U.S. ARMY ENGINEER DIVISION
HUNTSVILLE, ALABAMA

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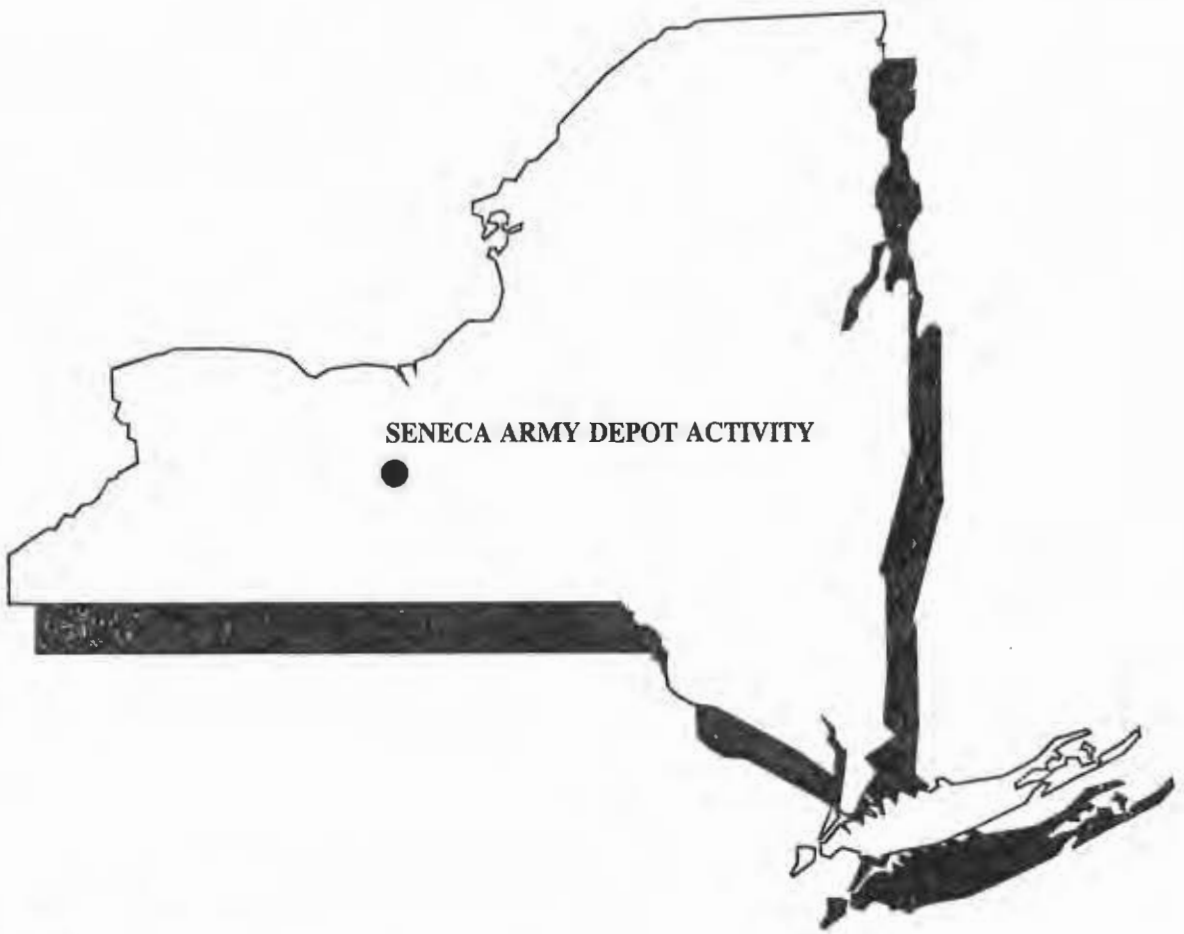

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DECISION DOCUMENT FOR REMOVAL ACTIONS AT SWMUs SEAD-38, SEAD-39, SEAD-40, SEAD-41, AND SEAD-60
SENECA ARMY DEPOT ACTIVITY

CONTRACT NO. DACA87-95-D-0031
TASK ORDER N OF DELIVERY ORDER 14

FEBRUARY 1999

DECISION DOCUMENT FOR REMOVAL ACTIONS AT SWMUs SEAD-38, SEAD-39, SEAD-40 AND SEAD-41, and SEAD-60 SENECA ARMY DEPOT ACTIVITY

Prepared for:

Seneca Army Depot Activity
Romulus, New York

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Contract No. DACA87-95-D-0031
Task Order N of Delivery Order Order 14
734505

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1.0 DECISION DOCUMENT FOR REMOVAL ACTION AT SEAD-38

1.1 EXECUTIVE SUMMARY

A limited sampling program performed at SEAD-38, the Building 2079 Boiler Blowdown Leach Pit, at Seneca Army Depot Activity (SEDA) in Romulus, NY demonstrated that a release of petroleum hydrocarbons has occurred. It is recommended that 15 cubic yards of soil be removed from the ditch and the field where blowdown liquids were discharged and and then treated as part of the treatability study which will be conducted at SEAD-17. The treatability study will involve modification of the existing deactivation furnace at SEAD-17 in an effort to study its potential as a Low Temperature Thermal Desorption (LTTD) unit for the remediation of several sites at SEDA.

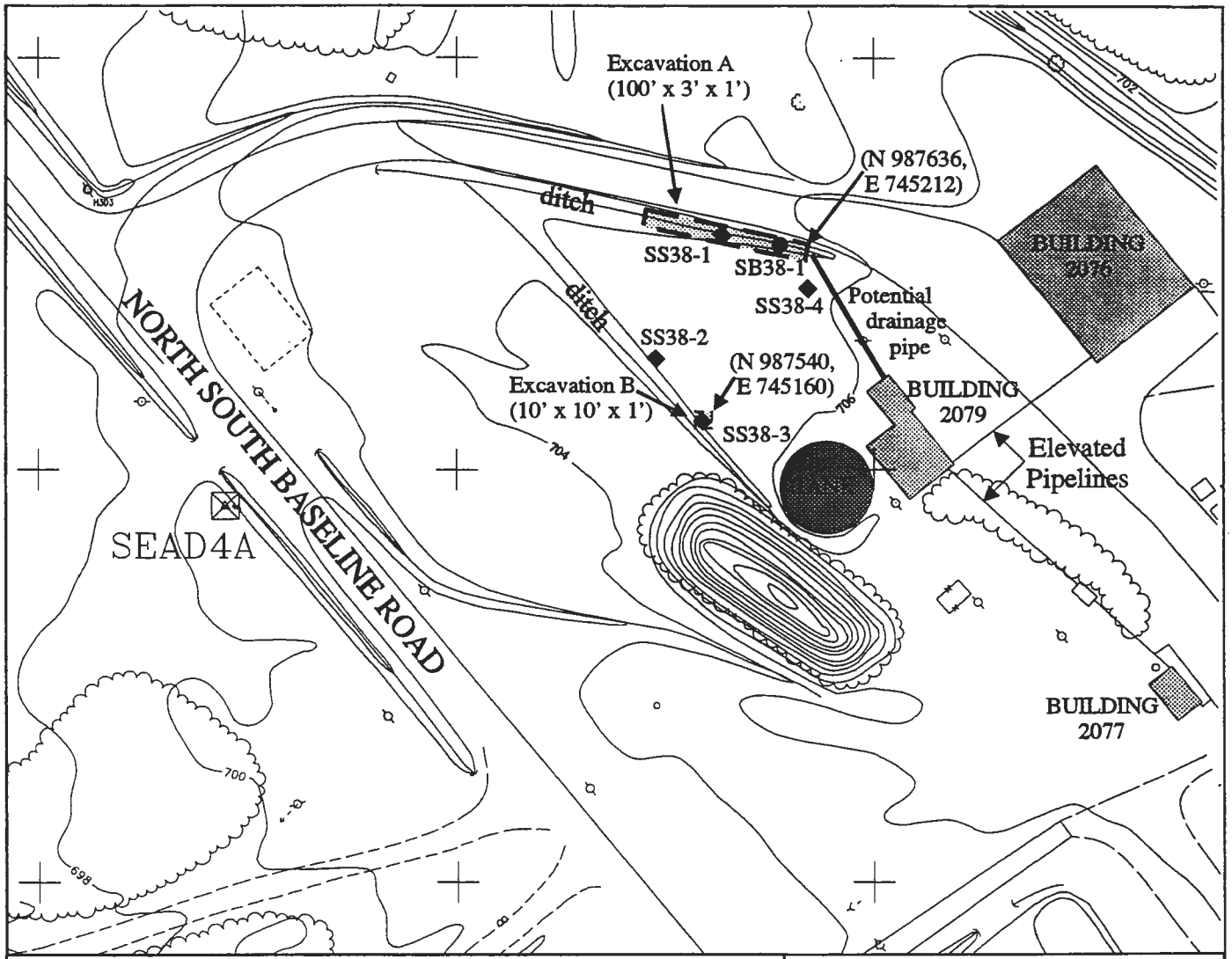
1.2 SITE BACKGROUND

1.2.1 Site Description

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 (Figure 1). 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 200 feet to the northeast of Building 2079 and drains to the west. A smaller drainage ditch originates approximately 50 feet to the northwest of Building 2079 and drains to the northwest into the larger roadside drainage ditch. The area between the boiler plant and the drainage ditches is a relatively level, grassy field.

1.2.2 Site History

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 drained partly into nearby drainage ditches and partly into the ground. The boiler blowdown probably contained tannins, caustic soda (sodium hydroxide), and sodium phosphate.



LEGEND

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

N

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY

DECISION DOCUMENT FOR REMOVAL ACTION
SEAD-38

DEPT.	DWG NO.
ENVIRONMENTAL ENGINEERING	727023-01001

FIGURE 1

SAMPLE LOCATIONS AND APPROXIMATE AREA TO BE REMEDIATED

SCALE	DATE
1" = 100'	AUGUST 1995

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1.3 PREVIOUS INVESTIGATIONS

1.3.1 Description of Sampling Program

A limited sampling program was performed in 1993 and 1994 to obtain evidence of a release. One soil boring was advanced in the roadside drainage ditch north-northeast of the northeast corner 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 three surface soil samples were collected from the grassy field between Building 2079 and the roadside drainage 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 1.

1.3.2 Results of Sampling Program

The results of the soil sampling program are presented in Table 1. 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.

TABLE 1

SURFACE AND SUBSURFACE SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT ACTIVITY
SEAD-38 LIMITED SAMPLING PROGRAM

Compound	Matrix Location Depth (ft) Date ES ID Lab ID Units	Maximum Result	NYSDEC TAGM #4046 value (2)	Number Above TAGM #4046 value	Soil SEAD-38 0-0.2 12/17/93 SB38-1 207135	Soil SEAD-38 0-0.2 12/17/93 SB38-2 207135	Soil SEAD-38 0-0.2 12/17/93 SB38-3 207135	Soil SEAD-38 0-0.2 12/17/93 SS38-4 207135	S
al Petroleum Hydrocarbons	mg/Kg	1940	NA	NA	1840	104	1940	110	
	standard units	8.93	NA	NA	7.36	7.46	7.47	7.4	
al Solids	%W/W	88.8	NA	NA	60.2	79.8	80.1	86	

TES :

(1) Laboratory results are from Sample Delivery Group (SDG) 41726.
(2) The New York State Department of Environmental Conservation's Technical and Administrative Guidance Memorandum HWR-94-4046 (or TAGM #4046) does not contain guidance values for these compounds.

1.4 DISCUSSION OF REMOVAL ALTERNATIVES

A number of removal alternatives/technologies are available for the treatment of petroleum-impacted soils at SEAD-38. These are:

1. land treatment
2. bioventing
3. vapor extraction
4. off-site disposal
5. soil washing
6. low temperature thermal desorption

However, low temperature thermal desorption has been chosen as the technology to treat petroleum-impacted soils at SEAD-38 for the following reasons:

1. Low temperature thermal desorption has been demonstrated to be an effective method for remediating petroleum-contaminated soil and is widely used for this purpose.

2. In an effort to determine the efficacy of treating VOC contamination on-site and using depot personnel, a treatability study is being proposed. The existing deactivation furnace (SEAD-17) will be modified slightly in an effort to study its potential as a Low Temperature Thermal Desorption (LTTD) unit for the remediation of several identified sites and additional sites as may become necessary. This process heats soil to a temperature of approximately 900°F via a gas fired, direct contact, countercurrent rotary retort furnace. The volatilized organics and other pollutants present in the soil such as polynuclear aromatic hydrocarbons are swept from the retort into a series of air pollution control equipment prior to atmospheric discharge.

3. A interim remedial measure (IRM) for contaminated soils was conducted at the Ash Landfill site. The remedial program consisted of removing soils impacted with chlorinated hydrocarbons and treating them using an on-site rotary kiln thermal desorption treatment unit. The estimated cost of the treatment of 24,000 cubic yards (CY) of contaminated soil from the Ash Landfill using low temperature thermal desorption is $6,000,000. Roughly,

this converts into a unit cost of $250/CY for the removal, transportation, treatment and disposal of the contaminated soil.

For the purpose of evaluating the economic costs of this alternative, and to justify the recommendation provided in Section 1.5, a conservative unit cost of $250/CY was used.

1.5 RECOMMENDATIONS

Removal of petroleum hydrocarbon-impacted soil is recommended in the roadside drainage ditch and in a small area between the boiler plant and the drainage ditch. Because the blowdown liquids are believed to have been drained directly into the roadside drainage ditch, the soil that would require remediation would primarily be the soil in the drainage ditch. Starting at the mouth of the pipe where soil boring SB38-1 was advanced, an area 3 feet across the ditch, and 100 feet in the downstream flow direction should be excavated. The subsurface soil sample that was collected at the mouth of the drainage pipe shows that there is little vertical extent of the impacted soil, so the ditch should only be excavated to a depth of 1 foot. The surface sample SS38-3 indicates that some of the soil in the field between the boiler plant and the drainage ditch needs to be remediated as well. Of the three samples collected in the field, sample SS38-3 was the only sample where a high petroleum hydrocarbon concentration was detected. Because the extent of the elevated petroleum hydrocarbon-impacted soil appears to be localized, a 10-foot square area around the SS38-3 sample location should be excavated to a depth of 1 foot. The locations of the areas to be remediated are shown in Figure 1.

The soil from the drainage ditch area and the soil from the SS38-3 sample location can be excavated with a backhoe by SEDA personnel and transported by truck to the rotary kiln incinerator at SEAD-17. Because of the low volume of soil to be remediated, clean fill from SEDA can be used to backfill the excavated area once the area has been demonstrated to comply with the New York State Department of Environmental Conservation (NYSDEC) Petroleum-Contaminated Soil Guidance Policy.

1.6 JUSTIFICATIONS

The total volume of soil that is being recommended for removal from SEAD-38 is approximately 15 CY. Using a conservative estimated unit cost of $250/CY for the treatment of the soil, the total

cost of remediating the soil at the rotary kiln incinerator at SEAD-17 would be $3,750. Because the lateral and vertical extent of the petroleum hydrocarbon-impacted soil can be sufficiently removed by this method of remediation, and the cost is not prohibitive, low temperature thermal desorption appears to be the most effective and immediate way to remediate the soil at SEAD-38.

1.7 POST-REMOVAL VERIFICATION SAMPLING

Each 150 CY batch that is processed through the rotary kiln incinerator is sampled to verify that the soil has been sufficiently treated, and the 15 CY from SEAD-38 will be processed as a portion of one of these larger batches. The soil will be processed through the rotary kiln until it satisfies conditions stated in the NYSDEC Petroleum-Contaminated Soil Guidance Policy, and then will be disposed of at the Ash Landfill.

To determine whether the 15 CY of soil excavated from SEAD-38 is a sufficient volume to remove the petroleum-impacted soil a total of six samples will be collected from the trench excavated at the ditch and a total of five samples will be collected from the pit excavated at sample location SS38-3. Each of these samples will be analyzed for volative organic compounds and semivolatile organic compounds by EPA Methods 8021 and 8270, respectively. In the trench, one composite sample will be collected from each of the side walls of the trench and one composite sample will be collected from each end of the floor of the trench. In the smaller pit, one composite sample will collected from each of the side walls of the pit and one composite sample will be collected from the floor of the pit.

If these samples demonstrate that the concentrations of the contaminants are below the guidance values for the 1) protection of groundwater, 2) protection of human health, 3) protection of fish and wildlife, and 4) protection against objectionable nuisance characteristics, as stated in the NYSDEC Petroleum-Contaminated Soil Guidance Policy, then SEAD-38 will be considered to have been acceptably remediated.

2.0 DECISION DOCUMENT FOR REMOVAL ACTION AT SEAD-39

2.1 EXECUTIVE SUMMARY

A limited sampling program performed at SEAD-39, the Building 121 Boiler Blowdown Leach Pit, at Seneca Army Depot Activity (SEDA) in Romulus NY, demonstrated that a release of petroleum hydrocarbons has occurred. It is recommended that 18.5 cubic yards of soil be removed from the yard where the blowdown liquids were discharged and then treated as part of the treatability study which will be conducted at SEAD-17. The treatability study will involve modification of the existing deactivation furnace at SEAD-17 in an effort to study its potential as a Low Temperature Thermal Desorption (LTTD) unit for the remediation of several sites at SEDA.

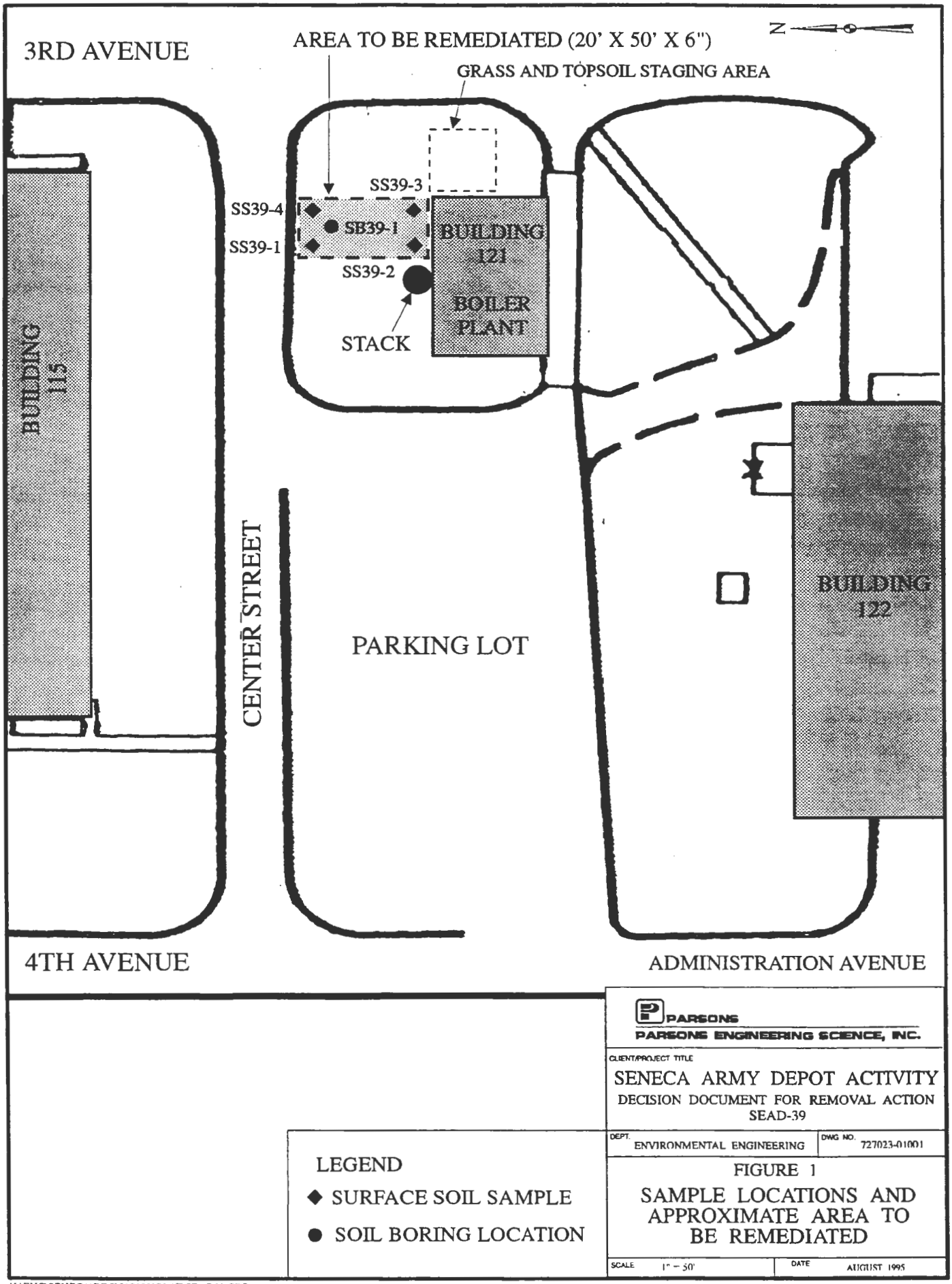
2.2 SITE BACKGROUND

2.2.1 Site Description

Building 121 is an active boiler plant located in the administrative area of the Seneca Army Depot Activity (SEDA). The blowdown leaching area that comprises SEAD-39 is located immediately to the north of Building 121 (Figure 1). 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.

2.2.2 Site History

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 in the street and partly into the ground. The boiler blowdown probably contained tannins, caustic soda (sodium hydroxide), and sodium phosphate.



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2.3 PREVIOUS INVESTIGATIONS

2.3.1 Description of Sampling Program

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 1.

2.3.2 Results of Sampling Program

The results of the soil sampling program are presented in Table 1. 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. This area is outlined in Figure 1.

TABLE 1

SURFACE AND SUBSURFACE SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT ACTIVITY
SEAD-39 LIMITED SAMPLING PROGRAM

Compound	Matrix Location Depth (ft) Date ES ID Lab ID QA/QC Units	Maximum Result	NYSDEC TAGM #4046 value (2)	Number Above TAGM #4046 value	Soil SEAD-39 0-0.2 1/12/94 SS39-1 208403	Soil SEAD-39 0-0.2 1/12/94 SS39-1 209343	Soil SEAD-39 0-0.2 1/24/94 SS39-5 209345 Dup. SS39-1	Soil SEAD-39 0-0.2 1/12/94 SS39-2 208404	Soil SEAD-39 0-0.2 1/12/94 SS39-3 208405	Soil SEAD-39 0-0.2 1/12/94 SS39-4 208406	Soil SEAD-39 3-5 12/16/93 SB39-1.1 207131	D
l Petroleum Hydrocarbons	mg/Kg	118	NA	NA	98	118	90	71	63	65	89	
	standard units	8.9	NA	NA	7.9	7.91	8.18	8.9	8.34	8.03	7.2	
l Solids	%W/W	84.6	NA	NA	83.2	82.1	82.5	79.8	84.6	83.9	85.8	

TES :

(1) Laboratory results are from Sample Delivery Group (SDG) 41726.
(2) The New York State Department of Environmental Conservation's Technical and Administrative Guidance Memorandum HWR-94-4046 (or TAGM #4046) does not contain guidance values for these compounds.

2.4 DISCUSSION OF REMOVAL ALTERNATIVES

A number of removal alternatives/technologies are available for the treatment of petroleum-impacted soils at SEAD-39. These are:

1. land treatment
2. bioventing
3. vapor extraction
4. off-site disposal
5. soil washing
6. low temperature thermal desorption

However, low temperature thermal desorption has been chosen as the technology to treat petroleum-impacted soils at SEAD-39 for the following reasons:

1. Low temperature thermal desorption has been demonstrated to be an effective method for remediating petroleum-contaminated soil and is widely used for this purpose.

2. In an effort to determine the efficacy of treating VOC contamination on-site and using depot personnel, a treatability study is being proposed. The existing deactivation furnace (SEAD-17) will be modified slightly in an effort to study its potential as a Low Temperature Thermal Desorption (LTTD) unit for the remediation of several identified sites and additional sites as may become necessary. This process heats soil to a temperature of approximately 900°F via a gas fired, direct contact, countercurrent rotary retort furnace. The volatilized organics and other pollutants present in the soil such as polynuclear aromatic hydrocarbons are swept from the retort into a series of air pollution control equipment prior to atmospheric discharge.

3. A interim remedial measure (IRM) for contaminated soils was conducted at the Ash Landfill site. The remedial program consisted of removing soils impacted with chlorinated hydrocarbons and treating them using an on-site rotary kiln thermal desorption treatment unit. The estimated cost of the treatment of 24,000 cubic yards (CY) of contaminated soil from the Ash Landfill using low temperature thermal desorption is $6,000,000. Roughly,

this converts into a unit cost of $250/CY for the removal, transportation, treatment and disposal of the contaminated soil.

For the purpose of evaluating the economic costs of this alternative, and to justify the recommendation provided in Section 2.5, a conservative unit cost of $250/CY was used.

2.5 RECOMMENDATIONS

To remove the petroleum-impacted soil at SEAD-39, a 20 by 50 foot area should be excavated down to one foot, as outlined in Figure 1. Because the fill that lies above the blowdown liquid discharge level is not likely to be contaminated, the top six inches of the topsoil need not be remediated.

The soil can be excavated with a backhoe by SEDA personnel and the soil from six inches to one foot can be transported by truck to the rotary kiln incinerator at SEAD-17 to be remediated. Because of the low volume of soil to be remediated, clean fill from SEDA can be used to backfill the excavated area once the area has been demonstrated to comply with the New York State Department of Environmental Conservation (NYSDEC) Petroleum-Contaminated Soil Guidance Policy. The untreated topsoil and sod can then be replaced.

2.6 JUSTIFICATIONS

The total volume of soil that is being recommended for remediation from SEAD-39 is approximately 18.5 CY. Using a conservative estimated unit cost of $250/CY for the treatment of the soil, the total cost of remediating the soil at the rotary kiln incinerator at the Ash Landfill would be $4,625. Because the lateral and vertical extent of the petroleum-impacted soil can be sufficiently removed by this method of remediation, and the cost is not prohibitive, low temperature thermal desorption appears to be the most effective and immediate way to remediate the soil at SEAD-39.

2.7 POST-REMOVAL VERIFICATION SAMPLING

Each 150 CY batch that is processed through the rotary kiln incinerator is sampled to verify that the soil has been sufficiently treated, and the 18.5 CY from SEAD-39 will be processed as a

portion of one of these larger batches. The soil will be processed through the rotary kiln until it satisfies conditions stated in the NYSDEC Petroleum-Contaminated Soil Guidance Policy, and then will be disposed of at the Ash Landfill.

To determine whether the 18.5 CY of soil excavated from SEAD-39 is a sufficient volume to remove the petroleum-impacted soil, a total of six samples will be collected from the excavated hole. Each of these samples will be analyzed for volatile organic compounds and semivolatile organic compounds by EPA Methods 8021 and 8270, respectively. One composite sample will be collected from each of the side walls of the hole and one composite sample will be collected from the floor of the hole. A composite sample will also be collected from the six inches of topsoil that will not be treated to verify that it is not sufficiently contaminated to require treatment.

If these samples demonstrate that the concentrations of the contaminants are below the guidance values for the 1) protection of groundwater, 2) protection of human health, 3) protection of fish and wildlife, and 4) protection against objectionable nuisance characteristics, as stated in the NYSDEC Petroleum-Contaminated Soil Guidance Policy, then SEAD-39 will be considered to have been acceptably remediated.

3.0 DECISION DOCUMENT FOR REMOVAL ACTION AT SEAD-40

3.1 EXECUTIVE SUMMARY

A limited sampling program performed at SEAD-40, the Building 319 Boiler Blowdown Leach Pit, at Seneca Army Depot Activity (SEDA) in Romulus, NY demonstrated that a release of petroleum hydrocarbons has occurred. It is recommended that 12.5 cubic yards be removed from the ditch where the blowdown liquids were discharged and then treated as part of the treatability study which will be conducted at SEAD-17. The treatability study will involve modification of the existing deactivation furnace at SEAD-17 in an effort to study its potential as a Low Temperature Thermal Desorption (LTTD) unit for the remediation of several sites at SEDA.

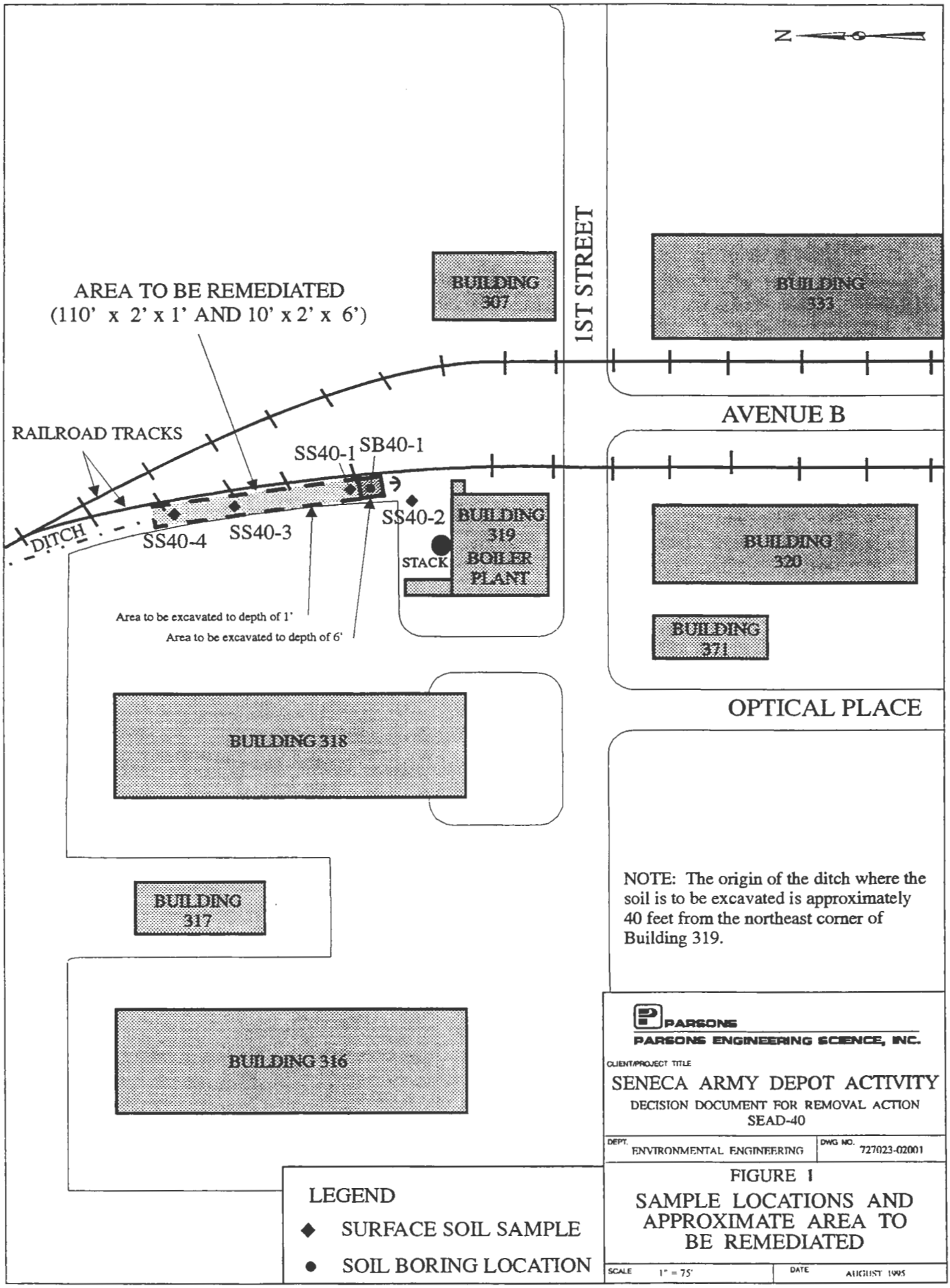
3.2 SITE BACKGROUND

3.2.1 Site Description

Building 319 is an active boiler plant located on first Street at the Seneca Army Depot Activity (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 (Figure 1). 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 thirty 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 south of the drainage ditch is covered with asphalt.

3.2.2 Site History

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 in the street and partly into the ground. The boiler blowdown probably contained tannins, caustic soda (sodium hydroxide), and sodium phosphate.



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3.3 PREVIOUS INVESTIGATION

3.3.1 Description of sampling program

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 50 an 100 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 1.

3.3.2 Results of Sampling Program

The results of the soil sampling program are presented in Table 1. 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.

3.4 DISCUSSION OF REMOVAL ALTERNATIVES

A number of removal alternatives/technologies are available for the treatment of petroleum-impacted soils at SEAD-40.

TABLE 1

SURFACE AND SUBSURFACE SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT ACTIVITY
SEAD-40 LIMITED SAMPLING PROGRAM

Compound	Matrix Location Depth (ft) Date ES ID Lab ID QA/QC Units	Maximum Result	NYSDEC TAGM #4046 value (2)	Number Above TAGM #4046 value	Soil SEAD-40 4-6 12/16/93 SB40-1.1 207134	Soil SEAD-40 0-0.2 12/17/93 SS40-1 207139	Soil SEAD-40 2-4 12/17/93 SS40-5 207144 Dup.SS40-1	Soil SEAD-40 0-0.2 12/17/93 SS40-2 207141	Soil SEAD-40 0-0.2 12/17/93 SS40-3 207142
al Petroleum Hydrocarbons	mg/Kg	1640	NA	NA	1270	300	270	420	1640
	standard units	8.15	NA	NA	7.37	7.86	8.15	7.64	7.54
al Solids	%W/W	91.8	NA	NA	85.4	90.8	91.8	89.2	81.1

TES :

(1) Laboratory results are from Sample Delivery Group (SDG) 41726.
(2) The New York State Department of Environmental Conservation's Technical and Administrative Guidance Memorandum HWR-94-4046 (or TAGM #4046) does not contain guidance values for these compounds.

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These are:

1. land treatment
2. bioventing
3. vapor extraction
4. off-site disposal
5. soil washing
6. low temperature thermal desorption

However, low temperature thermal desorption has been chosen as the technology to treat petroleum-impacted soils at SEAD-40 for the following reasons:

1. Low temperature thermal desorption has been demonstrated to be an effective method for remediating petroleum-contaminated soil and is widely used for this purpose.

2. In an effort to determine the efficacy of treating VOC contamination on-site and using depot personnel, a treatability study is being proposed. The existing deactivation furnace (SEAD-17) will be modified slightly in an effort to study its potential as a Low Temperature Thermal Desorption (LTTD) unit for the remediation of several identified sites and additional sites as may become necessary. This process heats soil to a temperature of approximately 900°F via a gas fired, direct contact, countercurrent rotary retort furnace. The volatilized organics and other pollutants present in the soil such as polynuclear aromatic hydrocarbons are swept from the retort into a series of air pollution control equipment prior to atmospheric discharge.

3. A interim remedial measure (IRM) for contaminated soils was conducted at the Ash Landfill site. The remedial program consisted of removing soils impacted with chlorinated hydrocarbons and treating them using an on-site rotary kiln thermal desorption treatment unit. The estimated cost of the treatment of 24,000 cubic yards (CY) of contaminated soil from the Ash Landfill using low temperature thermal desorption is $6,000,000. Roughly, this converts into a unit cost of $250/CY for the removal, transportation, treatment and disposal of the contaminated soil.

For the purpose of evaluating the economic costs of this alternative, and to justify the recommendation provided in Section 3.5, a conservative unit cost of $250/CY was used.

3.5 RECOMMENDATIONS

To remove the petroleum-impacted soil at SEAD-40, the ditch where the blowdown liquids were discharged should be excavated two feet across beginning at its origin pipe (to the south) to 120 feet downstream (to the north), as outlined in Figure 1. Two portions of the 120 foot length of ditch will be excavated to different depths. From the mouth of the drainage pipe to 10 feet downstream, the ditch should be excavated to a depth of 6 feet; the remainder of the ditch should be excavated to a depth of one foot.

The soil can be excavated with a backhoe by SEDA personnel and transported by truck to the rotary kiln incinerator at SEAD-17 to be remediated. Because of the low volume of soil to be remediated, clean fill from SEDA can be used to backfill the excavated area once it has been demonstrated to comply with the New York State Department of Environmental Conservation (NYSDEC) Petroleum-Contaminated Soil Guidance Policy.

3.6 JUSTIFICATIONS

The total volume of soil that is being recommended for remediation from SEAD-40 is approximately 12.5 CY. Using a conservative estimated unit cost of $250/CY for the treatment of the soil, the total cost of remediating the soil at the rotary kiln incinerator would be $3,125. Because the lateral and vertical extent of the petroleum-impacted soil can be sufficiently removed by this method of remediation, and the cost is not prohibitive, low temperature thermal desorption appears to be the most effective and immediate way to remediate the soil at SEAD-40.

3.7 POST-REMOVAL VERIFICATION SAMPLING

Each 150 CY batch that is processed through the rotary kiln incinerator is sampled to verify that the soil has been sufficiently treated, and the 12.5 CY from SEAD-40 will be processed as a portion of one of these larger batches. The soil will be processed through the rotary kiln until it

satisfies conditions stated in the NYSDEC Petroleum-Contaminated Soil Guidance Policy, and then it will be disposed of at the Ash Landfill.

To determine whether the 12.5 CY of soil excavated from SEAD-40 is a sufficient volume to remove the impacted soil, a total of six samples will be collected from the excavated trench. Each of these samples will be analyzed for volatile organic compounds and semivolatile organic compounds by EPA Methods 8021 and 8270, respectively. One composite sample will be collected from each of the side walls of the trench and two composite samples will be collected from the floor of the trench, one from each end.

If these samples demonstrate that the concentrations of the contaminants are below the guidance values for the 1) protection of groundwater, 2) protection of human health, 3) protection of fish and wildlife, and 4) protection against objectionable nuisance characteristics, as stated in the NYSDEC Petroleum-Contaminated Soil Guidance Policy, then SEAD-40 will be considered to have been acceptably remediated.

4.0 DECISION DOCUMENT FOR REMOVAL ACTION AT SEAD-41

4.1 EXECUTIVE SUMMARY

A limited sampling program performed at SEAD-41, the Building 718 Boiler Blowdown Leach Pit, at Seneca Army Depot Activity (SEDA) in Romulus, NY demonstrated that a release of petroleum hydrocarbons has occurred. It is recommended that 4.5 cubic yards of soil be removed from the ditch where the blowdown liquids were discharged and then treated as part of the treatability study which will be conducted at SEAD-17. The treatability study will involve modification of the existing deactivation furnace at SEAD-17 in an effort to study its potential as a Low Temperature Thermal Desorption (LTTD) unit for the remediation of several sites at SEDA.

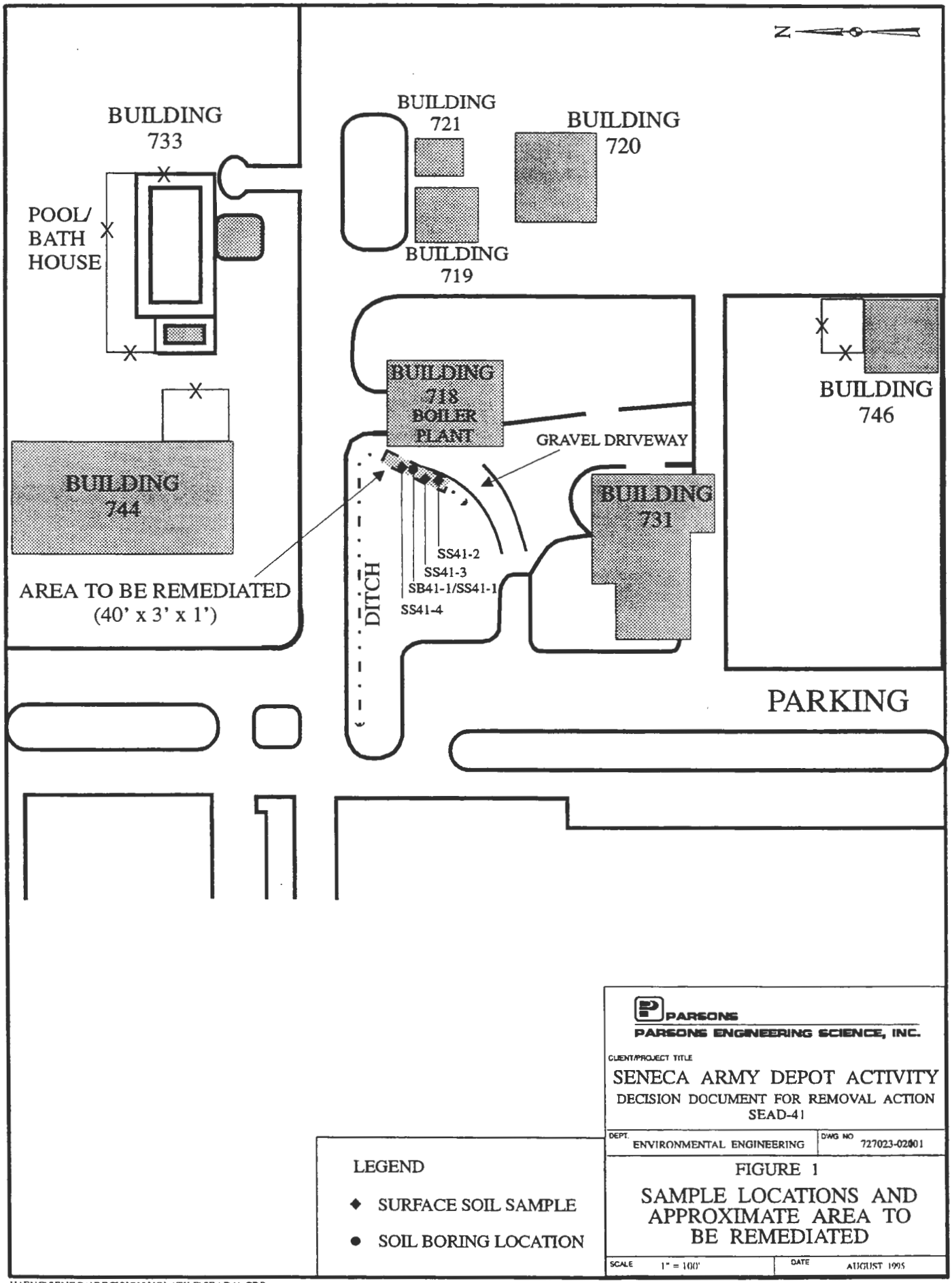
4.2 SITE BACKGROUND

4.2.1 Site Description

Building 718 is an abandoned boiler plant located in the northern end of the Seneca Army Depot Activity (SEDA). The blowdown leaching area that comprises SEAD-41 is suspected to be a drainage ditch located approximately 40 feet west of Building 718 (Figure 1). 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.

4.2.2 Site History

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



LEGEND

- ◆ SURFACE SOIL SAMPLE
- ● SOIL BORING LOCATION

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY

DECISION DOCUMENT FOR REMOVAL ACTION SEAD-41

DEPT.	DWG NO
ENVIRONMENTAL ENGINEERING	727023-02001

FIGURE 1

SAMPLE LOCATIONS AND APPROXIMATE AREA TO BE REMEDIATED

SCALE	DATE
1" = 100'	AUGUST 1995

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and flowed into the ditch. The boiler blowdown probably contained tannins, caustic soda (sodium hydroxide), and sodium phosphate.

4.3 PREVIOUS INVESTIGATIONS

4.3.1 Description of Sampling Program

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 1.

4.3.2 Results of Sampling Program

The results of the soil sampling program are presented in Table 1. 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

TABLE 1

SURFACE AND SUBSURFACE SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT ACTIVITY
SEAD-41 LIMITED SAMPLING PROGRAM

Compound	Matrix Location Depth (ft) Date ES ID Lab ID Units	Maximum Result	NYSDEC TAGM #4046 value (2)	Number Above TAGM #4046 value	Soil SEAD-41 0-0.2 1/11/94 SS41-1 208407	Soil SEAD-41 0-0.2 1/11/94 SS41-2 208408	Soil SEAD-41 0-0.2 1/11/94 SB41-3 208409	Soil SEAD-41 0-0.2 1/12/94 SS41-4 208410	S
tal Petroleum Hydrocarbons	mg/Kg	300	NA	NA	144	40	300	70	
H	standard units	8.74	NA	NA	8.74	8.57	8.49	8.19	
tal Solids	%W/W	88.3	NA	NA	88.3	86.5	84.4	84	

OTES :

(1) Laboratory results are from Sample Delivery Group (SDG) 41726.
(2) The New York State Department of Environmental Conservation's Technical and Administrative Guidance Memorandum HWR-94-4046 (or TAGM #4046) does not contain guidance values for these compounds.

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. This area is outlined in Figure 1.

4.4 DISCUSSION OF REMOVAL ALTERNATIVES

A number of removal alternatives/technologies are available for the treatment of petroleum-impacted soils at SEAD-41. These are:

1. land treatment
2. bioventing
3. vapor extraction
4. off-site disposal
5. soil washing
6. low temperature thermal desorption

However, low temperature thermal desorption has been chosen as the technology to treat petroleum-impacted soils at SEAD-41 for the following reasons:

1. Low temperature thermal desorption has been demonstrated to be an effective method for remediating petroleum-contaminated soil and is widely used for this purpose.

2. In an effort to determine the efficacy of treating VOC contamination on-site and using depot personnel, a treatability study is being proposed. The existing deactivation furnace (SEAD-17) will be modified slightly in an effort to study its potential as a Low Temperature Thermal Desorption (LTTD) unit for the remediation of several identified sites and additional sites as may become necessary. This process heats soil to a temperature of approximately 900°F via a gas fired, direct contact, countercurrent rotary retort furnace. The volatilized organics and other pollutants present in the soil such as polynuclear aromatic hydrocarbons are swept from the retort into a series of air pollution control equipment prior to atmospheric discharge.

3. A interim remedial measure (IRM) for contaminated soils was conducted at the Ash Landfill site. The remedial program consisted of removing soils impacted with chlorinated hydrocarbons and treating them using an on-site rotary kiln thermal desorption treatment

unit. The estimated cost of the treatment of 24,000 cubic yards (CY) of contaminated soil from the Ash Landfill using low temperature thermal desorption is $6,000,000. Roughly, this converts into a unit cost of $250/CY for the removal, transportation, treatment and disposal of the contaminated soil.

For the purpose of evaluating the economic costs of this alternative, and to justify the recommendation provided in Section 4.5, a conservative unit cost of $250/CY was used.

4.5 RECOMMENDATIONS

To remove the petroleum-impacted soil at SEAD-41, the ditch where the blowdown liquids were discharged should be excavated 3 feet across and 20 feet in each direction of flow from the suspected point of discharge (located approximately by sample location SB41-1).This area, as outlined in Figure 1, should be excavated down to a depth of one foot.

The soil can be excavated with a backhoe by SEDA personnel and transported by truck to the rotary kiln incinerator at the SEAD-17 to be remediated. Because of the low volume of soil to be remediated, clean fill from SEDA can be used to backfill the excavated area once the area has been demonstrated to comply with the New York State Department of Environmental Conservation (NYSDEC) Petroleum-Contaminated Soil Guidance Policy.

4.6 JUSTIFICATIONS

The total volume of soil that is being recommended for remediation from SEAD-41 is approximately 4.5 CY. Using a conservative estimated unit cost of $250/CY for the treatment of the soil, the total cost of remediating the soil at the rotary kiln incinerator at SEAD-17 would be $1125. Because the lateral and vertical extent of the petroleum-impacted soil can be sufficiently removed by this method of remediation, and the cost is not prohibitive, low temperature thermal desorption appears to be the most effective and immediate way to remediate the soil at SEAD-41.

4.7 POST-REMOVAL VERIFICATION SAMPLING

Each 150 CY batch that is processed through the rotary kiln incinerator is sampled to verify that the soil has been sufficiently treated, and the 4.5 CY from SEAD-41 will be processed as a portion of one of these larger batches. The soil will be processed through the rotary kiln until it satisfies

conditions stated in the NYSDEC Petroleum-Contaminated Soil Guidance Policy, and then will be disposed of at the Ash Landfill.

To determine whether the 4.5 CY of soil excavated from SEAD-41 is a sufficient volume to remove the impacted soil, a total of six samples will be collected from the excavated trench. Each of these samples will be analyzed for volatile organic compounds and semivolatile organic compounds by EPA Methods 8021 and 8270, respectively. One composite sample will be collected from each of the side walls of the trench and two composite samples will be collected from the floor of the trench, one from each end.

If these samples demonstrate that the concentrations of the contaminants are below the guidance values for the 1) protection of groundwater, 2) protection of human health, 3) protection of fish and wildlife, and 4) protection against objectionable nuisance characteristics, as stated in the NYSDEC Petroleum-Contaminated Soil Guidance Policy, then SEAD-41 will be considered to have been acceptably remediated.

5.0 DECISION DOCUMENT FOR REMOVAL ACTION AT SEAD-60

5.1 EXECUTIVE SUMMARY

An Expanded Site Inspection performed at SEAD-60, the Oil Discharge Area adjacent to Building 609, at Seneca Army Depot Activity (SEDA) in Romulus, NY demonstrated that a release of petroleum hydrocarbons has occurred. It is recommended that 195 cubic yards of soil and sediment be removed from the ditch and the area near Building 609 and then treated as part of the treatability study which will be conducted at SEAD-17. The treatability study will involve modification of the existing deactivation furnace at SEAD-17 in an effort to study its potential as a Low Temperature Thermal Desorption (LTTD) unit for the remediation of several sites at SEDA.

5.2 SITE BACKGROUND

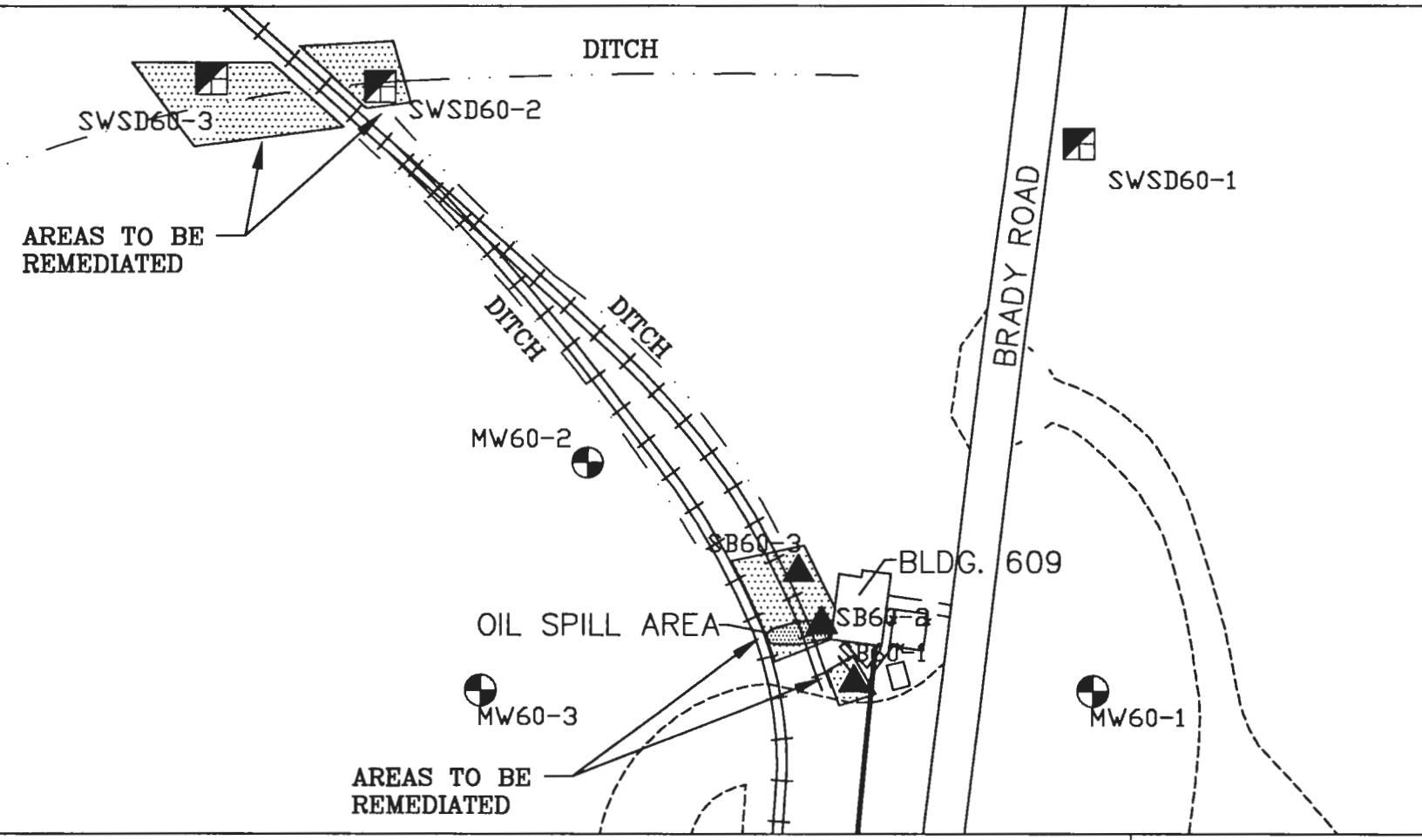
5.2.1 Site Description

SEAD-60 is located in the southeastern portion of SEDA and represents an area of oil stained soil adjacent to the southwest corner of Building 609. SEAD-52 is adjacent to the southern boundary of the SWMU area, and SEAD-62 is located to the east. The site is located within the ammunition storage area and access to the site is restricted. The site plan is shown in Figure 1.

The surrounding areas are characterized by developed and undeveloped land. The developed areas consist of Building 609, which is located immediately west of Brady Road, and two SEDA railroad spurs. One railroad track enters the site from the northwest and divides into two spurs approximately 300 feet northwest of Building 609. The two spurs transect the site to the west of Building 609. The eastern railroad spur passes within a few feet of Building 609 and ends just south of Building 609. The western spur ends at the northern side of Building 612.

The undeveloped areas are located north, west and east of SEAD-60, and consist of grassy fields with sparse brush. A grassy mounded area is also located north-northwest of the site.

Building 612, which is part of SEAD-52, is located approximately 120 feet south of the site. Building 609 is a boiler house for Building 612. Elevated pipes, which include steampipes, run parallel to Brady Road and connect Buildings 609 and 612. A tall emissions stack protrudes from



N

80 160

(FEET)

LEGEND:

SB60-3 — SOIL BORING

SWSD60-1 — SURFACE WATER/ SEDIMENT SAMPLE

MW60-1 — MONITORING WELL WITH WATER TABLE ELEVATION

DITCH

PARSONS

PARSONS ENGINEERING

CLIENT/PROJECT TITLE

SENECA ARMY DEPO

DECISION DOCUMENT FOR R

SEAD-60

DEPT. ENVIRONMENTAL ENGINEERING

FIGURE 1

SAMPLE LOCATIONS AND

AREA TO BE REME

SCALE AS NOTED

DATE FEBRUAR

the southeastern corner of Building 609. A paved driveway is located immediately south of Building 609 and provides vehicular access to the western portion of the site from Brady Road. There are also paved access routes on the eastern and northern sides of the building.

The spill area, which is evidenced by visibly stained soils, approximately 6 feet by 30 feet in area, extends west of the easternmost railroad spur. No vegetation is present in the visibly stained soil area.

The topography in the immediate vicinity of the Building 609 is variable but the most notable feature is a low-lying area defined by the western wall of Building 609 and the easement of the easternmost railroad spur. The local topography within an approximately 50-foot radius slopes toward this area while the regional topography slopes to the west. In the northern portion of the site, the topography slopes toward an east-west trending intermittent stream that flows to the west. Drainage swales, which parallel each side of the railroad spurs, flow north intersecting the intermittent stream approximately 300 feet northwest of Building 609.

Surface water flow from precipitation events at SEAD-60 is controlled by the local topography. Surface water flows primarily westward following the regional topographic slope in this area. There are no sustained surface water bodies present at SEAD-60, although intermittent drainage ditches are present to the north, northwest and west of the site. The two drainage ditches, which flow to the northwest along the railroad spurs, originate near the oil spill area.

As part of the ESI program, three monitoring wells were installed at SEAD-60. Groundwater elevations were measured in the three monitoring wells and the results are presented in the referenced ESI Report. Based on these data, the groundwater flow direction is primarily west across SEAD-60.

5.2.2 Site History

Most of the historical information for SEAD-60 is related to a release of oil on the site. Building 609 has historically been a boiler house for Building 612, which is located south of Building 609. It is believed that overflow from an aboveground storage tank located in Building 609 was discharged from a pipe in the wall of Building 609 resulting in a spill adjacent to the southwest

corner of the building. According to SEDA personnel, the aboveground storage tank contains No. 2 fuel oil. No information is available on the date of the spill or the volume of oil released.

5.3 PREVIOUS INVESTIGATIONS

5.3.1 Description of Sampling Program

Soil, surface water, sediment and groundwater were sampled as part of the ESI conducted at SEAD-60 in 1994. Sampling and analyses were based upon historical information of an oil release on site. The results of this investigation were detailed in the draft ESI Seven Low Priority SWMUs report (Parsons ES, April 1995).

A total of 3 surface and 6 subsurface soil samples were collected at SEAD-60 in the immediate vicinity of the oil-stained soil. To assess the potential impact from surface water runoff, 3 surface water and sediment samples were collected in drainage ditches north of the site that are suspected to receive surface water runoff from the site; one of these three sample locations (SWSD60-1) is an upstream sample. Three monitoring wells were also sampled as part of this investigation. The following sections describe the nature and extent of contamination identified at SEAD-60. The sample locations are shown in Figure 1.

5.3.2 Results of Sampling Program

The ESI conducted at SEAD-60 identified an area that had been impacted by a release of fuel oil to the ground surface immediately west of Building 609. The results of the soil sampling program are presented in Tables 1 through 4. The surface soils in this area have been impacted primarily by petroleum hydrocarbons and PAHs, and to a lesser extent by PCB compounds. At the location of the oil release, surface soils (0 to 0.2 feet) are the most significantly impacted media. TPH concentrations of 218,000 mg/kg and 50,900 mg/kg were found in the area of the oil-stained soil. Concentrations of PAHs (up to 18,000 mg/kg) correlated spatially with the elevated TPH concentrations in the surface soils. TAGM exceedances for PAHs were more numerous in the surface soil samples. At depth, the concentrations of these constituents in soil was reduced; only one subsurface sample contained a TAGM exceedance for an individual PAH compound. TAGM values were exceeded for benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(a)pyrene, and dibenz(a,h)anthracene. Dibenz(a,h)anthracene was detected at an estimated concentration of 27J

TABLE 1

SENECA ARMY DEPOT ACTIVITY
SEAD-60
SOIL ANALYSIS RESULTS FROM THE ESI

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-60 0-0.2 05/27/94 SB60-1-00 222473 44410	SOIL SEAD-60 0-2 02/28/94 SB60-1.01 212883 42510	SOIL SEAD-60 2-4 02/28/94 SB60-1.02 212884 42510	SOIL SEAD-60 0-0.2 06/07/94 SB60-2-00 223339 44410	SOIL SEAD-60 2-4 06/08/94 SB60-2-02 223513 44694
ORGANICS										
Chloride	ug/Kg	54	56%	100	0	12 U	11 U	11 U	27 J	11 U
	ug/Kg	170	11%	200	0	12 U	11 U	11 U	170 J	11 U
sulfide	ug/Kg	2	22%	2700	0	12 U	11 U	11 U	1 J	11 U
e	ug/Kg	26	11%	300	0	12 U	11 U	11 U	26 J	11 U
e	ug/Kg	1	11%	NA	NA	12 U	11 U	1 J	11 UJ	11 U
oethene	ug/Kg	3	11%	1400	0	12 U	11 U	11 U	11 UJ	11 U
	ug/Kg	13	33%	1500	0	12 U	11 U	11 U	13 J	2 J
ene	ug/Kg	4	11%	5500	0	12 U	11 U	11 U	4 J	11 U
tal)	ug/Kg	9	11%	1200	0	12 U	11 U	11 U	9 J	11 U
ATILE ORGANICS										
ne	ug/Kg	38	11%	13000	0	38 J	370 U	370 U	18000 U	360 U
aphthalene	ug/Kg	1100	11%	36400	0	390 U	370 U	370 U	1100 J	360 U
ene	ug/Kg	1400	33%	50000*	0	59 J	370 U	370 U	1400 J	360 U
ran	ug/Kg	29	11%	6200	0	29 J	370 U	370 U	18000 U	360 U
	ug/Kg	1300	22%	50000*	0	48 J	370 U	370 U	1300 J	360 U
ene	ug/Kg	8900	44%	50000*	0	570 J	25 J	370 U	8900 J	360 U
e	ug/Kg	2000	22%	50000*	0	98 J	370 U	370 U	2000 J	360 U
	ug/Kg	79	11%	50000*	0	79 J	370 U	370 U	18000 U	360 U
hthalate	ug/Kg	1500	33%	8100	0	390 U	370 U	370 U	1500 J	360 U
ne	ug/Kg	14000	67%	50000*	0	1100 J	33 J	370 U	14000 J	27 J
	ug/Kg	27000	78%	50000*	0	700 J	31 J	37 J	27000 J	27 J
nthracene	ug/Kg	340	11%	220	1	340 J	370 U	370 U	18000 U	360 U
	ug/Kg	17000	44%	400	2	400	370 U	370 U	17000 J	18 J
hexyl)phthalate	ug/Kg	380	44%	50000*	0	54 J	370 U	380 J	18000 U	360 U
uoranthene	ug/Kg	16000	33%	1100	2	730 J	370 U	370 U	16000 J	360 U
uoranthene	ug/Kg	190	11%	1100	0	190 J	370 U	370 U	18000 U	360 U
yrene	ug/Kg	350	11%	61	1	350 J	370 U	370 U	18000 U	360 U
,3-cd)pyrene	ug/Kg	1100	33%	3200	0	220 J	370 U	370 U	18000 U	360 U
)anthracene	ug/Kg	1100	33%	14	3	110 J	370 U	370 U	18000 U	360 U
i)perylene	ug/Kg	1600	33%	50000*	0	220 J	370 U	370 U	18000 U	360 U

TABLE 1

SENECA ARMY DEPOT ACTIVITY
SEAD-60
SOIL ANALYSIS RESULTS FROM THE ESI

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-60 0-0.2 05/27/94 SB60-1-00 222473 44410	SOIL SEAD-60 0-2 02/28/94 SB60-1.01 212883 42510	SOIL SEAD-60 2-4 02/28/94 SB60-1.02 212884 42510	SOIL SEAD-60 0-0.2 06/07/94 SB60-2-00 223339 44410	SOIL SEAD-60 2-4 06/08/94 SB60-2-02 223513 44694
S/PCB										
	ug/Kg	5	11%	110	0	4 UJ	1.9 U	1.9 U	5 J	1.8 U
	ug/Kg	16	11%	41	0	4 UJ	1.9 U	1.9 U	16 J	1.8 U
l	ug/Kg	34	33%	900	0	3.2 J	1.9 U	1.9 U	34 J	1.8 U
	ug/Kg	110	44%	2100	0	110 J	2.7 J	3.7 U	31 J	3.6 U
	ug/Kg	100	22%	2900	0	7.8 UJ	3.7 U	3.7 U	55 J	3.6 U
	ug/Kg	130	22%	2100	0	84 J	3.7 U	3.7 U	130 J	3.6 U
ne	ug/Kg	14	11%	NA	NA	7.8 UJ	3.7 U	3.7 U	14 J	3.6 U
dane	ug/Kg	27	22%	540	0	4 UJ	1.9 U	1.9 U	27 J	1.8 U
ordane	ug/Kg	10	11%	540	0	4 UJ	1.9 U	1.9 U	10 J	1.8 U
2	ug/Kg	970	11%	1000/10000(a)	0	78 UJ	37 U	37 U	970 J	36 U
3	ug/Kg	2100	11%	1000/10000(a)	1	78 UJ	37 U	37 U	2100 J	36 U
0	ug/Kg	4400	22%	1000/10000(a)	1	78 UJ	37 U	37 U	4400 J	36 U
	mg/Kg	14100	100%	14593	0	10800	8440	13300	9420	6850 J
	mg/Kg	1.8	78%	3.59	0	0.28 J	0.43 J	0.36 J	1.8 J	0.29 J
	mg/Kg	8.1	100%	7.5	1	5.3	4.1 J	6.2 J	8.1	4.6
	mg/Kg	679	100%	300	2	77.6	98.3	85.8	679	71.7 J
	mg/Kg	0.67	100%	1	0	0.47 J	0.43 J	0.67 J	0.42 J	0.26 J
	mg/Kg	2	100%	1	2	0.58 J	0.36 J	0.27 J	2	0.32 J
	mg/Kg	102000	100%	101904	1	65800	75100	64000	56200	90900 J
	mg/Kg	23.3	100%	22	2	18.3	14.2	19.4	18.8	12 J
	mg/Kg	13.1	100%	30	0	9.6	8.3 J	10.8	9.5 J	8.1 J
	mg/Kg	190	100%	25	3	24.9	21.3	21.7	190	16.6 J
	mg/Kg	32100	100%	26627	1	22800	18900	23900	22800	15600 J
	mg/Kg	66.7	100%	30	3	17.1	47.5 J	12.6 J	66.7	7.2
	mg/Kg	25400	100%	12222	5	13300	11300	17200	12200	25400 J
	mg/Kg	536	100%	669	0	422	333	431	317	536 J
	mg/Kg	0.08	89%	0.1	0	0.06 J	0.08 J	0.03 J	0.03 J	0.03 J
	mg/Kg	44.3	100%	34	1	30.9	23.5	29.1	29.5	23.5 J
	mg/Kg	1920	100%	1762	7	1920 J	1470	1820	1870 J	1860
	mg/Kg	1.5	33%	2	0	0.43 U	0.32 U	0.31 U	1.5 J	0.54 U
	mg/Kg	140	100%	104	8	105 J	75 J	129 J	127 J	119 J
	mg/Kg	26.2	100%	150	0	18.6	14.8	21.9	21.2	13.7 J
	mg/Kg	569	100%	83	5	85	58.6	101	569	43.7 J
ALYSES										
eum Hydrocarbons	mg/Kg	218000	89%	NA	NA	87 J	29 U	87 J	218000	283
	%W/W					85.4	88.4	87.7	90.1	91.8

TABLE 1

SENECA ARMY DEPOT ACTIVITY
SEAD-60
SOIL ANALYSIS RESULTS FROM THE ESI

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-60 6-8 06/07/94 SB60-2-04 223340 44665	SOIL SEAD-60 0-0.2 06/08/94 SB60-3.00 223499 44665	SOIL SEAD-60 4-6 06/08/94 SB60-3 03 223500 44665	SOIL SEAD-60 6-8 06/08/94 SB60-3.04 223501 44665
ORGANICS									
hloride	ug/Kg	54	56%	100	0	3 J	21	54	1 J
	ug/Kg	170	11%	200	0	11 U R	14 U	11 U	11 U
lfide	ug/Kg	2	22%	2700	0	11 U R	14 U	11 U	2 J
	ug/Kg	26	11%	300	0	11 U R	14 U	11 U	11 U
	ug/Kg	1	11%	NA	NA	11 U R	14 U	11 U	11 U
thene	ug/Kg	3	11%	1400	0	3 J	14 U	11 U	11 U
	ug/Kg	13	33%	1500	0	2 J	14 U	11 U	11 U
e	ug/Kg	4	11%	5500	0	11 U R	14 U	11 U	11 U
)	ug/Kg	9	11%	1200	0	11 U R	14 U	11 U	11 U
TILE ORGANICS									
	ug/Kg	38	11%	13000	0	350 U	2200 U	350 U	350 U
hthalene	ug/Kg	1100	11%	36400	0	350 U	2200 U	350 U	350 U
ne	ug/Kg	1400	33%	50000*	0	32 J	2200 U	350 U	350 U
n	ug/Kg	29	11%	6200	0	350 U	2200 U	350 U	350 U
	ug/Kg	1300	22%	50000*	0	350 U	2200 U	350 U	350 U
ne	ug/Kg	8900	44%	50000*	0	350 U	680 J	350 U	350 U
	ug/Kg	2000	22%	50000*	0	350 U	2200 U	350 U	350 U
	ug/Kg	79	11%	50000*	0	350 U	2200 U	350 U	350 U
thalate	ug/Kg	1500	33%	8100	0	350 U	2200 U	81 J	94 J
e	ug/Kg	14000	67%	50000*	0	29 J	1300 J	350 U	350 U
	ug/Kg	27000	78%	50000*	0	62 J	2000 J	350 U	350 U
hracene	ug/Kg	340	11%	220	1	350 U	2200 U	350 U	350 U
	ug/Kg	17000	44%	400	2	350 U	1100 J	350 U	350 U
exyl)phthalate	ug/Kg	380	44%	50000*	0	43 J	2200 U	350 U	160 J
ranthene	ug/Kg	16000	33%	1100	2	350 U	1500 J	350 U	350 U
ranthene	ug/Kg	190	11%	1100	0	350 U	2200 UJ	350 U	350 U
ene	ug/Kg	350	11%	61	1	350 U	2200 U	350 U	350 U
-cd)pyrene	ug/Kg	1100	33%	3200	0	46 J	1100 J	350 U	350 U
nthracene	ug/Kg	1100	33%	14	3	27 J	1100 J	350 U	350 U
perylene	ug/Kg	1600	33%	50000*	0	43 J	1600 J	350 U	350 U

TABLE 1

SENECA ARMY DEPOT ACTIVITY
SEAD-60
SOIL ANALYSIS RESULTS FROM THE ESI

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-60 6-8 06/07/94 SB60-2-04 223340 44665	SOIL SEAD-60 0-0.2 06/08/94 SB60-3.00 223499 44665	SOIL SEAD-60 4-6 06/08/94 SB60-3.03 223500 44665	SOIL SEAD-60 6-8 06/08/94 SB60-3.04 223501 44665
ES/PCB									
	ug/Kg	5	11%	110	0	1.8 U	2.9 UJ	1.8 U	1.8 U
	ug/Kg	16	11%	41	0	1.8 U	2.9 UJ	1.8 U	1.8 U
n l	ug/Kg	34	33%	900	0	1.8 U	6.3 J	1.8 U	1.8 U
	ug/Kg	110	44%	2100	0	3.5 U	28 J	3.5 U	3.5 U
	ug/Kg	100	22%	2900	0	3.5 U	100 J	3.5 U	3.5 U
	ug/Kg	130	22%	2100	0	3.5 U	5.6 UJ	3.5 U	3.5 U
one	ug/Kg	14	11%	NA	NA	3.5 U	5.6 UJ	3.5 U	3.5 U
rdane	ug/Kg	27	22%	540	0	1.8 U	3 J	1.8 U	1.8 U
lordane	ug/Kg	10	11%	540	0	1.8 U	2.9 UJ	1.8 U	1.8 U
42	ug/Kg	970	11%	1000/10000(a)	0	35 U	56 UJ	35 U	35 U
48	ug/Kg	2100	11%	1000/10000(a)	1	35 U	56 UJ	35 U	35 U
60	ug/Kg	4400	22%	1000/10000(a)	1	35 U	220 J	35 U	35 U
	mg/Kg	14100	100%	14593	0	8320	14100	6980	13200
	mg/Kg	1.8	78%	3.59	0	0.22 UJ	0.49 J	0.26 J	0.18 UJ
	mg/Kg	8.1	100%	7.5	1	3.8	7	4	5.6
	mg/Kg	679	100%	300	2	90.1	416	64	50.1
	mg/Kg	0.67	100%	1	0	0.38 J	0.66 J	0.35 J	0.63 J
	mg/Kg	2	100%	1	2	0.33 J	1.5 J	0.35 J	0.72
	mg/Kg	102000	100%	101904	1	72300 J	23700 J	102000 J	50600 J
	mg/Kg	23.3	100%	22	2	14.1	23.3	12	22.7
	mg/Kg	13.1	100%	30	0	7.9 J	13.1 J	8.2	12.7
	mg/Kg	190	100%	25	3	20.5	74.1	19.8	30.6
	mg/Kg	32100	100%	26627	1	17700	25700	15500	32100
	mg/Kg	66.7	100%	30	3	9.5	50.6	8.2	15.3
n	mg/Kg	25400	100%	12222	5	19000	8570	18000	11400
e	mg/Kg	536	100%	669	0	368	443	417	378
	mg/Kg	0.08	89%	0.1	0	0.07 J	0.02 U	0.02 J	0.01 J
	mg/Kg	44.3	100%	34	1	23.6	31.3	22.9	44.3
	mg/Kg	1920	100%	1762	7	1820 J	1820 J	1690 J	1920 J
	mg/Kg	1.5	33%	2	0	0.47 U	1.2 J	0.43 U	0.65 J
	mg/Kg	140	100%	104	8	119 J	118 J	113 J	140 J
	mg/Kg	26.2	100%	150	0	14.5	26.2	12.9	19.3
	mg/Kg	569	100%	83	5	64.4	314	56.3	266
NALYSES									
leum Hydrocarbons	mg/Kg	218000	89%	NA	NA	332	50900	57	34
s	%W/W					94.2	59.1	93.1	93.8

NOTES:
a) The TAGM value for PCBs is 1000ug/Kg for surface soils and 10,000 ug/Kg for subsurface soils.
b) * = As per proposed TAGM, total VOCs < 10 ppm, total SVOs < 500 ppm, and individual SVOs < 50 ppm.
c) NA = Not Available.
d) U = The compound was not detected below this concentration.
e) J = The reported value is an estimated concentration.
f) UJ = The compound may have been present above this concentration, but was not detected due to problems with
g) R = The data was rejected during the data validation process.

TABLE 2

SENECA ARMY DEPOT ACTIVITY
SEAD-60
GROUNDWATER ANALYSIS RESULTS FROM THE ESI

COMPOUND	MATRIX LOCATION SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	FEDERAL DRINKING WATER MCL (h)	NY AWQS CLASS GA (a)	NUMBER ABOVE LOWEST CRITERIA	WATER SEAD-60 07/07/94 MW60-1 226301 45257	WATER SEAD-60 07/07/94 MW60-2 226302 45257	WATER SEAD-60 03/29/94 MW60-3 215838 43179
VOLATILE ORGANICS									
Acetone	ug/L	77	67%	NA	NA	NA	48	77 J	10 U
Benzene	ug/L	1	33%	5	0.7	1	1 J	10 U	10 U
PESTICIDES/PCB									
beta-BHC	ug/L	0.049	33%	NA	5	0	0.051 U	0.051 U	0.049 J
METALS									
Aluminum	ug/L	376	100%	50-100*	NA	3	348	58 J	376
Barium	ug/L	88.7	100%	2000	1000	0	88.7 J	45 J	34 J
Calcium	ug/L	113000	100%	NA	NA	NA	95100	112000	113000
Chromium	ug/L	0.56	67%	100	50	0	0.56 J	0.4 U	0.51 J
Cobalt	ug/L	0.72	33%	NA	NA	NA	0.5 U	0.5 U	0.72 J
Copper	ug/L	0.99	33%	1000*	200	0	0.5 U	0.5 U	0.99 J
Iron	ug/L	1440	100%	300	300	3	1290	1340	1440
Magnesium	ug/L	55100	100%	NA	NA	NA	31100	55100	52600
Manganese	ug/L	377	100%	50*	300	3	377	125	166
Mercury	ug/L	0.05	67%	2	2	0	0.05 J	0.05 J	0.03 U
Nickel	ug/L	1.6	33%	100	NA	NA	0.7 U	0.7 U	1.6 J
Potassium	ug/L	8760	100%	NA	NA	NA	8760	4530 J	4510 J
Sodium	ug/L	59400	100%	NA	20000	1	59400	12300	11400
Thallium	ug/L	1.8	33%	2	NA	0	1.9 U	1.9 U	1.8 J
Vanadium	ug/L	1.5	67%	NA	NA	NA	1 J	0.5 U	1.5 J
Zinc	ug/L	6.9	100%	5000*	300	0	6.9 J	3.2 J	4.8 J
OTHER ANALYSES									
Total Petroleum Hydrocarbons	mg/L	2.2	66%		NA	NA	2.2	1.22	0.4 U
pH	Standard Units						7.4	7.3	7.6
Conductivity	umhos/cm						1010	700	615
Temperature	°C						11.7	11.5	8.2
Turbidity	NTU						104	8.6	5.8

NOTES:
a) NY State Class GA Groundwater Regulations
b) NA = Not Available
d) U = The compound was not detected below this concentration.
e) J = The reported value is an estimated concentration.
f) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
g) R = The data was rejected during the data validation process.
h) Federal Primary and Secondary (*) Drinking Water Maximum Contaminant Levels (40 CRF 141.61-62 and 40 CRF 143.3)

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TABLE 3

SENECA ARMY DEPOT ACTIVITY
SEAD-60
SURFACE WATER ANALYSIS RESULTS FROM THE ESI

COMPOUND	MATRIX LOCATION SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	NYS GUIDELINES CLASS D (a,c)	NUMBER ABOVE CRITERIA	WATER SEAD-60 04/27/94 SW60-1 219531 43626	WATER SEAD-60 04/20/94 SW60-2 218496 43626	W SE 04 SW6 21 4
LS								
um	ug/L	259	100%	NA	NA	35.7 J	259	93.5
	ug/L	1.6	33%	360	0	1.5 U	1.6 J	1.5
	ug/L	49.4	100%	NA	NA	28.7 J	49.4 J	22.4
n	ug/L	89000	100%	360	NA	42300	89000	42200
um	ug/L	0.68	67%	3275	0	0.56 J	0.68 J	0.4
	ug/L	2	100%	36.8	0	1.7 J	2 J	1.1
	ug/L	453	100%	300	1	78 J	453	121
sium	ug/L	22000	100%	NA	NA	8260	22000	8390
nese	ug/L	28.5	100%	NA	NA	12.5 J	28.5	4.5
	ug/L	1.8	100%	50562	0	0.98 J	1.8 J	0.83
um	ug/L	1430	100%	NA	NA	1060 J	1430 J	649
	ug/L	53800	100%	NA	NA	2030 J	53800	2340
um	ug/L	0.85	33%	190	0	0.7 U	0.85 J	0.69
	ug/L	9.6	100%	611	0	3 J	3.4 J	9.6
R ANALYSES								
	Standard Units					8.4	8.7	9.1
tivity	umhos/cm					232	675	180
rature	°C					23.3	16	10
y	NTU					2.2	5.7	2.4

NOTES:

a) The New York State Ambient Water Quality standards and guidelines for Class D surface water.
b) Hardness dependent values assume a hardness of 217 mg/L.
c) NA = Not Available
d) U = The compound was not detected below this concentration.
e) J = The reported value is an estimated concentration.
f) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.

TABLE 4

SENECA ARMY DEPOT
SEAD-60
SEDIMENT ANALYSIS RESULTS FROM THE ESI

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	NYSDEC SEDIMENT CRITERIA FOR AQUATIC LIFE (a)	NYSDEC SEDIMENT CRITERIA FOR HUMAN HEALTH (a)	NYSDEC SEDIMENT CRITERIA FOR WILDLIFE (a)	LOT (b)	NUMBER ABOVE CRITERIA	SOIL SEAD-60 0-0.2 04/27/94 SD60-1 219550 43663	SOIL SEAD-60 0-0.2 04/20/94 SD60-2 218490 43663	SOIL SEAD-60 0-0.2 04/20/94 SD60-3 218491 43663
VOLATILE ORGANICS											
Chloroform	ug/Kg	3	33%	NA	NA	NA	NA	NA	16 U	3 J	16 U
SEMIVOLATILE ORGANICS											
Phenanthrene	ug/Kg	70	67%	1390	NA	NA	NA	0	580 U	63 J	70 J
Fluoranthene	ug/Kg	200	67%	NA	NA	NA	NA	NA	580 U	160 J	200 J
Pyrene	ug/Kg	250	67%	NA	NA	NA	NA	NA	580 U	190 J	250 J
Benzo(a)anthracene	ug/Kg	68	67%	NA	13	NA	NA	2	580 U	56 J	68 J
Chrysene	ug/Kg	160	67%	NA	13	NA	NA	2	580 U	130 J	160 J
bis(2-Ethylhexyl)phthalate	ug/Kg	1100	100%	1197 (c)	NA	NA	NA	0	110 J	1100	75 J
Benzo(b)fluoranthene	ug/Kg	120	67%	NA	13	NA	NA	2	580 U	120 J	120 J
Benzo(k)fluoranthene	ug/Kg	97	67%	NA	13	NA	NA	2	580 U	87 J	97 J
Benzo(a)pyrene	ug/Kg	79	67%	NA	13	NA	NA	2	580 U	79 J	64 J
Indeno(1,2,3-cd)pyrene	ug/Kg	68	67%	NA	13	NA	NA	2	580 U	68 J	57 J
Benzo(g,h,i)perylene	ug/Kg	93	67%	NA	NA	NA	NA	NA	580 U	93 J	67 J
PESTICIDES/PCB											
Endosulfan I	ug/Kg	2.1	33%	0.3	NA	NA	NA	1	3 U	3.3 U	2.1 J
4,4'-DDE	ug/Kg	5.4	33%	500	0.1	10	NA	1	5.8 U	6.5 U	5.4 J
4,4'-DDT	ug/Kg	3.4	33%	NA	NA	10	NA	0	5.8 U	6.5 U	3.4 J
alpha-Chlordane	ug/Kg	1.9	33%	0.06	0.01	0.06	NA	1	3 U	3.3 U	1.9 J
METALS											
Aluminum	mg/Kg	12700	100%	NA	NA	NA	NA	NA	12700	10700	5470
Arsenic	mg/Kg	4.8	100%	5	NA	NA	33	0	4.8	3.6	3.7
Barium	mg/Kg	97.6	100%	NA	NA	NA	NA	NA	97.6	80.3	46.5 J
Beryllium	mg/Kg	0.62	100%	NA	NA	NA	NA	NA	0.62 J	0.54 J	0.35 J
Cadmium	mg/Kg	0.44	100%	0.8	NA	NA	10	0	0.34 J	0.44 J	0.25 J
Calcium	mg/Kg	227000	100%	NA	NA	NA	NA	NA	3760	21300	227000
Chromium	mg/Kg	19.5	100%	26	NA	NA	111	0	19.5	17.5	9
Cobalt	mg/Kg	9.6	100%	NA	NA	NA	NA	NA	9.6 J	8.2 J	6.7 J
Copper	mg/Kg	21.1	100%	19	NA	NA	114	1	14.2	21.1	12.5
Iron	mg/Kg	25000	100%	24000	NA	NA	40000	1	25000	22000	12700
Lead	mg/Kg	24.6	100%	27	NA	NA	250	0	13.9	24.6	9.1
Magnesium	mg/Kg	8380	100%	NA	NA	NA	NA	NA	4370	7490	8380
Manganese	mg/Kg	509	100%	428	NA	NA	1100	2	467 J	282 J	509 J
Mercury	mg/Kg	0.03	33%	0.11	NA	NA	2	0	0.05 J R	0.04 J R	0.03 J
Nickel	mg/Kg	27.2	100%	22	NA	NA	90	2	27.2	26.7	16.2
Potassium	mg/Kg	1610	100%	NA	NA	NA	NA	NA	1610	1190 J	988 J
Sodium	mg/Kg	134	67%	NA	NA	NA	NA	NA	45 U	134 J	91 J
Thallium	mg/Kg	0.55	33%	NA	NA	NA	NA	NA	0.45 U	0.55 J	0.46 U
Vanadium	mg/Kg	23.9	100%	NA	NA	NA	NA	NA	23.9	19.2	11.1 J
Zinc	mg/Kg	101	100%	85	NA	NA	800	3	93.5	88.1	101
Cyanide	mg/Kg	3.3	33%	NA	NA	NA	NA	NA	0.83 U	0.94 U	3.3
OTHER ANALYSES											
Total Petroleum Hydrocarbons	mg/Kg	149	33%						40 U	149	44 U
Total Solids	%W/W								56.8	50.7	60.5

NOTES:

a) NYSDEC Sediment Criteria - 1989
b) LOT = Limit of Tolerance: Represents point at which significant effects on benthic species occur.
c) NYSDEC 1989 guideline for phthalates.
d) NA = Not Available.
e) U = The compound was not detected below this concentration.
f) J = The reported value is an estimated concentration.
g) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
h) R = The data was rejected during the data validation process.

µg/kg in sample SB60-2-04 collected at 6 to 8 feet in the boring and was the only compound detected in the subsurface soil samples exceeding the associated TAGM value.

While the concentrations of VOCs, pesticides, and PCBs present in the 2 surface soil samples from the release area were generally below TAGM values, 2 PCBs (Aroclor 1248 and Aroclor 1260) were found at concentrations above their TAGM values. Heavy metals concentrations above TAGM values were present in all of the samples. While the surface soil samples from the two soil borings located near the oil release area generally had more TAGM exceedances for heavy metals; no consistent pattern in the spacial distribution of these exceedances was evident.

Sediment at SEAD-60 has also been impacted by the release of the fuel oil. Concentrations of semivolatile organic compounds (primarily PAHs) and TPH were reported in the analysis results of the 2 sediment samples collected down slope of the oil-stained soil. The concentrations of several semivolatile organic compounds exceed their respective TAGMs.

The analytical results indicate that TPH has impacted the groundwater beneath the oil release area, even though the concentrations of TPH in soil were dramatically reduced at depth. A TPH concentration of 1.22 mg/L was detected in the monitoring well (MW60-2) located hydraulically downgradient of the oil release area. Monitoring well MW60-1, located approximately 130 feet east of the Building 609 and hydraulically upgradient of the oil release area, also contained TPH at a concentration of 2.2 mg/L. TAGM and Federal Drinking Water criteria exceedances for benzene and four metals (aluminum, iron, manganese, and sodium) were also detected in the groundwater samples.

Surface water at the site has not been significantly impacted by any of the constituents that were analyzed for during the investigation.

These results indicate that a significant release of TPH and PAHs in the near surface soils has occurred at SEAD-60.

5.4 DISCUSSION OF REMOVAL ALTERNATIVES

A number of removal alternatives/technologies are available for the treatment of petroleum-impacted soils at SEAD-60. These are:

1. land treatment
2. bioventing
3. vapor extraction
4. off-site disposal
5. soil washing
6. low temperature thermal desorption

However, low temperature thermal desorption has been chosen as the technology to treat petroleum-impacted soils at SEAD-60 for the following reasons:

1. Low temperature thermal desorption has been demonstrated to be an effective method for remediating petroleum-contaminated soil and is widely used for this purpose.

2. In an effort to determine the efficacy of treating VOC contamination on-site and using depot personnel, a treatability study is being proposed. The existing deactivation furnace (SEAD-17) will be modified slightly in an effort to study its potential as a Low Temperature Thermal Desorption (LTTD) unit for the remediation of several identified sites and additional sites as may become necessary. This process heats soil to a temperature of approximately 900°F via a gas fired, direct contact, countercurrent rotary retort furnace. The volatilized organics and other pollutants present in the soil such as polynuclear aromatic hydrocarbons are swept from the retort into a series of air pollution control equipment prior to atmospheric discharge.

3. A interim remedial measure (IRM) for contaminated soils was conducted at the Ash Landfill site. The remedial program consisted of removing soils impacted with chlorinated hydrocarbons and treating them using an on-site rotary kiln thermal desorption treatment unit. The estimated cost of the treatment of 24,000 cubic yards (CY) of contaminated soil from the Ash Landfill using low temperature thermal desorption is $6,000,000. Roughly,

this converts into a unit cost of $250/CY for the removal, transportation, treatment and disposal of the contaminated soil.

For the purpose of evaluating the economic costs of this alternative, and to justify the recommendation provided in Section 5.5, a conservative unit cost of $250/CY was used.

5.5 RECOMMENDATIONS

Removal of petroleum hydrocarbon-impacted soil is recommended in the spill area between the railaroad spurs adjacent to the southwestern corner of Building 609 and in the drainage ditch area near the sediment sampling locations. Between the railroad spurs, an area approximately 35 feet across and 50 feet long should be excavated. The ends of the excavation should be near soil borings SB60-2 and SB60-3. A 15-foot by 15-foot area around soil boring SB60-1, which is located on the southern side of Building 609, should also be excavated. The sediment from the drainage ditch area near the SWSD60-2 and SWSD60-3 sample locations should be excavated. The soil in these areas should only be excavated to a depth of 1 foot. The locations of the areas to be remediated are shown in Figure 1.

The soils can be excavated with a backhoe by SEDA personnel and transported by truck to the rotary kiln incinerator at SEAD-17. Because of the low volume of soil to be remediated, clean fill from SEDA can be used to backfill the excavated area once the area has been demonstrated to comply with the New York State Department of Environmental Conservation (NYSDEC) Petroleum-Contaminated Soil Guidance Policy.

5.6 JUSTIFICATIONS

The total volume of soil that is being recommended for removal from SEAD-60 is approximately 195 CY. Using a conservative estimated unit cost of $250/CY for the treatment of the soil, the total cost of remediating the soil at the rotary kiln incinerator at SEAD-17 would be $48,750. Because the lateral and vertical extent of the petroleum hydrocarbon-impacted soil can be sufficiently removed by this method of remediation, and the cost is not prohibitive, low temperature thermal desorption appears to be an effective and immediate way to remediate the soil at SEAD-60.

5.7 POST-REMOVAL VERIFICATION SAMPLING

Each 150 CY batch that is processed through the rotary kiln incinerator is sampled to verify that the soil has been sufficiently treated, and the 185 CY from SEAD-60 will be processed as a portion of one of these larger batches. The soil will be processed through the rotary kiln until it satisfies conditions stated in the NYSDEC Petroleum-Contaminated Soil Guidance Policy, and then will be disposed of at the Ash Landfill.

To determine whether the 195 CY of soil excavated from SEAD-60 is a sufficient volume to remove the petroleum-impacted soil a total of 10 samples will be collected from the area excavated at the near Building 609 and a total of ten samples will be collected from the ditch excavated at sample locations SS60-2 and SS60-3. Each of these samples will be analyzed for volative organic compounds and semivolatile organic compounds by EPA Methods 8021 and 8270, respectively. Near Building 609, one composite sample will be collected from each of the side walls of the excavations and one composite sample will be collected from the floor of each excavation. In the drainage ditch, one composite sample will collected from each of the side walls of the excavations and one composite sample will be collected from the floor of each excavation.

If these samples demonstrate that the concentrations of the contaminants are below the guidance values for the 1) protection of groundwater, 2) protection of human health, 3) protection of fish and wildlife, and 4) protection against objectionable nuisance characteristics, as stated in the NYSDEC Petroleum-Contaminated Soil Guidance Policy, then SEAD-60 will be considered to have been acceptably remediated.