14.8	14	10.1	39.8
	mg/kg	210	100.0%	90	3	44.4	47.7	57.9	35.4	97.9	56.7	94.8	74.7	43.7
	mg/kg	0.2	82.4%	NA	NA	0.2	0.01	0.05	0.02	0.09	0.01	0.02	0.04	0.01 U
	%W/W	94.7	100.0%			91.6	91.8	92.4	92.9	92.5	92.2	91	94.7	83.3
carbons	mg/kg	27000	100.0%	NA	NA	1240	68	98	1600	1270	3000	1920	14800	112

TABLE 1 (continued)

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-25 EXPANDED SITE INSPECTION

ID	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-25 0-2 12/03/93 SB25-4.1 206062	SOIL SEAD-25 2-4 12/03/93 SB25-4.2 206063	SOIL SEAD-25 4-6 12/03/93 SB25-4.3 206064	SOIL SEAD-25 0-2 12/03/93 SB25-5.1 206065	SOIL SEAD-25 2-4 12/03/93 SB25-5.2 206066	SOIL SEAD-25 4-6 12/03/93 SB25-5.3 206067	SOIL SEAD-25 0-2 12/03/93 SB25-6.1 206068	SOIL SEAD-25 2-4 12/03/93 SB25-6.2 206069
	ug/kg	390	11.8%	100	2	1400 U	11 U	11 U	390 J	6600 U	160 J	11 U	11 U
	ug/kg	2800	52.9%	200	3	1800	38	19	2800	6800 U	760 J	11 U	7 J
al)	ug/kg	310	5.9%	300(d)	1	1400 U	11 U	11 U	310 J	6800 U	1200 U	11 U	11 U
	ug/kg	9	11.8%	300	0	1400 U	9 J	11 U	1300 U	6800 U	1200 U	11 U	11 U
	ug/kg	10	17.6%	300	0	1400 U	6 J	11 U	1300 U	6800 U	1200 U	11 U	11 U
	ug/kg	170	5.9%	800	0	1400 U	11 U	11 U	1300 U	6800 U	1200 U	11 U	11 U
	ug/kg	280	11.8%	700	0	1400 U	11 U	11 U	280 J	6800 U	1200 U	11 U	11 U
	ug/kg	100	11.8%	60	1	1400 U	11 U	11 U	1300 U	6800 U	1200 U	11 U	11 U
	ug/kg	4500	29.4%	1500	1	1400 U	11 U	11 U	820 J	4500 J	1200 U	11 U	11 U
	ug/kg	17000	35.3%	5500	1	1400 U	11 U	11 U	990 J	17000	1200	11 U	11 U
	ug/kg	30000	58.8%	1200	5	2900	50	110	14000	130000	9000	11 U	11 U
	ug/kg	6.4	5.9%	NA	NA	5.9 U	5.6 U	5.4 U	6.4	5.7 U	5.5 U	5.6 U	5.4 U
	ug/kg	5400	5.9%	NA	NA	5900 U	5600 U	5400 U	5300 U	5700 U	5500 U	5600 U	5400 U
ANICS													
	ug/kg	4300	47.1%	13000	0	770 J	1500 U	810 U	1500 J	330 J	4300 J	360 U	360 U
	ug/kg	8900	64.7%	36400	0	2600 J	1500 U	68 J	8900 J	550	7100 J	360 U	360 U
	ug/kg	32	5.9%	41000	0	12000 U	1500 U	810 U	11000 U	510 U	11000 U	32 J	360 U
	ug/kg	300	11.8%	50000 *	0	12000 U	1500 U	810 U	11000 U	510 U	11000 U	360 U	360 U
	ug/kg	1900	47.1%	50000 *	0	1500 J	170 J	95 J	1900 J	510 U	11000 U	28 J	360 U
e	ug/kg	1500	17.6%	50000 *	0	12000 U	1500 U	810 U	11000 U	510 U	11000 U	360 U	360 U
	ug/kg	4600	70.6%	50000 *	0	2700 J	350 J	180 J	4600 J	67 J	1000 J	370	360 U
	ug/kg	42	5.9%	50000 *	0	12000 U	1500 U	810 U	11000 U	510 U	11000 U	42 J	360 U
	ug/kg	26	5.9%	50000 *	0	12000 U	1500 U	810 U	11000 U	510 U	11000 U	26 J	360 U
	ug/kg	570	11.8%	50000 *	0	12000 U	1500 U	810 U	11000 U	510 U	11000 U	570	360 U
	ug/kg	950	23.5%	50000 *	0	12000 U	1500 U	810 U	950 J	510 U	11000 U	560	360 U
	ug/kg	230	11.8%	220	1	12000 U	1500 U	810 U	11000 U	510 U	11000 U	230 J	360 U
	ug/kg	350	11.8%	400	0	12000 U	1500 U	810 U	11000 U	510 U	11000 U	350 J	360 U
ate	ug/kg	480	35.3%	50000 *	0	12000 U	1500 U	810 U	11000 U	510 U	11000 U	360 U	360 U
	ug/kg	240	5.9%	1100	0	12000 U	1500 U	810 U	11000 U	510 U	11000 U	240 J	360 U
	ug/kg	260	5.9%	1100	0	12000 U	1500 U	810 U	11000 U	510 U	11000 U	260 J	360 U
	ug/kg	250	5.9%	61	1	12000 U	1500 U	810 U	11000 U	510 U	11000 U	250 J	360 U
	ug/kg	170	5.9%	3200	0	12000 U	1500 U	810 U	11000 U	510 U	11000 U	170 J	360 U
	ug/kg	72	5.9%	14	1	12000 U	1500 U	810 U	11000 U	510 U	11000 U	72 J	360 U
	ug/kg	200	11.8%	50000 *	0	12000 U	1500 U	810 U	11000 U	510 U	11000 U	200 J	360 U

TABLE 1 (continued)

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-25 EXPANDED SITE INSPECTION

D	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-25 0-2 12/03/93 SB25-4.1 206062	SOIL SEAD-25 2-4 12/03/93 SB25-4.2 206063	SOIL SEAD-25 4-6 12/03/93 SB25-4.3 206064	SOIL SEAD-25 0-2 12/03/93 SB25-5.1 206065	SOIL SEAD-25 2-4 12/03/93 SB25-5.2 206066	SOIL SEAD-25 4-6 12/03/93 SB25-5.3 206067	SOIL SEAD-25 0-2 12/03/93 SB25-6.1 206068	SOIL SEAD-25 2-4 12/03/93 SB25-6.2 206069
	ug/kg	2.9	11.8%	20	0	2 UJ	1.9 U	2.2 U	2.9 J	1.9 UJ	1.9 U	1.9 U	1.8 U
	ug/kg	2.5	5.9%	900	0	2 UJ	1.9 U	2.2 U	1.8 UJ	1.9 UJ	1.9 U	1.9 U	1.8 U
	ug/kg	4.8	11.8%	2100	0	3.9 UJ	3.7 U	4.3 U	4.8 J	3.7 UJ	3.6 U	3.7 U	3.6 U
	ug/kg	3.4	11.8%	100	0	3.9 UJ	3.7 U	4.3 U	2.1 J	3.7 UJ	3.6 U	3.7 U	3.6 U
	ug/kg	4.3	11.8%	2100	0	3.9 UJ	3.7 U	4.3 U	3.5 UJ	3.7 UJ	3.6 U	4.3	3.6 U
	ug/kg	3.7	5.9%	NA	NA	3.9 UJ	3.7 U	4.3 U	3.5 UJ	3.7 UJ	3.6 U	3.7 U	3.6 U
	ug/kg	2.5	11.8%	540	0	2 UJ	1.9 U	2.2 U	2.5 J	1.9 UJ	1.9 U	1.9 U	1.8 U
	ug/kg	130	17.6%	1000(a)	0	33 NJ	37 U	43 U	130 J	37 UJ	36 U	37 U	36 U
	mg/kg	23600	100.0%	15523	4	19700	16600	7590	13200	23600	11600	10600	7070
	mg/kg	2.5	5.9%	5	0	4.2 U	4.5 U	4.6 U	2.5 J	3.8 U	4 U	4.2 U	3 U
	mg/kg	12.2	100.0%	7.5	6	12.2	7.4	9.1	5.1	8.3	8	8.3	4.8
	mg/kg	160	100.0%	300	0	57.4	86.1	46.1	61.8	160	81.1	59.1	35
	mg/kg	1.1	100.0%	1	1	0.86 J	0.82 J	0.76 J	0.57 J	1.1	0.54 J	0.48 J	0.35 J
	mg/kg	0.73	22.2%	1	0	0.41 U R	0.43 U R	0.44 U R	0.24 U R	0.37 U R	0.39 U R	0.41 U R	0.29 U R
	mg/kg	195000	100.0%	120725	5	5330	17800	128000	42600	5120	74200	82500	122000
	mg/kg	30.4	100.0%	24	4	28.4	26.8	15.8	21.1	30.4	17.5	16.9	11.3
	mg/kg	16.8	100.0%	30	0	11.5	16.8	5.6 J	10.8	14	9.5	11.2	6.6 J
	mg/kg	35.7	100.0%	25	3	35.7 J	28.3 J	11.4 J	17.6 J	34 J	22 J	20.2 J	12 J
	mg/kg	54600	100.0%	28986	4	38100	35200	14000	24400	31100	20700	21400	15800
	mg/kg	291	100.0%	30	6	66.4	16.4	156	77.2	18	15.6	9.5	13.8
	mg/kg	22800	100.0%	12308	7	5210	8550	21800	6590	6950	17800	19600	22800
	mg/kg	776	100.0%	759	1	281 J	776 J	344 J	433 J	697 J	423 J	722 J	610 J
	mg/kg	0.96	58.3%	0.1	1	0.04 J	0.04 J	0.04 U	0.03 U	0.96	0.04 U	0.03 J	0.04 U
	mg/kg	47.8	100.0%	37	3	34.4	47.8	14.2	30.8	45.2	29.1	26.8	18
	mg/kg	3250	100.0%	1548	5	1430	1410	1980	1790	3250	2090	1480	1060
	mg/kg	2.3	52.9%	2	1	0.92 J	0.85 J	1.5 J	1 J	0.67 J	0.66 J	0.97 J	0.63 J
	mg/kg	269	100.0%	114	12	55.2 J	81.3 J	176 J	97.4 J	98.1 J	162 J	269 J	186 J
	mg/kg	0.79	41.2%	0.3	6	0.51 J	0.48 J	0.79 J	0.55 J	0.62 J	0.23 J	0.24 UJ	0.21 UJ
	mg/kg	40.8	100.0%	150	0	34.1	27.5	14.8	17.5	40.8	20.5	18.5	12
	mg/kg	210	100.0%	90	3	72.9 J	210 J	67 J	51.9 J	60.5 J	76.6 J	71.6 J	40.6 J
	mg/kg	0.2	82.4%	NA	NA	0.01 U	0.01 U	0.01	0.01 U	0.01	0.02	0.17	0.01 U
	%W/W	94.7	100.0%			85.2	89.7	93	94.3	87.5	91.5	90	91.6
arbons	mg/kg	27000	100.0%	NA	NA	5800	770	800	740	27000	2100	99	112

Notes:
a) The TAGM value for PCBs is 1000 ug/kg for surface soils and 10,000 ug/kg for subsurface soils.
b) * = As per proposed TAGM, total VOCs < 10ppm; total Semi-VOCs <500ppm; individual semi-VOCs < 50 ppm.
c) NA = Not Available
d) The TAGM for 1,2-Dichloroethene (trans) was used for 1,2-Dichloroehtene(total) since it was the only value available.
e) U = Compound was not detected.
f) J = the reported value is an estimated concentration.
g) R = the data was rejected in the data validating process.
h) UJ = the compound was not detected; the associated reporting limit is approximate.

TABLE 2
SOIL ANALYTICAL RESULTS: TPH, pH and Solids
SEAD-38

WK3 (38)	MATRIX		SOIL	SOIL	SOIL	SOIL	S
	LOCATION		SEAD-38	SEAD-38	SEAD-38	SEAD-38	S
	DEPTH(FT.)		0-0.2	0-0.2	0-0.2	0-0.2	2
	DATE		12/17/93	12/17/93	12/17/93	12/17/93	1
	ES ID		SS38-1	SS38-2	SS38-3	SS38-4	S
	LAB ID		207135	207136	207137	207138	2
COMPOUND	UNITS	NYSDEC TAGM[1]					
eum Hydrocarbons	mg/Kg	-	1840	104	1940	110	85
	standard units	-	7.36	7.46	7.47	7.4	8.93
	%W/W	-	60.2	79.8	80.1	86	88.8

York State Guidelines (Technical Adminstrative Guidance Memorandum (TAGM).

TABLE 3
SOIL ANALYTICAL RESULTS: TPH, pH and Solids
SEAD-39

WK3 (39)	MATRIX		SOIL	SOIL	SOIL	SOIL	S
	LOCATION		SEAD-39	SEAD-39	SEAD-39	SEAD-39	S
	DEPTH(FT.)		0-0.2	0-0.2	0-0.2	0-0.2	0-
	DATE		1/12/94	1/24/94	1/12/94	1/12/94	1/
	ES ID		SS39-1	SS39-1	SS39-2	SS39-3	S
	LAB ID		208403	209343	208404	208405	2(
COMPOUND	UNITS	NYSDEC TAGM[1]					
eum Hydrocarbons	mg/Kg	-	98	118	71	63	65
	standard units	-	7.9	7.91	8.9	8.34	8.03
	%W/W	-	83.2	82.1	79.8	84.6	83.9

York State Guidelines (Technical Adminstrative Guidance Memorandum (TAGM).

TABLE 3 (continued)
SOIL ANALYTICAL RESULTS: Solids, TPH, and pH
SEAD-39

399.WK3 (39) 726	SOIL SEAD-39 3-5 12/16/93 SB39-1.1 207131	SOIL SEAD-39 0-0.2 1/24/94 SS39-5 209345 (SS39-1DUP)	SOIL SEAD-39 3-5 12/16/93 SB39-1.2 207133 (SB39-1.1DUP)
COMPOUND			
etroleum Hydrocarbons	89	90	72
	7.2	8.18	7.39
olids	85.8	82.5	84.7

ew York State Guidelines (Technical Adn

TABLE 4
SOIL ANALYTICAL RESULTS: TPH, pH and Solids
SEAD-40

VK3 (40)	MATRIX		SOIL	SOIL	SOIL	SOIL	S
	LOCATION		SEAD-40	SEAD-40	SEAD-40	SEAD-40	S
	DEPTH(FT.)		4-6	0-0.2	0-0.2	0-0.2	0-
	DATE		12/16/93	12/17/93	12/17/93	12/17/93	12
	ES ID		SB40-1.1	SS40-1	SS40-2	SS40-3	S
	LAB ID		207134	207139	207141	207142	2
COMPOUND	UNITS	NYSDEC TAGM[1]					
um Hydrocarbons	mg/Kg	-	1270	300	420	1640	680
	standard units	-	7.37	7.86	7.64	7.54	7.29
	%W/W	-	85.4	90.8	89.2	81.1	69.9

York State Guidelines (Technical Adminstrative Guidance Memorandum (TAGM).

TABLE 4 (continued)
SOIL ANALYTICAL RESULTS: TPH, pH and Solids
SEAD-40

399.WK3 (40)	SOIL
726	SEAD-40
	0-0.2
	12/17/93
	SS40-5
	207144
COMPOUND	(SS40-1DUP)
troleum Hydrocarbons	270
	8.15
lids	91.8

ew York State Guidelines (Technical Adn

TABLE 5
SOIL ANALYTICAL RESULTS: TPH, pH and Solids
SEAD-41

VK3 (41)	MATRIX		SOIL	SOIL	SOIL	SOIL	S
	LOCATION		SEAD-41	SEAD-41	SEAD-41	SEAD-41	S
	DEPTH(FT.)		0-0.2	0-0.2	0-0.2	0-0.2	2-
	DATE		1/11/94	1/11/94	1/11/94	1/12/94	1/
	ES ID		SS41-1	SS41-2	SS41-3	SS41-4	S
	LAB ID		208407	208408	208409	208410	2
COMPOUND	UNITS	NYSDEC TAGM[1]					
um Hydrocarbons	mg/Kg	-	144	40	300	70	66
	standard units	-	8.74	8.57	8.49	8.19	8.64
	%W/W	-	88.3	86.5	84.4	84	85.1

ork State Guidelines (Technical Adminstrative Guidance Memorandum (TAGM).

SECTION 2
OBJECTIVES

2.0 OBJECTIVES

2.0.1 The objective of this document is to present and describe the technical requirements for the service contract to design, and implement the excavation, transportation, backfilling and treatment of soils at the five SWMU's of concern. Design, and implementation refers to the removal, storage, treatment and discharge of associated wastewaters as well as to the actual excavation, storage and treatment of soils.

2.0.2 The overall objective of this project is the removal and treatment of the contaminated soils that form the source of a potential threat to human health at the five SWMU's. The Contractor will be required to treat the extracted soils, as part of the Contractors base bid, for volatile organic and polynuclear aromatic compounds according to the cleanup requirements established in New York State Department of Environmental Conservation (NYSDEC) Technical and Administrative Guidance Memorandum (TAGM) HWR-92-4046, dated 16 November 1992.

2.0.3 Cleanup requirements for treated soils are derived from the NYSDEC TAGM HWR-92-4046. For this site, cleanup requirements have been established for the principle volatile organic and polynuclear aromatic contaminants of concern. These levels are as follows:

Constituent Cleanup Levels (μg/kg)

Trichloroethene (TCE)	700
1,2-Dichloroethene (DCE)	300
Vinyl chloride (VC)	200
Benzene	60
Toluene	1,500
Xylene	1,200
Bis(2-ethylhexyl)phthalate	50,000

Constituent Cleanup Levels (μg/kg)

Pyrene	50,000
Fluoranthene	50,000
Phenanthrene	50,000
Benzo(a)pyrene	61
Indeno(1,2,3-cd)pyrene	3,200
Naphthalene	13,000
Chrysene	400
Benzo(a)anthracene	220
Dibenzo(a,h)anthracene	14

SECTION 3
SCOPE OF WORK

3.0 GENERAL REQUIREMENTS

3.0.1 The entire soil removal and treatment system shall be designed, installed, operated, maintained and evaluated by the Contractor. Recovery, storage, treatment and discharge of wastewaters is a requirement of this work. The Contractor shall remove contaminated soil, perform treatment and store treated soil while evaluating the effectiveness of the system relative to the objectives and analyzing soil samples from the stockpiled treated soil prior to backfilling the soil. If soil does not meet the objectives of this action, then the soil shall be reprocessed until the objectives are obtained. The Contractor shall continually evaluate the effectiveness of the system as new data becomes available and shall recommend any changes to the system that are necessary to achieve optimal soil remediation. All work performed under this contract shall be under the supervision of a Professional Engineer registered in the State of New York.

3.0.2 As part of the base bid, the Contractor shall be required to treat up to 3,450 tons of soil, to acceptable levels. Provisions for retreatment of soil, if required, shall be made. Acceptable levels are defined as producing soil meeting the treatment criteria with a production rate sufficient to ensure completion of all soil treatment prior to the required completion date. Acceptable performance shall not be contingent upon pretreatment, soil moisture, weather or any other variable.

3.0.3 The Contractor shall be responsible for furnishing all labor, material, and equipment and for performing all work required for protection of the environment during the removal action.

3.0.3.1 The Contractor shall be responsible for maintaining the environment in its natural state to the greatest extent possible during the removal action. The Contractor will consider air, surface water, groundwater, and land resources. In order to prevent, and provide for abatement and control of any environmental pollution arising from the Contractor's activities

in conducting the removal action, the Contractor, and any subcontractors, shall comply with all applicable federal, state, and local regulations.

3.0.3.2 Assuring compliance with the provisions of this section by subcontractors shall be the responsibility of the Contractor.

3.0.3.3 The land resources within the project boundary and outside the limits of permanent work performed as part of this removal action shall be preserved in their present condition or restored to a condition that will appear to be natural after completion of the removal action. The Contractor shall confine all construction activities to the areas defined by the plans and specifications.

3.0.3.4 The Contractor shall not pollute any streams or wetlands with any hazardous constituents. The Contractor shall comply with all federal, state, and local regulations regarding pollution of surface waters and an emergency response plan is required to prevent pollution caused by inadvertant releases.

3.0.3.5 The Contractor shall take all necessary measures, in addition to those required by federal, state, and local regulations, to minimize the migration of dust off-site. Dust control requirements and air monitoring requirements are described in these specifications.

3.0.3.6 All construction and excavation activities shall be conducted so as to minimize erosion. The Contractor shall prevent offsite surface water from entering the excavation, and shall prevent contaminated on-site surface water from leaving the site. Drainage control requirements are described later in these specifications.

3.0.4 The Contractor shall furnish all equipment, labor, materials, quality control measures, and health and safety provisions necessary to complete the work described in these specifications for final acceptance. The work includes the Contractor's design, mobilization, demobilization, construction, and operation and maintenance of the excavation, materials handling, and low temperature thermal desorption unit operations. The Contractor will also be responsible for site restoration.

3.0.5 The Contractor shall be responsible for protecting and maintaining existing roads and fences. The Contractor shall be responsible for locating and protecting any existing utilities within the work area.

3.0.6 All materials and equipment used to complete the work described in these specifications shall be adequate in capacity for the required usage, shall not create unsafe conditions, and shall meet the requirements of all applicable codes and standards. All equipment brought onto the SEDA site must be decontaminated and in proper working condition at the time of arrival at the SEDA site. All equipment may be inspected by the Army's representative before it is used at the site. Equipment found to be contaminated or in need of repair shall be removed from the SEDA site immediately. Additional mobilizations to the SEDA site caused by rejection of faulty or contaminated equipment will be at the Contractors expense.

3.0.7 The Contractor shall provide temporary site utilities to be removed at the completion of the project. Such utilities shall include telephone, electricity, natural gas (if required), water and sanitation.

3.0.8 No on-site work will be permitted until required submittals, if applicable, for that activity have been approved by the Army as provided in the individual sections of these specifications. Work conducted during this removal action by the Contractor shall be limited to execution of the activities defined by these specifications. The Contractor shall employ a professional engineer of the discipline required for specific service on this project licensed in the State of New York. The Contractor shall assume full responsibility for the health and safety of all on-site personnel and the protection of all equipment and materials.

3.0.9 Support Requirements.

3.0.9.1 Meetings. The Contractor shall attend all meetings specified in this section and any other meetings called by the Contracting Officer or his representatives. Subcontractors may attend when involved in the matter to be discussed, or when requested by the contracting officer or his representatives or the Contractor.

3.0.9.1.1 Meeting Minutes. The Contractor shall record minutes of each meeting and shall furnish copies to the Contracting Officer or his representatives within 10 working days after the meeting.

3.0.9.1.2 Meeting Schedule. All meetings shall be held at SEDA, at dates and times to be agreed upon during the preconstruction conference. Changes to the meeting schedule shall be by agreement between the Contracting Officer or his representatives and the Contractor, with appropriate written notice to all parties involved.

3.0.9.1.2.1 Preconstruction Conference. A preconstruction conference shall be held be held prior to mobilization at SEDA. In addition to the Army and the Contractor, the meeting may be attended by representatives of the regulatory agencies having jurisdiction over this project. The agenda for this meeting will be determined prior to the meeting.

3.0.9.1.2.2 Postconstruction Conference. A postconstruction conference shall be held prior to final inspection of the work to discuss and resolve all unsettled matters.

3.0.9.1.2.4 Progress Meetings. Progress meetings shall be held at a frequency of once per month during the performance of the work to review operating performance and any problems that may have arisen.

3.0.10 Definitions and Acronyms. This sections contains the definitions of words, phrases, acronyms, and abbreviations used in the text of these specifications and requiring special interpretation.

3.0.10.1 Definitions.

Project sites - The sites consists of all areas within the five SWMU boundaries as shown on the drawings.

Work areas - The work areas includes all portions of the project sites affected by the Removal Action. This includes the excavation area, staging area, and decontamination area.

Exclusion zone - This is the region of the site where contamination exists or where remedial activities are or will occur. The boundaries of the exclusion zone may vary during the Removal Action.

Army - This term refers to the United States Department of the Army, including, but not limited to, United States Army Corps of Engineers and Seneca Army Depot Activity personnel and authorized representatives of these groups.

Subcontractor - A subcontractor is any firm or individual contracted by the Contractor to perform a portion of the removal action.

Regulators - This term refers to all authorized representatives of the United States Environmental Protection Agency, United States Occupational Safety and Health Administration, New York State Department of Environmental Conservation, New York State Department of Health, and any other federal, state, or local government agency with jurisdiction over the site.

Removal Action - The removal action describes this entire project from the notice to proceed until completion, and includes the initial plan preparation, all field work, and final report preparation.

TSD Facility - A hazardous waste treatment, storage, or disposal facility permitted pursuant to the requirements of 40 CFR 260 through 270.

Hazardous Waste - A substance determined to be a hazardous waste by application of the criteria in 40 CFR 261.

Contaminated Soil - The soil that contains concentrations of volatile organic or polynuclear aromatic compounds in excess of the treatment criteria listed in these specifications.

3.0.10.2 Acronyms

ANSI	American National Standards Institute
API	American Petroleum Institute
ASP	Analytical Services Protocols
ASTM	American Society for Testing of Materials
CDAP	Chemical Data Acquisition Plan
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CLP	Contract Laboratory Program
EE/CA	Engineering Evaluation/Cost Analysis
EPA	United States Environmental Protection Agency
ES	Engineering-Science, Inc.
FS	Feasibility Study
HDPE	High-density polyethylene
IEEE	The Institute of Electrical and Electronic Engineers
IPCEA	Insulated Power Cable Engineers Association
µg/kg	micrograms per kilogram
LTTD	Low Temperature Thermal Desorption
mil	0.001 inch
mm	millimeter
MRD	United States Army Corps of Engineers, Missouri River Division
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Code
NESC	National Electrical Safety Code
NESHAPS	National Emissions Standards for Hazardous Air Pollutants
NYCRR	New York Codes, Rules and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
OSHA	Occupational Safety and Health Administration
PAH	Polynuclear Aromatic Hydrocarbons
PID	Photoionization Detector

QA	Quality Assurance
QC	Quality Control
RI	Remedial Investigation
SARA	Superfund Amendments and Reauthorization Act
SEDA	Seneca Army Depot Activity
SHSO	Site Health and Safety Officer
SOP	Standard Operating Procedure
SV	Semi-Volatile Organic
SWMU	Solid Waste Management Unit
TAGM	Technical and Administrative Guidance Memorandum
TCLP	Toxicity Characteristic Leaching Procedure
TSD	Treatment, Storage, or Disposal
VOA	Volatile Organic Analyte

3.1 INSTITUTIONAL REQUIREMENTS

3.1.1 CERCLA, as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA) is the controlling legislation in the performance of this removal action. In addition to any other applicable federal, state, and local regulations, the following regulations also form a part of this specification:

Federal:

29 CFR 1910 and 1926	Occupational safety and health standards
40 CFR 50	Ambient air quality standards
40 CFR 58	Ambient air quality surveillance
40 CFR 61	National emissions standards for hazardous air pollutants (NESHAPS)
40 CFR 260	Hazardous waste management system - general
40 CFR 261	Identification and listing of hazardous waste
40 CFR 262	Standards applicable to generators of hazardous waste
40 CFR 263	Standards applicable to transporters of hazardous waste
40 CFR 264	Standards for owners and operators of hazardous waste treatment, storage, and disposal facilities

40 CFR 265	Interim status standards for owners and operators of hazardous waste treatment, storage, and disposal facilities
49 CFR 171-177	Hazardous material transportation regulations

New York State:

6 NYCRR 360	NYSDEC rules for solid waste management facilities
6 NYCRR 364	NYSDEC rules for transport of regulated waste
6 NYCRR 375	NYSDEC rules for inactive hazardous waste sites

United States Army Corps of Engineers:

ER-1110-1-263	Chemical Data Quality for Hazardous Waste Remedial Activities

Other:

All other relevant New York State Regulations
All local regulations regarding transport of hazardous materials

3.1.2 The Contractor shall be responsible for meeting all permit requirements and obtaining any permits that are required. All air emissions shall meet all applicable NYSDEC requirements, including, but not limited to NYSDEC Air Guide-1 (NYSDEC Division of Air Resources, 1991 or most recent addition) and 6 NYCRR 200, 201, 202, 212 and 257 (Air Quality Standards).

3.1.2.1 The contractor shall meet all substantive requirements of an air discharge permit from the NYSDEC, for the Low Temperature Thermal Desorption (LTTD) unit.

3.1.2.2 Odor, dust and noise control shall be limited in accordance with State and local regulations and ordinances. It shall be the contractor's responsibility to meet these requirements.

3.1.3 The Contractor shall assure that all facilities that receive hazardous wastes from this site meet the requirements of 40 CFR 260 through 268. The Contractor shall assure that all

facilities that receive nonhazardous solid waste from this site meet the requirements of 6 NYCRR 360.

3.1.4 The Contractor shall provide supporting documentation to complete hazardous waste manifests and to obtain services of permitted treatment, storage and disposal facilities if, during the performance of this work, off-site disposal of any hazardous waste is performed. With regard to disposal of wastes from this site, the Army will be the Waste Generator as defined in 40 CFR 262.

3.1.5 The Contractor shall comply with all applicable codes and standards. At a minimum, the Contractor will comply with the following codes and standards:

3.1.5.1 National Fire Protection Association (NFPA) Standards

3.1.5.2 Electrical material and equipment shall conform in all respects to the latest approved standards of the following:

(i) National Electrical Manufacturers Association (NEMA).
(ii) The American National Standards Institute (ANSI).
(iii) The Institute of Electrical and Electronic Engineers (IEEE).
(iv) Insulated Power Cable Engineers Association (IPCEA).
(v) National Electrical Code (NEC).
(vi) National Electrical Safety Code (NESC).

3.2 COMPLETE SYSTEM ENGINEERING REQUIREMENTS

3.2.1 Work Plan The Contractor shall prepare and submit for approval a Work Plan under which all work to be done shall be performed. The Work Plan shall fully describe the work to be conducted for the removal action. The contents of the work plan are described below. At a minimum, the Work Plan will discuss the following items:

- Title Page with approval signatures,
- Organization chart and description of roles of key personnel,
- Project Schedule,

- Excavation, backfilling, compaction, and grading plan,
- Erosion/dust control plan,
- Site control and security (including exclusion zone) plan,
- Air monitoring plan,
- Mobilization (including decontamination procedures)/demobilization plan and a
- Site layout.

The dates for submission and requirements are described in the Contract Data Requirements List shown in Appendix D and the Data Items Description shown in Appendix E.

3.2.1.1 Excavation Backfilling, Compaction and Grading Plan. Prior to commencement of excavation, the Contractor shall submit an Excavation, Backfilling, Compaction and Grading Plan as part of the Workplan, for earthwork to be accomplished. The plan shall show the proposed sequence of operations; the type, rated capacity, and quantity of equipment to be used in the excavation phase or sequence; plans showing locations and configuration of proposed temporary stockpiles; the drainage and dewatering plans, which show the control and removal of surface water and groundwater flowing toward and tending to collect in excavations. The excavation plan shall make provisions for controlling the amount of air emissions at the down wind air monitoring station by controlling the size of the open excavations.

3.2.1.2 Erosion/Dust Control Plan. The Contractor shall discuss proposed erosion/dust controls including run-on and run-off control and management of stockpiled soil.

3.2.1.3 Site Control and Security Plan. The Contractor shall discuss proposed procedures for controlling access to the work areas to authorized personnel only and for complying with all SEDA security requirements.

3.2.1.4 Air Monitoring Plan. The Contractor shall discuss proposed air monitoring and action levels. The air monitoring and action levels section will indicate how the Contractor intends to comply with NYSDEC TAGM (HWR-89-4031), and is separate from the air monitoring and action level requirements for the site-specific health and safety plan.

3.2.1.5 Mobilization/Demobilization and Site Restoration Plan. The Contractor shall discuss his proposed mobilization procedures including temporary site utility and decontamination facilities. The demobilization plan shall discuss site cleanup and site restoration activities.

3.2.1.7 Project Drawings. The Contractor shall provide the following drawings as required by these specifications.

- Excavation Plans
- Site Layouts

All drawings shall be a minimum of 11 inches x 17 inches.

3.2.2 Site Specific Health and Safety Plan. The Contractor shall prepare and submit a site specific Health and Safety Plan that describes the safety, health and emergency response procedures to be implemented during the removal action. Protocols necessary for protecting workers and potential on-site and off-site receptors from hazards posed by activities during the site remediation are to be specified. The dates for submission and requirements are described in the Contract Data Requirements List shown in Appendix D and the Data Items Description shown in Appendix E.

3.2.2.1 The health and safety documents developed by the contractor shall comply with the requirements specified in ER 385-1-92 entitled "Safety and Health Elements for HTRW Documents" as presented in Appendix B. These requirements do not supersede, but are in addition to, any federal, state, or local regulations. These requirements are in accordance with the Occupational Health and Safety Administration (OSHA) guidelines established in 29 CFR 1910.120, "Hazardous Waste Operations and Emergency Response." If a conflict occurs between these requirements and the current regulations, the more stringent shall apply. The Contractor must comply with all federal, state, and local safety codes and regulations at all times and is responsible for educating his supervisors and employees of the safety requirements and practices to be followed during the course of the work. The Contractor shall be solely and completely responsible for conditions of the job site, including safety of all persons and property during the performance of the work. This requirement shall apply continuously and not be limited to normal working hours. The Contractor shall

comply with all SEDA health and safety and emergency response requirements. It is the responsibility of the Contractor to coordinate activities with SEDA personnel, and to make all Contractor's employees and subcontractors aware of SEDA policy. The Contractor will provide written certification that a health and saftey program has been developed, implemented and maintained. The dates for submission and requirements are described in the Contract Data Requirements List shown in Appendix D and the Data Items Description shown in Appendix E.

3.2.2.2 The health and safety plan will contain the following minimum subject areas. The contractor shall maintain a copy of the site-specific Health and Safety Plan onsite at all times.

- Health and safety organization
- Hazard assessment
- Training
- Medical surveillance
- Site control
- Standard operating procedures
- Personal protective equipment
- Personal hygiene and decontamination
- Equipment decontamination
- Air monitoring
- Emergency equipment and first aid requirements
- Emergency response/contingency plans and procedures
- Heat/cold stress monitoring
- Fall protection
- Trenching and shoring
- Confined space entry
- Logs, reports, and record keeping
- Site description and evaluation.

3.2.3 Health and Safety Program. The contractor shall prepare and submit a written certification that a Health and Safety Program (HSP) has been developed, implemented and maintained.

3.2.4 Chemical Data Acquisition Plan.

3.2.4.1 Contractor shall prepare and submit a Chemical Data Acquisition Plan (CDAP). This plan shall address soil sampling, wastewater sampling and air sampling. The plans shall be submitted for Army approval. At a minimum, the Contractor must comply with all applicable EPA and NYSDEC quality assurance (QA) requirements, and with the United States Army Corps of Engineers document: "Chemical Data Quality for Hazardous Waste Remedial Activities," ER 1110-1-263 as presented in Appendix C. The Contractor shall document compliance with all QC requirements in these specifications. The CDAP plan shall be prepared in accordance with the outline presented in Appendix D of ER 1110-1-263. The CDAP shall include, at a minimum, the following sections.

- Title page with approval signatures
- Site background information
- Data quality objectives
- Sample parameters, locations, types, preservation, holding times, containers, collection procedures, and decontamination techniques
- Field quality control samples including duplicates, trip blanks (VOA analyses only), matrix spike samples, and equipment rinsates
- Analytical methods (only EPA or NYSDEC approved methods shall be used)
- Laboratory information
- Chain-of-custody procedures
- Data validation protocols.

The dates for submission and requirements are described in the Contract Data Requirements List shown in Appendix D and the Data Items Description shown in Appendix E.

3.2.4.2 The Contractor shall identify the key personnel within their project staff responsible for QC. At a minimum, the Contractor shall designate a site quality control manager who will be responsible for, and have authority for all QC matters at the site. The site quality control manager shall be responsible for ensuring that all Contractor and subcontractor personnel at the work site have been properly trained in the site-specific QC procedures. The site quality control manager shall have no duties other than QC.

3.2.4.3 The Contractor shall maintain current records of all QC activities performed during the removal action. These records should be in a legible and easily understood form, and shall be made available to the Army and the regulators upon request.

3.2.5.4 The Contractor shall not conceal any work containing uncorrected defects. If deficiencies indicate that the Contractor's quality control system is inadequate or does not produce the desired results, corrective action in both the work and the quality control system shall be taken by the Contractor.

3.2.5 Document Format. All final drawings shall be of engineering quality in drafted form with sufficient details to show interrelations of major features on the installation site map. When drawings are required, data may be combined to reduce the number of drawings. The workplans and final report shall consist of 8.5 x 11" pages with drawings folded, if necessary, to this size. A decimal paragraphing system shall be used, with each section and paragraph of the reports having a unique decimal designation. The report covers shall consist of vinyl 3-ring binders and shall hold pages firmly while allowing easy removal, addition, or replacement of pages. A report title page shall identify the Contractor, the Corps of Engineers, Huntsville Division, and the data. The Contractor identification shall not dominate the title page. Each page of draft and final reports shall be stamped "DRAFT" and "FINAL", respectively. Each report shall identify the members and title of the Contractor's staff which had significant, specific input into the report's preparation or review. Submittals shall include incorporation of all previous review comments accepted by the Contractor as well as a section describing the disposition of each comment. Disposition of comments submitted with the final report shall be separate from the report document. All final submittals shall be sealed by the registered Professional Engineer-In-Charge.

3.3 SITE CONTROL AND SECURITY REQUIREMENTS

3.3.1 Site Control. The Contractor shall establish a system to control access to the work areas. At a minimum, these areas will include an exclusion zone (defined as the area where contamination exists), a stockpile area, and a staging area. The Contractor will establish a decontamination area in compliance with these specifications.

3.3.2 SEDA Requirements. The Contractor shall be responsible for complying with all SEDA requirements, including, but not limited to, access control, site security, and work permit requirements. The Contractor shall be responsible for determining the applicable SEDA requirements. At a minimum, the contractor shall meet the SEDA requirements of this subsection. The following requirements must be followed by the Contractor at Seneca Army Depot Activity to facilitate entry and exit of Contractor employees and to maintain security.

3.3.2.1 A list of all Contractor employees, subcontractors and suppliers indicating firm name and address shall be furnished through POC/COR to the Counterintelligence Division, Building 710. A confirmation of employment SDSSE-SC Form 268 shall be executed by the Contractor concerning each employee, to include all subcontractors and their personnel. No forms will be transferred from another file if the Contractor has other on-going contracts at SEDA. The Contractor shall provide a list of personnel who are authorized to sign Form 268 for the firm. A sample of each signature is required. Counterintelligence Division must be notified, in writing, of any changes to this list. All completed forms shall be provided through COR/POC to the Counterintelligence Division 72 hours prior to commencement of work. Failure to complete Form 268 correctly will result in employee's denial of access to Seneca. The Counterintelligence Division must be notified, in writing through POC/COR to Counterintelligence, at least 72 hours prior to requesting any action. The chain of command for all contractor actions will be through POC/COR to Counterintelligence Division. There will be no exceptions.

3.3.2.2 Camera permits require written notice from the POC/COR prior to access. Open camera permits will not be issued. The following information is required:

a. Camera make, model and serial number.
b. Contract name and name of individual responsible for the camera.
c. Dates camera will be used.
d. Where it will be used.
e. What will be photographed and why.

3.3.2.3 If a rental, leased or privately owned vehicle is required in place of a company vehicle, the following information is required:

a. Name of individual driving.
b. Year, make, model, color and license plate of the vehicle.
c. Typed letter on company letterhead indicating that the company assumes responsibility for rental, leased or privately owned vehicles.

3.3.2.4 All access media will be destroyed upon expiration data of contract. If an extension is required, a list of employee names and new expiration data must be furnished to the Counterintelligence Division. Contract extensions must be made prior to the contract expiration data or new Form 268s will be required for each individual that requires an extension.

3.3.2.5 Traffic laws of the State of New York apply with emphasis on the following regulations. All are subject to change with road conditions or as otherwise posted.

a. Speed Limit: Controlled Area as posted
b. Ammo Area - 5 mph
c. Limited/Exclusion Area - 25 mph

3.3.2.6 Contractor vehicles (trucks, rigs, etc.) shall be parked in areas designated by the director of Law Enforcement and Security. Usually parking will be permitted within close proximity to the work site. No parking is allowed within 30 feet of a depot fence, as these are clear zones.

3.3.2.7 Available entrance/exits gates are Post 1, Main Gate (NY Highway 96, Romulus, New York; open for personnel entrance and exit 24 hours daily, 7 days a week) and Post 3, (entrance to North Depot Troop Area, located at end of access road from Route 96-A is open 7 days a week for personnel and vehicle entrance and exit).

3.3.2.8 The following restiction apply to all Contractor personnel:

1. Cameras, binoculars, weapons and intoxicating beverages will not be introduced to the installation, except by written permission of the Director/Deputy Director of Law Enforcement and Security.

2. Matches or other spark producing devices will not be introduced into the Limited/Exclusion or Ammo Area except when the processor of such items is covered by a properly validated match or flame producing device permit.

3. All vehicles and personal parcels, lunch pails, etc. are subject to routine security inspections at any time while on depot property.

4. All building materials, equipment and machinery must be cleared by the Director of Engineering and Housing who will issue a property pass for outgoing equipment and materials.

3.3.2.9 Contractor employees are cleared for entrance to the location of contract work only. Sight-seeing tours or wandering from the work site is NOT AUTHORIZED. The following items must be adheared to in order to obtain access to the facility:

a. Written notification will be provided to the Counterintelligence Division (Ext. 30202) at least 72 hours prior to overtime work or prior to working on non-operating days.

b. Security Police (Ext. 30448/30366) will be notified at least two hours in advance of any installation or movement of slow moving heavy equipment that may interfere with normal traffic flow, parking or security.

3.3.2.10 All Contractor/subcontractor employees on-site shall be aware of potential violations of law or regulations, including:

a. Minor. Offenses committed by a Contractor personnel which are minor in nature will be reported by the Director of Law Enforcement and Security to the Contracting Officer who in turn will report such incidents to the Contractor for appropriate disciplinary action.

b. Major. Serious offenses committed while on the installation will be reported to the FBI. Violators may be subject to trial in Federal Court.

3.3.2.11 The following rules shall be observed with regard to explosives-laden vehicles. Vehicles such as vans, cargo trucks, etc., carrying explosives will display placards or signs stating "EXPLOSIVES". Explosive ladened vehicles will not be passed. When an explosive laden vehicle is approaching, pull over to the side and stop. When catching up with an explosive laden vehicle, slow down and allow that vehicle to remain at least 100 feet ahead. When approaching an intersection where an explosive laden vehicle is crossing - STOP - do not enter the intersection until such time as the explosive carrier has passed through and cleared the intersection. When passing a vehicle that is parked and displaying "Explosive" signs, slow down to 10 miles per hour and take every precaution to allow more than ample clearance.

3.3.2.12 All Contractor employees are required to return all identification badges and passed on the last day of employment on the depot. The Contractor is responsible for the completion of all turn-ins by his employees and informing the Counterintelligence Division and the depot organization administering the contract, for termination of any employee's access to the depot.

3.4 MOBILIZATION

3.4.1 Utilities. The Contractor shall be responsible for complete mobilization of temporary site facilities for the performance of this removal action. The Contractor shall provide and maintain all temporary site utilities including telephone, electricity, natural gas (if required), water and sanitation. Non-potable water, telephone and electric services are available in the area for tie-in by the contractor. The contractor shall furnish portable sanitary facilities,

communications equipment, and potable water. Payment for telephone, electricity and water will be through SEDA.

3.4.2 Site Clearance. The Contractor shall locate, identify, and protect utilities from damage. The Contractor shall protect survey benchmarks from damage or displacement. The Contractor shall remove surface debris and clear areas required for site access and excavation.

3.4.3 Security Fence. The Contractor shall be responsible for preventing entry into the exclusion zone, excavation, and any other potentially hazardous locations. The Contractor shall construct a security fence around the work areas.

3.4.4 Decontamination Facility.

3.4.4.1 This section describes the basic requirements for constructing a decontamination facility for cleaning site vehicles prior to leaving the site. These requirements apply to all excavation equipment, and any trucks used to haul contaminated soil.

3.4.4.2 The Contractor shall supply all labor, materials, and equipment to design, construct, and equip a decontamination facility in accordance with these specifications. The Contractor shall design and operate the decontamination facility such that none of the fluids used in the decontamination process are released to the environment. The decontamination facility shall be sloped such that the fluids used will drain to a sump from which the fluids may be transferred to the water storage unit for eventual treatment and discharge. All decontamination fluids will be managed in accordance with these specifications. The Contractor shall decontaminate all excavation equipment prior to use for backfilling.

3.5 EXCAVATION AND BACKFILLING

3.5.1 Staging Areas

3.5.1.1 The Contractor shall construct staging areas for the stockpiling of treated and untreated soil.

3.5.1.2 The Contractor shall line all staging areas with 2 to 3 inches of sand covered by a 40 mil HDPE (or equivalent) liner. The Contractor shall cover all soils with a tarp and weighted appropriately to prevent erosion from wind or rain. The Contractor shall use berms or other equivalent controls to prevent surface water runon and runoff from the staging areas.

3.5.1.3 The Contractor shall establish staging areas for both untreated and treated soil. The locations of the different staging areas shall be clearly identified on the site plan. The treated soil stockpiles will be constructed such that soils which have satisfactorily met the requirements of confirmatory sampling can be distinguished from the soil awaiting the results of the confirmatory sampling. The staging area shall have sufficient capacity for 6 days volume of soil.

3.5.1.4 The Contractor shall minimize vehicular traffic on the liners in order to prevent damage to the liner. The Contractor shall use only rubber-tired loaders in the staging area to minimize damage to the liner. The Contractor shall inspect the liners on a regular basis to ensure the integrity of the liner has not been breached, and shall repair or replace damaged liners.

3.5.2 **Preparation for Excavation**. The Contractor shall identify the required lines, levels, contours, and datum. The Contractor shall survey the site in order to delineate the proposed extent of the excavation. The Contractor shall identify and protect utilities and existing benchmarks from damage.

3.5.2.2 **Surveying**. One bench mark is available in the area of SEAD-25 (Monument SEAD-25A) and in the area of SEAD-38 (Monument SEAD-4A) as shown on Figure Nos. 1 and 2. The benchmark have the following coordinates:

Monument SEAD-25A	N: 998589.45 E: 750993.84	Monument SEAD-4A	N: 987478.03 E: 744860.95

There are no permanent benchmarks at the other three SWMU's. All surveying shall be done under the supervision of a New York licensed and registered surveyor.

3.5.3 Excavation.

3.5.3.1 The Contractor shall excavate all soil from the project sites in which the soils exceed the treatment criteria for volatile organic or polynuclear aromatic compounds.

3.5.3.2 Excavations shall be made and maintained in accordance with the Grading and Excavation Plan submitted. The Contractor shall grade the top perimeter of the excavation to prevent surface water inflow.

3.5.3.3 The Contractor shall be responsible for excavation of areas delineated in Figures 1 through 5 and as described below:

3.5.3.3.1 SEAD-25 An area 100 feet by 100 feet (shown in shaded area of Figure 1) will be excavated to bedrock which is expected to be at an average depth of 6 feet based on drilling performed at SEAD-25 during the ESI. The soil will be excavated and stockpiled in an adjacent staging area and will then be loaded into trucks adjacent to the excavation area. The amount of soil requiring removal will be approximately 2200 CY. After the soil has been loaded into the trucks, the trucks will be covered by a tarpaulin and will transport the soil to the Ash Landfill for treatment.

3.5.3.3.2 SEAD-38 Two portions of the blowdown area will be excavated (shown in shaded areas of Figure 2 as Excavation A and B). Excavation A begins at the origination of the drainage ditch to the north of Building 2709 where the blowdown liquids are suspected to have been released and extends to 100 feet downstream. The ditch will be excavated three feet across to a depth of 1 foot. Excavation B is a 10 foot by 10 foot area at the approximate location where soil sample SS38-3 was collected. This area will be excavated to a depth of 1 foot. The total amount of soil requiring treatment will be approximately 15 CY. No soil staging areas will be necessary because the impacted soil that is removed will immediately by loaded onto the trucks for transportation.

3.5.3.3.3 SEAD-39 A 20 foot by 50 foot area will be excavated to a depth of 6 inches (shown in shaded area of Figure 3). This soil (mostly grass and topsoil) will be set aside and another 6 inches of soil will be excavated from the hole and placed in a truck waiting on Center Street adjacent to the excavation area. The amount of soil requiring removal will be

approximately 18 CY. After the soil has been loaded into the trucks, the trucks will be covered will be covered by a tarpaulin and will transport the soil to the Ash Landfill. The first 6 inches of soil that is excavated and set aside is clean and will be staged on a tarpaulin adjacent to the hole for later backfilling. No additional soil staging areas will be necessary because the impacted soil that is removed will immediately by loaded onto the trucks for transportation.

3.5.3.3.4 SEAD-40 Two portions of the ditch alongside the railroad tracks will be excavated (shown in shaded areas of Figure 4). From the origination of the drainage ditch, an area 2 feet across the ditch and 10 feet down the length of the ditch will be excavated to a depth of 6 feet. From 10 feet from the origin of the ditch to 120 feet from the origin of the ditch, an area 2 feet across the ditch will be excavated to a depth of 1 foot. This soil will be excavated and immediately loaded into trucks waiting on the asphalt driveway area adjacent to the excavation area. The amount of soil requiring removal will be approximately 13 CY. After the soil has been loaded onto the trucks, the trucks will be covered by a tarpaulin and will transport the soil to the Ash Landfill for treatment.

3.5.3.3.5 SEAD-41 An area 40 feet along the length of a drainage ditch and 3 feet across the ditch will be excavated to a depth of 1 foot (shown in shaded area of Figure 5). The approximate location of soil sample SS41-1 is the suspected discharge point for the blowdown liquids, so the excavation will extend 20 feet in each direction of flow from SS41-1. This soil will be excavated and immediately loaded into a truck waiting on the asphalt driveway area adjacent to the excavation area. The amount of soil requiring removal will be approximately 5 CY. After the soil has been loaded onto the truck, the trucks will be covered by a tarpaulin and will transport the soil to the Ash Landfill for treatment.

3.5.3.4 The excavation limits shown in Figures 1 through 5 should be considered as initial. The contractor shall take soil samples along the perimeter and bottoms of the areas to be excavated to confirm that the proposed limits of excavation meet the specified performance standards. These samples shall be analyzed for volatile organics and semi-volatiles organics. No backfilling shall begin until the laboratory results from these samples are reviewed and the final limits of excavation are defined. If the laboratory results indicate that additional soils

must be excavated than the contractor shall notify the Contracting Officer and await his instructions.

3.5.3.5 The Contractor shall notify the Army of any unexpected subsurface conditions and discontinue work in the affected area until notified to resume work. Work is to continue in unaffected portions of the site.

3.5.3.6 The Contractor shall stockpile all soils in accordance with these specifications.

3.5.3.7 The Contractor shall use appropriate dust and vapor control measures to minimize emissions from the excavation. The Contractor shall conduct air monitoring in accordance with the NYSDOH "Community Air Monitoring Plan" as presented in Appendix A. Should the air monitoring action levels be exceeded, work will be stopped until appropriate air emission control measures can be instituted.

3.5.3.8 The Contractor shall record the volume of material excavated and report this volume to the Army as part of the weekly reports required in these specifications.

3.5.3.9 The Contractor shall carefully set the excavation rate in areas with high concentration of volatile organics in order to control the volatile organic emissions. The Contractor shall include excavation procedures for the high concentration areas in the workplan.

3.5.3.10 The Contractor shall prepare a drawing which documents the extent of the excavations, and identifies the locations where each batch of treated soil was backfilled. The approximate location of each batch of soil shall be identified by the corresponding soil sample ID number.

3.5.4 Backfilling

3.5.4.1 The Contractor shall backfill only certified, treated soils at SEAD-25 as soon as possible after the post-treatment results indicate that the treated soil has met the treatment requirements. For the remaining four sites, SEAD-38, SEAD-39, SEAD-40 and SEAD-41 clean imported backfill will be used. The treated soils from these four sites will be backfilled at the Ash Landfill area.

3.5.4.2 The Contractor shall not backfill soils if standing water is present in the excavation.

3.5.4.3 All material backfilled into the excavation shall be compacted enough to support the construction traffic. The final grading plan shall allow for proper drainage after any estimated subsidence of the backfilled material has taken place.

3.6 TREATMENT SYSTEMS.

3.6.1 Treatment of Soil

3.6.1.1 The Contractor shall treat, using low temperature thermal desorption (LTTD), all soils excavated from the project sites to levels meeting the cleanup objectives laid out in these specifications.

3.6.1.2 The Contractor shall stage all soils. No soils shall be backfilled until the post treatment testing confirms that the treatment objectives have been met.

3.6.1.3 The Contractor shall transport all soils from the pretreatment stockpiles to the low temperature thermal desorption unit. The soils shall be weighed using a conveyor belt scale system or other approved soil weighing system. The weights shall be recorded each time the scale is activated. The Contractor shall arrange for a one-time scale calibration by an independent testing agency who shall provide a certificate documenting an accuracy of $\pm$ 1 percent over the expected range, with equivalent traceability to the National Institute of Standards and Technology. The scale shall be calibrated daily by the Contractor in accordance with the weighing system manufacturer's recommendations. Soil weights will be used as the basis for determining the progress of the work performed.

3.6.1.4 The Contractor shall collect treatment data on a computer database system compatible with Lotus 1-2-3 for each load of material that is treated. The data shall include the date, the weight of soil receiving treatment, the time that the weight measurement is made, the number of times the soil has been treated, the minimum and maximum temperatures of the low temperature thermal desorption unit during the treatment period, the treatment residence time, the soil exit temperature and analytical post-treatment results.

3.6.1.5 The low temperature thermal desorption equipment shall consist of the low temperature thermal desorption unit, soil conveyance devices, soil screening devices, air pollution control devices, and a scale or other equivalent weighing device. The equipment will comply with all federal, state, and local regulations, and with all applicable codes and standards. The Contractor shall ensure that the air pollution control equipment used is sufficient to meet the requirements of these specifications. All equipment shall be capable of operating on a continuous or intermittent basis without a loss of process efficiency. The system shall employ sufficient flexibility and redundancy to meet the cleanup objectives in a timely and cost-effective manner. The thermal desorption unit shall be capable of treating a minimum of 200 tons per day of inlet soil.

3.6.1.6 Operations and Maintenance.

3.6.1.6.1 The Contractor shall provide all materials and labor required to operate and maintain all equipment in accordance with the process objectives. The Contractor shall provide proper training to all Contractor and subcontractor personnel that will operate the equipment. The Contractor shall provide a copy of all standard operating procedures (SOPs) for all equipment on site. In addition, a copy of each SOP shall be maintained on site and will be available for inspection by the Army's representative.

3.6.1.6.2 The Contractor shall operate all equipment to minimize the time and cost of treatment.

3.6.1.6.3 All wastewater generated from thermal desorption operations shall be managed in accordance with these specifications.

3.6.1.6.4 The Contractor shall operate the LTTD unit at a minimum temperature of 500°F or higher to remove polynuclear aromatic hydrocarbons (PAHs) to meet the performance standards specified.

3.6.1.6.5 The Contractor shall be responsible for maintaining all equipment used as part of this removal action. Maintenance will include regular preventive maintenance, as required, prompt repair of all equipment removed from service due to breakdown, and replacement of

all spare parts and special tools which have been used. Whenever possible, maintenance activities should be provided by Contractor personnel.

3.6.2 Treatment of Water.

3.6.2.1 The Contractor shall store all wastewater in portable tanks appropriate for managing wastewater. The Contractor shall ensure that the tanks used have been constructed in accordance with all applicable codes and standards. The Contractor shall visually inspect all tanks for leaks and shall replace all leaking tanks.

3.6.2.2 The Contractor shall treat wastewater on site using an air stripper column and shall discharge the treated water in accordance with the approved discharge permit.

3.6.3 Treatment of Offgas.

3.6.3.1 The Contractor shall ensure that the air emissions from the excavation, staging area, and low temperature thermal desorption unit meet all federal, state, and local air emissions requirements. At a minimum, the Contractor must demonstrate compliance with the NYSDEC documents "Air Guide - 1 and the "Community Air Monitoring Plan." These requirements are in addition to the health and safety air emissions requirements of these specifications.

3.6.3.2 At a minimum, the Contractor shall provide particulate and organic vapor control equipment for control of the emissions from the low temperature thermal desorption unit. The particulate and organic vapor control equipment shall be capable of treating the particulates, volatile organics and polynucelar aromatic compounds to all applicable regulatory limits. For the excavation, and staging area the Contractor shall use a combination of procedural controls and/or equipment to control the air emissions.

3.7 DRAINAGE CONTROL

3.7.1 Runon Control. The Contractor shall implement runon control measures to prevent uncontaminated surface water from entering the work areas of the site. These measures shall consist of berms and or ditches that redirect the surface water around the site to the historic surface water discharge points.

3.7.2 Runoff Control. The Contractor shall implement measures to prevent surface water from leaving the work areas of the site. These measures shall include berms or ditches that collect surface water from the work areas for subsequent testing and disposal. The Contractor shall construct berms around all staging areas to prevent runoff from the stockpiled materials. Any collected runoff from the staging areas shall be collected and disposed of in accordance with the requirements of these specifications.

3.7.3 Excavation Drainage. The Contractor shall provide pumps, hoses, and any other equipment necessary to remove accumulated water from the excavation. The Contractor shall be required to remove water from the excavation when necessary to continue excavation activities, or if a safety threat exists. The water from the excavation shall be collected and treated in accordance with the requirements of these specifications.

3.8 EROSION/DUST CONTROL

3.8.1 Erosion Control The Contractor shall provide the materials and labor required to control erosion of soils originating from the site. These measures may include limiting the exposure area, haybales and silt fences or berms.

3.8.2 Dust Control. The Contractor shall take necessary measures, in addition to those required by federal, state, and local regulations, to eliminate or minimize the migration of dust off site due to site activities. At a minimum, the Contractor shall follow the requirements of the NYSDEC TAGM HWR-89-4031, "Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites," October, 27, 1989 (or most recent version) and the monitoring requirements in these specifications.

3.9 AIR MONITORING AND ACTION LEVELS

3.9.1 General. The Contractor shall monitor the emissions from the excavations, staging area, and low temperature thermal desorption unit in order to assure compliance with all federal, state, and local regulations. Monitoring shall be conducted in accordance with the NYSDEC TAGM, "Fugitive Dust Suppression and Particulate Monitoring at Inactive Hazardous Waste Sites," October 27, 1989 (or most recent version), and with the New York State Department of Health "Community Air Monitoring Plan."

3.9.2 Air Monitoring Stations. At a minimum, the Contractor shall establish two fixed air monitoring stations at the work area boundary at SEAD-25. One unit shall be located on the northeast boundary in the direction of the administrative area while the other unit shall be situated at the nearest point to the center of the excavated areas. These stations shall be equipped with a photoionization detector with a strip chart recorder capable of providing a permanent record of all monitoring results. The unit shall be equipped with a local and remote alarm that will indicate exceedances of the action levels. The remote alarm shall be located at the contractors main control panel. Response to alarms shall be in accordance with the "Community Air Monitoring Plan". The data printouts from each unit shall be included in the daily logs. Air monitoring at SEADs-38, 39, 40 and 41 shall be performed using portable photoionization detectors.

3.9.3 Calibration. The Contractor shall calibrate all air monitoring equipment weekly in accordance with the manufacturer's instructions, and shall maintain records of all calibrations. These records shall be made available to the Army's representative or to the regulators upon request.

3.10 CONFIRMATORY SAMPLING AND ANALYSIS

3.10.1 General. This section describes the requirements for confirmatory sampling and analysis for documenting the successful treatment of the soils.

3.10.2 Sampling Locations.

3.10.2.1 Soil. The Contractor shall collect and analyze samples of the treated stockpiled soil

standards in these specifications. Soil failing confirmation sampling shall be retreated at no additional cost.

Confirmatory soil samples shall be collected from the perimeter of excavation and the bottom of the excavation to confirm that the performance standards have been met. These samples shall be analyzed for volatile organics and semi-volatile organics.

3.10.2.2 Wastewater. The Contractor shall collect samples of the wastewater resulting from all site operations, including excavation dewatering, precipitation onto contaminated soil stockpiles, and spent washwater to ensure proper treatment and disposal.

3.10.3 Sampling and Analysis.

3.10.3.1 Sample Locations, Frequency, and Types

3.10.3.1.1 Soil. The treated soil shall be tested for volatile organics and semi-volatile organic compounds at a rate of 1 sample per 150 tons. These samples shall be composite samples collected from four different areas in the soil stockpile. Each sample shall be collected from a depth of at least two feet. Since the samples will be analyzed for volatile organic compounds, the Contractor shall collect each fraction of the composite sample in an individual bottle, and will specify that the sample be composited in the laboratory. In addition one sample of treated soil only for every 750 tons of soil treated shall be taken and analyzed for TCLP toxicity to assure that the material being backfilled meet the land ban restriction. The Contractor shall specify a maximum of 3 days turnaround time for all volatile organic analyses in soil analyses.

The excavation limits shown in Figures 1 through 5 should be considered as initial. Confirmatory soil samples shall be collected from the perimeters and bottoms of the excavations. With the exception of SEAD-25, where the limit of excavation is bedrock, one sample will be collected for every 500 square feet of excavation bottom or at least one per excavation and one sample from every 200 feet of excavation perimeter or at least one per wall. These samples will be analyzed for volatile organics and semi-volatile organics. If these samples indicate that additional contaminated soil still remains at the site then addtional soil

will be excavated until the testing indicates that all impacted soil has been excavated and treated.

3.10.3.1.2 Wastewater. Samples of wastewater shall be collected as necessary to ensure proper treatment and discharge of the wastewater.

3.10.3.2 Sampling Equipment Decontamination. The Contractor shall use disposable sampling equipment wherever possible to minimize decontamination requirements. When reusable equipment is used, the Contractor shall decontaminate all equipment prior to use in sampling. The decontamination procedure shall consist of successive washes in the following order:

- Potable water rinse
- Wash with laboratory grade detergent (Alconox or equivalent)
- Distilled water rinse
- Methanol rinse
- Hexane rinse
- Distilled water rinse

If samples are to be analyzed for metals, a nitric acid rinse and an additional distilled water rinse will be added between steps 3 and 4. All decontamination wastes shall be disposed of off-site as hazardous waste.

3.10.3.3 Sample Volumes, Containers, and Preservation. The Contractor shall ensure that all sample containers, preservation, packaging, and holding times are in accordance with EPA Region 2 and NYSDEC protocols. All samples collected shall be properly logged, labeled, packaged, and stored in an iced cooler immediately after collection and until arrival at the laboratory. All samples will be accompanied by a completed chain-of-custody form which can be used to document sample custody.

3.10.3.4 Laboratory Analyses. All soil samples shall be analyzed for volatile and semi-volatile organic compounds using NYSDEC Analytical Services Protocols (ASP). Soil samples shall be analyzed for toxicity characteristic by TCLP using EPA SW-846 Method 1311. The Contractor shall ensure that the laboratory is capable of providing reporting limits below the

soil cleanup levels so that reported non-detect values may be compared to the cleanup levels. The Contractor shall ensure that the selected laboratory has been approved by NYSDEC and the Corps of Engineers, Missouri River Division.

3.11 DISPOSAL REQUIREMENTS.

3.11.1 General.

3.11.1.1 This section describes the disposal requirements for all soils, wastewater, treatment residue, and treatment residuals generated as part of this removal action.

3.11.1.2 The Contractor shall comply with all applicable federal, state, and local regulations. At a minimum, the Contractor shall identify and comply with all hazardous and solid waste, and transportation requirements.

3.11.1.3 The Contractor shall be responsible for determining whether the waste residuals generated from the treatment processes are hazardous wastes. Wastes include any waste oils or lubricants, hydraulic fluids, coolants, plastic sheeting, used personnel protection equipment and other miscellaneous debris.

3.11.1.4 The Contractor shall ensure that all transport of waste is conducted in accordance with DOT regulations.

3.11.1.5 The Contractor shall obtain approval from the Army of all offsite disposal facilities that will receive wastes from this site.

3.11.2 Soil. With the exception of soils excavated at SEAD-25, all soil that has met the treatment requirements of these specifications will be backfilled at the Ash Landfill treatment site in a location to be specified by the Army's representative. Soils excavated from SEAD-25, will be transported and backfilled at SEAD-25, following certification that the treated soils have met the requirements of these specifications. All other soils will be backfilled within the Ash Landfill site boundaries. Any soils which do not meet the treatment standards will be retreated. Retreated soils that do not meet the treatment standards will be treated for a third

time. If the soils fail to meet the treatment standards after the second retreatment, these soils will be disposed off site at a permitted hazardous waste treatment storage and disposal facility.

3.11.3 Water. Following treatment of wastewater, the Contractor shall discharge all treated waters from this removal action including groundwater to a nearby drainage ditch. The Contractor shall include in the site plans all specific testing requirements for this discharge permit, and shall be responsible for meeting these testing requirements.

3.12 DEMOBILIZATION AND SITE RESTORATION

3.12.1 Demobilization. Following completion and acceptance of the work by the Contracting Officer, the Contractor shall provide all Contractor and subcontractor labor and materials required to decontaminate, dismantle, package, and transport from the site all Contractor or subcontractor equipment, materials, and personnel. Demobilization will not be complete until site restoration is complete.

3.12.2 Removal. At the completion of the removal action the Contractor shall remove all temporary facilities, utility services, and debris, unless otherwise directed by the Army's representative. The Contractor shall restore the area in accordance with these specifications.

3.12.3 Site Restoration.

3.12.3.1 General. The Contractor shall restore the sites to their original condition except as described in these specifications or as directed by the Army.

3.12.3.2 Regrading. The Contractor shall regrade the sites to approximate the original site conditions. As necessary, the Contractor shall bring in documented clean fill to make up for any volume losses. The Contractor shall also grade the sites to minimize erosion during the revegetation period.

3.12.3.3 Revegetation. The Contractor shall revegetate the sites using grass seed upon completion of the backfilling and demobilization. The Contractor shall revegetate the backfilled excavations and all work areas in which site work has killed off the vegetation.

3.12.3.4 Materials

3.12.3.4.1 Fill. Satisfactory materials for use as fill shall be materials classified in ASTM D 2487 as GW, GM, GC, SW, SM, SC and shall be free from roots and other organic matter, trash, debris, frozen materials, and stores larger than 3 inches in any dimension. Any material classified as SM shall have not more than 25 percent by weight passing the No. 200 sieve.

3.12.3.4.2 Topsoil. Topsoil shall be fertile, natural fraible, silty soil, with characteristics of typical soil in the vicinity which produces heavy crops, grass and other vegetation, obtained from naturally well-drained areas. The topsoil shall be reasonably free from subsoil, weeds and other vegetation and from clay lumps or stones. Soil shall have a pH between 5.5 to 7.6. The Contractor shall have representative topsoil samples test by a soil-test chemist and a copy of the test and recommendations for additives shall be furnished to the site representative prior to commencing work. Quantity given for the following materials used for conditioning and seeding will be adjusted as required by the soil chemist recommendations.

3.12.3.4.3 Limestone. Limestone shall consist of ground calcareous or dolomitic limestone, 95% to pass a No. 20 sieve and at least 50% to pass a No. 100 sieve. Limestone shall conform to the standards of the American Association of Analytical Chemists, and be marked in accordance with the appropriate Federal and state laws relating to commercial fertilizers.

3.12.3.4.4 Fertilizer. Fertilizer shall be applied in granular dry form and shall be a slow-release type product specifically designed for starting grass seed. The chemical analysis shall be (approximately) 15-10-10 applied at the rate designated by the soil-test chemist. The fertilizer shall conform to the requirements of the appropriate Federal and sate laws relating to commercial fertilizers, and be delivered dry in original, unopened containers bearing the manufacturer's guaranteed analysis.

3.12.3.4.5 Grass Seed. Grass seed shall meet the requirements of the appropriate state and Federal agricultural and vegetable seed laws. Grass seed shall contain Kentucky Blue, Red

Top, Fescue and Creeping Bent. Red Top shall not exceed 20% of the mixture. Alternate types of permanent seed mixtures of equal quality may be used, if in the opinion of the Contractor's soil-chemist they are more suitable to the local climate and conditions provided that 80% of permanent grasses and not clover is used in any traffic areas. Weeds and inert material shall not exceed 2%.

3.12.3.4.6 Mulch. Mulch shall consist of hay mulch or straw mulch.

3.12.3.5 Application.

3.12.3.5.1 Topsoil. The areas to be topsoiled shall be rough graded to the appropriate required sub-grades and shall be maintained in a true and even condition. Finish grading shall include any necessary repairs to previously rough graded areas. Immediately prior to dumping and spreading the topsoil, the sub-grade, wherever compacted by traffic or other causes, shall be loosened by disking or scarifying to a depth of at least two inches to permit bonding of the topsoil to the sub-grade. Topsoil shall be spread evenly to a compacted thickness of 6 inches over all required areas and shall be rolled and raked until it is clean and free from irregularities, and is at the finished grades. Topsoil shall not be placed on frozen, excessively wet or dry sub-grade.

3.12.3.5.2 Fertilizer and Limestone. After the topsoil has been spread to the required thickness, ground limestone shall be distributed uniformly over the topsoil at a rate of 5 pounds per 100 square feet. After disking in of the ground limestone, fertilizer shall be spread at a rate of 2 pounds per 100 square feet or as recommended by the soil chemist. Subsequent to liming and fertilization, the topsoil areas shall be scarified by disking in two directions at right angles to each other, or by other approved methods, in such a manner that the topsoil will be thoroughly incorporated into the top two inches of the subgrade. Prior to seeding, the surface of the topsoil shall be raked free of all stones and other objectionable material.

3.12.3.5.3 Grass Seed. No seeding shall be done during windy weather or when the ground is frozen, wet or otherwise non-tillable. As soon as the seed is sown, it shall be thoroughly covered with a thin layer of topsoil by raking, harrowing or dragging. The areas shall be

uniformly seeded using not less than 4 pounds per 100 square yards of area. The seed shall be raked in lightly and rolled with a light roller.

3.12.3.6 Maintenance. Seeded areas shall be protected and maintained by watering, mowing and replanting as necessary for at least 30 days and as much longer as is necessary to establish a uniform stand of the specified grasses and until acceptance. The Contractor shall be responsible for the watering of all seeded areas which shall be kept moist. The Army's representative's decision will prevail in the event a dispute develops with the Contractor as to whether or not the seeded and grassed areas are moist. Seeded areas on which growth has started shall be watered to a minimum depth of two inches to assure continuing growth. Watering shall be done in a manner which will provide uniform coverage, prevent erosion and prevent damage to the finished surface by the watering equipment. The Contractor shall furnish sufficient watering equipment. Prior to acceptance of the project, the Contractor will be responsible for mowing the grass on all flat or rolling slopes from level, to and including 4 to 1 slopes to a height of 2" when the grass has attained a height of 3". The grass on all slopes steeper than 4 to 1 shall be cut to a height of 2" at such time as a stable turf has been established in the judgement of the Army's representative. Seeded areas shall be cut at least 3 times; none of which shall be closer than ten (10) days apart. The Contractor shall cut and maintain the lawn and field areas until they are judged by the Army's representative to be at least 95% satisfactory.

3.13 DOCUMENTATION/RECORDKEEPING.

3.13.1 Daily Logs. The Contractor shall maintain daily logs that include the quantities of the soil excavated and treated the previous day and copies of all analytical data received the previous day. The daily logs will also include any air monitoring results obtained the previous day and the volume of water treated the previous day.

3.13.2 Weekly Reports. The Contractor shall submit weekly reports each Monday morning to the Contracting Officer or his representatives. The weekly reports shall summarize the daily logs from the previous week, and address administrative issues. Topics which should be included in the weekly report are:

- Any problems which arose the previous week, and the resolutions
- Documentation of health and safety meetings
- Health and safety issues
- Site visitor logs
- Thermal desorption unit operating parameters

The requirements for the final report are presented in Appendix D and Appendix E.

3.13.3 Final Report. The Contractor shall submit a final report to the Contracting Officer or his representatives within 30 days of demobilization. The report shall summarize all the daily logs and weekly reports, and provide tabular summaries of all data collected during the removal action. The final report shall include copies of all analytical data, visitor logs, air monitoring data, shipping forms, manifests, and description of all problems and problem resolutions. The final report shall include a drawing which shows the extent of the excavations and clearly indicates the locations of all samples collected to verify the extent of the excavation. The requirements for the final report is presented in Appendix D and Appendix E.

3.14 PERFORMANCE SCHEDULE

3.14.1 The Contractor shall complete each of the project tasks within the time frame presented in the Contract Data Requirements List, shown in Appendix D.

3.15 DELIVERABLE DATA.

3.15.1 The Contractor shall prepare and submit a CDAP in accordance with ER 1110-1-263 and DD Forms 1423 and 1664-1.

3.15.2 The Contractor shall prepare and submit a written certification of the HSP in accordance with DD Forms 1423 and 1664-1.

3.15.3 The Contractor shall prepare and submit an SSHP in accordance with DD Forms 1423 and 1664-1.

3.15.4 The Contractor shall prepare and submit a Work Plan in accordance with DD Forms 1423 and 1664-1.

3.15.5 The Contractor shall prepare and submit weekly progress reports in accordance with DD Forms 1423 and 1664-1.

3.15.6 The Contractor shall prepare and submit a Final Report at the conlusion of the treatment period in accordance with DD Forms 1423 and 1664-1.

3.15.7 The Contractor shall submit all deliverable data to the Contracting Officer or his representatives. The Contracting Officer or his representatives will review the submissions to determine whether they meet the minimum contract requirements and will accept or reject them accordingly. The Contractor shall correct the deficiencies of the rejected deliverables and resubmit them within 30 days of rejection. The Contracting Officer's acceptance of any submittal does not constitute or imply approval or endorsement, and in no way relieves the Contractor of his responsibility to meet all the requirements of this document.

3.16 ADDRESSES

3.16.1 Deliverables shall be distributed to the following addresses in the quantities shown.

	Quantities Required
Commander U.S. Army Corps of Engineers Huntsville Division ATTN: CEHND-PM-EP (Ms. Dorothy Richards) Huntsville, AL 35805-1957	3
Commander U.S. Army Corps of Engineers Baltimore District ATTN: CENAB-EN-HM (Mr. William Thayer) 10 South Howard Street Baltimore, MD 21010	3

	Quantities Required
Commander U.S. Army Environmental Hygiene Agency (USAEHA) ATTN: HSHB-ME-SR (Mr. Hoddinott) Aberdeen Proving Ground, MD 21010-5422	7
Commander U.S. Army Depot Systems Command (DESCOM) ATTN: AMSDS-EN-FD Chambersburg, PA 17201	1
Commander Seneca Army Depot ATTN: SDSSE-HE (Mr. Randy Battaglia) Romulus, NY 14541	10
Commander U.S. Army Environmental Center ATTN: SFIM-AEC-IRP (Dr. Buchi) Bldg. E4480 Aberdeen Proving Ground, MD 21010-5401	3
Commander U.S. Army Corps of Engineers Missouri River Division ATTN: CEMRD-ED-CG (Mr. Don Williams) 12565 West Center Road Omaha, NE 68144	1

Quantities Required

Commander 2
U.S. Army Corps of Engineers
Omaha District
ATTN: CEMRD-MD-HA
215 North 17th Street
Omaha, NE 68102

Commander 1
U.S. Army Material Command (USAMC)
ATTN: AMCEN-A
5001 Eisenhower Avenue
Alexandria, VA 22333-0001

3.17 REFERENCES

U.S. Army Corps of Engineers, Huntsville Division, Manual No. HNDM 1110-1-1, Design Manual for Architect-Engineer, August 1986.

Engineering-Science, Inc., "Solid Waste Management Unit Classification Report", September, 1994.

Engineering-Science, Inc., "Draft Expanded Site Inspection Seven High Priority SWMUs" June 1994.

United States Army Environmental Hygiene Agency (USAEHA), 1987, Evaluation of Solid Waste Management Units, Seneca Army Depot, Interim Final Report, Groundwater Contamination Survey, No. 38-26-0868-88.

United States Army Toxic and Hazardous Materials Agency (USATHAMA), 1989, Remedial Investigations Feasibility Studies, Seneca Army Depot Ash Landfill.

United States Army Toxic and Hazardous Materials Agency (USATHAMA), 1980, Installation Assessment of Seneca Army Depot, Report No. 157, AMXTH-IR-A-157, January 1980.

APPENDIX A

NEW YORK STATE DEPARTMENT OF HEALTH COMMUNITY AIR MONITORING PLAN AND NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION DIVISION TECHNICAL AND ADMINISTRATIVE GUIDANCE MEMORANDUM FUGITIVE DUST SUPPRESSION AND PARTICULATE MONITORING AT INACTIVE HAZARDOUS WASTE SITES

Community Air Monitoring Plan

Real-time air monitoring, for volatile compounds and particulate levels at the perimeter of the work area is necessary. The plan must include the following:

- Volatile organic compounds must be monitored at the downwind perimeter of the work area daily at 2 hour intervals. If total organic vapor levels exceed 5 ppm above background, work activities must be halted and monitoring continued under the provisions of a Vapor Emission Response Plan. All readings must be recorded and be available for State (DEC & DOH) personnel to review.
- Particulates should be continuously monitored upwind, downwind and within the work area at temporary particulate monitoring stations. If the downwind particulate level is 150 $\mu g/m^3$ greater than the upwind particulate level, then dust suppression techniques must be employed. All readings must be recorded and be available for State (DEC & DOH) personnel to review.

Vapor Emission Response Plan

If the ambient air concentration of organic vapors exceeds 5 ppm above background at the perimeter of the work area, activities will be halted and monitoring continued. If the organic vapor level decreases below 5 ppm above background, work activities can resume but more frequent intervals of monitoring, as directed by the Safety Officer, must be conducted. If the organic vapor levels are greater than 5 ppm over background but less than 25 ppm over background at the perimeter of the work area, activities can resume provided:

- the organic vapor level 200 ft..downwind of the work area or half the distance to the nearest residential or commercial structure, whichever is less, is below 5 ppm over background, and
- more frequent intervals of monitoring, as directed by the Safety Officer, are conducted.

If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown. When work shutdown occurs, downwind air monitoring as directed by the Safety Officer will be implemented to ensure that vapor emission does not impact the nearest residential or commercial structure at levels exceeding those specified in the Major Vapor Emission section.

Major Vapor Emission

If any organic levels greater than 5 ppm over background are identified 200 feet downwind from the work area or half the distance to the nearest residential or commercial property, whichever is less, all work activities must be halted.

If, following the cessation of the work activities, or as the result of an emergency, organic levels persist above 5 ppm above background 200 feet downwind or half the distance to the nearest residential or commercial property from the work area, then the air quality must be monitored within 20 feet of the perimeter of the nearest residential or commercial structure (20 Foot Zone).

If efforts to abate the emission source are unsuccessful and if any of the following levels persist for more than 30 minutes in the 20 Foot Zone, then the Major Vapor Emission Response Plan shall automatically be placed into effect if organic vapor levels are approaching 5 ppm above background.

However, the Major Vapor Emission Response Plan shall be immediately placed into effect if organic vapor levels are greater than 10 ppm above background.

Major Vapor Emission Response Plan

Upon activation, the following activities will be undertaken:

1. All Emergency Response Contacts as listed in the Health and Safety Plan of the Work Plan will go into effect.
2. The local police authorities will immediately be contacted by the Safety Officer and advised of the situation.
3. Frequent air monitoring will be conducted at 30 minutes intervals within the 20 Foot Zone. If two successive readings below action levels are measured, air monitoring may be halted or modified by the Safety Officer.

HWR-89-4031
October 27, 1989

New York State Department of Environmental Conservation

MEMORANDUM

TO: Regional Hazardous Waste Remediation Engrs., Bur. Directors & Section Chiefs
FROM: Michael J. O'Toole, Jr., Director, Division of Hazardous Waste Remediation
SUBJECT: DIVISION TECHNICAL AND ADMINISTRATIVE GUIDANCE MEMORANDUM--FUGITIVE DUST SUPPRESSION AND PARTICULATE MONITORING PROGRAM AT INACTIVE HAZARDOUS WASTE SITES
DATE: OCT 2 7 1989

Michael J. O'Toole

1. Introduction

Fugitive dust suppression, particulate monitoring, and subsequent action levels for such must be used and applied consistently during remedial activities at hazardous waste sites. This guidance provides a basis for developing and implementing a fugitive dust suppression and particulate monitoring program as an element of a hazardous waste site's health and safety program.

2. Background

Fugitive dust is particulate matter--a generic term for a broad class of chemically and physically diverse substances that exist as discrete particles, liquid droplets or solids, over a wide range of sizes--which becomes airborne and contributes to air quality as a nuisance and threat to human health and the environment.

On July 1, 1987, the United States Environmental Protection Agency (USEPA) revised the ambient air quality standard for particulates so as to reflect direct impact on human health by setting the standard for particulate matter less than ten microns in diameter (PM_{10}); this involves fugitive dust whether contaminated or not. Based upon an examination of air quality composition, respiratory tract deposition, and health effects, PM_{10} is considered conservative for the primary standard--that requisite to protect public health with an adequate margin of safety. The primary standards are 150 ug/m^3 over a 24-hour averaging time and 50 ug/m^3 over an annual averaging time. Both of these standards are to be averaged arithmetically.

There exists real-time monitoring equipment available to measure PM_{10} and capable of integrating over a period of six seconds to ten hours. Combined with an adequate fugitive dust suppression program, such equipment will aid in preventing the off-site migration of contaminated soil. It will also protect both on-site personnel from exposure to high levels of dust and the public around the site from any exposure to any dust. While specifically intended for the protection of on-site personnel as well as the public, this program is not meant to replace long-term monitoring which may be required given the contaminants inherent to the site and its air quality.

3. Guidance

A program for suppressing fugitive dust and monitoring particulate matter at hazardous waste sites can be developed without placing an undue burden on remedial activities while still being protective of health and environment. Since the responsibility for implementing this program ultimately will fall on the party performing the work, these procedures must be incorporated into appropriate work plans. The following fugitive dust suppression and particulate monitoring program will be employed at hazardous waste sites during construction and other activities which warrant its use:

(1) Reasonable fugitive dust suppression techniques must be employed during all site activities which may generate fugitive dust.

(2) Particulate monitoring must be employed during the handling of waste or contaminated soil or when activities on site may generate fugitive dust from exposed waste or contaminated soil. Such activities shall also include the excavation, grading, or placement of clean fill, and control measures therefore should be considered.

(3) Particulate monitoring must be performed using real-time particulate monitors and shall monitor particulate matter less than ten microns (PM_{10}) with the following minimum performance standards:

Object to be measured: Dusts, Mists, Aerosols
Size range: <0.1 to 10 microns
Sensitivity: 0.001 mg/m^3
Range: 0.001 to 10 mg/m^3
Overall Accuracy: ±10% as compared to gravimetric analysis of stearic acid or reference dust

Operating Conditions:
Temperature: 0 to 40°C
Humidity: 10 to 99% Relative Humidity

Power: Battery operated with a minimum capacity of eight hours continuous operation

Automatic alarms are suggested.

Particulate levels will be monitored immediately downwind at the working site and integrated over a period not to exceed 15 minutes. Consequently, instrumentation shall require necessary averaging hardware to accomplish this task; the P-5 Digital Dust Indicator as manufactured by MDA Scientific, Inc. or similar is appropriate.

(4) In order to ensure the validity of the fugitive dust measurements performed, there must be appropriate Quality Assurance/Quality Control (QA/QC). It is the responsibility of the entity operating the equipment to adequately supplement QA/QC Plans to include the following critical features: periodic instrument calibration, operator training, daily instrument performance (span) checks, and a record keeping plan.

(5) The action level will be established at 150 ug/m^3 over the integrated period not to exceed 15 minutes. While conservative, this short-term interval will provide a real-time assessment of on-site air quality to assure both health and safety. If particulate levels are detected in excess of 150 ug/m^3, the upwind background level must be measured immediately using the same portable monitor. If the working site particulate measurement is greater than 100 ug/m^3 above the background level, additional dust suppression techniques must be implemented to reduce the generation of fugitive dust and corrective action taken to protect site personnel and reduce the potential for contaminant migration. Corrective measures may include increasing the level of personal protection for on-site personnel and implementing additional dust suppression techniques (see Paragraph 7). Should the action level of 150 ug/m^3 be exceeded, the Division of Air Resources must be notified in writing within five working days; the notification shall include a description of the control measures implemented to prevent further exceedences.

(6) It must be recognized that the generation of dust from waste or contaminated soil that migrates off-site, has the potential for transporting contaminants off-site. There may be situations when dust is being generated and leaving the site and the monitoring equipment does not measure PM_{10} at or above the action level. Since this situation has the potential to migrate contaminants off-site, it is unacceptable. While it is not practical to quantify total suspended particulates on a real-time basis, it is appropriate to rely on visual observation. If dust is observed leaving the working site, additional dust suppression techniques must be employed. Activities that have a high dusting potential--such as solidification and treatment involving materials like kiln dust and lime--will require the need for special measures to be considered.

(7) The following techniques have been shown to be effective for the controlling of the generation and migration of dust during construction activities:

1. Applying water on haul roads.
2. Wetting equipment and excavation faces.
3. Spraying water on buckets during excavation and dumping.
4. Hauling materials in properly tarped or watertight containers.
5. Restricting vehicle speeds to 10 mph.
6. Covering excavated areas and material after excavation activity ceases.
7. Reducing the excavation size and/or number of excavations.

Experience has shown that utilizing the above-mentioned dust suppression techniques, within reason as not to create excess water which would result in unacceptable wet conditions, the chance of exceeding the 150 ug/m^3 action level at hazardous waste site remediations is remote. Using atomizing sprays will prevent overly wet conditions, conserve water, and provide an effective means of suppressing the fugitive dust.

(8) If the dust suppression techniques being utilized at the site do not lower particulates to an acceptable level (that is, below 150 ug/m^3 and no visible dust), work must be suspended until appropriate corrective measures are approved to remedy the situation. Also, the evaluation of weather conditions will be necessary for proper fugitive dust control--when extreme wind conditions make dust control ineffective, as a last resort remedial actions may need to be suspended.

There may be situations that require fugitive dust suppression and particulate monitoring requirements with action levels more stringent than those provided above. Under some circumstances, the contaminant concentration and/or toxicity may require appropriate toxics monitoring to protect site personnel and the public. Additional integrated sampling and chemical analysis of the dust may also be in order. This must be evaluated when a health and safety plan is developed and when appropriate suppression and monitoring requirements are established for protection of health and the environment.

cc: E. Sullivan
D. Markell
A. DeBarbieri
C. Goddard
R. Tramontano
E. McCandless
A. Fossa
J. Kelleher
J. Colquhoun
M. Keenan
D. Ritter
Regional Directors
Regional Engineers
RSHWE
Reg. Citizen Participation Specs.

Responsiveness Summary
TAGM: Fugitive Dust Suppression and Particulate Monitoring at Inactive Hazardous Waste Sites

The following comments (1. through 12.) have been incorporated into the TAGM:

1. Comment: TAGM covers only dust from hazardous waste; however, dust from non-hazardous construction activity at a site can cause a very troublesome nuisance dust condition that can lead to a considerable public concern and annoyance.

2. Comment: Since solidification and treatment at sites can involve using materials such as kiln dust, lime, etc. that have a high dusting potential, a statement stating the need for special measures for these materials should be considered.

3. Comment: TAGM does not state that when extreme wind conditions make dust control ineffective, as a last resort remedial actions may have to be suspended. In general, evaluation of weather conditions will be necessary for proper dust control.

4. Comment: Piles of excavated material should be covered as well as excluded areas.

5. Comment: A technique for dust suppression should be added for reducing the excavation size and/or the number of excavations.

6. Comment: To insure the validity of the dust measurements performed in accordance with this TAGM, there must be an appropriate QA/QC program.

7. Comment: The TAGM should provide for notification should the action level be exceeded.

8. Comment: For explanatory purposes, it may be useful to explain the significance of the ten micron standard in relation to health effects.

9. Comment: Since the responsibility for implementing this will ultimately fall to the PRP or contractor, the TAGM should state that these procedures must be incorporated into appropriate work plans.

10. Comment: The phrase "increasing the level of protection" should read "increasing the level of personal protection for on-site personnel" for clarity.

11. Comment: Suppression techniques should include atomizing sprays as an effective fugitive dust control method.

12. Comment: Define "fugitive dust."

The following comments (13. through 24.) as noted have been modified for use in the TAGM or rejected as being inappropriate or beyond the scope of the TAGM:

13. Comment: It would be helpful to add a section labeled "Purpose" to outline the specific reasons for monitoring and dust suppression.

Response: The third paragraph of "Background" has been revised to describe the purpose.

14. Comment: The use of calcium chloride as a dust suppressant has been specifically prohibited for this use in the Construction Grants program due to possible adverse environmental effects, and recommendation for its use should be evaluated further.

Response: Calcium chloride has been replaced with water.

15. Comment: The reference to a specific monitoring instrument should be deleted and minimum performance standards be substituted.

16. Comment: The real-time monitors used for monitoring particulates should be equipped with automatic alarms and the necessary averaging hardware.

Response (to 15. and 16.): Minimum performance standards have been adopted. A specific instrument has been kept since it is used by the Division of Air Resources, not as an endorsement but as an example and qualified as such by including "or similar." Automatic alarms are suggested, but not required since they are not minimum standards for performance.

17. Comment: The need for the use of watertight containers is unclear. Although watertight roll-offs may prohibit fine particles from passing through the seals, properly tarped standard dump trucks and roll-offs should provide adequate dust control.

Response: Properly tarping has been added.

18. Comment: In the final paragraph it is suggested that it may be appropriate to modify the particulate standard in consideration of the toxicity of the dust generating material. The PM_{10} standard was developed without regard to the chemical characteristics of the particulate material and it should be used accordingly by the Division.

Response: While particulate monitoring and standards should be virtually independent of the toxicity levels, there may be situations involving toxic dusts that warrant more stringent monitoring and action levels than those conservative levels provided for in this TAGM. If toxic air emissions are a concern, appropriate toxics monitoring and action levels should be in place and this suggestion in the TAGM should remain. However, the details of such are beyond the scope of this TAGM.

19. Comment: TAGM does not address what level of protection should be used for varying concentrations or toxicity of fugitive dust in the work zone.

Response: While increasing the level of personnel protection is addressed as a corrective action to be taken if action level are exceeded, the issue of specific levels of personnel protection is not appropriate for this TAGM.

20. Comment: Since semi-volatiles in vapor phase may not register during the dust or volatile organics monitoring, it is essential that these monitorings by themselves are not construed as providing complete safeguards.

Response: The issue addressed by the TAGM is the possible need for more stringent action levels for dust and particulates--vapors are a whole different issue beyond the scope of the TAGM.

21. Comment: It is not clear if TAGM specifies the long-term collection and analysis of fugitive dust to ascertain whether toxic chemicals are present in any significant level.

Response: Collection and analysis of fugitive dust are not within the scope of this TAGM.

22. Comment: TAGM does not specify what actions should be taken when the concentration and/or toxicity of fugitive dust may require lower action levels (i.e. health risk assessment).

Response: The intent of the TAGM is to provide a real-time measure of air quality due to fugitive dust during remedial activities at inactive hazardous waste sites, and health risk assessment from the toxicity of the dust is beyond the scope of this TAGM.

23. Comment: The particulate monitoring could also be utilized to evaluate the exposure of the general public to dusts created by the remedial activities. Sampling should be conducted downwind at an off-site receptor such as a residence or school.

Response: By monitoring on-site both down- and upwind with discrete and conservative action levels along with employing a feasible dust suppression program, the public will be protected from any potential impact of the dust.

24. Comment: The TAGM could also address a screening analysis to determine if a particular contaminant is a possible concern in dust fallout.

Response: While there may be instances where screening analysis is necessary, methodologies for such are more appropriately outlined in the Division of Air Resources Air Guide-1, Guidelines for the Control of Hazardous Air Contaminants.

APPENDIX B

ER 385-1-92 SAFETY AND HEALTH ELEMENTS FOR HTRW DOCUMENTS

APPENDIX B

Safety and Health Elements For HTRW Documents

1. Site Description and Contamination Characterization.

a. Describe the site location, topography, approximate size of the site, the onsite jobs/tasks to be performed, and the duration of planned site activities.

b. Compile a complete list of the contaminants found or known to be present in site areas to be impacted by work performed. Compilation of this listing shall be based on results of previous studies; or, if not available, select the likely contaminants based on site history and prior site uses/activities. Include chemical names, concentration ranges, media in which found, locations on-site, and estimated quantities/volumes to be impacted by site work.

2. Hazard/Risk Analysis.

a. Identify the chemical, physical (including radiological), biological, and safety hazards of concern for each site task and/or operation to be performed. Selection of chemicals as indicators of hazards shall be based upon media concentrations (i.e., air, water, soil), toxicity, volatility or risk potential for air entrainment at hazardous levels, and frequency of detection.

b. Describe chemical and physical properties of selected contaminants, sources and pathways of employee exposures, anticipated on- and off-site exposure level potentials, and regulatory (including Federal, State, and Local governments) or recommended protective exposure standards.

c. Specify and justify "action levels" based upon airborne exposure hazards and direct skin contact potentials for upgrades/downgrades in levels of personnel protection; for implementation of engineering and/or work practice controls; for emergency evacuation of on-site personnel; and for the prevention and/or minimization of public exposures to hazards created by site activities. Exposure monitoring/air sampling shall be performed in accordance with paragraph 8 below, resulting data compared with established "action levels," and appropriate corrective actions initiated as necessary.

3. Accident Prevention.

a. Any additional Accident Prevention Plan topics required by EM 385-1-1, but not specifically covered elsewhere in these elements, shall be addressed.

b. Daily safety and health inspections shall be conducted to determine if operations are being performed in accordance with the SSHP, USACE and OSHA regulations, and contract requirements.

c. In the event of an accident/incident, the CO (or approving authority for in-house USACE activities) shall be notified according to EM 385-1-1, Section 2. Within two (2) working days of any reportable accident, the contractor (or responsible USACE supervisor for in-house USACE activities) shall complete and submit an Accident Report on ENG Form 3394 in accordance with AR 385-40 and USACE Supplements to that regulation.

4. Staff Organization, Qualifications, and Responsibilities.

a. Discuss the organizational structure, including lines of authority (chain of command), and overall responsibilities of the contractor and all subcontractors for site activities, including supervisor/employee relationships.

b. Summarize the operational and health and safety responsibilities, and qualifications of each key person identified.

(1) Specifically, a Certified Industrial Hygienist (CIH) with experience in the hazardous waste site operations shall be responsible for the development, implementation, and oversight of the contractor's Safety and Health Program (SHP) and Site Safety and Health Plan (SSHP). The SSHP shall be signed and dated by the CIH prior to submittal. (For in-house USACE activities, this responsibility shall be undertaken by qualified USACE industrial hygiene personnel at the geographic Major Subordinate Command/ District Command performing the work.)

(2) A fully trained and experienced Site Safety and Health Officer (SSHO), responsible to the contractor and the CIH (or the USACE approving authority), may be delegated to implement and continually enforce the safety and health program and site-specific plan elements on-site.

(3) At least one person currently certified in Standard First Aid/CPR by the American Red Cross or equivalent agency, according to EM 385-1-1, Section 4, shall be present on-site at all times during site operations.

5. Training.

a. All personnel performing on-site work activities wherein they may be exposed to safety or health hazards resulting from hazardous waste operations shall have completed applicable training in compliance with 29 CFR 1910.120(e).

b. Prior to conducting on-site HTRW activities, all USACE and contractor personnel shall successfully complete a 40 hour HTRW health and safety training course to be followed by an 8-hour annual refresher and/or an 8-hour supervisors course as mandated in OSHA (29 CFR 1910.120) and this regulation.

c. In addition, site-specific training covering site hazards, procedures, and all contents of the approved SSHP shall be conducted by the SSHO for on-site employees and visitors prior to commencement of work or entering the site.

d. The type (including initial, supervisory, refresher, and site-specific), duration, and dates of all employee training performed shall be listed by employee name and certified in the SSHP.

6. Personal Protective Equipment (PPE).

a. A written Personal Protective Equipment (PPE) program in accordance with 29 CFR 1910.120(g)(5) and the respiratory protection requirements of 29 CFR 1910.134 is required.

b. Provide a detailed description of the minimum PPE (including respirators) and specific materials from which the PPE components are constructed for each site-specific task/operation to be performed, based upon the hazard/risk analysis performed above. Component levels of protection (A,B,C,D and modifications) must be relevant to site-specific conditions, including potential heat stress and associated PPE safety hazards.

c. Provide site-specific procedures to determine PPE program effectiveness and for on-site fit-testing of respirators, proper cleaning, maintenance, inspection, and storage of all PPE.

7. Medical Surveillance.

a. All personnel performing on-site work activities wherein they may be exposed to safety or health hazards resulting from

hazardous waste operations shall be participants in an ongoing medical surveillance program, meeting the requirements of 29 CFR 1910.120(f) and ANSI Z-88.2.

b. All medical surveillance protocols and examination results shall be reviewed by a licensed physician who is certified in Occupational Medicine or who, by necessary training and experience, is considered Board-eligible by the American Board of Preventive Medicine Incorporated.

c. In consultation with such an occupational physician, and based upon probable site conditions, potential occupational exposures and required protective equipment, specify minimum content and frequencies of necessary medical tests/examinations/consultations.

d. Certification of participation in the medical surveillance program, the date of last examination, and name of reviewing occupational physician shall also be included for each affected employee in the SSHP.

e. The written medical opinion from the attending physician required by 29 CFR 1910.120(f)(7) shall be made available upon request to the CO or approving authority for any site employee.

8. Exposure Monitoring/Air Sampling Program.

a. Where it has been determined that there may be potential employee exposures to and/or off-site migration of hazardous concentrations of airborne substances, appropriate direct-reading (real-time) air monitoring and time-integrated (time-weighted average (TWA)) air sampling shall be conducted in accordance with applicable regulations (OSHA, EPA, State). Air monitoring and air sampling must accurately represent concentrations of airborne contaminants encountered on, and leaving, the site.

b. Sampling and analytical methods following NIOSH criteria (for on-site personnel) and EPA criteria (for site perimeter or off-site locations) shall be appropriately utilized.

c. Personnel samples shall be analyzed only by laboratories successfully participating, in and meeting the requirements of the American Industrial Hygiene Association's (AIHA) Proficiency Analytical Testing (PAT) or Laboratory Accreditation programs.

d. Meteorological monitoring shall be performed on-site and used as an adjunct in determining perimeter and any off-site

monitoring locations. Where perimeter monitoring/sampling is not deemed necessary, a suitable justification for its exclusion should be provided.

e. Noise monitoring and radiation monitoring (alpha, beta, gamma) shall be conducted as needed, depending on the site hazard assessment.

f. All monitoring/sampling results shall be compared to "action levels" established pursuant to paragraph 2. above to determine acceptability and need for corrective action.

9. Heat/Cold Stress Monitoring.

a. Heat and/or cold stress monitoring protocols shall be specified and implemented, as appropriate.

b. Work/rest schedules shall be developed by measurement of ambient temperature, humidity, wind speed (wind chill), solar radiation intensity, duration and intensity of work, and level of protective equipment.

c. Minimum required physiological monitoring protocols which will affect work schedules shall be developed.

d. In cases where impervious clothing is worn (i.e., full-body protective clothing), the NIOSH/OSHA/USCG/EPA "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities" protocol for prevention of heat stress shall be followed, and heat stress monitoring shall commence at temperatures of 70 degrees Fahrenheit and above. Where impervious clothing is not worn, the most current published ACGIH heat stress standard (TLV) shall be used. For cold stress monitoring to help prevent frostbite and hypothermia, the most current published ACGIH cold stress standard shall be referenced and followed, as a minimum.

10. Standard Operating Safety Procedures, Engineering Controls and Work Practices. Address, as appropriate:

a. Site rules/prohibitions (buddy system, eat/drink/ smoking restrictions, etc.).

b. Material handling procedures (soils, liquids, radioactive materials).

c. Drum/container handling procedures and precautions (opening, sampling, overpacking).

d. Confined space entry procedures.

e. Hot-work, sources of ignition, fire protection/prevention, and electrical safety (ground-fault protection, overhead power line avoidance, etc.).

f. Excavation safety.

g. Guarding of machinery and equipment.

h. Fall protection.

i. Hazard Communication.

j. Illumination.

k. Sanitation.

l. Engineering controls.

11. Site Control Measures.

a. Include a site map.

b. Delineate work zones and their access points. Work zone delineation (Exclusion Zone, Contamination Reduction Zone, Support Zone) shall be based upon the contamination characterization data and the hazard/risk analysis to be performed under paragraphs 1 and 2 above.

c. Describe on-site and off-site communications.

d. Describe site security (physical and procedural).

e. Describe general site access.

12. Personal Hygiene and Decontamination.

a. Specify necessary facilities and their locations.

b. Provide detailed standard operating procedures, for frequencies, supplies and materials to accomplish decontamination of site personel.

13. Equipment Decontamination.

a. Specify necessary facilities, equipment, and their locations.

b. Provide detailed procedures, frequencies, supplies and materials, and methods to determine adequacy for the decontamination of equipment used on-site.

14. Emergency Equipment and First Aid Requirements. The following items, as a minimum and as appropriate, shall be immediately available for on-site use:

a. First aid equipment and supplies approved by the consulting physician.

b. Emergency eyewashes/showers (per ANSI Z-358.1).

c. Emergency-use respirators, i.e., escape: 5 - 15 minute emergency escape mask with air bottle; rescue: positive pressure self-contained breathing apparatus (SCBA).

d. Spill control materials and equipment.

e. Fire extinguishers (specify type, size, locations).

15. Emergency Response and Contingency Procedures (On-Site and Off-Site).

a. Local fire/police/rescue authorities having jurisdiction and nearby medical facilities that would be utilized for emergency treatment of injured personnel shall be contacted in order to notify them of upcoming site activities and potential emergency situations, to ascertain their response capabilities, and to obtain a response commitment.

b. An Emergency Response Plan, which complies with 29 CFR 1910.120(l), and which, as a minimum, addresses the following elements, shall be developed and implemented:

(1) Pre-emergency planning and procedures for reporting incidents to appropriate government agencies for potential chemical exposures, personal injuries, fires/explosions, environmental spills and releases, discovery of radioactive materials.

(2) Personnel roles, lines of authority, communications.

(3) Posted instructions and list of emergency contacts: physician/nearby medical facility, fire and police departments, ambulance service, state/local/federal environmental agencies, CIH, Contracting Officer, (approving authority for in-house activities.

(4) Emergency recognition and prevention.

(5) Site topography, layout, and prevailing weather conditions.

(6) Criteria and procedures for site evacuation (emergency alerting procedures/employee alarm system, emergency PPE and equipment, safe distances, places of refuge, evacuation routes, site security and control).

(7) Specific procedures for decontamination and medical treatment of injured personnel.

(8) Route maps to nearest pre-notified medical facility.

(9) Criteria for initiating community alert program, contacts and responsibilities.

(10) Critique of emergency responses and follow-up.

16. Logs, Reports, and Recordkeeping.

a. The following logs, reports, and records shall be developed, retained, and submitted to the CO (or approving authority for in-house activities):

(1) Training logs (site-specific and visitor).

(2) Daily safety inspection logs (may be part of the Daily QC Reports).

(3) Equipment maintenance logs.

(4) Employee/visitor register.

(5) Environmental and personal exposure monitoring/sampling results.

b. All personnel exposure and medical monitoring records are to be maintained in accordance with applicable OSHA standards, 29 CFR 1910 and 1926.

APPENDIX C

ER-1110-1-263 ENGINEERING AND DESIGN CHEMICAL DATA QUALITY MANAGEMENT FOR HAZARDOUS WASTE REMEDIAL ACTION

K (0459)

DEPARTMENT OF THE ARMY
U. S. Army Corps of Engineers
Washington, DC 20314-1000

CEMP-RT

ER 1110-1-263

Regulation
No. 1110-1-263

1 October 1990

Engineering and Design
CHEMICAL DATA QUALITY MANAGEMENT FOR
HAZARDOUS WASTE REMEDIAL ACTIVITIES

1. Purpose. This regulation prescribes Chemical Data Quality Management (CDQM) responsibilities and procedures for all chemical contamination investigative and remedial activities to assure that the analytical data obtained is of sufficient quality to meet intended usages within the project.

2. Applicability. This regulation applies to HQUSACE/OCE elements, major subordinate commands, districts, laboratories, and separate field operating activities.

3. References.

a. PL 98-212, Department of Defense (DOD) Appropriation Act, Fiscal Year 1984, Environmental Restoration, enacted 8 December 1983, and following legislation.

b. PL 96-510, Comprehensive Environmental Response, Compensation and Liability Act of 1980.

c. PL 99-499, Superfund Amendments and Reauthorization Act of 1986.

d. Interagency Agreement between the USACE and the U.S. Environmental Protection Agency (EPA) in executing PL 96-510, 10 February 1982, and following extensions or modifications.

e. EPA OSWER Directive 9355.3-01, Guidance for Conducting Remedial Investigations (RI) and Feasibility Studies (FS) Under CERCLA (Interim Final), October 1988.

f. EPA OSWER Directive 9355.0-4A, Superfund Remedial Design and Remedial Action Guidance, June 1986.

g. EPA OSWER Directive 9345.1-02, Expanded Site Inspection Transitional Guidance for FY 1988.

This regulation supersedes ER 1110-1-263 dated 30 December 1985

h. EPA 540/G-87/003, Data Quality Objectives for Remedial Response Activities, March 1987.

i. ER 1180-1-6.

j. ER 1110-1-261.

k. ER 415-1-11.

l. EP 1110-2-6.

4. Discussion.

a. The intent of this ER is to conduct CDQM activities in full compliance with all applicable federal and state regulatory requirements. Standard methods and procedures promulgated by the EPA and the American Society of Testing Materials (ASTM) will be followed when available and applicable. ASTM is developing a document entitled "Standard Practice for Generation of Environmental Data Related to Waste Management Activities". When finalized, the ASTM document is expected to be adopted by the EPA and the Industry as standard practice. Accordingly, this ER is intended to be in compliance with the ASTM standard.

b. The U.S. Army Toxic and Hazardous Material Agency (CETHA), now an FOA of USACE, has developed and is practicing a separate approach to CDQM activities. Insofar as the CETHA CDQM program meets the federal, state and ASTM requirements set forth above, the CETHA CDQM program may be utilized for activities CETHA independently executes.

5. General.

a. Hazardous waste programs under which USACE currently executes remedial activities include:

(1) EPA Superfund

(2) Defense Environmental Restoration Program (DERP)

(a) Installation Restoration Program (IRP) (Army, Air Force and Navy)

(b) Formerly Used Defense Sites (FUDS)

b. Chemical analysis of environmental samples is usually required during the following activities under the programs listed in the previous section.

(1) Preliminary Assessment (PA) and Site Inspection (SI)

(2) Remedial Investigation/Feasibility Study (RI/FS)

(3) Remedial Design (RD) and Pre-Design Activities

(4) Remedial Action (RA)

(5) Post Remedial Action Monitoring

c. Acquisition of chemical analytical data is an integral part of chemical contamination investigative and remedial activities. There are a multitude of purposes for which chemical analytical data are acquired; however, they generally can be divided into eight categories.

(1) Site investigation

(2) Health and safety; hazard assessment

(3) Determination of potential responsible parties

(4) Engineering decisions

(5) Construction contractor payment

(6) Post remedial action monitoring

(7) Legal support of government actions

(8) Determination of proper disposal

d. The purpose of CDQM is to insure that chemical analytical data, acquired during investigative, remedial and monitoring activities, are of sufficient quality to meet intended usages. Data quality depends not only on how carefully an analytical method is carried out, but also on the sample point selection, sampling procedures, sample integrity and analytical methods selected. Data quality objectives (DQO) will be defined in the scope of services or design specifications for contract services

and in the Chemical Data Acquisition Plan (CDAP) for in-house work for which a scope of services is not generated.

e. CDQM during chemical contamination investigative, remedial ard monitoring activities includes roles for both the government (USACE) and its contractors. Planning and reporting CDQM documents/tasks required of USACE or its contractors are listed in Tables 1, 2, and 3 shown at Appendix A. An estimate of the time required to prepare and review each submittal is also included. Table 1 contains investigation activities, Table 2 design activities, and Table 3 construction activities. In most cases, investigation activities will be conducte.. by Architect-Engineer (AE) firms; however, the listed documents/tasks are pertinent to all activities in which both planning and execution are carried out under a single contract or by utilizing in-house government personnel. In contrast, the documents/tasks listed under design and construction activities are pertinent to all activities in which planning and execution are carried under separate contracts. Specific guidance for carrying out the tasks in Appendix A are found in Appendices B through F, and a glossary is provided in Appendix G.

6. Responsibilities.

a. The Environmental Restoration Division, Directorate of Military Programs, Headquarters (CEMP-R), is responsible for program management, technical oversight, and USACE policy and guidance development and dissemination.

b. The Investigation District or FOA is responsible for executing investigation activities for chemical contamination cleanup projects and informing the local district of their activity.

c. The Design District or FOA is responsible for executing design activities for chemical contamination projects and coordination with the local district throughout design.

d. The Construction District or FOA is responsible for executing construction chemical contamination remedial action projects within its geographical area. It is also responsible for cooperating with activities undertaken by other Investigation and Design Districts or FOA within its geographical area.

e. Divisions are responsible for monitoring and oversight of activities of their districts to assure that program policies and procedures are implemented.

f. CEMRD has primary responsibility for implementation of CDQM requirements for all aspects of HTW activities conducted in support of the Superfund, DERP, and non-mission HTW assignments. To execute this overall responsibility CEMRD is responsible for identifying shortfalls and drafting technical guidance; training; conducting selected technical reviews of documents and chemical data; coordinating review with CDQM personnel in other districts and divisions; providing technical assistance; receiving and analyzing quality assurance samples; evaluating contract laboratories; and validating USACE division laboratories to participate in the above activities. These responsibilities are discharged through the assigned tasks of the Chemical Review Branch (CEMRD-ED-GC) and the Missouri River Division Laboratory HTW Chemistry Unit (CEMRD-ED-GL), which is designated the lead USACE QA laboratory for HTW projects.

g. CEMRD has review and approval authority for all work brokered by CEMRD to other FOA until that authority is transferred to the parent division with the approval of HQUSACE.

h. The QA Laboratory is responsible for executing CDQM activities delegated to it through the procedures specified in the Appendix E, USACE Chemical Quality Assurance.

i. Additional definition of organizational responsibilities for CDQM activities is described in Tables 4, 5, and 6 shown at Appendix A.

ALBERT J. GENETTI, JR.
Colonel, Corps of Engineers
Chief of Staff

7 Appendices
App. A - Tables
App. B - Guide to USACE Chemical Quality Assurance Procedures and Notifications
App. C - Commercial Laboratory Validation Procedures

Appendices (cont'd)

APPENDIX A

TABLES

TABLE 1

DOCUMENTS/TASKS FOR INVESTIGATIVE ACTIVITIES*

Activities	Estimated Window
Designation of a USACE Quality Assurance (QA) Laboratory	1 Week
Scope of Services	Preparation - 3 weeks Review - 3 weeks
Validation of AE's Laboratory	Begin as soon as lab is identified - allow 6-12 weeks
Chemical Data Acquisition Plan (CDAP)	Expect 1 month after scope is provided to AE - allow 3-4 weeks for review
Daily Quality Control Reports (DQCR)	Prepared daily, submitted USACE project manager daily by regular mail and to QA Lab by the USACE project manager
Submission of AE's Chemical Data to the QA Laboratory	As soon as possible
Quality Control Summary Report (QCSR)/Site Inspection Report	Expect 2-3 months after completion of field work - 3-4 weeks for review
Chemical Quality Assurance Report (CQAR)	Expect within 30 days of submission of data to the QA laboratory.

* These include SI, RI/FS, and Pre-Design investigative activities.

TABLE 2

DOCUMENTS/TASKS FOR DESIGN ACTIVITIES

Activities	Estimated Window
Scope of Services	Preparation - 3 weeks Review - 3 weeks
Design Documents, to include Design Analysis Reports and Plans and Specifications	Project manager sets deadlines for Design Analysis Reports and 30%, 60% and 90% submittals. These are reviewed by District/Division technical personnel. Copies are sent to CEMRD and program management personnel for review of each submittal.

TABLE 3

DOCUMENTS/TASKS FOR CONSTRUCTION ACTIVITIES

Activities	Estimated Window
Designation of USACE Quality Assurance (QA) Laboratory for Construction	1 Week
Contractor Laboratory Validation	Begin as soon as laboratory is identified. Allow 6-12 weeks.
Chemical Data Acquisition Plan (CDAP)	Expect 1 month after contract is awarded. Allow three weeks for review.
Daily Quality Control Reports (DQCR)	Prepared daily by contractor, submitted to contracting officer daily by regular mail and to the QA lab by the contracting officer when relevant.
Submission of Contractor's Data to the QA Laboratory	As soon as available.
Quality Control Summary Report (QCSR)/Contractor Final Report	Expect 2-3 months after completion of field work. Allow 3-4 weeks for review.
Chemical Quality Assurance Report (CQAR)	Expect within 30 days of submission of data to the QA Lab.

TABLE 4

ADDITIONAL ORGANIZATONAL RESPONSIBILITIES FOR INVESTIGATION CDQM DOCUMENTS/TASKS

Activity	Investigation* District	Investigation* Division	QA Laboratory	MRD	CEMP-R
Designation of a USACE QA Laboratory	I	I		E, A	O
Scope of Services (SOS)	E	R, A	R, M	O	
Disposition of SOS Comments	E	R, A	R	M	O
Contract Laboratory Validation	I, A	I	R	E, M, A	M, O
Chemical Data Acquisition Plan (CDAP)	E	R, A	R	R, M	O**
Disposition of CDAP Comments	E	R, A	R	M	O
Notice to Proceed (field work)	E	M	M	M	O
Daily Quality Control Reports (DQCR)	E	R	R	M	O
Inspection and Analyses of QA Samples,			E	R, M	O
Quality Control Summary Report (QCSR)/Site Inspection Report	E	R, A	R	M	O
Disposition of Site Inspection Report Comments	E	R, A	R	M	O
Chemical Quality Assurance Report (CQAR)	R	R	E	R, M	O

KEY: I = initiate, E = execution, R = review, A = approve, M = monitor, and O = oversight

* = These responsibilities are for district in-house work. For AE/Contractor work, the contracting officer in the district has approval authority.

** = Documents will be provided to HQUSACE (CEMP-R) for monitoring and oversight. On an exception basis, CEMP-R will audit specific projects and will require that all project documents be submitted.

The local district/division should be kept informed of the progress of any work in their geographic area, and should be furnished copies of documents if they so desire.

TABLE 5
ADDITIONAL ORGANIZATIONAL RESPONSIBILITIES FOR
DESIGN CDQM DOCUMENTS/TASKS

Activity	Design*		Construction		QA		
	District	Division	District	Division	Laboratory	MRD	CEMP-R
Designation of a USACE QA Laboratory for Design	I	I	R	R	R	M	O
Scope of Services (SOS)	E	R, A	R	R	R	R	O
Disposition of SOS Comments	E	R, A	R	R	R	R	O
AE Laboratory Validation	I, A	I			R	E, M	M, O
Chemical Data Acquisition Plan (CDAP)	E	R, A	R	R	R	R	O
Daily Quality Control Reports	E	R	R	R	R	M	O
Quality Control Summary Report/ Investigation Report	E	R, A	R	R	R	M	O**
Chemical Quality Assurance Report	R	R	R	R	E	M	O**
Design Analyses Reports and Design Plans and Specifications	E	R, A	R	R	R	R	O**
Disposition of Design Comments	E	R, A	R	R	R	R	O
Advertise and Award Construction Contract	E			O			

KEY: I = initiate, E = execution, R = review, M = monitor, and O = oversight

* = These responsibilities are for district in-house work. For AE/Contractor work, the contracting officer in the district has approval authority. For design brokered by CEMRD, review and approval authority is retained by CEMRD until transferred to the Division.

** = Documents will be provided to HQUSACE (CEMP-R) for monitoring and oversight. On an exception basis, CEMP-R will audit specific projects and will require that all project be submitted.

The local district/division should be kept informed of the progress of any work in their geographical area, and should be furnished copies of documents if they so desire.

TABLE 6

ADDITIONAL ORGANIZATIONAL RESPONSIBILITIES FOR
CONSTRUCTION CDQM DOCUMENTS/TASKS

Activity	Design		Construction		QA		
	District	Division	District	Division	Laboratory	MRD	CEMP-R
Designation of a USACE QA Laboratory			I	I		E	O
Contract Laboratory Validation			I	I	R	E	O
Chemical Data Acquisition Plan (CDAP)	R		E, A	R	R	R	O
Disposition of CDAP Comments	R		E	R	R	M	O
Daily Quality Control Reports			E	R	R	M	O
Inspection and Analysis of QA Samples					E	M	O
Quality Control Summary Report (QCSR)/Contractor Final Report			E, A	R	R	M	O**
Disposition of Final Report Comments			E, A	R	R	M	O
Chemical Quality Assurance Report (CQAR)			R	R	E	R, M	O**

KEY: I = initiate, E = execution, R = review, A = approve, M = monitor and O = oversight
** = Documents will be provided to HQUSACE (CEMP-R) for monitoring and oversight. On an exception basis, CEMP-R will audit specific projects and will require that all project documents be submitted.

The local district/division should be kept informed of the progress of any work in their geographical area, and should be furnished copies of documents if they so desire.

APPENDIX B

GUIDE TO USACE CHEMICAL QUALITY ASSURANCE PROCEDURES AND NOTIFICATIONS

1. Purpose. Chemical quality assurance in chemical contamination investigation, design, and remedial action activities requires the interface and coordination of several USACE units. This appendix outlines the procedures involved and provides suggested formats to aid in the coordination process. The responsibility for initiation and coordination lies with the USACE project manager for investigation and design and with the contracting officer (CO) or his representative (COR) for construction.

2. Applicability. This appendix applies to all HTW investigative, design, and remedial activities executed by USACE either in-house or utilizing the services of a contractor.

3. Procedures for Chemical Quality Management.

a. Site Investigation and Pre-Design Activities.

(1) Investigation district solicits AE services.

(2) Investigation district writes Scope of Services with data quality objectives and submits it for review to division, program management personnel and CEMRD.

(3) Project Manager obtains the services of a USACE division laboratory for quality assurance using protocols established by CEMRD (memorandum or attached Request for Government Quality Assurance Services).

(4) District negotiates and awards AE contract.

(5) AE identifies subcontract laboratory and supplies Laboratory Quality Management Manual (LQMM) or required information. See Appendix C.

(6) Project Manager verifies validation status of the laboratory with CEMRD or requests validation be initiated (memorandum or attached Request for Evaluation of Commercial Laboratory).

(7) LQMM is submitted to CEMRD, performance audit samples are sent if necessary, laboratory is inspected by CEMRD, and a recommendation for approval/disapproval is sent to the USACE project manager. Personnel from the QA laboratory or investigation district will be notified of a scheduled inspection and may assist with this process. If approval is not given, AE will select another laboratory.

(8) AE submits CDAP for investigation district's approval.

(9) CEMRD-ED-GC and QA laboratory review CDAP and make approval/disapproval recommendation to investigation district.

(10) Field work begins if CDAP is approved.

(11) AE Daily Quality Control Report is filled out daily and submitted to the investigation district. Copies are sent to the QA laboratory whenever sampling or analytical activities are included.

(12) Field work completed.

(13) AE's analytical results are submitted to the QA lab as they become available, and to the executing FOA.

(14) AE's Site Inspection or Investigation Report together with the Quality Control Summary Report is submitted to the investigation district. These are reviewed by the same offices that reviewed the CDAP.

(15) QA laboratory prepares the Chemical Quality Assurance Report and submits it to the investigation district.

b. Design Activities.

(1) Design district solicits AE services.

(2) Design district writes Scope of Services and submits it to design division, CEMRD, and program management personnel for review/approval.

(3) Design district negotiates and awards AE design contract.

(4) If investigative activities are included in the design contract, steps 5-15 of Section 3.a. should be followed.

(5) AE submits Design Analysis Reports which contain a section that specifically addresses chemical quality management concerns. AE also submits plans and specifications which include chemical quality management at the preliminary, intermediate, final and 100% phases. The chemical section of the plans and specifications should give the Construction Contractor instructions for writing the CDAP in addition to including all necessary site specific chemical detail. Relevant requirements in this ER and appendices should be addressed. These submittals are sent to the design division, CEMRD, and program management personnel for technical review, and comments are sent back to the design district.

(6) Design district assures that the comments are addressed and incorporated into the appropriate documents or provides an explanation if comments are not used. Revised documents and annotated comments are sent to the offices generating comments at the next submittal stage.

(7) 100% plans and specifications are approved by the design district and the district advertises and awards the construction contract.

c. Construction.

(1) The contractor submits a CDAP (which may be a section in his overall Quality Control Plan). The contract laboratory (if needed) along with the Contractor's proposed quality control officers are identified for the Construction District's approval.

(2) CEMRD at request of the CO designates the Construction Division Lab or CEMRD-ED-GL to be the government QA laboratory for construction (forms provided) and validate the contractor's laboratory.

(3) The designated QA laboratory together with CEMRD assists the Construction District in reviewing the CDAP. The contractor's proposed laboratory is validated by CEMRD according to protocols discussed in Appendices C and E.

(4) Construction district approves/disapproves the contractor's laboratory and/or CDAP.

(5) Construction cleanup begins after CDAP and contractor's laboratory are approved.

(6) Contractor's Daily Quality Control Report is submitted to the Contracting Officer's Representative (COR) daily. The COR submits copies to the QA laboratory when sampling or analyses are involved. Analytical results are submitted to the QA laboratory as soon as they are available.

(7) Construction work is completed.

(8) The contractor submits the Quality Control Summary Report to the construction district. This should include a complete data package.

(9) The QA laboratory prepares the Chemical Quality Assurance Report and submits it to the construction district.

4. The following pages contain suggested formats which may be used to initiate interaction among various Corps elements regarding chemical data quality management. These would initiate a request for government quality assurance services, laboratory validation or document review. If these services are initiated by memoranda, the information called for on these pages should be supplied. Examples of formats which might be used for Daily Quality Control Reports and Chemical Quality Assurance Reports are also included.

(SAMPLE FORMAT)

TO: CEMRD-ED-GC FROM: _____ DATE__/__/__

SUBJECT: Request for Evaluation of Commercial Laboratory

Project Name:_____Contract No.:_____

Superfund _____ FUDS _____ IRP _____ Other _____ Phase _____

Location:_____State:_____

A-E/Contractor:_____State:_____

USACE Project Manager:_____
Phone:_____Address:_____

Approximate Sampling Dates:_____
Laboratory Name:_____
Address:_____
Phone:_____
POC:_____

Laboratory Quality Management Manual Request ON __/__/__

Required analytical methods and approximate number of samples to be taken for above project.

METHOD	# OF WATER SAMPLES	# OF SOIL/SEDIMENT SAMPLES

State or other laboratory certification which will be required for this project:_____

If the laboratory is planning to subcontract any samples to another laboratory or location, all of these are to be evaluated separately. This request should be sent for verification of laboratory status regardless of expiration date on the list of validated laboratories.

(SAMPLE FORMAT)

TO:_____ FROM:_____ DATE:__/__/__

SUBJECT: Request for Government Quality Assurance Services (To be sent to the requested USACE Laboratory with a copy to CEMRD-ED-GC)

Project Name:_____ Contract No.:_____

Superfund ____ FUDS ____ IRP ____ Other ____ Phase _____
Location:_____ State:_____

A-E/Contractor:_____ State:_____
USACE Project
Manager:_____
Phone:_____ Address:_____

Laboratory Name:_____
Address:_____
Phone:_____
POC:_____

Approximate Sampling Dates:_____

The following QA Laboratory support is requested for the subject project: USACE Division Laboratory:_____

____ Review and comment on Draft _____
_____
_____
_____

____ Analysis and Reports of Quality Assurance Samples

METHOD	NO. OF WATER SAMPLES*	NO. OF SOIL/SEDIMENT SAMPLES‡

* Includes Blanks

‡ Includes Background Soil Sample

CF: CEMRD-ED-GC

DATE _____

DAY

S	M	T	W	TH	F	S

A-E DAILY QUALITY CONTROL REPORT

WEATHER	Bright Sun	Clear	Overcast	Rain	Snow
TEMP	To 32	32-50	50-70	70-85	85 up
WIND	Still	Moder	High	Recon No.	
HUMIDITY	Dry	Moder	Humid		

COE PROJECT MANAGER _____

PROJECT _____

JOB NO. _____

CONTRACT NO. _____

SUB-CONTRACTORS ON SITE:

EQUIPMENT ON SITE.

WORK PERFORMED (INCLUDING SAMPLING):

SHEET _____ OF _____

(Continuation Sheet)

PROJECT. _____ REPORT NO. _____

JOB NO. _____ DATE _____

QUALITY CONTROL ACTIVITIES (INCLUDING FIELD CALIBRATIONS)
HEALTH AND SAFETY LEVELS AND ACTIVITIES.
PROBLEMS ENCOUNTERED/CORRECTION ACTION TAKEN:
SPECIAL NOTES.
TOMORROW'S EXPECTATIONS:

BY _____ TITLE _____

(SAMPLE FORMAT)

_____ LAB NO.

DEPARTMENT OF THE ARMY
_____ DIVISION, CORPS OF ENGINEERS
DIVISION LABORATORY

_____, _____, _____
(city) (state) (zip)

Subject: Chemical Quality Assurance Report

Project:
Intended Use:
Source of Material:

Submitted by:
Date Sampled: _____, Date Received:
Method of Test or Specification: See attached Tables 1 - ____
References:

-- REMARKS --

1. CONTRACTOR DATA EVALUATION: (General comments)

   a. ACCURACY:

   b. PRECISION:

   c. LABORATORY CONTMINATION:

2. QA/QC DATA COMPARISON:

3. OTHER PROBLEMS:

4. CORRECTIVE ACTION:

Submitted by:

Director, _____ Laboratory

APPENDIX C

COMMERCIAL LABORATORY VALIDATION PROCEDURES

1. Purpose. This appendix specifies the procedure used to evaluate a commercial laboratory for hazardous and toxic chemical analysis either for AE/Contractor work or for in-house projects conducted by USACE in hazardous waste activities. The latter includes chemical analyses contracted by the quality assurance laboratory.

2. Applicability. These procedures apply to all chemical analyses conducted to support investigative and remedial actions undertaken by USACE.

3. Initiation Procedures. A project manager from a Corps District or Division contacts CEMRD-ED-GC requesting validation of a contract laboratory. A form is provided in Appendix A or a memorandum may be written. The name of the project, the contract number, analytical methods to be used, numbers of samples of each matrix, estimated dates of sampling, and any special certification requirements should be included.

4. Implementation Procedures. Ordinarily each step in this sequence is completed before the subsequent step is initiated.

a. Step 1. The laboratory must submit its qualifications. This submittal may be in the form of an off-the-shelf Quality Management Manual (LQMM) or in some other format. Blank information tables can be requested from CEMRD. The submittal includes the following information:

- General Lab Information: (1) Lab name, address, POC, phone #; lab age, number of employees; square footage, etc.
  (2) Type of analytical work routinely performed;
  (3) Organizational chart and floor plan;
  (4) Special capabilities.

- List of previous evaluation/validation programs and most recent results.

- List of EPA and USACE contracts held in the last two years.

- Copy of lab certificates for other environmental programs or states.

• Chart of employee training and experience or chronological resumes.

• Copy of QA manual and/or in-house SOP's for analyses to be conducted for the contract including all internal quality control practices.

• List of instruments to be used for the contract and date of purchase.

The laboratory is requested to furnish above information promptly for review. If it appears that the capabilities of the laboratory are adequate to meet project requirements, CEMRD will initiate Step 2.

b. Step 2. The Corps of Engineers will provide the laboratory with performance audit (PA) samples through CEMRD-ED-GC. Arrangements will be made with the laboratory for the analysis of these samples. The results will be submitted as directed within 20 working days after receipt of the PA samples. Failure to analyze these samples correctly and within the required time frame may result in termination of the validation process. Ordinarily the laboratory is not reimbursed for costs involved in the analysis of the PA samples. The details of payment must be clarified in advance. If any of the results are unacceptable, a second set of PA samples may be allowed.

(1) The performance audit samples are method and matrix specific. The results are considered passing if a particular method has no results outside three standard deviations as determined by USACE, and no more than two parameters outside two standard deviations. Often a laboratory will be contacted if problems such as dilution or calculation errors can be identified.

c. Step 3. On-site inspection. A representative of CEMRD will inspect the contract laboratory only after Steps 1 and 2 have been successfully completed. All in-house SOPs will be reviewed. Any problems encountered with the performance audit samples will be discussed with laboratory management at the time of the inspection. The inspecting team will prepare a detailed report using the format specified by CEMRD and submit this to CEMRD-ED-GC. An exit interview will be held with lab personnel in which any problems encountered are discussed. The project manager or contracting officer and/or the assigned QA laboratory will be invited to send a representative to the inspection.

5. Conclusion. CEMRD will evaluate lab performance on the preceding steps and make a validation decision. A letter and a copy of the inspection report will be sent to the USACE personnel who initiated the validation process and to the laboratory. Ordinarily the letter will specify the methods and matrices, the project(s) and the time period (usually 18 months) for which the validation is granted. If specific recommendations are made by the inspectors, the lab is required to respond to CEMRD within a given time frame. Centralized records of validations and lab performances are kept at CEMRD-ED-GC. If a laboratory obtains a second contract within the eighteen month period, previous performances will be checked. If different analytes/matrices are involved in the second contract, only those performance audit samples will be sent. If work done for the Corps by the lab has been satisfactory, no further action will be necessary. **A validated laboratory may not subcontract USACE samples to a second laboratory without the knowledge and approval of the contracting officer and unless the second laboratory is validated for the parameters concerned.**

6. Renewal of Validation. Towards the close of the eighteen month period CEMRD-ED-GC will notify USACE users of laboratories of the pending expiration of validation. When the next contract is awarded, the validation will be renewed. After considering use of the lab and previous performance, CEMRD-ED-GC will determine which of the steps in Part II will apply to the revalidation process.

APPENDIX D

GUIDE TO THE PREPARATION OF THE CHEMICAL DATA ACQUISITION PLAN

1. Definition and Responsibility. Chemical Data Acquisition Plan (CDAP)--a document prepared by an Architect-Engineer firm, a Contractor or USACE for all field activities, laboratory activities, and contract deliverables related to the acquisition and reporting of chemical data for HTW investigation or remedial activities. For the convenience of the sampling team, field activities may be bound separately; however for purposes of cost this should not be considered a separate document. The CDAP must be approved by the CO prior to initiation of field work. In the event corrections and comments on the draft are provided by the CO, the changes shall be incorporated by the authors in a revised plan before final approval is given. It should be noted that the purpose and content of the CDAP are essentially the same as the Quality Assurance Project Plan (QAPjP) required for Superfund investigations by the EPA. On Superfund projects QAPjP guidance may be followed as an alternative to this appendix, but ordinarily the Contract Laboratory Program (CLP) should not be used in its entirety (CLP analytical methods may be specified as well as a CLP type data validation).

2. Applicability. This guide applies to all HTW investigative, pre-design, and remedial activities undertaken by USACE. A CDAP will be prepared for each activity and submitted to the appropriate USACE personnel for review, comments, and recommendations. The identification of these reviewers for each type of project is found in Tables 4, 5, and 6 in Appendix A. Once approved, the CDAP is considered part of the contract and is enforceable as such.

3. USACE Chemical Quality Data Management. USACE requires that quality control (QC) and quality assurance (QA) samples be collected and analyzed by the contract laboratory and the USACE QA laboratory, respectively. These QC and QA samples include splits or replicates of field samples, rinsate blanks, trip blanks and background soil and groundwater samples. QC samples, which represent approximately 10% of the field samples, help the prime contractor to identify and diagnose problems related to sampling and analysis. QA samples, which represent approximately 10% of the field samples, are sent to a USACE QA laboratory by overnight delivery for government monitoring of sampling and contract laboratory performance. For additional guidance on chemical quality assurance, see Appendix E. When

the following procedures, performed by the USACE QA laboratory, demonstrate that contract requirements for chemical quality control were not met, contractor resampling and reanalysis may be required by the contracting officer.

a. Inspection of QA samples to insure that sampling procedures correspond to Chemical Data Acquisition Plan (CDAP), with regard to sample containers, preservation, labeling, and chain of custody.

b. Analyses of QA samples.

c. Evaluation of contractor deliverables specified in Chemical Data Acquisition Plan (CDAP).

d. Comparison of analytical results obtained by contract laboratory and USACE QA laboratory from split or replicate samples. The procedures for obtaining QA laboratory services are in Appendix E to ER 1110-1-263.

4. Contract Laboratory Validation. Any laboratory performing chemical analyses shall be validated by USACE Missouri River Division (MRD). Laboratories are validated for each environmental matrix and each specific analytical method to be employed. If the prime contractor selects a laboratory which has a current (within one year) validation for all analytes and matrices specific to its project, additional evaluation will not be necessary. A request for the evaluation of commercial laboratory should be sent to CEMRD to verify the status of the contract laboratory(ies). If the prime contractor selects a laboratory which does not have a current validation, the laboratory shall be validated prior to approval of the CDAP. Commercial laboratory validation procedures are in Appendix C to ER 1110-1-263. **Samples may not be subcontracted to another laboratory without knowledge and approval of the contracting officer and unless the second laboratory is validated for the parameters concerned.**

5. The CDAP shall address the following topics, not necessarily in the presented order within subsections.

SECTION 1.0	TABLE OF CONTENTS
SECTION 2.0	PROJECT DESCRIPTION
SECTION 3.0	CHEMICAL DATA QUALITY OBJECTIVES - GENERAL DISCUSSION
SECTION 4.0	AE CONTRACTOR PROJECT ORGANIZATION AND FUNCTIONAL AREA RESPONSIBILITIES.
SECTION 5.0	FIELD ACTIVITIES

7.2.8 Internal Quality Control Checks
7.2.9 Corrective Action
7.2.10 Data Reduction, Validation, and Documentation
7.3 Analytical Method 3, etc.

SECTION 8.0 CDQM DELIVERABLES
SECTION 9.0 REFERENCES

6. Project Description (SECTION 2.0 in Table of Contents). This section of the CDAP shall include a description of the work site and any unusual conditions. Anticipated project start and completion dates shall be estimated. This section shall also provide a summary of past and future work at the site including past chemical data of significance as well as a presentation of the multi-media sampling to be carried out in the present work effort.

7. Chemical Data Quality Objectives (SECTION 3.0 in Table of Contents). This section of the CDAP shall include a description of the general scope of work and relevant background information as it relates to the acquisition of chemical analytical data. State the objectives of the project: what questions must be answered and what decisions must be made; one specific objective may be completion of the USACE Hazardous Ranking System. Describe the level and extent of chemical data required to answer questions and support decisions during the project: the approach for sample collection, sample analysis, and QA/QC which will result in the required chemical data. The extent of analytical effort and data validation procedures to be required must be specified. Guidance for this requirement can be found in "Data Quality Objectives for Remedial Response Activities", EPA 540/G-87/003.

8. Contractor Project Organization and Functional Area Responsibilities (SECTION 4.0 in Table of Contents). The project organization for the prime contractor and any subcontractors shall be clearly defined with a discussion of quality control responsibilities. The prime contractor's Quality Assurance (QA) Officer shall report to a responsible senior officer of the company (i.e., QA management shall be separate from project management). A list of all individuals shall be provided and will include QC officers for the various components (those responsible for initiating and carrying out corrective actions and those involved in the data reporting sequence) and all analytical laboratory personnel (supervisors, chemists, and technicians). Resumes of all non-laboratory AE/Contractor personnel listing education and experience are

required, including personnel collecting samples. List the names of field personnel that will wear monitoring equipment. The name of the contract laboratory with a brief description of location, facilities and capabilities should be included.

9. Field Activities. Briefly summarize types of field activities required by the project.

10. List of Equipment, Containers, and Supplies to be taken to the Field (SECTION 5.1 in the Table of Contents). This section of the CDAP shall include all sample screening equipment to be used (brand, model, serial number) and a description of its calibration as well as sampling equipment, decontamination supplies and sample containers (specific numbers and types).

11. Sampling Locations (SECTION 5.2 in Table of Contents). This section of the CDAP shall provide the location of each sampling point on a site map. These locations shall be identified by the AE/Contractor after a visual inspection if they are not already specified in their Scope of Services or in the Specifications. In addition, at least one soil sample and one groundwater sample shall be collected in areas presenting the least potential for contamination and shall be used as background samples if this data has not been obtained in a previous phase. This section shall describe the rationale that governed the selection of sampling locations.

12. General Information and Definitions (SECTION 5.3 in Table of Contents). Some commonly used definitions are given below.

a. Contractor Laboratory. The laboratory performing analysis of the field samples. This may be an AE laboratory, a Remedial Action contractor laboratory or a laboratory subcontracted by either.

b. QA and QC Samples. Samples analyzed for the purpose of assessing the quality of the sampling effort and of the analytical data. QA and QC samples include splits or replicates of field samples, rinsate blanks, trip blanks, and background (up gradient) samples.

c. QC Samples. Quality Control samples are collected by the sampling team for use by the contractor's laboratory. The identity of these samples is held blind to the analysts and labboratory personnel until data are in deliverable form. The purpose of the sample is to provide site specific field originated checks that the data generated by the contractor's

analytical lab are of suitable quality. QC samples represent approximately 10% of the field samples.

d. QA Samples. Samples sent to a USACE QA laboratory by overnight delivery and analyzed to evaluate AE and contractor laboratory performance. QA samples represent approximately 10% of the field samples. The contractor shall coordinate with the designated QA laboratory not less than 48 hours before sampling to assure that the QA laboratory is alerted to receive the QA samples and process them within the time limits specified by applicable EPA regulations and guidelines.

e. Split Samples. Samples that are collected as a single sample, homogenized, divided into two or more equal parts, and placed into separate containers. The sample shall be split in the field prior to delivery to a laboratory. Ordinarily split samples are analyzed by two different laboratories.

f. Replicate (duplicate, triplicate, etc.) Samples. Multiple grab samples, collected separately, that equally represent a medium at a given time and location. This is the required type of collocated sample for volatile organic analyses and most groundwater and surface water samples.

g. Rinsate Blank. Samples consisting of reagent water collected from a final rinse of sampling equipment after the decontamination procedure has been performed. The purpose of rinsate blanks is to determine whether the sampling equipment is causing cross contamination of samples.

h. Trip Blank. Containers of organic-free reagent water that are kept with the field sample containers from the time they leave the laboratory until the time they are returned to the laboratory. The purpose of trip blanks is to determine whether samples are being contaminated during transit or sample collection. Trip blanks pertain only to volatile organic analyses; therefore, the containers must contain no headspace. Only one trip blank is needed for one day's sampling and shall satisfy trip blank requirements for all matrices for that day if the volatile samples are shipped in the same cooler.

13. Sampling and Preservation Procedures (SECTION 5.4 in Table of Contents). The CDAP shall include a table, which lists sampling locations, matrix (waste, soil, water, etc.), number of field samples, number of split or replicate samples, and number of rinsate or trip blank samples. Specific sampling, preservation, etc. details shall be included. All details

shall meet the requirements of one of the following: (a) EPA SW-846 method; (b) another EPA method; (c) ASTM method; (d) NIOSH method (for air sampling); or (e) another accepted published method. Container and preservation requirements shall meet the USACE Sample Handling Protocol (Appendix F to ER 1110-1-263). Each table entry shall include the reference, if any, from which the specifications were taken. Any modifications to the standard methods must be approved by the CO with the concurrence of the QA laboratory prior to their use. All methods should be referenced to the most recent edition of their source. If a standard method is not available, the AE/Contractor or subcontractors shall propose a nonstandard method with validation data for approval by the CO.

14. Details of Sampling and Preservation Procedures. The composition and volume of sample containers shall be specified along with a description of their preparation and cleaning. Sampling equipment directly contacting the sample shall be stainless steel or Teflon. The CDAP shall describe the cleaning of equipment and precautions for prevention of sample cross contamination during collection. Any field screening methods employed to select samples for analysis shall be discussed in detail. Compositing and homogenizing procedures shall be included. Sample containers, volumes, preservatives and holding times for the common analyses in low concentration are presented in Table D-1. A more detailed table is presented in the Sample Handling Protocol (Appendix F).

a. Soil Sampling Procedure. Using stainless steel or Teflon sampling equipment enough solid is removed from a specified depth to fill the required containers. The volatile organic samples should be removed first with as little mixing as possible. The remaining soil shall be placed in a clean stainless steel bowl and mixed thoroughly with stainless steel implements (spoons, spades, etc.), then divided among the sample containers to be filled and properly preserved. QC and/or QA sample containers shall be filled from the same mixture as one of the samples.

b. Groundwater Sampling Procedure. Valid, representative samples must be obtained. Before a sample is collected from a well, the water level shall be measured and recorded. Then the well shall be pumped or bailed with clean equipment to remove a quantity of water equal to at least three times the submerged volume of the casing and filter pack. If the well does not recharge fast enough to permit removing three casing volumes, the well shall be pumped or bailed dry, and sampled as soon as sufficient recharge has occurred. The field parameters of pH,

conductivity and temperature must be stable before sampling. Containers to be analyzed for volatiles should be filled first allowing no headspace and with as little disturbance of the water as possible. If preservative is added to the bottles prior to shipment to the field, care must be taken not to overfill the containers and pH must be measured on samples where a value is specified.

c. Other Matrices. Sampling methods and equipment used shall meet the requirements of EPA or NIOSH methods.

15. Field Documentation (SECTION 5.5 in Table of Contents). The system for identifying and tracking the samples shall be described, and shall include the recording of field data in permanently bound notebooks along with the method of relating the field data to the proper samples. All field documentation shall be done in indelible ink. Daily Quality Control Reports shall be prepared daily, dated, signed by the site manager, and sent to the CO. These reports shall include (with respect to chemistry) weather information at the time of sampling, samples taken with reference given to appropriate sections of the CDAP, field instrument measurements and calibrations. Any deviations from the CDAP shall be stated. All field documentation will become part of the project files.

16. Sample Chain of Custody and Transportation (SECTION 6.0 in Table of Contents). All sample labeling, packing, transportation and chain of custody procedures shall follow the USACE Sample Handling Protocol (Appendix F to ER 1110-1-263).

17. Laboratory Analytical Procedures (SECTION 7.0 in Table of Contents). Specific laboratory procedural details shall be included. Each method shall be specified exactly and in detail by one of the following: (a) reference to an EPA SW-846 method; (b) reference to another EPA method; (c) reference to an ASTM method; (d) reference to a NIOSH method (for air analysis); (e) reference to another accepted published method; (f) reference to an accepted published method with a description of any deviations from the published procedure; or (g) complete description of the procedure, e.g., copies of laboratory instructions. EPA SW-846 methods shall be used where possible. Generally, nonstandard methods are not allowed. In special cases that require the consideration of nonstandard methods, the contract laboratory shall be prepared to provide validation data. The use of proposed nonstandard methods requires prior approval of the CO. A list of sample preparation and analytical methods most frequently used is presented in Table D-2. A table shall be included which lists for each matrix

sample preparation method number, analytical method number, analytes and laboratory quantitation limits.

18. Preventive Maintenance. The instrument, including manufacturer, model, accessories, etc., shall be specified and preventive maintenance shall be described. Preventive maintenance shall be performed by qualified personnel. Records of repairs, adjustments and calibrations shall be maintained and available for inspection by the CO on request.

19. Instrument Calibration and Frequency. Description of the procedure used for calibration and frequency of checks is required for each instrument or method. These shall be consistent with the requirements of the contract and the analytical method.

20. Analytical Methods. Include the required concentration range and data on the sensitivity (detection limits), precision, and accuracy when this information is not included in the method. Indicate how preexisting data on sensitivity, precision, and accuracy were determined, and procedures to be used to validate the method. State source and purity of analytical reference materials and laboratory chemicals necessary to perform the analyses. Nominal detection limits for common analytes are given in Tables D-3 and D-5. DQO's for specific projects will affect the value of required detection limits and goals for precision, accuracy and completeness.

21. Method Specific Data Quality Objectives. Provide objectives for precision, accuracy, detection limits, and completeness. DQO's for accuracy and precision established for each measurement parameter will be based on prior knowledge of the specific measurement system used and method validation studies employing replicate analyses, spikes, standards, calibrations, recoveries, control charts and project specific requirements. Completeness refers to the amount of valid data obtainable (by the specific method in the laboratory used with the instrument to be employed) from a measurement system compared to the expected amount of data, and is usually expressed as a percentage.

22. Quality Control Checks. Quality control checks are necessary to evaluate performance reliability for each measurement parameter. Describe procedures to assess the precision, accuracy and completeness of the measurement. The numbers and types of internal laboratory QC checks and samples proposed (e.g., blanks, duplicates, splits, spikes, surrogates, and reference standards, as applicable) shall be defined

clearly. At a minimum these must be run at the rates prescribed in the individual methods. The laboratory's established practice for including control samples among the samples analyzed and any additional controls required by the present project shall be described. Describe the feedback systems used to identify problems by means of the results obtained from control samples. Limits of data acceptability shall be included. Results from laboratory internal quality control checks shall be reported with the analytical data. Standard forms should be used, preferably CLP or SW-846 recommended format.

23. Corrective Action. Plans for corrective actions to be taken when results appear unusual, questionable, or limits of acceptability are exceeded shall be included. When limits of acceptability are exceeded, information justifying the poor recovery or precision shall be documented. Describe how reestablishment of control is demonstrated.

24. Data Reduction, Validation, and Documentation. Equations, including units, required to calculate the concentration or value of the measured parameter, shall be included. Describe the data management systems which collect raw data, store data, and document quality control data. If statistical procedures are used for data review before reporting, include descriptions. Data validation procedures and organization shall be specified. Data validation shall be conducted as determined by the Data Quality Objectives.

25. CDQM Deliverables (SECTION 8.0 in Table of Contents). The contractor shall address the frequency and content of chemical data quality control reports that shall be submitted during the project.

a. Daily Quality Control Report (DQCR) during field activities.

b. Daily Quality Control Report from the contract laboratory if this is required in the specifications or Scope of Work.

c. Departure From Approved Plans. Include problems identified, corrective actions, and verbal/written instructions from USACE personnel for sampling or re-analysis. These reports of significant problems should be sent to the CO within 48 hours of the occurrence.

d. Data Report to the QA Laboratory. The contractor's data must be submitted to the designated quality assurance laboratory (for data validation and comparison purposes) as soon as it is available. This submittal should include all sample, blank and internal quality control results such as spike and surrogate recoveries and agreement between replicate analyses. Interim data reports may be requested if the project warrants. A complete data set should also be submitted to the executing FOA for evaluation. If the submission of raw data such as chromatograms is required, it should be specified in the approved CDAP.

e. Quality Control Summary Report (QCSR)/Final Investigation Report. Ordinarily these reports are completed within thirty days of the availability of results. The QCSR addresses quality control practices employed and summarizes the DQCR. For investigative activities the QCSR may be included in the Final Investigation Report.

f. Final Investigation Report. (For investigation projects).

TABLE D-1

SAMPLE CONTAINERS, PRESERVATION AND HOLDING TIMES

Matrix	Parameter[1]	Container[2]	Preservation[3]	Maximum Holding Times[4] Extraction	Analysis
Water	Volatiles	2 x 40 mL G, Septa vial	Ice to 4°C 4 drops con HCl or $NaHSO_4$ to pH < 2	-	14 d
Water	B/N/A	2 x 1 L amber G	Ice to 4°C	7 d	40 d
Water	PCBs, Pesticides	2 x 1 L amber G	Ice to 4°C	7 d	40 d
Water mo[5]	Metals[5]	1 x 1 L P	HNO_3 to pH<2	-	6
Water	TRPH	2 x 1 L amber G	Ice to 4°C HCl to pH<2	-	28 d
Water	Common anions[6]	1 x 1 L G	Ice to 4°C	-	28 d[6]
Water	Explosives	2 x 1 L amber G	Ice to 4°C	7 d	40 d
Water	Cyanide	1 x 1 L P	Ice to 4°C NaOH to pH > 12	-	14 d
Soils/ Sed.	Volatiles	2 x 40 mL or 2 x 125 mL G, Septa vial	Ice to 4°C	-	14 d
Soils/ Sed.	B/N/A, PCBs Pesticides	1 x 8 oz G	Ice to 4°C	14 d	40 d
Soils/ Sed.	Metals, Cyanid TRPH	1 x 8 oz G	Ice to 4°C	-	6mo[5] (TRPH: 28d)
Soils/ Sed.	Explosives	1 x 4 oz G	Ice to 4°C	14 d	40 d

TABLE D-1 (cont'd)

1. B/N/A = Base/Neutral/Acid extractable organics; TRPH = Total Recoverable Petroleum Hydrocarbons.

2. All containers must have Teflon-lined seals (Teflon-lined septa for VOA vials). G = Glass; P = High density polyethylene.

3. Sample preservation will be done in the field immediately upon sample collection. If preservative is added to the bottles prior to shipment, care must be taken not to overfill them and pH should be checked. If samples are filtered in the field, differential pressure methods and 45 micron filters will be used. (Preservative is added after filtration.) VOA samples must never be filtered.

4. When only one holding time is given, it implies total holding time from sampling until analysis.

5. Total Recoverable Metals for water samples. Holding time for Hg is 28 days; for Cr(VI) is 24 hours.

6. Cl^-, Br^-, F^-, NO_3^-, NO_2^-, PO_4^{3-}, SO_4^{2-}; 1 L for each method; orthophosphate requires filtration. Holding time for analysis is 48 hours for NO_2^-, NO_3^-, and PO_4^{3-} if not preserved with H_2SO_4 to pH < 2.

TABLE D-2
EPA METHODS FOR SAMPLE ANALYSIS

Part 1. General Information. All sample analyses of water or soils will be performed using standard EPA methods as listed below. All procedures specified must be followed exactly with no deviations unless modifications are specifically authorized by the government's QA laboratory. All method QC requirements will be followed explicitly. The running of QC duplicates and spike samples shall be in accordance with the laboratory QA/QC Plan as set forth in the LQMP, or at a minimum rate of 1 in 20 but at least 1 per batch. The detection limits stated in each method must be met by the AE laboratory. All samples must be extracted and analyzed within the specific holding times specified by each method. All analyses must be performed by the validated laboratory (in-house) and may not be subcontracted out to another laboratory. EPA-CLP methods may be substituted for analytical parameters included in the CLP Statements of Work.

Part 2. Methods for the Determination of Metals (RCRA and Priority Pollutants) by Atomic Absorption and Inductively Coupled Plasma

Metal	Technique[1]	Extraction and Analysis Method		
		Soil/Sed.	Groundwater[2]	Surface Water[2]
Antimony (Sb)	DA	CLP[4]/7040	3005/7040	204.1
	GF	CLP[4]/7041	3020/7041	204.2
	ICP	CLP[4]/6010	3005/6010	200.7
Arsenic (As)	GF	3050/7060	Inc[3]/7060	206.2
	H	Inc[3]/7061	Inc[3]/7061	206.3
Barium (Ba)	DA	3050/7080	3005/7080	208.1
	GF	3050/7081	3020/7081	208.2
	ICP	3050/6010	3005/6010	200.7
Beryllium (Be)	DA	3050/7090	3005/7090	210.1
	GF	3050/7091	3020/7091	210.2
	ICP	3050/6010	3005/6010	200.7
Cadmium (Cd)	DA	3050/7130	3005/7130	213.1
	GF	3050/7131	3020/7131	213.2
	ICP	3050/6010	3005/6010	200.7
Calcium (Ca)	DA	3050/7140	3005/7140	215.1
	GF	-	-	-
	ICP	3050/6010	3005/6010	200.7

Table D-2 (Cont'd)

Metal	Technique[1]	Extraction and Analysis Method		
		Soil/Sed.	Groundwater[2]	Surface Water[2]
Chromium (Cr)	DA	3050/7190	3005/7190	218.1
	GF	3050/7191	3020/7191	218.2
	ICP	3050/6010	3005/6010	200.7
Copper (Cu)	DA	3050/7210	3005/7210	220.1
	GF	3050/7211	3020/7211	220.2
	ICP	3050/6010	3005/6010	200.7
Iron (Fe)	DA	3050/7380	3005/7380	236.1
	GF	3050/7381	3020/7381	236.2
	ICP	3050/6010	3005/6010	200.7
Lead (Pb)	DA	3050/7420	3005/7420	239.1
	GF	3050/7421	3020/7421	239.2
	ICP	3050/6010	3005/6010	200.7
Manganese (Mn)	DA	3050/7460	3005/7460	243.1
	GF	3050/7461	3020/7461	243.2
	ICP	3050/6010	3005/6010	200.7
Mercury (Hg)	CV	Inc[3]/7471	Inc[3]/7470	245.1
Nickel (Ni)	DA	3050/7520	3005/7520	249.1
	GF	-	-	249.2
	ICP	3050/6010	3005/6010	200.7
Selenium (Se)	GF	3050/7740	Inc[3]/7740	270.2
	H	Inc[3]/7741	Inc[3]/7741	270.3
Silver (Ag)	DA	3050/7760	Inc[3]/7760	272.1
	GF	3050/7761	Inc[3]/7761	272.2
	ICP	3050/6010	3005/6010	200.7
Sodium (Na)	DA	3050/7770	3005/7770	273.1
	GF	-	-	273.2
	ICP	3050/6010	3005/6010	200.7
Thallium (Tl)	DA	3050/7840	3005/7840	279.1
	GF	3050/7841	3020/7841	279.2
	ICP	3050/6010	3005/6010	200.7
Zinc (Zn)	DA	3050/7950	3005/7950	289.1
	GF	3050/7951	3020/7951	289.2
	ICP	3050/6010	3005/6010	200.7

Table D-2 (Cont'd)

Part 2. Methods for the Determination of Metals (RCRA and Priority Pollutants) by Atomic Absorption and Inductively Coupled Plasma (continued)

NOTES:
1. Abbreviations: DA = Direct Aspiration; GF = Graphite Furnace; H = Hydride; CV = Cold Vapor; ICP = Inductively Coupled Plasma.

2. (a) Any water samples may be analyzed by the groundwater techniques. Groundwater samples must be analyzed by these techniques. Surface water and other water samples (drinking, silo, leachate, etc.) may be analyzed by the 200-series or the SW-846 series methods.

(b) Other extraction procedures may be appropriate instead of those listed. Methods 3010 (for flame and ICP) and 3020 (for graphite furnace) are used as extraction procedures for Total Metals and are used in TCLP methodology. Method 3040 is used to extract metals from oily wastes (greases, waxes, etc.).

(c) All 200 series methods are from EPA 600/4-79-020 (1983) "Methods for Chemical Analysis of Water and Wastes"; all other methods are from SW-846 (1986), "Test Methods for Evaluation of Solid Waste".

3. Method-specific extraction procedure is incorporated into method.

4. Follow CLP sample preparation procedures. Existing guidance in SW-846 is inadequate in this regard.

Table D-2 (Cont'd)

Part 3. Methods for the Determination of Non-Metallic Analytes

Organic Analytes	Technique[1]	Analytical Methods Soil/Sed	Groundwater[2]	Surface Water[2]
Halogenated Volatile Organics	GC	5030/8010	5030/8010[3]	601[3]
Non-Halogenated Volatile Organics	GC	5030/8015	5030/8015[3]	602[3]
Aromatic Volatile Organics	GC	5030/8020	5030/8020[3]	602[3]
Organochlorine Pesticides and PCBs	GC	3540/8080 3550/8080	3510/8080 3520/8080	608
Organophosphorus Pesticides	GC	3540/8140 3550/8140	3510/8140 3520/8140	
Chlorinated Herbicides	GC	Inc[4]/8150	Inc[4]/8150	509B[10]
Volatile Organics	GC/MS	Inc[4]/8240	Inc[4]/8240	624
Base/Neutral Semi-volatile Organics	GC/MS[5]	3540/8250 3550/8250 3540/8270 3550/8270	3510/8250 3520/8250 3510/8270 3520/8270	625
Acid Semivolatile Organics	GC/MS	3540/8250 3550/8250 3540/8270 3550/8270	3510/8250 3520/8250 3510/8270 3520/8270	625
Dioxins, etc.	GC/MS	Inc[4]/8280	Inc[4]/8280	613
Polynuclear Aromatic Hydrocarbons	HPLC	3540/8310 3550/8310	3510/8310 3520/8310	

Table D-2 (Cont'd)

Inorganic Analytes	Technique[1]	Analytical Methods: Soil/ Sediment	Ground-water[2]	Surface Water[2]
Total and Amenable Cyanide		9010 or 9012		335
Sulfide		9030	9030	376
Sulfate		9035, 9036, or 9038		375
Nitrate		9200	9200	353.
Chloride		9250, 9251, or 9252		325
Common Anions[6]	IC			300.0 429[10]
Total Organic Carbon			9060	415
Oil and Grease	IR	9071/413.2	413.2	413.2
TRPH[7]	IR	9071/418.1[7]	418.1	418.1
Ignitability		1010 or 1020		
Corrosivity		9045	9040/1110	9040/1110
Reactivity		(Section 7.3.3 and 7.3.4 of SW-846)		
EP Toxicity		1310[8]	1310[8]	
TCLP		1311[8,9]	1311[8,9]	
pH		9045	9040	
Gross alpha and beta		9310	9310	
Explosives		[11]	[11]	[11]

Table D-2 (Cont'd)

Part 3 continued:
NOTES:
1. Abbreviations: GC = Gas Chromatograph; GC/MS = Gas Chromatograph/Mass Spectroscopy; IC = Ion Chromatograph; IR = Infrared Spectroscopy; HPLC = High Pressure Liquid Chromatograph.

2. (a) All water samples may be analyzed by these techniques. Groundwater samples must be analyzed by these techniques. Surface water and other water samples (drinking, silo, leachate, etc.) may be analyzed by the 200-series or the SW-846 series methods. Soil or sediment preparation unless otherwise specified involves extration of a predetermined weight of the dried samples with a fixed anount (500 mL) of water.

(b) All 300-600 series methods are from EPA 600/4-79-020 (1983) "Methods for Chemical Analysis of Water and Wastes"; all other methods are from SW-846 (1986), "Test Methods for Evaluation of Solid Waste".

3. Direct injection may be used for high concentrations of contaminates in water. It is preferable to use Method 8240. If Method 8010, 8015, 8020, 601, or 602 is used, it is necessary to confirm results with a second GC column or a validation by GC/MS.

4. Method-specific extraction procedure is incorporated into method.

5. Either method may be used. Extract cleanup by Methods 3600 is usually also required.

6. Common anions are fluoride (F^-), chloride (Cl^-), bromide (Br^-), nitrite (NO_2^-), nitrate (NO_3^-), Orthophosphate (PO_4^{3-}), and sulfate (SO_4^{2-}).

7. Total Recoverable Petroleum Hydrocarbons. Follow extraction procedures 9071 through Step 7.11 and then dilute with Freon-113 to 100 mL.

8. Extraction procedure only. Analysis must follow.

9. Federal Register March 29, 1990. TCLP leachates are analyzed by one or more of the following methods. Scope must specify which analyses are to be performed on TCLP leachate extracts.

Table D-2 (Cont'd)

Metals: Methods 6010, 7060, 7470, and 7740
Pesticides: Method 8080
Herbicides: Method 8150
Volatile organics: Method 8240 (Zero headspace TCLP extraction required)
Semi-volatile organics: Method 8270

10. Standard Methods for the Examination of Water and Wastewater, 16th Edition, 1985.

11. USACE method developed by Cold Regions Research and Engineering Laboratory to be obtained from CEMRD.

Table D-3. Inorganic Analysis Nominal Values for Instrument Detection Limits[a].

Analyte:	User's Guide to CLP ug/L	SW-846 ICP ug/L	SW-846 AA-DA ug/L	SW-846 AA-GF ug/L
Aluminum, Al	200	45	100	-
Antimony, Sb	60	32	200[b]	3
Arsenic, As	10	53	2[b]	1
Barium, Ba	200	2	100	-
Beryllium, Be	5	0.3	5	0.2
Cadmium, Cd	5	4	5	0.1
Calcium, Ca	5000	10	10	-
Chromium, Cr	10	7	50	1
Cobalt, Co	50	7	50	1
Copper, Cu	25	6	20	-
Iron, Fe	100	7	30	-
Lead, Pb	5	42	100	1
Magnesium, Mg	5000	30	1	-
Manganese, Mn	15	2	10	-
Mercury, Hg	0.2	-	0.2[c]	-
Nickel, Ni	40	15	40	-
Potassium, K	5000	-	10[b]	-
Selenium, Se	5	75	2[b]	2
Silver, Ag	10	7	10	-
Sodium, Na	5000	29	2	-
Thallium, Tl	10	10	100	1
Vanadium, V	50	8	200	4
Zinc, Zn	20	2	5	-
Cyanide, CN^-	10	-	-	-

Important Note: These estimated instrument detection limits are to be used as a guide. The actual detection limits are matrix dependent and sample dependent. For ICP, each instrument must have an established analyte interference table as per Method 6010. See Method 6000 or 7000 for further guidance.

a. AA-DA = Atomic Absorption - Direct Aspiration
AA-GF = Atomic Absorption - Graphite Furnace

b. Gas hydride technique

c. Cold vapor technique

Table D-4. Volatile Organic Analysis Nominal Values for Practical Quantitation Limits

Analyte:	Ground Water ug/L	Low Soil Sediment ug/kg
Chloromethane	10	10
Bromomethane	10	10
Vinyl Chloride	10	10
Chloroethane	10	10
Methylene Chloride	5	5
Acetone	100	100
Carbon Disulfide	5	5
1, 1-Dichloroethene	5	5
1, 1-Dichloroethane	5	5
1, 2-Dichloroethene	5	5
Chloroform	5	5
1, 2-Dichloroethane	5	5
2-Butanone	100	100
1,1,1-Trichloroethane	5	5
Carbon Tetrachloride	5	5
Vinyl Acetate	50	50
Bromodichloromethane	5	5
1,2-Dichloropropane	5	5
cis-1,3-Dichloropropene	5	5
Trichloroethene	5	5
Dibromochloromethane	5	5
1,1,2-Trichloroethane	5	5
Benzene	5	5
trans-1,3-dichloropropene	5	5
Bromoform	5	5
2-Chloroethyl Vinyl Ether	10	10
4-Methyl-2-pentanone	50	50
2-Hexanone	50	50
Tetrachloroethene	5	5
Toluene	5	5
1,1,2,2-Tetrachloroethane	5	5
Chlorobenzene	5	5
Ethyl Benzene	5	5
Styrene	5	5
Xylenes (Total)	5	5

Table D-5. Semivolatile Organic Analysis Nominal Values for Practical Quantitation Limits

Analyte:	Ground Water ug/L	Low Soil Sediment ug/kg
Phenol	10	660
Bis (2-chloroethyl) ether	10	660
2-Chlorophenol	10	660
1,3-Dichlorobenzene	10	660
1,4-Dichlorobenzene	10	660
Benzyl alcohol	20	1300
1,2-Dichlorobenzene	10	660
2-Methylphenol	10	660
Bis (2-chloroisopropyl)ether	10	660
4-Methylphenol	10	660
N-Nitroso-di-n-dipropylamine	10	660
Hexachloroethane	10	660
Nitrobenzene	10	660
Isophorone	10	660
2-Nitrophenol	10	660
2,4-Dimethylphenol	10	660
Benzoic Acid	50	3300
Bis(2-chloroethoxy)methane	10	660
2,4-Dichlorophenol	10	660
1,2,4-Trichlorobenzene	10	660
Naphthalene	10	660
4-Chloroaniline	20	1300
Hexachlorobutadiene	10	660
4-Chloro-3-methylphenol	20	1300
2-Methylnaphthalene	10	660
Hexachlorocyclopentadiene	10	660
2,4,6-Trichlorophenol	10	660
2,4,5-Trichlorophenol	50	3300
2-Chloronaphthalene	10	660
2-Nitroaniline	50	3300
Dimethylphthalate	10	660
Acenaphthylene	10	660
2,6-Dinitrotoluene	10	660
3-Nitroaniline	50	3300
Acenaphthene	10	660
2,4-Dinitrophenol	50	3300
4-Nitrophenol	50	3300
Dibenzofuran	10	660
2,4-Dinitrotoluene	10	660
Diethylphthalate	10	660
4-Chlorophenyl phenyl ether	10	660
Fluorene	10	660
4-Nitroaniline	50	3300
4,6-Dinitro-2-methylphenol	50	3300

Table D-5. (Cont'd)

Analyte:	Ground Water ug/L	Low Soil Sediment ug/kg
N-Nitrosodiphenylamine	10	660
4-Bromophenyl phenyl ether	10	660
Hexachlorobenzene	10	600
Pentachlorophenol	50	3600
Phenanthrene	10	660
Anthracene	10	660
Di-n-butylphthalate	10	660
Fluoranthene	10	660
Pyrene	10	660
Butylbenzylphthalate	10	660
3,3'-Dichlorobenzidine	20	1300
Benzo(a)anthracene	10	660
Chrysene	10	660
Bis(2-ethylhexyl)phthalate	10	660
Di-n-octylphthalate	10	660
Benzo(b)fluoranthene	10	660
Benzo(k)fluoranthene	10	660
Benzo(a)pyrene	10	660
Indeno(1,2,3-cd)pyrene	10	660
Dibenzo(a,h)anthracene	10	660
Benzo(g,h,i)perylene	10	660

Table D-6. Pesticide/PCB Analysis Nominal Values for Practical Quantitation Limits

Analyte:	Ground Water ug/L	Low Soil Sediment ug/kg
Aldrin	0.04	2.7
alpha-BHC	0.03	2.0
beta-BHC	0.06	4.0
delta-BHC	0.09	6.0
gamma-BHC (Lindane)	0.04	2.7
Chlordane (technical)	0.14	9.4
4,4'-DDD	0.11	7.5
4,4'-DDE	0.04	2.7
4,4'-DDT	0.12	8.0
Dieldrin	0.02	1.3
Endosulfan I	0.14	9.4
Endosulfan II	0.04	2.7
Endosulfan sulfate	0.66	44.2
Endrin	0.06	4.0
Endrin aldehyde	0.23	15.4
Heptachlor	0.03	2.0
Heptachlor epoxide	0.83	55.6
Methoxychlor	1.76	117.9
Toxaphene	2.4	160.8
Aroclor-1016	0.5	80.0
Aroclor-1221	0.5	80.0
Aroclor-1232	0.5	80.0
Aroclor-1242	0.65	43.6
Aroclor-1248	0.5	80.0
Aroclor-1254	1.0	160.0
Aroclor-1260	1.0	160.0

APPENDIX E

USACE CHEMICAL QUALITY ASSURANCE

1. Purpose. This appendix defines the components of USACE HTW chemical quality assurance and delineates the responsibilities of those USACE elements which provide these services.

2. Applicability. The policies in this appendix apply to all HTW projects executed by USACE districts, divisions and other FOA and their contractors. Every project must be assigned a QA Laboratory. QA functions may not be contracted out directly by the FOA to commercial enterprises. Sample analysis may be performed by a commercial lab under direct contract to the USACE QA Laboratory.

3. Elements and Responsibilities of USACE Chemical Quality Assurance. CEMRD is appointed by HQUSACE to exercise the lead in Corps-wide chemical data quality management and maintain consistency in this effort for all HTW activities. The elements of chemical data quality management involved in quality assurance are document review, analysis of field quality assurance samples, generation of the Chemical Quality Assurance Report (CQAR), validation of commercial laboratories, and assignment of quality assurance responsibilities. The first three are responsibilities transferred to the assigned quality assurance laboratory for a given project. The latter two activities remain the responsibility of CEMRD.

4. Procedures. The following procedures are followed for each investigation and remedial activity involving chemical analysis.

a. The project manager/COR notifies CEMRD and the preferred QA Laboratory (CEMRD-ED-GL or the geographic USACE Division Laboratory) of the need for chemical quality assurance services. A suggested format is provided for this purpose. If a memorandum is preferred the same information should be included.

b. The proposed QA laboratory requests project specific assignment providing CEMRD with information on procedures which will be employed to discharge their responsibilities. The suggested format provided in this appendix or a memorandum which addresses the same information should be sent.

c. CEMRD confirms the assignment in writing to the project manager/COR and the Division Laboratory and monitors the chemical data quality management through oversight review of ER 1110-1-263

documents and review of the Chemical Quality Assurance Report. To facilitate this the quality assurance laboratory should send copies of their comments and of the CQAR to CEMRD as soon as these are available.

d. The quality assurance laboratory will either analyze the QA samples in-house or send them to a USACE validated commercial laboratory for analysis. Analysis in-house requires method and matrix-specific validation by CEMRD. Ongoing retention of validation requires periodic analysis of performance audit samples and laboratory site audits. Internal quality control specified in the methods--blanks, replicate analyses, spikes, surrogates, etc. must be included and reported in the analyses of the QA samples and results must be reported.

e. USACE quality assurance laboratories are required to maintain a Laboratory Quality Management Manual which is updated regularly. The manual should contain chronological resumes of all HTW chemistry personnel, a list of instruments and accessories with dates of purchase, and SOP's for the following activities:

(1) sample check-in, logging, and cooler packing procedure,

(2) in-house chain of custody,

(3) glassware cleaning,

(4) analytical procedures used in-house,

(5) data analysis and reporting,

(6) quality control procedures employed for each analytical method.

A copy of updated pages or the revised LQMM should be sent to CEMRD when these are generated.

f. The validation of commercial laboratories for nationwide USACE work is centralized at CEMRD. If a Division Quality Assurance Laboratory assists in this effort by sending an inspector to a commercial laboratory, CEMRD will be notified immediately by phone of general inspection results. A written report will be prepared by the inspector and sent to CEMRD within two weeks of the inspection date, and should not specify approval but rather make recommendations based on the inspection. The formats of the inspection checklist to be used and of the report will be provided to the inspector by CEMRD.

CEMRD will take into account all aspects of laboratory performance during evaluation and determine extent and length of validation, and make an approval recommendation to the requesting FOA.

5. Guidance on Field Quality Assurance Sample Rates. Quality Assurance Samples are duplicates and/or splits and field blanks which are sent to one of the USACE Division Laboratories to be analyzed and later compared in the CQAR with the contractor's results. Some attempt should be made to select contaminated samples for QA, as based on physical evidence such as appearance, odor, or field screening tests. Prior to determining the QA rates on a site, the following should be ascertained:

a. Number of Matrices - groundwater, surface water, soil, sediment, and waste are those most commonly encountered.

b. Whether dedicated sampling equipment will be used for each sampling event or decontamination in the field will be an issue.

c. Whether the QA splits or duplicates will be taken on the same sample as the contractor's QC or whether these will be staggered.

d. Whether the rinsates will be associated with samples which will be split for QA purposes (in most cases this would be advisable).

(1) In general samples which are taken for volatiles analyses are discrete collocated samples. Most groundwater and surface water samples also fall under this category. Soil and sediment samples which are taken for analytical methods other than volatiles should be thoroughly mixed in the field and then split for QC and/or QA purposes, with a portion going to the contractor as a regular sample.

(2) Trip blanks are relevant only when water samples are taken for volatile organics analysis. Ordinarily one trip blank is shipped in each cooler containing aqueous volatile samples. To reduce the number of trip blanks needed, it is recommended that all VOA samples be shipped in the same cooler. The trip blank is not to be opened at any time between its preparation and its analysis.

(3) The rinsates should be associated by sample number with the sample for which the equipment was decontaminated.

Rinsates taken for government quality assurance samples, should be taken just prior to the QA sample. If the sample is analyzed first, and is clean, the rinsate and trip blanks need not be analyzed. If dedicated sampling equipment is used for each sampling event, rinsate blanks are not required.

(4) The Scope of Services or the CDAP for the site should contain a Data Quality Objectives section which discusses in some detail the rationale for the rates of QA which are selected for the site. The following are proposed minimum rates for the USACE QA samples.

a. DERP Site Inspection Confirmation Studies (usually a sample set of 1 to 20 samples per matrix).

(1) Soil or sediment -- 1 duplicate/split to be analyzed for all site specific analytes. Under some circumstances such as suspected heavy contamination, a rinsate may be advisable. See Section 5.d.(3) above.

(2) Groundwater -- 1 duplicate, 1 rinsate analyzed for all groundwater parameters, 1 trip blank analyzed only for volatiles.

(3) Surface water -- 1 duplicate, 1 rinsate analyzed for all surface water parameters. If volatiles are included among the parameters, ship VOA vials with groundwater VOA's to avoid the necessity of an additional trip blank.

(4) A background soil sample with no attendant blanks to be analyzed for metals, total recoverable petroleum hydrocarbons, volatiles, BNAs and PCBs/Pesticides if these are site-specific analytes for soils.

b. RI/FS or Pre-Design CDQM.

(1) Include 5-10% duplicates/splits or at least one per matrix for both QC and QA. If there is a possibility of litigation, the higher rate should probably be selected.

(2) A background soil sample should be included and analyzed for metals, volatiles, BNA's, PCB's/Pesticides, and total recoverable petroleum hydrocarbons if these are site-specific soil analytes. Additional background samples may be specified depending upon the degree of confidence needed in establishing background levels.

(3) Rinsates at the rate of one per day for water samples.

(4) Include 1 trip blank per shipping cooler containing water samples to be analyzed for volatiles.

c. Construction and other activities. Special projects such as pilot plant treatability studies, kinetic studies, leachate tests, etc. undertaken in Design/Construction stages require separate consideration. The rates of quality assurance should be decided on a case-by-case basis by the project manager or COR in concurrence with CEMRD. Ordinarily they will be somewhat less than 10%.

6. The Chemical Quality Assurance Report. The CQAR is written by the USACE Quality Assurance Laboratory and sent to the project manager within 30 days of receipt of the contractor's data and completion of the quality assurance data. This report should address the following concerns:

a. Overall performance of the laboratory--commercial or USACE--that analyzed the site primary samples,

b. Detailed evaluation of the contractor's data--laboratory blanks, replicate analyses, agreement between duplicates/splits, acceptability of spike and surrogate recoveries,

c. Comparison of the quality assurance analytical results with those of the project laboratory,

d. Any other problems or issues encountered such as packing and shipment errors, chain of custody failures, etc.

Tables should be prepared which compare the results for duplicates, splits and blanks sent to both laboratories. The quality assurance data with internal quality control results should be appended.

7. In-House Work. When a USACE Division Laboratory is functioning as the primary laboratory on a project, special arrangements for quality assurance should be made. If the samples are contracted out by the division laboratory, and only the QA samples are analyzed in-house, the final report written by the division laboratory would have to be modified to accommodate this arrangement. If the division laboratory is analyzing all of the project samples or a method subset of the samples in-house, ordinarily a second USACE Division Laboratory should be selected as the quality assurance laboratory for the project.

8. When the following procedures, performed by the designated USACE QA laboratory, demonstrate that contract requirements are not being met, resampling and/or reanalysis may be required by the COR at the expense of the contractor.

a. Inspection of QA samples to insure that sampling procedures correspond to the CDAP with regard to containers, preservation, labeling, packing, chain of custody, etc.

b. Analyses of QA samples,

c. Evaluation of contractor analytical deliverables specified in the CDAP,

d. Comparison of analytical results obtained by contract laboratory and USACE QA laboratory from split or duplicate samples.

(SAMPLE FORMAT)

TO: CEMRD-ED-GC FROM:_____ DATE:__/__/__

SUBJECT: **Request for USACE Project Specific Chemical Quality Assurance Assignment** (To be filled out by the Quality Assurance Laboratory)

Project Name:_____ Contract No.:_____

Superfund ___ FUDS ___ IRP ___ Other ___ Phase _____
Location:_____ State:_____

A-E/Contractor:_____ State:_____
USACE Project Manager:_____
Phone:_____ Address:_____

Approximate Sampling Dates:_____

Document to be reviewed: _____
_____
_____
_____

Reviewer: _____

QUALITY ASSURANCE SAMPLES:

MATRIX	METHOD	NO. OF SAMPLES	ANALYTICAL LABORATORY*	ESTIMATED COST‡

* Name of USACE validated laboratory to be used or designated "in-house" analyses.
‡ Include cost of review, sample checks, etc.

(SAMPLE FORMAT)

TO:_____ FROM:_____ DATE:__/__/

SUBJECT: Request for Government Quality Assurance Services (To be sent to the requested USACE Laboratory with a copy to CEMRD-ED-GC)

Project Name:_____ Contract No.:_____

Superfund ___ FUDS ___ IRP ___ Other ___ Phase _____
Location:_____ State:_____

A-E/Contractor:_____ State:_____
USACE Project Manager:_____
Phone:_____ Address:_____

Laboratory Name:_____
Address:_____
Phone:_____
POC:_____

Approximate Sampling Dates:_____

The following QA Laboratory support is requested for the subject project: USACE Division Laboratory:_____

____ Review and comment on Draft _____
_____
_____
_____

____ Analysis and Reports of Quality Assurance Samples

METHOD	NO. OF WATER SAMPLES*	NO. OF SOIL/SEDIMENT SAMPLES‡

* Includes Blanks

‡ Includes Background Soil Sample

CF: CEMRD-ED-GC

APPENDIX F

SAMPLE HANDLING PROTOCOL FOR LOW, MEDIUM AND HIGH CONCENTRATION SAMPLES OF HAZARDOUS WASTE

1. Purpose. This protocol provides guidance on sample volumes, containers, packing, and shipping for low, medium, and high concentration environmental samples taken for chemical analysis.

2. Applicability. The guidance in this appendix applies to all samples taken by USACE for HTW chemical analysis. The requirements are consistent with those of the Environmental Protection Agency and all standard chemical methods generally used are included.

3. Low Concentration Samples. Low level samples are considered to be those collected off-site, around the perimeter of a waste site, or in areas where hazards are thought to be significantly reduced by normal environmental processes.

a. Waters.

(1) Organics.

(a) Bottle and Preservative Requirements.

- Four 1-liter amber glass bottles (Teflon-lined caps), iced to 4°C (may not be held at site over 24 hours). Remember: Leave some headspace!
- Two 40 mL glass VOA vials (with Teflon septa), iced to 4°C (may not be held at site over 24 hours). Fill completely! All air bubbles must be excluded. Add HCl (4 drops of concentrated HCl) or $NaHSO_4$ to pH < 2.
- The samples above are needed when Method 8240 is used to analyze for volatile (or purgeable) organics, when Methods 8250 or 8270 are used to analyze for Base/Neutral/Acid (B/N/A) extractable organics, and when Method 8080 is used to analyze for pesticides and PCB's. Two of the 1-L bottles are needed for 8250 or 8270 and two for 8080.

- o Oil and Grease, Total Organic Carbon (TOC) or TRPH. For each analyte, two 1-liter glass bottle (Teflon-lined cap), 5 mL 1:1 HCl (to pH < 2), and 4 °C. Leave headspace.

(b) Paperwork/Labels.

- o (ENG Form 5021-R) Chain of Custody Record. See attached example. It is important to note that only one site may be listed per form even if the sites have the same project number. Top original goes with the samples; a copy should be saved for the sampler's files.

- o Receipt for Samples. See attached example. This form complies with the requirements that the owner, operator, or agent-in-charge is legally entitled to: (1) a receipt describing the samples obtained from the site and; (2) a portion of each sample equal in weight or volume to the portion retained, if requested. The original form is retained for the Project Coordinator and a copy is given to the owner, operator, or agent-in-charge.

- o Sample Labels/Tags. See attached example. You must label the sample with a date, time of collection, site name, and brief description on a label that will not float/soak off - no masking tape, please. Use only indelible ink on all labels. Numbered sample labels should be used on all samples. Some projects may also require the use of sample tags in addition to labels.

(c) Packaging and Shipping.

- o Waterproof metal (or equivalent strength plastic) ice chests or coolers only.

- o After filling out the pertinent information on the sample label and tag, put the sample in the bottle or vial and screw on the lid. For bottles other than VOA vials, secure the lid with strapping tape. (Tape on VOA vials may cause contamination.) Then, secure the string from the numbered approved tag around the lid.

- o Mark volume level on bottle with grease pencil.

- Place about 3 inches of inert cushioning material such as vermiculite in the bottom of the cooler.

- Enclose the bottles in clear plastic bags through which sample tags and labels are visible, and seal the bag. Place bottles upright in the cooler in such a way that they do not touch and will not touch during shipment.

- Put in additional inert packing material to partially cover sample bottles (more than halfway). Place bags of ice around, among, and on top of the sample bottles. If chemical ice is used, it should be placed in a plastic bag.

- Fill cooler with cushioning material.

- Put paperwork (chain of custody record) in a waterproof plastic bag and tape it with masking tape to the inside lid of the cooler.

- Tape the drain shut.

- Secure lid by taping. Wrap the cooler completely with strapping tape at a minimum of two locations. Do not cover any labels.

- Attach completed shipping label to top of the cooler.

- Put "This Side Up" labels on all four sides and "Fragile" labels on at least two sides.

- Affix numbered and signed custody seals on front right and back left of cooler. Cover seals with wide, clear tape.

Remember that each cooler cannot exceed the weight limit set by the shipper.

(2) Inorganics.

(a) Bottle and Preservative Requirements.

- Metals. One 1-liter high density polyethylene bottle (Teflon-lined cap), adjust to pH < 2 with 1:1 HNO_3 (usually 3 mL).

- o Cyanides. One 1-liter high density polyethylene bottle (Telfon-lined cap), adjust to pH > 12 with NaOH (usually 2 mL of 10N NaOH or 4 pellets), and 4°C.

- o Sulfide. One 1-liter high density polyethylene bottle (Teflon-lined cap), 4 mL 2.0 N zinc acetate and adjust pH > 9 with NaOH, and 4°C.

- o Fluoride. One 1-liter high density polyethylene bottle (Teflon-lined cap), no preservative, and 4°C.

- o pH. No preservative. Must be measured twice immediately in field. Do not ship.

- o Ammonia, Total Kjeldahl Nitrogen, Nitrate/Nitrite. For each analyte, one 1-liter high density polyethylene bottle (Telfon-lined cap), adjust to pH < 2 with H_2SO_4 (usually 4 mL 1:1 H_2SO_4), and 4°C.

(b) Paperwork/Labels.

- o Inorganic Paperwork is the same as described for organics (see Section 3.a.(1).(b). above) and includes the Chain of Custody Record, Receipt for Samples, and Labels/Sample Tags. See previous examples and explanations.

(c) Packaging and Shipment.

- o Follow packaging and shipping requirements listed for organics (see Section 3.a.(1).(c). above). "Fragile" labels are optional for coolers not containing glass bottles. In cases where ice is not required (metals), fill cooler with only packing material. Once again, remember that the cooler must not exceed the shipper's weight limit.

b. Soils/Sediments (Organics and Inorganics).

(1) Bottle and Preservative Requirements.

- o Two 8-ounce glass wide mouth jars at least 3/4 full (Teflon-lined caps), iced to 4°C - one jar for organics (non-VOA) and one jar for inorganics. For analysis of volatiles in soil, two 40 mL VOA vials or two 125 mL jars with Teflon septa are used. These shoudl be completely filled and iced to 4°C.

(2) Paperwork/Labels.

- Follow paperwork requirements listed for water samples in Section 3.a.(1).(b). above. See attached examples of forms.

(3) Packaging and Shipping.

- Follow packaging and shipping requirements in Section 3.a.(1).(c). above. Be sure that the shipping cooler does not exceed the shipper's weight limits.

4. Medium Concentration Samples. Medium level samples are most often those collected on-site, in areas of moderate dilution by normal environmental processes.

a. Water/Liquids (Organics and Inorganics).

Note: Samples are not known to contain highly toxic compounds.

(1) Bottle and Preservative Requirements.

- Four 32-ounce wide mouth glass jars (Teflon-lined caps), no preservatives, and iced to 4°C for B/N/A extractable organics and PCB/Pesticides (two jars for each method). Remember: Leave some headspace.

- Two 40 mL glass VOA vials (Teflon septa), Iced to 4°C. Fill completely. No headspace.

- Two 16-ounce wide mouth glass jars nearly full (Teflon-lined caps) one for metals and one for cyanides. (Preserved as for low level. See Section 3.a.(2).(a).)

(2) Paperwork/Labels.

- See previous examples. Follow paperwork requirements in Section 3.a.(1).(b). for low concentration samples.

(3) Packaging and Shipping

- Secure sample jar lids with strapping tape or evidence tape. At the same time secure string from USEPA numbered tag around lid.

- Mark volume level of bottle with grease pencil.
- Position jar in Ziploc bag so that tags may be read.
- Place about 1/2 inch of cushioning material in the bottom of metal can.
- Place jar in can and fill remaining volume of can with cushioning material.
- Close the can using three clips to secure lid.
- Write sample number on can lid. Indicate "This Side Up" by drawing an arrow and place "Flammable Liquid N.O.S." label on can. Personnel who ship samples must be sure to comply with DOT shipping regulations and not knowingly over-classify a sample prior to shipment. If the person shipping a sample knows that the sample is not a "Flammable Liquid" (i.e., a water phase sample or a soil sample), he should not classify it as "Flammable Liquid."
- Place about 1 inch of packing material in bottom of cooler.
- Place cans in cooler and fill remaining volume of of cooler with packing material. Add ice bags if required.
- Put paperwork in plastic bags and tape with masking tape to inside lid of cooler.
- Tape drain shut.
- After acceptance by shipper, tape cooler completely around with strapping tape at two locations. Secure lid by taping. Do not cover any labels.
- Place lab address on top of cooler.

Note: Write "Flammable Liquid N.O.S." on side of cooler if this is not marked on the margin of your DOT label.

- For all medium and high concentration shipments, complete shipper's hazardous material certification form.

- Put "This Side Up" labels on all four sides sides, "Flammable Liquid N.O.S." and "Danger-Peligro" on all sides.

Note: "Danger-Peligro" labels should be used only when net quantity of samples in cooler exceeds 1 quart (32 ounces) for liquids or 25 pounds for solids. In other words, for our purposes "Danger-Peligro" labels will never be used for Flammable Solids N.O.S.

- Affix number custody seals on front right and back left of cooler. Cover seals with wide, clear tape.

b. Soils/Sediments/Solids (Organics and Inorganics).

(1) Bottles and Preservatives Requirements.

- For analysis of volatiles, two 40 mL VOA vials or two 125 mL jars with Teflon septa are used. These should be completely filled and iced to 4 ^{o}C.

- Two 8-ounce wide mouth glass jars, 3/4 full (Teflon-lined caps), no preservatives, one jar for organics (non-VOA) and one jar for inorganics (metals and cyanide) or

- Four 4-ounce wide mouth glass jars each 3/4 full (Teflon-lined caps), no preservative; two jars for organics (non-VOA) and two jars for inorganics.

(2) Paperwork/Labels.

- See previous examples. Follow paperwork requirements listed in Section 3.a.(1).(b). for low concentration samples.

(3) Packaging and Shipping.

- Follow packaging and shipping requirements listed in Section 3.a.(1).(c). for medium concentration water/liquids above substituting "Flammable Liquid N.O.S." with "Flammable Solid N.O.S."

5. High Concentration Samples (Hazardous: Determined Not to be D.O.T.-Defined Poison A). High concentration samples include those from drums, surface impoundments, direct discharges, and chemical spills, where there is little or no evidence of environmental dilution. High concentration (or high

hazard) samples are suspected to contain greater than 15% concentration of any individual chemical substituent.

a. Liquids (Organics and Inorganics).

(1) Bottle and Preservative Requirements.

- o One 8-ounce wide mouth glass jar filled 1/2 to 3/4 full (Teflon-lined cap). No preservative.

(2) Paperwork/Labels.

(a) See previous examples. Follow paperwork requirements listed in Section 3.a.(1).(b). above.

(b) Shipper may require special forms to be completed before shipment of high hazard concentration samples.

(3) Packaging and Shipping.

- o Follow packaging and shipping requirements listed in Section 3.a.(1).(c). above for medium concentration water/liquids.

b. Soils/Sediments/Solids (Organics and Inorganics).

(1) Bottle and Preservative Requirements.

- o One 8-ounce wide-mouth glass jar filled 1/2 to 3/4 full (Teflon-lined cap)., No preservative.

(2) Paperwork/Labels.

- o See attached examples. Follow paperwork requirements in Section 3.a.(1).(b). above.

(3) Packaging and Shipping.

- o Follow packaging and shipping requirements listed in Section 3.a.(1).(c). for medium concentration water/liquids, substituting "Flammable Liquid N.O.S." with "Flammable Solid N.O.S."

TABLE F-1

SAMPLE CONTAINERS, PRESERVATIVES, AND HOLDING TIMES

Low Concentration Samples

Matrix	Parameter[1]	Container[2]	Preservation[3]	Maximum Holding Times: Extraction[4]	Maximum Holding Times: Analysis
Water	Volatiles	2 x 40 mL[8] G, Septa vial	Ice to 4°C 4 drops con HCl or $NaHSO_4$ to pH<2	-	14 d
Water	B/N/A	2 x 1 L[5,8] amber G	Ice to 4°C	7 d	40 d
Water	PCBs, Pesticides	2 x 1 L[5,8] amber G	Ice to 4°C	7 d	40 d
Water	Metals[6]	1 x 1 L P	HNO_3 to pH<2	-	6 mo[6]
Water	TRPH	2 x 1 L G	Ice to 4°C HCl to pH<2	-	28 d
Water	Common anions[7]	1 x 1 L[7] G	Ice to 4°C	-	28 d[7]
Water	Explosives	2 x 1 L G (amber)	Ice to 4°C	7 d	40 d
Water	Cyanide	1 x 1 L P	NaOH to pH>12 Ice to 4°C	-	14 d
Soils/ Sed.	Volatiles	2 x 40 ml G or 2 x 125 mL G, Septa vial	Ice to 4°C	-	14 d
Soils/ Sed.	B/N/A, PCBs, Pesticides	1 x 8 oz G	Ice to 4°C	14 d	40 d
Soils/ Sed.	Metals, Cyanide, TRPH	1 x 8 oz G	Ice to 4°C (Cyanide & TRPH)	-	6 mo[6] (TRPH: 28d)
Soils/ Sed.	Explosives	1 x 4 oz G	Ice to 4°C	14 d	40 d

TABLE F-2

SAMPLE CONTAINERS AND PRESERVATIVES[9]

Medium Concentration Samples

Matrix	Parameter[1]	Container[2]	Preservation[3]
Water/Liquid	Volatiles	2 x 40 mL G, Septa vial	Ice to 4°C[8]
Water/Liquid	B/N/A[5]	2 x 32 oz wide mouth jars, G	Ice to 4°C[8]
Water/Liquid	PCBs[5], Pesticides	2 x 32 oz wide mouth jars, G	Ice to 4°C[8]
Water/Liquid	Metals	1 x 16 oz wide mouth jar, G	HNO_3 to pH<2
Water/Liquid	Cyanide	1 x 16 oz wide mouth jar, G	Ice to 4°C
Water/Liquid	Explosives	2 x 1 L G (Amber)	Ice to 4°C
Soils/ Sediments	Volatiles	2 x 40 ml G or 2 x 125 mL G	Ice to 4°C
Soils/ Sediments	B/N/A, PCBs, Pesticides	1 x 8 oz wide mouth jar, G	---
Soils/ Sediments	Metals, Cyanide, TRPH	1 x 8 oz wide mouth jar, G	Ice to 4°C (Cyanide & TRPH)
Soils/ Sediments	Explosives	1 x 4 oz wide mouth jar, G	Ice to 4°C

High Concentration Samples

Matrix	Parameter[1]	Container[2]	Preservation
Liquid	All organic and inorganic analyses	1 x 8 oz wide mouth jar, G	---
Solid	All organic and inorganic analyses	1 x 8 oz wide mouth jar, G	---

1. B/N/A = Base/Neutral/Acid extractables; TRPH = Total Recoverable Petroleum Hydrocarbons

2. All containers must have Teflon-lined seals (Teflon-lined septa for VOA vials). G = Glass; P = High density polyethylene.

3. Sample preservation will be done in the field immediately upon sample collection. If water samples are filtered in the field, differential pressure methods using 45 micron filters will be used, and preservative added after filtration. VOA samples should never be filtered.

4. When only one holding time is given, it implies total holding time from sampling until analysis.

5. Three bottles are required on at least 5-10% (but at least one) sample so that laboratory can perform all method QC checks for SW-846 method.

6. Total Recoverable Metals for water samples. Holding time for Hg is 28 days in glass; for Cr(VI) is 24 hours.

7. Cl^-, Br^-, F^-, NO_3^-, NO_2^-, PO_4^{3-}, SO_4^{2-}; 1 L for each method; orthophosphate requires filtration. Holding time for extraction is 48 hours for NO_2^-, NO_3^-, and PO_4^{3-} if not preserved with H_2SO_4 to pH < 2.

8. Samples with residual chlorine present will be dechlorinated with sodium thiosulfate as specified in SW-846 (Third edition).

9. Holding times for medium concentration samples are the same as those specified for low concentration samples.

S. Army Corps of Engineers

Chain of Custody Record

(ER 1110-1-263)

oj. No.	Project Name																
mpler : *(Signature)*																	
e	Time	Pres.	Grab	Comp	Site Code/Sample Number	Number of Containers										Remarks:	

FOR ILLUSTRATION PURPOSES ONLY
(Local reproduction authorized - blank masters available from local FMO)

ampler inquished by:	Date/Time	Received by: (Sig.)	Date/Time	Hazards Associated with Samples
nquished by: (Sig.)	Date/Time	Received by: (Sig.)	Date/Time	
inquished by: (Sig)	Date/Time	Received for Laboratory by: (Sig.)	Date/Time	Remarks at time of receipt:
tody Seal No.		Lab case No.:		

Form 5021-R, Oct 90

Proponent: CEMP-RT

ER 1110-1-263
1 Oct 90

SAMPLE

U.S. Army Corps of Engineers — Chain of Custody Record

(ER 1110-1-263)

Proj. No. 017 | Project Name: ANY ARMY AMMUNITION PLANT

Sampler: (Signature) Marcia C Davis

Date 90	Time	Pres.	Grab	Comp	Site Code/Sample Number	Number of Containers	Volatile Organics	B/N/A	Total Metals	TRPH	Explosives			Remarks
9/4	0930	4°C	X		AAAP-SB01-0001	2	X							Strong hydrocarbon odor
9/4	0935	4°C	X		AAAP-SB01-0001	1		X	X		X			" " "
9/4	0937	4°C	X		AAAP-SB01-0001	1				X				" " "
9/4	1035	pH<2 HNCL 4°C	X		AAAP-MW02-0001	2	X							No visual turbidity
9/4	1036	4°C	X		AAAP-MW02-0001	2		X						" " "
9/4	1040	pH<2 HNO3 4°C	X		AAAP-MW02-0001	1			X					" " "
9/4	1050	pH<2 HCL 4°C	X		AAAP-MW02-0001	2				X				" " "
9/4	1055	4°C	X		AAAP-MW02-0001	1					X			" " "

Sample Relinquished by: Marcia C Davis	Date/Time 9/4 1400	Received by: (Sig.)	Date/Time	Hazards Associated with Samples: NONE
Relinquished by: (Sig.)	Date/Time	Received by: (Sig.)	Date/Time	
Relinquished by: (Sig)	Date/Time	Received for Laboratory by: (Sig.)	Date/Time	Remarks at time of receipt:
Custody Seal No. 1535		Lab case No.:		

ENG Form 5021-R, Oct 90

Proponent: CEMP-RT

SAMPLE LABELS

SITE NAME	DATE
ANALYSIS	TIME
	PRESERVATIVE

LOT # 9062023

SPECIALTY CLEANED CONTAINER

SITE NAME	DATE
Atlas Missile Site	6/1/89
ANALYSIS	TIME
Total Metals	1200
Sampler KC	PRESERVATIVE HNO3

LOT # 9062023

SPECIALTY CLEANED CONTAINER

SAMPLE TAGS

Designate: Grab / Comp.
Time
Month Day Year
Station No.
Proj. Code
Samplers (Signatures)
Station Location

Preservative: Yes ☐ or No ☐

ANALYSES

BOD Anions Solids (TSS) (TDS) (SS)	
COD, TOC, Nutrients	
Phenolics	
Mercury	
Metals	
Cyanide	
Oil and Grease	
Organics GC/MS	
Priority Pollutants	
Volatile Organics	
Pesticides	
Mutagenicity	
Bacteriology	

Remarks:

Tag No. | Lab Sample No.

Designate: Grab ✓ / Comp.
Time: 1007
Month/Day/Year: 5-28-93
Station No.: HW 26 SS-11(6)
Project Code: WES 310.001 21.5M10.0
Samplers (Signatures): Jane Doe
Station Location: Monitoring Well #26 Split Spoon # 11

Preservative: Yes ☐ No ☑

ANALYSES

BOD Anions Solids (TSS) (TDS) (SS)	
COD, TOC, Nutrients	
Phenolics	
Mercury	
Metals	
Cyanide	
Oil and Grease	
Organics GC/MS	X
Priority Pollutants	X
Volatile Organics	X
Pesticides	X
Mutagenicity	
Bacteriology	

Remarks: case 1746
ITR # HE0637
Bottle Lot # 63292

Tag No.: H0502 | Lab Sample No.:

APPENDIX G

GLOSSARY

1. **Chemical Contamination Activities** - All activities related to the cleanup of chemical contamination at a site including investigation and remedial activities. This definition includes activities defined by EPA as "removal activities" and "remedial activities".

2. **Chemical Data Acquisition Plan (CDAP)** - A submittal document which describes the site specific implementation of CDQM requirements. For investigation and design contracts, CDQM guidance and requirements for CDAP preparation and implementation are found in the Scope of Services. For construction contracts, these requirements are found in the contract technical specifications in language which is clearly biddable and enforceable. The CDAP shall include detailed plans for sampling, analysis, and chemical QC activities. A guide for preparation of the CDAP is found in Appendix D. A CDAP is required for both in-house and contracted work. The EPA equivalent is called a Quality Assurance Project Plan (QAPjP) and may be substituted for the CDAP.

3. **Chemical Data Quality Management (CDQM)** - The combination of activities establishing a government quality assurance (QA) program and specifying quality control (QC) operations for the AE, construction contractor, or USACE District. CDQM includes the maintenance of field and laboratory practices/checks which insure that Data Quality Objectives (DQO) are met.

4. **Chemical Data Management Specifications** - Construction Contract technical specifications prepared during design which describe all construction contractor sampling, sample handling and custody, documentation, analytical procedures, and data reporting. The specifications outline contractor QC responsibilities and the requirements of the Chemical Data Acquisition Plan for construction. Appropriate chemical concerns should be addressed at each design submittal phase.

5. **Chemical Quality Assurance (QA)** - The government activities required to assure desired and verifiable levels of quality in chemical data for a specific project. Chemical Quality Assurance activities are defined in Appendix E.

6. Chemical Quality Assurance Report (CQAR) - Prepared by the designated QA laboratory; approved by the investigation/design/construction division; and normally ready for distribution within 30 days of receipt of the AE/contractor analytical data. The report will include an overall evaluation of the contractor's/AE's data and quality assurance data, a comparison of the contractor's and government results, problems in accomplishing the CDAP, and lessons learned. The CQAR shall be prepared in accordance with the guidance found in Appendix E.

7. Chemical Quality Control (QC) - Specific activities for insuring that data of the required quality will be obtained for a specific project by the AE, construction contractor, or government (for in-house chemical analyses). Normally this consists of the analysis of field blanks, duplicate samples and the inclusion of laboratory internal quality control procedures as required by the methods or otherwise specified.

8. Construction District - The district assigned the responsibility to administer the construction contract.

9. Construction Division - The geographic USACE division in which the Construction District is located.

10. Contract Laboratory - The laboratory retained by a USACE AE/contractor or QA laboratory to perform chemical analyses of field samples. These laboratories are evaluated in accordance with the procedures in Appendix C, and must be validated by CEMRD prior to performing chemical analyses for HTW projects.

11. Daily Quality Control Report (DQCR) - A daily report prepared by an AE in accordance with the Scope of Services or by a construction contractor per contract specifications and submitted to the Contracting Officer (CO) during chemical contamination investigation and remedial activities. Copies are sent by the COR to the QA laboratory whenever sampling and analytical activities are involved. The DQCR shall contain at a minimum the following with respect to chemistry:

(a) Work performed. Sections in the CDAP that specify the sampling procedure and the analytical procedure shall be referenced. Weather information at the time of sampling shall be included. Information concerning all field samples, sample shipping, and field instrument measurements and calibration shall be included.

(b) Departures from the approved sampling plan. Include problems identified, corrective actions, and verbal/written instructions from USACE personnel. These shall be reported to the contracting officer (CO) in writing within two working days.

12. Data Quality Objectives (DQO) - DQOs are qualitative and quantitative statements specifying the level and extent of chemical data required to support decisions during remedial activities. They are determined based on the end uses of the data to be collected. DQOs are established prior to data collection and are not considered a separate deliverable. Rather, the DQO development process is integrated with the project planning process and the results are incorporated into Scopes of Work and Work Plans for the site. The levels and responsibility for data validations should be determined with the DQOs.

13. Design Analysis Reports - Documents prepared during design to support the Plans and Specifications. Technical Design Analysis Reports should have a section or chapter dedicated to design chemical evaluations and to the level of sampling, analysis, and CDQM required to support and document construction.

14. Design District - The USACE district assigned the responsibility for coordinating, reviewing, and completing design documents, including plans and specifications for HTW site design activities either in-house or through contracted services. Other Design District responsibilities include procuring AE services and construction contracts when work is not done in-house.

15. Design Division - The USACE Division overseeing the Design District.

16. HQUSACE (CEMP-R) - Headquarters office responsible for CDQM requirements and other supporting issues related to the proper implementation and execution of all phases of HTW program activities under USACE management.

17. Internal Quality Control - Measures which a laboratory implements to ensure data reliability. These include the analysis of blanks of various types, replicate sample or extract analysis, lab duplicates, blind standards, matrix spikes, matrix spike duplicates, surrogate compound analysis, calibrations, generation of control charts, etc. Minimal requirements are

usually specified in the analytical methods. Internal quality control needs and requirements should be determined as a part of the Data Quality Objectives. All internal quality control results should be reported with the sample results.

18. Investigation District - The USACE district assigned the responsibility for coordinating, reviewing, and completing an HTW site investigation activity either in-house or through contracted services.

19. Investigation Division - The USACE Division overseeing the Investigation District.

20. Laboratory Validation - An ongoing assessment of laboratory capabilities, including evaluation of personnel, equipment, QA/QC procedures, results from performance evaluation samples and an on-site laboratory inspection.

21. Matrix is the environmental medium which is sampled; e.g. groundwater, surface water, soil, sediment, waste, etc.

22. Quality Assurance - Measures taken by USACE to oversee the work of contractors.

23. QA Laboratory - The validated USACE Division Laboratory performing or coordinating CDQM activities for a project. These activities ordinarily include: document review, inspection and analysis of quality assurance samples, technical assistance to project managers and preparation of the Chemical Quality Assurance Reports. A given Division Laboratory may not have capability for in house performance of all these activities. The QA laboratory is assigned on a project specific basis by CEMRD. QA functions may not be contracted out directly by the FOA to commercial enterprises. QA sample analysis may be performed under contract to the USACE QA laboratory.

24. Quality Assurance and Quality Control Samples. Samples analyzed for the purpose of assessing the quality of the sampling effort and of the analytical data. QA and QC samples include splits or replicates of field samples, rinsate blanks, trip blanks, and background (up gradient) samples. The purpose of the sample is to provide site specific field originated checks that the data generated by the contractor's analytical lab are of suitable quality.

25. Quality Control - Measures taken by contractors and to verify the reliability of their own work and to oversee subcontractors.

26. Quality Control Summary Report (QCSR) - A report submitted by the AE/construction contractor at the conclusion of a chemical contamination remedial activity. For an investigation activity, the QCSR may be included in the Investigation Report. The QCSR should include the following.

(a) An outline of QC practices employed by the AE/construction contractor, including any problems and corrective actions taken;

(b) A consolidation and summary of the DQCR, as prescribed in the contract.

27. Replicate (duplicate, triplicate, etc.) Samples. Multiple grab samples, collected separately, that equally represent a medium at a given time and location. This is the required type of collocated sample for volatile organic analyses and most groundwater and surface water samples.

28. Rinsate blanks (equipment blanks) are field blanks generated by passing analyte-free reagent water through sampling equipment after it has been decontaminated between uses. Rinsates are analyzed by the same methods as the samples for which they are blanks and are a check on sampling and decontamination procedures.

29. Split is a field sample taken, homogenized, divided in the field, contained and sent to one or more laboratories for analysis.

30. Trip Blank. 40 mL vials of organic-free reagent water that are kept with the field sample containers from the time they leave the laboratory until the time they are returned to the laboratory. The purpose of trip blanks is to determine whether samples are being contaminated during transit or sample collection. Trip blanks pertain only to volatile organic analyses; therefore, the containers must contain no headspace. Only one trip blank is needed for one day's sampling and shall satisfy trip blank requirements for all matrices for that day if the volatile samples are shipped in the same cooler.

31. Scope of Services - Prepared by a District or Field Operation Activity (FOA) and provided to a contractor for the purposes of work definition and fee negotiation. The Scope of Services for an investigation activity shall have attached guidance to the AE including Guide for Preparing a Chemical Data Acquisition Plan (CDAP) (Appendix D), and the Sample Handling Protocol (Appendix F). The Scope of Services for design shall provide the AE with guidance including any appropriate Guide Specifications for Chemical Data Quality Management and the Sample Handling Protocol (Appendix F).

32. Site Inspection Report or Investigation Report - Prepared by the AE firm or the investigating district (in-house work) and includes a summary of work done, departures from the CDAP, analytical results, results from all testing, field observations, and regulatory or action level factors which impact on decisions to be made as a result of the investigation.

SAMPLE

U.S. Army Corps of Engineers

Chain of Custody Record

(ER 1110-1-263)

Proj. No.: 017 | Project Name: ANY ARMY AMMUNITION PLANT

Sampler: (Signature) Marcia C Davis

Date 90	Time	Pres.	Grab	Comp	Site Code/Sample Number	Number of Containers	Volatile Organics	B/N/A	Total Metals	TRPH	Explosives			Remarks
9/4	0930	4°C	X		AAAP-SB01-0001	2	X							Strong hydrocarbon odor
9/4	0935	4°C	X		AAAP-SB01-0001	1		X	X		X			" " "
9/4	0937	4°C	X		AAAP-SB01-0001	1				X				" " "
9/4	1035	pH<2 HNCL 4°C	X		AAAP-MW02-0001	2	X							No visual turbidity
9/4	1036	4°C	X		AAAP-MW02-0001	2		X						" " "
9/4	1040	pH<2 HNO3 4°C	X		AAAP-MW02-0001	1			X					" " "
9/4	1050	pH<2 HCL 4°C	X		AAAP-MW02-0001	2				X				" " "
9/4	1055	4°C	X		AAAP-MW02-0001	1					X			" " "

Sampler Relinquished by: Marcia C Davis	Date/Time 9/4 1400	Received by: (Sig.)	Date/Time	Hazards Associated with Samples	
Relinquished by: (Sig.)	Date/Time	Received by: (Sig.)	Date/Time	NONE	
Relinquished by: (Sig)	Date/Time	Received for Laboratory by: (Sig.)	Date/Time	Remarks at time of receipt:	
Custody Seal No. 1535		Lab case No.:			

ENG Form 5021-R, Oct 90

Proponent: CEMP-RT

SAMPLE LABELS

SITE NAME	DATE
ANALYSIS	TIME
	PRESERVATIVE

Lot # 9042023

SPECIALTY CLEANED CONTAINER

SITE NAME	DATE
Atlas Missile Site	6/1/89
ANALYSIS	TIME
Total Metals	1200
Sampler ⟶ KC	PRESERVATIVE HNO3

Lot # 9042023

SPECIALTY CLEANED CONTAINER

SAMPLE TAGS

Designate: Grab / Comp.
Time
Month Day Year
Station No.
Proj. Code
Samplers (Signatures)
Station Location

Preservative: Yes ☐ or No ☐

ANALYSES

BOD Anions Solids (TSS) (TDS) (SS)	
COD, TOC, Nutrients	
Phenolics	
Mercury	
Metals	
Cyanide	
Oil and Grease	
Organics GC/MS	
Priority Pollutants	
Volatile Organics	
Pesticides	
Mutagenicity	
Bacteriology	

Remarks:

Tag No. | Lab Sample No.

Designate: Grab ✓ / Comp.
Time 1007
Month/Day/Year 5-28-93
Station No. MW 26 SS-11(6)
Project Code WBS 310.001 21.5M10.0
Samplers (Signatures) Jane Doe
Station Location Monitoring Well #26 Split Spoon # 11

Preservative: Yes ☐ No ☑

ANALYSES

BOD Anions Solids (TSS) (TDS) (SS)	
COD, TOC, Nutrients	
Phenolics	
Mercury	
Metals	
Cyanide	
Oil and Grease	
Organics GC/MS	X
Priority Pollutants	X
Volatile Organics	X
Pesticides	X
Mutagenicity	
Bacteriology	

Remarks: case 1746
ITR # HE0637
Bottle Lot # 63129

Tag No. 10502 | Lab Sample No.

APPENDIX G

GLOSSARY

1. **Chemical Contamination Activities** - All activities related to the cleanup of chemical contamination at a site including investigation and remedial activities. This definition includes activities defined by EPA as "removal activities" and "remedial activities".

2. **Chemical Data Acquisition Plan (CDAP)** - A submittal document which describes the site specific implementation of CDQM requirements. For investigation and design contracts, CDQM guidance and requirements for CDAP preparation and implementation are found in the Scope of Services. For construction contracts, these requirements are found in the contract technical specifications in language which is clearly biddable and enforceable. The CDAP shall include detailed plans for sampling, analysis, and chemical QC activities. A guide for preparation of the CDAP is found in Appendix D. A CDAP is required for both in-house and contracted work. The EPA equivalent is called a Quality Assurance Project Plan (QAPjP) and may be substituted for the CDAP.

3. **Chemical Data Quality Management (CDQM)** - The combination of activities establishing a government quality assurance (QA) program and specifying quality control (QC) operations for the AE, construction contractor, or USACE District. CDQM includes the maintenance of field and laboratory practices/checks which insure that Data Quality Objectives (DQO) are met.

4. **Chemical Data Management Specifications** - Construction Contract technical specifications prepared during design which describe all construction contractor sampling, sample handling and custody, documentation, analytical procedures, and data reporting. The specifications outline contractor QC responsibilities and the requirements of the Chemical Data Acquisition Plan for construction. Appropriate chemical concerns should be addressed at each design submittal phase.

5. **Chemical Quality Assurance (QA)** - The government activities required to assure desired and verifiable levels of quality in chemical data for a specific project. Chemical Quality Assurance activities are defined in Appendix E.

6. Chemical Quality Assurance Report (CQAR) - Prepared by the designated QA laboratory; approved by the investigation/design/construction division; and normally ready for distribution within 30 days of receipt of the AE/contractor analytical data. The report will include an overall evaluation of the contractor's/AE's data and quality assurance data, a comparison of the contractor's and government results, problems in accomplishing the CDAP, and lessons learned. The CQAR shall be prepared in accordance with the guidance found in Appendix E.

7. Chemical Quality Control (QC) - Specific activities for insuring that data of the required quality will be obtained for a specific project by the AE, construction contractor, or government (for in-house chemical analyses). Normally this consists of the analysis of field blanks, duplicate samples and the inclusion of laboratory internal quality control procedures as required by the methods or otherwise specified.

8. Construction District - The district assigned the responsibility to administer the construction contract.

9. Construction Division - The geographic USACE division in which the Construction District is located.

10. Contract Laboratory - The laboratory retained by a USACE AE/contractor or QA laboratory to perform chemical analyses of field samples. These laboratories are evaluated in accordance with the procedures in Appendix C, and must be validated by CEMRD prior to performing chemical analyses for HTW projects.

11. Daily Quality Control Report (DQCR) - A daily report prepared by an AE in accordance with the Scope of Services or by a construction contractor per contract specifications and submitted to the Contracting Officer (CO) during chemical contamination investigation and remedial activities. Copies are sent by the COR to the QA laboratory whenever sampling and analytical activities are involved. The DQCR shall contain at a minimum the following with respect to chemistry:

(a) Work performed. Sections in the CDAP that specify the sampling procedure and the analytical procedure shall be referenced. Weather information at the time of sampling shall be included. Information concerning all field samples, sample shipping, and field instrument measurements and calibration shall be included.

(b) Departures from the approved sampling plan. Include problems identified, corrective actions, and verbal/written instructions from USACE personnel. These shall be reported to the contracting officer (CO) in writing within two working days.

12. Data Quality Objectives (DQO) - DQOs are qualitative and quantitative statements specifying the level and extent of chemical data required to support decisions during remedial activities. They are determined based on the end uses of the data to be collected. DQOs are established prior to data collection and are not considered a separate deliverable. Rather, the DQO development process is integrated with the project planning process and the results are incorporated into Scopes of Work and Work Plans for the site. The levels and responsibility for data validations should be determined with the DQOs.

13. Design Analysis Reports - Documents prepared during design to support the Plans and Specifications. Technical Design Analysis Reports should have a section or chapter dedicated to design chemical evaluations and to the level of sampling, analysis, and CDQM required to support and document construction.

14. Design District - The USACE district assigned the responsibility for coordinating, reviewing, and completing design documents, including plans and specifications for HTW site design activities either in-house or through contracted services. Other Design District responsibilities include procuring AE services and construction contracts when work is not done in-house.

15. Design Division - The USACE Division overseeing the Design District.

16. HQUSACE (CEMP-R) - Headquarters office responsible for CDQM requirements and other supporting issues related to the proper implementation and execution of all phases of HTW program activities under USACE management.

17. Internal Quality Control - Measures which a laboratory implements to ensure data reliability. These include the analysis of blanks of various types, replicate sample or extract analysis, lab duplicates, blind standards, matrix spikes, matrix spike duplicates, surrogate compound analysis, calibrations, generation of control charts, etc. Minimal requirements are

usually specified in the analytical methods. Internal quality control needs and requirements should be determined as a part of the Data Quality Objectives. All internal quality control results should be reported with the sample results.

18. Investigation District - The USACE district assigned the responsibility for coordinating, reviewing, and completing an HTW site investigation activity either in-house or through contracted services.

19. Investigation Division - The USACE Division overseeing the Investigation District.

20. Laboratory Validation - An ongoing assessment of laboratory capabilities, including evaluation of personnel, equipment, QA/QC procedures, results from performance evaluation samples and an on-site laboratory inspection.

21. Matrix is the environmental medium which is sampled; e.g. groundwater, surface water, soil, sediment, waste, etc.

22. Quality Assurance - Measures taken by USACE to oversee the work of contractors.

23. QA Laboratory - The validated USACE Division Laboratory performing or coordinating CDQM activities for a project. These activities ordinarily include: document review, inspection and analysis of quality assurance samples, technical assistance to project managers and preparation of the Chemical Quality Assurance Reports. A given Division Laboratory may not have capability for in house performance of all these activities. The QA laboratory is assigned on a project specific basis by CEMRD. QA functions may not be contracted out directly by the FOA to commercial enterprises. QA sample analysis may be performed under contract to the USACE QA laboratory.

24. Quality Assurance and Quality Control Samples. Samples analyzed for the purpose of assessing the quality of the sampling effort and of the analytical data. QA and QC samples include splits or replicates of field samples, rinsate blanks, trip blanks, and background (up gradient) samples. The purpose of the sample is to provide site specific field originated checks that the data generated by the contractor's analytical lab are of suitable quality.

25. Quality Control - Measures taken by contractors and to verify the reliability of their own work and to oversee subcontractors.

26. Quality Control Summary Report (QCSR) - A report submitted by the AE/construction contractor at the conclusion of a chemical contamination remedial activity. For an investigation activity, the QCSR may be included in the Investigation Report. The QCSR should include the following.

(a) An outline of QC practices employed by the AE/construction contractor, including any problems and corrective actions taken;

(b) A consolidation and summary of the DQCR, as prescribed in the contract.

27. Replicate (duplicate, triplicate, etc.) Samples. Multiple grab samples, collected separately, that equally represent a medium at a given time and location. This is the required type of collocated sample for volatile organic analyses and most groundwater and surface water samples.

28. Rinsate blanks (equipment blanks) are field blanks generated by passing analyte-free reagent water through sampling equipment after it has been decontaminated between uses. Rinsates are analyzed by the same methods as the samples for which they are blanks and are a check on sampling and decontamination procedures.

29. Split is a field sample taken, homogenized, divided in the field, contained and sent to one or more laboratories for analysis.

30. Trip Blank. 40 mL vials of organic-free reagent water that are kept with the field sample containers from the time they leave the laboratory until the time they are returned to the laboratory. The purpose of trip blanks is to determine whether samples are being contaminated during transit or sample collection. Trip blanks pertain only to volatile organic analyses; therefore, the containers must contain no headspace. Only one trip blank is needed for one day's sampling and shall satisfy trip blank requirements for all matrices for that day if the volatile samples are shipped in the same cooler.

31. Scope of Services - Prepared by a District or Field Operation Activity (FOA) and provided to a contractor for the purposes of work definition and fee negotiation. The Scope of Services for an investigation activity shall have attached guidance to the AE including Guide for Preparing a Chemical Data Acquisition Plan (CDAP) (Appendix D), and the Sample Handling Protocol (Appendix F). The Scope of Services for design shall provide the AE with guidance including any appropriate Guide Specifications for Chemical Data Quality Management and the Sample Handling Protocol (Appendix F).

32. Site Inspection Report or Investigation Report - Prepared by the AE firm or the investigating district (in-house work) and includes a summary of work done, departures from the CDAP, analytical results, results from all testing, field observations, and regulatory or action level factors which impact on decisions to be made as a result of the investigation.

APPENDIX D

CONTRACT DATA REQUIREMENTS LIST
DD FORM 1423

CONTRACT DATA REQUIREMENTS LIST

Form Approved
OMB No. 0704-0188

A. CONTRACT LINE ITEM NO.	B. EXH/ATCH NO.	C. CATEGORY: TDP ____ TM ____ OTHER ____

D. SYSTEM/ITEM	E. CONTRACT/PR NO.	F. CONTRACTOR

1. DATA ITEM NO. A001 | **2. TITLE OF DATA ITEM** Chemical Data Aquisition Plan (CDAP) | **3. SUBTITLE** | **17. PRICE GROUP** | **18. ESTIMATED TOTAL PRICE**

4. AUTHORITY (Data Acquisition Document No.) | **5. CONTRACT REFERENCE** SOW - Section C, 3.2.4 | **6. REQUIRING OFFICE**

7. DD 250 REQ | **8. APP CODE** | **9. DIST STATEMENT REQUIRED** | **10. FREQUENCY** | **11. AS OF DATE** | **12. DATE OF FIRST SUBMISSION** 10 days after award | **13. DATE OF SUBSEQUENT SUBMISSION** 30 days after award

14. DISTRIBUTION

a. ADDRESSEE	b. COPIES Draft	Final Reg	Final Repro
15. TOTAL →			

16. REMARKS
CDAP prepared in accordance with ER1110-1-263

1. DATA ITEM NO. A002 | **2. TITLE OF DATA ITEM** Certification of Health & Safety Program (HSP) | **3. SUBTITLE** | **17. PRICE GROUP** | **18. ESTIMATED TOTAL PRICE**

4. AUTHORITY (Data Acquisition Document No.) | **5. CONTRACT REFERENCE** SOW - Section C, 3.2.3 | **6. REQUIRING OFFICE**

7. DD 250 REQ | **8. APP CODE** | **9. DIST STATEMENT REQUIRED** | **10. FREQUENCY** | **11. AS OF DATE** | **12. DATE OF FIRST SUBMISSION** 10 days after award | **13. DATE OF SUBSEQUENT SUBMISSION**

14. DISTRIBUTION

a. ADDRESSEE	b. COPIES Draft	Final Reg	Final Repro
15. TOTAL →			

16. REMARKS
A written certification of the development and implementation of the HSP in accordance with 29 CFR 1910.120 shall be submitted.

1. DATA ITEM NO. A003 | **2. TITLE OF DATA ITEM** Site Health & Safety Plan (SSHP) | **3. SUBTITLE** | **17. PRICE GROUP** | **18. ESTIMATED TOTAL PRICE**

4. AUTHORITY (Data Acquisition Document No.) | **5. CONTRACT REFERENCE** SOW - Section C, 3.2.2 | **6. REQUIRING OFFICE**

7. DD 250 REQ | **8. APP CODE** | **9. DIST STATEMENT REQUIRED** | **10. FREQUENCY** | **11. AS OF DATE** | **12. DATE OF FIRST SUBMISSION** 10 days after award | **13. DATE OF SUBSEQUENT SUBMISSION** 30 days after award

14. DISTRIBUTION

a. ADDRESSEE	b. COPIES Draft	Final Reg	Final Repro
15. TOTAL →			

16. REMARKS
SSHP prepared in accordance with requirements of EM 385-1-1 and 29 CFR 1910.120.

1. DATA ITEM NO. A004 | **2. TITLE OF DATA ITEM** Work Plan | **3. SUBTITLE** | **17. PRICE GROUP** | **18. ESTIMATED TOTAL PRICE**

4. AUTHORITY (Data Acquisition Document No.) | **5. CONTRACT REFERENCE** SOW - Section C, 3.2.1 | **6. REQUIRING OFFICE**

7. DD 250 REQ | **8. APP CODE** | **9. DIST STATEMENT REQUIRED** | **10. FREQUENCY** | **11. AS OF DATE** | **12. DATE OF FIRST SUBMISSION** 20 days after award | **13. DATE OF SUBSEQUENT SUBMISSION** 40 days after award

14. DISTRIBUTION

a. ADDRESSEE	b. COPIES Draft	Final Reg	Final Repro
15. TOTAL →			

16. REMARKS
A detailed work plan documenting the proposed equipment, procedures and subcontractors to be used.

G. PREPARED BY	H. DATE	I. APPROVED BY	J. DATE

CONTRACT DATA REQUIREMENTS LIST

Form Approved
OMB No. 0704-0188

A. CONTRACT LINE ITEM NO.	B. EXH/ATCH NO.	C. CATEGORY: TDP ____ TM ____ OTHER ____

D. SYSTEM/ITEM	E. CONTRACT/PR NO.	F. CONTRACTOR

Block 1

1. DATA ITEM NO.	2. TITLE OF DATA ITEM	3. SUBTITLE
A005	Weekly Progress Reports	

4. AUTHORITY (Data Acquisition Document No.)	5. CONTRACT REFERENCE	6. REQUIRING OFFICE
	SOW - Section C, 3.13.2	

7. DD 250 REQ	9. DIST STATEMENT REQUIRED	10. FREQUENCY	12. DATE OF FIRST SUBMISSION
8. APP CODE		11. AS OF DATE	13. DATE OF SUBSEQUENT SUBMISSION
			30 days after award / weekly until completion

16. REMARKS

Weekly progress reports will be used to monitor progress and be used as the basis for progress payments.

14. DISTRIBUTION	b. COPIES		
a. ADDRESSEE	Draft	Final Reg	Final Repro
15. TOTAL →			

17. PRICE GROUP

18. ESTIMATED TOTAL PRICE

Block 2

1. DATA ITEM NO.	2. TITLE OF DATA ITEM	3. SUBTITLE
A006	Final Report	

4. AUTHORITY (Data Acquisition Document No.)	5. CONTRACT REFERENCE	6. REQUIRING OFFICE
	SOW - Section C, 3.13.3	

7. DD 250 REQ	9. DIST STATEMENT REQUIRED	10. FREQUENCY	12. DATE OF FIRST SUBMISSION
8. APP CODE		11. AS OF DATE	13. DATE OF SUBSEQUENT SUBMISSION
			90 days after award

16. REMARKS

14. DISTRIBUTION	b. COPIES		
a. ADDRESSEE	Draft	Final Reg	Final Repro
15. TOTAL →			

17. PRICE GROUP

18. ESTIMATED TOTAL PRICE

Block 3

1. DATA ITEM NO.	2. TITLE OF DATA ITEM	3. SUBTITLE

4. AUTHORITY (Data Acquisition Document No.)	5. CONTRACT REFERENCE	6. REQUIRING OFFICE

7. DD 250 REQ	9. DIST STATEMENT REQUIRED	10. FREQUENCY	12. DATE OF FIRST SUBMISSION
8. APP CODE		11. AS OF DATE	13. DATE OF SUBSEQUENT SUBMISSION

16. REMARKS

14. DISTRIBUTION	b. COPIES		
a. ADDRESSEE	Draft	Final Reg	Final Repro
15. TOTAL →			

17. PRICE GROUP

18. ESTIMATED TOTAL PRICE

Block 4

1. DATA ITEM NO.	2. TITLE OF DATA ITEM	3. SUBTITLE

4. AUTHORITY (Data Acquisition Document No.)	5. CONTRACT REFERENCE	6. REQUIRING OFFICE

7. DD 250 REQ	9. DIST STATEMENT REQUIRED	10. FREQUENCY	12. DATE OF FIRST SUBMISSION
8. APP CODE		11. AS OF DATE	13. DATE OF SUBSEQUENT SUBMISSION

16. REMARKS

14. DISTRIBUTION	b. COPIES		
a. ADDRESSEE	Draft	Final Reg	Final Repro
15. TOTAL →			

17. PRICE GROUP

18. ESTIMATED TOTAL PRICE

G. PREPARED BY	H. DATE	I. APPROVED BY	J. DATE

APPENDIX E

DATA ITEM DESCRIPTIONS
DD FORM 1664

DATA ITEM DESCRIPTION

Form Approved
OMB No 0704-0188

2 TITLE	1. IDENTIFICATION NUMBER
Chemical Data Acquisition Plan (CDAP)	1

3 DESCRIPTION / PURPOSE

The CDAP shall provide detailed information on chemical QA/QC during execution of this contract.

4 APPROVAL DATE (YYMMDD)	5 OFFICE OF PRIMARY RESPONSIBILITY (OPR)	6a DTIC APPLICABLE	6b. GIDEP APPLICABLE

7 APPLICATION / INTERRELATIONSHIP

8. APPROVAL LIMITATION	9a APPLICABLE FORMS	9b. AMSC NUMBER

10. PREPARATION INSTRUCTIONS

The Contractor shall comply with the ER 1110-1-263 to prepare and submit the CDAP. In addition, the Contractor shall reference existing RI/FS work plans for SEDA prepared by ES.

11 DISTRIBUTION STATEMENT

DATA ITEM DESCRIPTION

Form Approved
OMB No 0704-0188

2 TITLE	1. IDENTIFICATION NUMBER
Written Certification of Health and Safety Program (HSP).	2

3 DESCRIPTION / PURPOSE

Certification of the development and implementation of HSP.

4 APPROVAL DATE (YYMMDD)	5 OFFICE OF PRIMARY RESPONSIBILITY (OPR)	6a DTIC APPLICABLE	6b. GIDEP APPLICABLE

7 APPLICATION / INTERRELATIONSHIP

8. APPROVAL LIMITATION	9a. APPLICABLE FORMS	9b. AMSC NUMBER

10 PREPARATION INSTRUCTIONS

The contractor shall prepare and submit a written certification that a Health and Safety Program (HSP) has been developed, implemented and maintained.

11. DISTRIBUTION STATEMENT

DATA ITEM DESCRIPTION

Form Approved
OMB No 0704-0188

2 TITLE	1. IDENTIFICATION NUMBER
Site specific Health and Safety Plan (SSHP)	3

3 DESCRIPTION / PURPOSE

The SSHP shall provide detailed information on safety at SEDA during the execution of the contract.

4 APPROVAL DATE (YYMMDD)	5 OFFICE OF PRIMARY RESPONSIBILITY (OPR)	6a DTIC APPLICABLE	6b. GIDEP APPLICABLE

7 APPLICATION / INTERRELATIONSHIP

8. APPROVAL LIMITATION	9a. APPLICABLE FORMS	9b. AMSC NUMBER

10 PREPARATION INSTRUCTIONS

The Contractor shall prepare the SSHP in accordance with EM 385-1-1, 29 CFR 1910 and 1926, Appendix B,
The SSHP shall address the elements described in Appendix B. The services of a Certified Industrial Hygienist experienced in hazardous waste site operation shall be utilized to oversee the development and implementation of the SSHP.

11 DISTRIBUTION STATEMENT

DATA ITEM DESCRIPTION

Form Approved
OMB No. 0704-0188

2 TITLE	1. IDENTIFICATION NUMBER
Work Plan	4

3 DESCRIPTION / PURPOSE

Documentation on the proposed equipment, procedures and sub-contractors to be used during the project.

4 APPROVAL DATE (YYMMDD)	5. OFFICE OF PRIMARY RESPONSIBILITY (OPR)	6a DTIC APPLICABLE	6b. GIDEP APPLICABLE

7 APPLICATION / INTERRELATIONSHIP

8. APPROVAL LIMITATION	9a. APPLICABLE FORMS	9b. AMSC NUMBER

10 PREPARATION INSTRUCTIONS

The contractor shall provide a detailed workplan for the owner's review prior to mobilization. The work plan shall provide the information specified in Section 3.1.

11 DISTRIBUTION STATEMENT

DATA ITEM DESCRIPTION

Form Approved
OMB No 0704-0188

2 TITLE	1. IDENTIFICATION NUMBER
Weekly progress Reports	5

3 DESCRIPTION / PURPOSE

Weekly progress reports will be used to monitor the actual progress of the contractor. These reports will be the basis for progress payments.

4 APPROVAL DATE (YYMMDD)	5. OFFICE OF PRIMARY RESPONSIBILITY (OPR)	6a DTIC APPLICABLE	6b. GIDEP APPLICABLE

7 APPLICATION / INTERRELATIONSHIP

8. APPROVAL LIMITATION	9a. APPLICABLE FORMS	9b. AMSC NUMBER

10. PREPARATION INSTRUCTIONS

The contractor shall issue a weekly progress report which shall include the following information:

1. Weight of treated soil processed for the week and cumulative.
2. Weight of treated soil passing the treatment standard for the week and cumumlative.
3. Weight of the debris shipped off site for disposal for the week and cumulative.
4. Volume of wastewater shipped off site for disposal for the week and cumulative.
5. Site plan updated monthly with treated areas highlighted.
6. Weight tickets.
7. Laboratory reports.
8. Air monitoring results.
9. Manifests for material shipped offsite.

11 DISTRIBUTION STATEMENT

DATA ITEM DESCRIPTION

Form Approved
OMB No 0704-0188

2 TITLE	1. IDENTIFICATION NUMBER
Final Report	6

3 DESCRIPTION / PURPOSE

The final report shall document that the contractor has successfully completed the SEDA ash landfill removal action.

4 APPROVAL DATE (YYMMDD)	5 OFFICE OF PRIMARY RESPONSIBILITY (OPR)	6a DTIC APPLICABLE	6b GIDEP APPLICABLE

7 APPLICATION / INTERRELATIONSHIP

8. APPROVAL LIMITATION	9a. APPLICABLE FORMS	9b. AMSC NUMBER

10 PREPARATION INSTRUCTIONS

The final report shall contain the following information:

1. Description of work completed with weight of soil processed, weight of debris disposed off site, volume of water disposed off site.

2. As built site plan with limits of excavation and sample locations (i.e. show approximate area where each load or treated soil is backfilled).

3. Laboratory reports and summary tables.

4. Air monitoring results.

5. Daily logs with weight tickets.

6. Manifests for all material disposed offsite.

7. Surveyor report defining the limits of the treated area.

11. DISTRIBUTION STATEMENT