Alaska Railroad Corporation

Anchorage, Alaska

Final Report

1992 Activities

Underground Storage Tank Removals and Site Characterization, Seward and Whittier

Additional Site Characterization, Tunne

In-Place Closure and Site Characterization, Moose Pass

ENSR Consulting and Engineering

January 1993

Document Number 0092-009

CONTENTS

CONTENTS
(Cont'd)

CONTENTS
(Cont'd)

LIST OF TABLES

LIST OF FIGURES

1.0 INTRODUCTION

The Alaska Railroad Corporation (ARRC) contracted ENSR Consulting and Engineering (ENSR) to oversee the removal of underground storage tanks (USTs), closure in place, site assessment, and corrective action for four sites in the Kenai Borough. All work was conducted as detailed in ENSR's Work Plan for Underground Storage Tank Removal, Site Assessment, and Corrective Action for Seward, Moose Pass, Tunnel, and Whittier dated August 1992.

Table 1-1 provides the number and types of USTs at each site location.

1.1 Quality Assurance Plan

A Quality Assurance/Quality Control Plan, Site Investigations, Remediation Projects, and Quality Assurance Plan, 1991 ENSR Projects, applicable to Alaska Railroad Corporation (ARRC) UST projects was submitted to the Alaska Department of Environmental Conservation (ADEC). The procedures outlined in this document were used for quality assurance on the UST removal operations described in this report.

1.2 Health and Safety Plan

A Health and Safety Plan, Alaska Railroad Corporation, Health and Safety Plan, Underground Storage Tank Removals and Corrective Actions, 1992, was prepared to cover the tank removal and remediation activities conducted at Seward, Moose Pass, Tunnel, Whittier, Willow, Sunshine, and Talkeetna. The plan was prepared to cover proper safety procedures and potential health hazards relating to UST removal and remediation operations.

Two ARRC safety documents entitled Alaska Railroad Corporation, Manual of Safety Rules and Regulations for General Guidance and Protection of Railroad Personnel, and Timetable No. 122 were incorporated by reference into the Health and Safety Plan as supplemental information specific to the ARRC working environment.

Health and Safety meetings were conducted at the start of each UST removal and on a daily basis thereafter during the ARRC UST removal operations.

Table 1-1

Site Locations for USTs

Site	Work Conducted
Seward	Removal of: two 10,000-gallon heating oil USTs – Non-regulated one 500-gallon gasoline UST one 1,000-gallon diesel UST one 2,000-gallon gasoline UST — regulated USTs
Moose Pass	Closure in-place of: one 2,000-gallon gasoline UST
Tunnel Section	Corrective action--sampling as detailed in ARRC's Corrective Action Plan (CAP) for 1991 UST removals
Whittier	Removal of: one 2,500-gallon gasoline UST one 10,000-gallon heating oil UST

LUST →

1.3 Field Methods

The following sections describe the methods used during the 1992 UST removal activities.

1.3.1 Ambient Temperature Headspace (ATH) analysis

Soil samples were collected from excavation walls and floor to screen the soils in the field for volatile organic compounds (VOCs) using an Ambient Temperature Headspace (ATH) method. Representative soil samples were collected in Ziploc™ freezer bags, leaving approximately 2 inches of headspace above the soil in the bag. The bags were sealed and set aside for about 15 to 30 minutes to allow the soil to reach ambient temperature. After the soil reached ambient temperature, a photoionization detector (PID) probe (Photovac Microtip) was inserted into the headspace of the bags to detect the presence of photoionizable VOCs. ATH readings for each sample were recorded in the field book. Prior to field screening, the PID was calibrated with a 100 ppm by volume isobutylene reference gas. A more comprehensive description of ENSR's field screening techniques is provided in ENSR's 1991 Quality Assurance Plan (QAPP).

1.3.2 UST Excavation Soil Sampling

In-place soil samples for laboratory analysis were collected from under the USTs as required by Alaska Department of Environmental Conservation (ADEC) requirements. Additional samples collected from the UST excavation, as per ADEC regulations, were collected from locations in which field screening (from ATH analyses, see Section 1.3.1) indicated the highest presence of volatile organic compounds.

1.3.3 Excavated Soil Pile Sampling

Samples from the excavated soil piles were collected from random locations. The ATH field analyses and laboratory samples were collected from at least 18 inches into the soil piles.

1.3.4 Laboratory Methods

1.3.4.1 Excavation Soils Analyses

Soil samples collected at diesel fuel/heating oil tanks were analyzed for diesel range organics (DRO) by EPA Method 8015 (modified). Soil samples collected at gasoline tanks were analyzed for gasoline range organics (GRO) by EPA Method 8100 and for benzene, toluene, ethylbenzene, and xylenes (BTEX) by EPA Method 8020.

1.3.4.2 Excavated Soil Pile Analyses

Soils samples collected for laboratory analyses were analyzed for the compounds listed below:

- Total petroleum hydrocarbons (TPH) using EPA Test Method 418.1;
- Total arsenic (As) using EPA Test Method 7060/7061;
- Total chromium (Cr) using EPA Test Method 7190/7191;
- Total lead (Pb) using EPA Test Method 3050/7421;
- Polychlorinated biphenyls (PCBs) using EPA Test Method 8080;
- Halogenated organic compounds (HOCs) using EPA Test Method 8010; and
- Aromatic volatile organics (BETX) using EPA Test Method 8020. Aromatic volatile organics report concentrations of benzene, ethylbenzene, toluene, and xylenes.

The excavated soils were analyzed for these compounds to allow for waste characterization and determination of remedial options.

The following sections detail the work conducted at each site as well as the general site conditions and results of field and laboratory analyses.

2.0 SEWARD

A total of five USTs were removed from the Seward rail yard. A list of the removed USTs is provided below:

- Two 10,000-gallon heating oil USTs
- One 500-gallon gasoline UST
- One 1,000-gallon diesel UST
- One 2,000-gallon gasoline UST

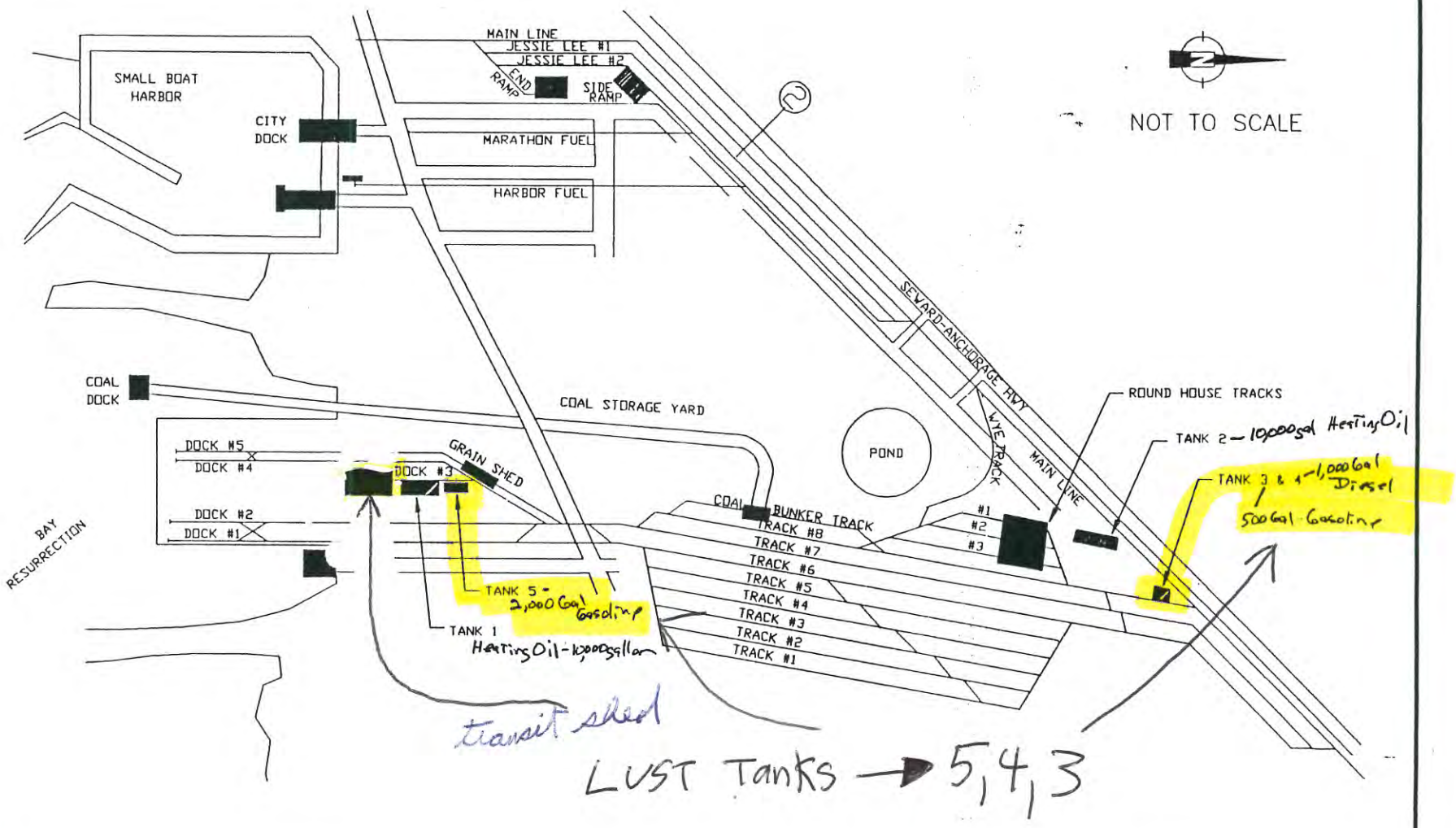
} LUST

All the USTs were removed as detailed in Section 5.0 of ENSR's Work Plan for Underground Storage Tank Removal, Site Assessment, and Corrective Action for Seward, Moose Pass, Tunnel, and Whittier, dated August 1992. UST removal work at the Seward site was conducted by ARRC personnel. Oversight of the UST removal was provided by Steven King and Michael MacDonald of ENSR Consulting and Engineering.

The full laboratory data for the Seward site is presented in Appendix A.

The following sections provide a breakdown of the conditions and work performed at each UST.

A site and tank location map is presented in Figure 2-1



ENSR CONSULTING & ENGINEERING DRAWING: TANKSITE C/SC: 1:1 DATE: 01/25/93 DRAWN: ABB DISK: D/517 CHECK: MM	FIGURE 2-1 SITE AND TANK LOCATION MAP SEWARD, ALASKA	ALASKA RAILROAD CORPORATION ANCHORAGE, ALASKA PROJECT 0092-009

2.1 Tank 1 (T1) 10,000-Gallon Heating Diesel Fuel Oil UST

- Location: North end of the dock building (Figure 2-2). Figure 2-3 presents a cross sectional view of the excavation.

2.1.1 Tank Removal

- Factors Affecting Tank Removal or Sampling: The UST was installed with a hold-down pad. This hold-down pad is a concrete pad with a cradle on which the UST rested. The pad was 15 feet by 36 feet by approximately 8 inches. The UST was attached to the pad with steel straps. The pad was not removed from the excavation. This pad was approximately 9 feet below grade.

- Dates Work Was Performed: The UST was removed on August 6, 1992. The UST excavation was backfilled on August 7, 1992.

2.1.2 Description of the Tank Removal/Soil Sampling Activities

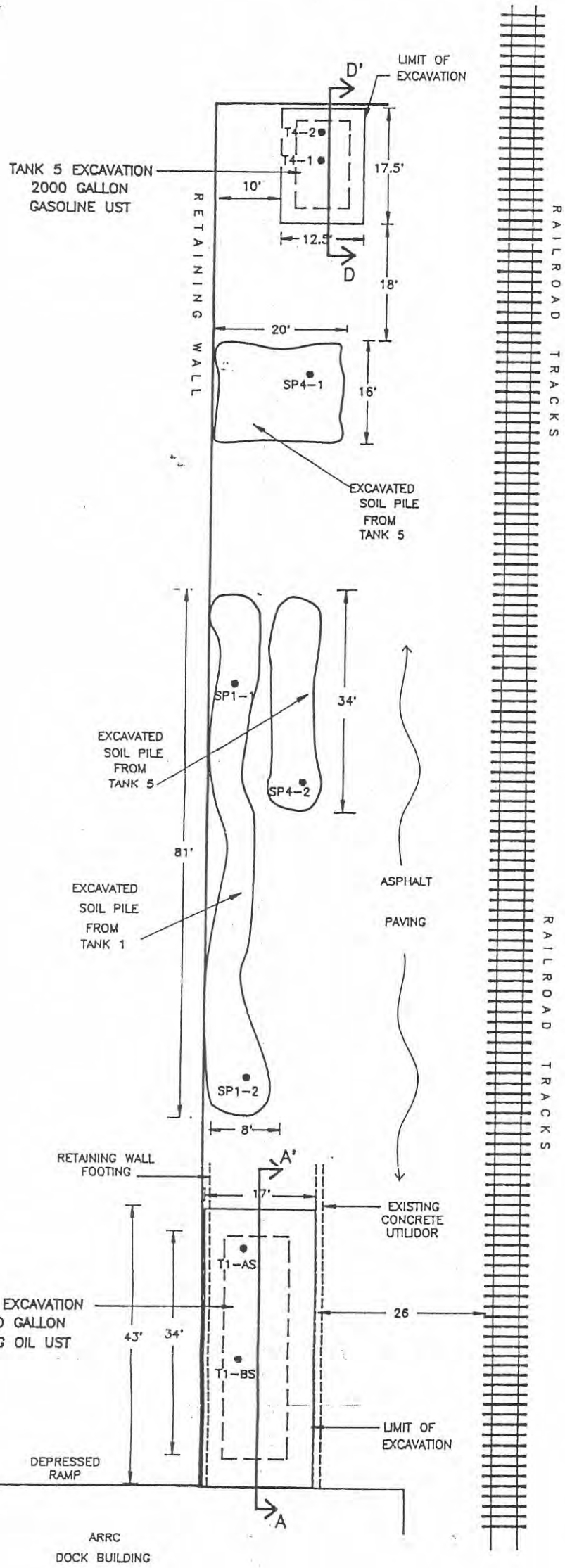
- Soil Types Encountered: The soils encountered during excavation were a gray/black/dark gray sandy gravel with some coarse sands.

- Groundwater Depth: The excavation was open for approximately one day. Groundwater was not encountered during either high or low tides.

- Location and Extent of Petroleum-Impacted Soils: Soils with a visible sheen and a hydrocarbon odor were encountered starting at 3 feet below grade. The soils were encountered in the southeast, southwest, and northwest corners of the excavation. Visually impacted soils were encountered to the bottom of the excavation.

  Ambient Temperature Headspace (ATH) field samples were collected at various depths and locations throughout the excavation. Table 2-1 presents the general location, depth, and results of the ATH field analysis from the excavation and stockpiled soils.

- Visual Condition of the Tank: The tank was under asphalt paving and had two stand pipes and supply lines to the Dock Building. After removal, the tank was inspected and was in good visual condition. The tank had an asphalt coating. No holes or corrosion was evident.

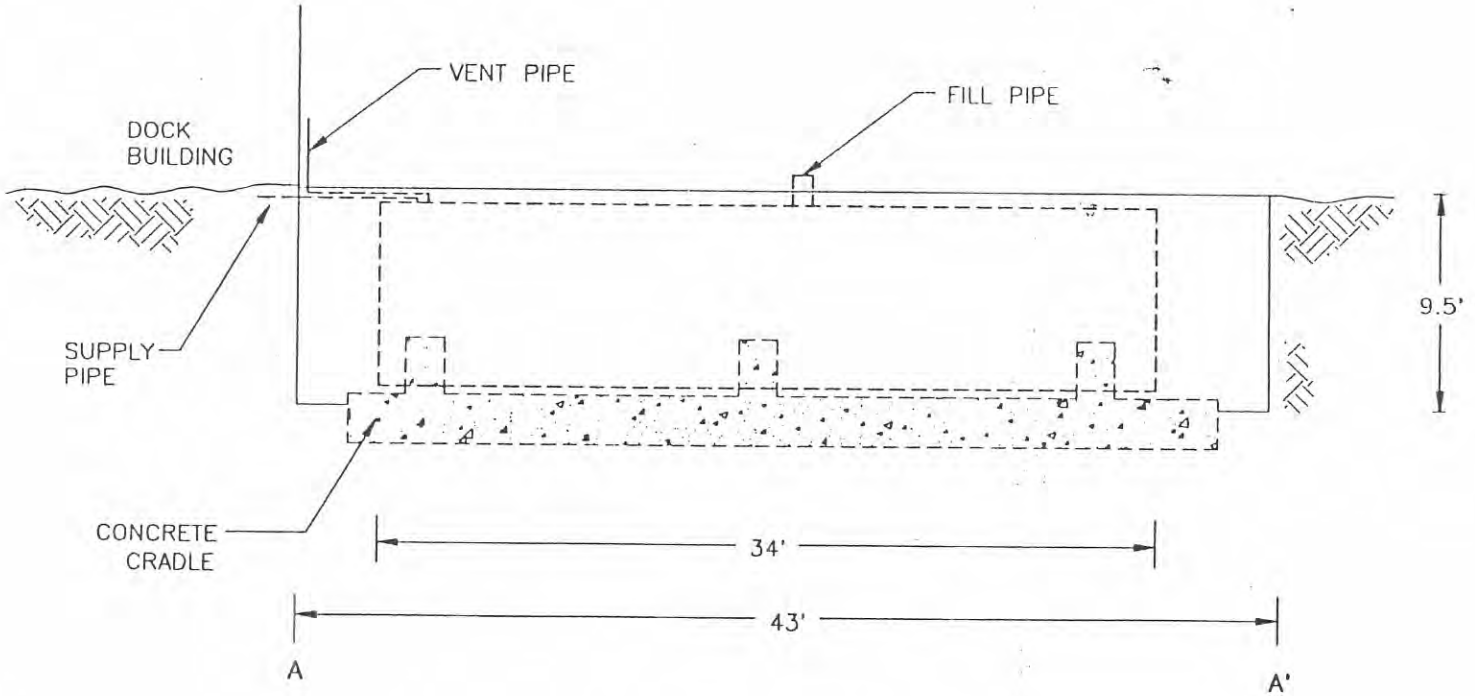


ENSR CONSULTING & ENGINEERING

ALASKA RAILROAD CORPORATION
ANCHORAGE, ALASKA

FIGURE 2-2
UST REMOVALS-SOIL SAMPLE LOCATIONS
SEWARD, ALASKA

DATE: 01/26/93	DRAWN BY: ABB/SR	SCALE: AS SHOWN	DRAWING: EX10-2
C/SC: DISK: 445	ENGINEER MM	CHECKED: MM	PROJECT: 0092-009-700



TANK 1 (T1) 10,000 GALLON HEATING OIL
(DIESEL FUEL) UST EXCAVATION

NOT TO SCALE

NOTE: NO PVC GALLERY INSTALLED

ENSR CONSULTING & ENGINEERING DRAWING: XTANK1 DRAWN: ABB C/SC: 1:1 DISK: D/517 DATE: 01/26/93 CHECK: MM	FIGURE 2-3 CROSS SECTION OF TANK 1 AT SEWARD	ALASKA RAILROAD ANCHORAGE, ALASKA PROJECT 0092-009-700

Table 2-1

Ambient Temperature Headspace (ATH) Results
Field Analysis
Tank 1, Seward

Sample Number	Approximate Location	Depth (ft)	Field ATH Reading[1]
T1-A	S End of tank	1	148
A sample numbered T1-B was not taken.			
T1-C	SE Corner	3	79.8
T1-D	SE Corner	5	259
T1-E	SE Corner	7	55.8
T1-F	E Side	9	82.4
T1-G	SW Corner	3	23.5
T1-H	SW Corner	5	45.2
T1-I	SW Corner	7.5	62.5
T1-J	SW Corner	9	90.2
T1-K	W Side	6	65.4
T1-L	W Side	5.5	51.9
T1-M	W Side	5	112
T1-N	W Side	9	144
T1-O	E Side	6	301
T1-P	E Side	9	136
T1-Q	W Side	8.5	60.3
T1-R	W Side	9.5	79.2
T1-S	N End	9	68.9
T1-AS	N End of Excavation, Below Tank	9.5	48.1
T1-BS	Center of Excavation, Below Tank	9.5	34.6
SP1-1	Excavated Soils		0
SP1-2	Excavated Soils		0

[1] ATH readings were obtained as detailed in Section 1.3.1.

- Size of the Excavation: The excavation extended approximately 43 feet by 17 feet by 9.5 feet in depth. NO GROUND WATER ENCOUNTERED,

WERE SAMPLES COLLECTED TO SHOW THE LEVELS OF CONTAMINATION THAT ARE REMAINING IN PLACE ?

Estimated Volume of Soil Removed During Excavation: Approximately 100 cubic yards of soil was excavated to remove the UST. The excavation was not expanded to try and remove suspected impacted soil because of the proximity of a retaining wall for the loading dock at the Dock Building. The Dock Building footing and a concrete utilidor were also in close proximity to the excavation. The hold-down pad prevented deeper excavation.

SAMPLES COLLECTED ALONG PERIMETER OF CONCRETE HOLD DOWN PAD?

PVC Gallery: A PVC gallery was not installed in this excavation because of the hold-down pad.

- Backfill: The excavation was backfilled with a clean gravel from Metco Sand and Gravel. The gravel was placed using a front-end loader and was compacted into place.

2.1.3 Laboratory Results

Figure 2-1 presents the location of the soil samples which were collected for laboratory analysis. Tables 2-2 and 2-3 present the analytical results from the excavation and from stockpiled soil.

Sample T1-BS was collected from soil two feet beneath the center of the tank and sample T1-AS was collected from soil two feet beneath the north end of the tank.

Two stockpile samples were taken at random locations. These samples were collected at least 18 inches into the stockpile. ATH screening was done to determine if the soil was impacted. The ATH results (Table 2-2) showed the soils to have generally low to nondetected levels of compounds. The highest TPH was detected at 649 ppm in SP1-2.

Stockpile sample SP1-2 had PCBs detected at 1 ppm. This is the method detection limit for PCBs.

Table 2-2

Analytical Results for Tank 1, Seward

Sample Number	Depth (ft)	Diesel Range Organics (DRO) (mg/kg)
T1-AS	9.5	583-
T1-BS	9.5	< 10[1]

[1] Sample results reported with < indicate that the sample was below laboratory detection limits. The method detection limit is the number right of the < symbol.

Table 2-3

Analytical Results of Tank 1, Excavated Soils, Seward

Sample Number	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-benzene (mg/kg)	Xylenes (mg/kg)	TPH (mg/kg)	PCB (mg/kg)	Halogenated Organics[2] (mg/kg)	Arsenic (mg/kg)	Chromium (mg/kg)	Lead (mg/kg)
SP1-1	< 0.05[1]	< 0.1	< 0.1	< 0.1	88	< 1	< 0.05 to < 0.5	6	44	< 20
SP1-2	< 0.05	< 0.1	< 0.1	< 0.1	649	1	< 0.05 to < 0.5	7	44	< 20

[1] Sample results reported with < indicate that the sample was below laboratory detection limits. The method detection limit is the number right of the < symbol.

[2] Halogenated organics consist of different compounds that have detection limits, which range from < 0.05 mg/kg to < 0.5 mg/kg.

2.2 Tank 2 (T2) 10,000-gallon Heating Oil (Diesel Fuel) UST

- Location: North end of Roundhouse 3 (see Figure 2-4). Figure 2-5 presents a cross sectional view of the excavation.

2.2.1 Tank Removal

- Factors Affecting Tank Removal or Sampling: None. (RAILROAD TRACKS?)

- Dates Work was Performed: The UST was removed on August 6, 1992. The supply piping was removed on August 10, 1992. Backfilling of the excavation started on August 7 and was completed on August 10, 1992.

2.2.2 Description of the Tank Removal/Soil Sampling Activities

- Soil Types Encountered: The soils encountered during excavation were a light gray to gray/brown sandy gravel with some fine-grained sand silt. Along the northwestern portion of the excavation, there was a large amount of man-made material such as metal fittings, plastic strapping, and pieces of wooden railroad ties. The soils also had a strong organic (septic) odor.

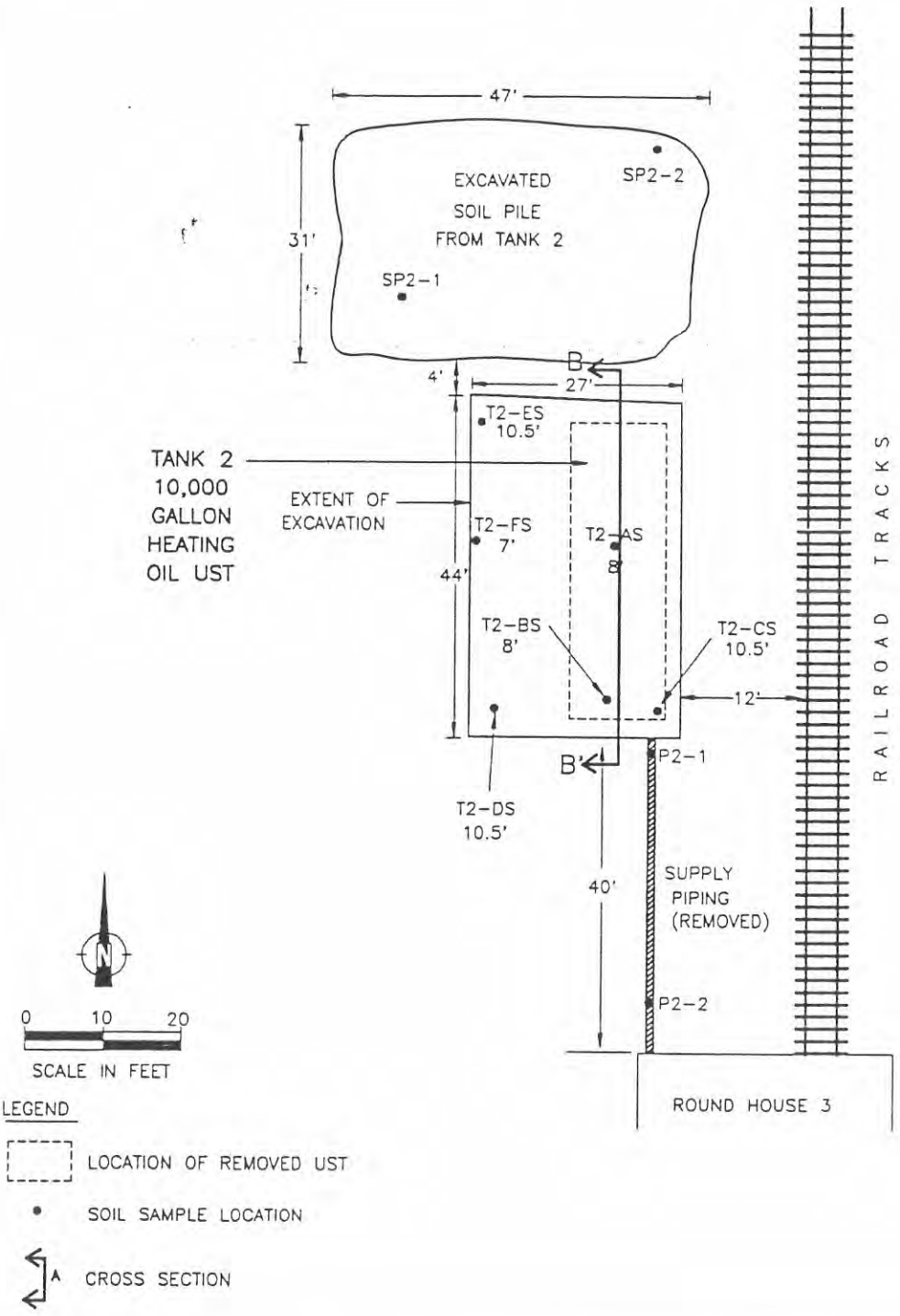
- Groundwater Depth: Groundwater was encountered in the excavation at a depth of approximately 7 feet below ground surface. Groundwater encountered in the excavation had a hydrocarbon sheen on it. A review of the tide tables indicate that the groundwater in the excavation was not affected by the tides.

GW SAMPLE COLLECTED AND ANALYZED? (YES)

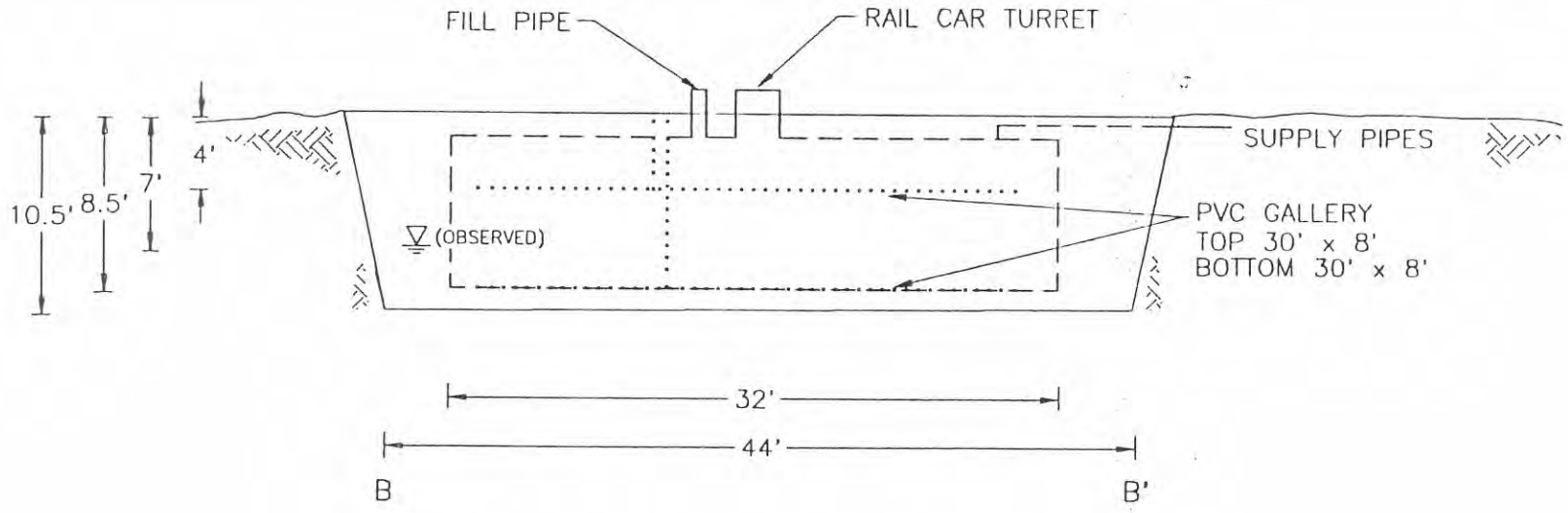
- Location and Extent of Petroleum-Impacted Soil: Petroleum-impacted soil was encountered throughout the excavation. Based on field ATH readings, additional soil was removed along the western and northern limits of the excavation. (Additional soil was not removed to the east of this excavation because of the presence of railroad tracks.)

(WAS THERE INDICATION OF CONTAMINATION REMAINING IN THIS AREA?)

ATH samples were collected at various depths and locations throughout the excavation. Table 2-4 presents the general location, depth, and results of the ATH field analysis.



ENSR CONSULTING & ENGINEERING DRAWING: EXCAV1 DRAWN: ABB/SR C/SC: 1:1 DISK: D/445 DATE: 01/26/93 CHECK: MM	2-4 UST REMOVAL SOIL SAMPLE LOCATIONS SEWARD; ALASKA	ALASKA RAILROAD ANCHORAGE, ALASKA PROJECT 0092-900-700



TANK 2 (T2) 10,000 GALLON HEATING OIL
(DIESEL FUEL) UST

N

NOT TO SCALE

ENSR CONSULTING & ENGINEERING DRAWING: XTANK2 DRAWN: ABB C/SC: 1:1 DISK: D/460 DATE: 01/26/93 CHECK: MM	FIGURE 2-5 CROSS SECTION OF TANK 2 AT SEWARD	ALASKA RAILROAD ANCHORAGE, ALASKA PROJECT 0092-009--700

Table 2-4

Ambient Temperature Headspace (ATH) Results
Field Analysis
Tank 2, Seward

Sample Number	Approximate Location	Depth (ft)	Field ATH Reading[1]
T2-A_f *	N End of tank	5	66.1
T2-B	N End of tank	9	50.5
T2-C	NE side	4	69.4
T2-D	NE Corner	6	62.6
T2-E	W Side	9	58.3
T2-F	E Side	7.5	296
T2-G	E Side	8.5	325
T2-H	E Side	8.5	51.4
T2-I	W Side	8	192
T2-J	W Side	9	122
T2-K	W Side	8	74.8
T2-L	S End of tank	8	83.5
T2-M	SW Corner	2	45.1
T2-N	SW Corner	4.5	9.3
T2-O	W Side	5.5	8.3
T2-P	W Side	7.5	12.1
T2-Q	W Side	8	17.2
T2-R	NW Corner	6	NA
P2-1 (Piping)	41 feet N of Roundhouse	0.5	0
P2-2 (Piping)	9 feet N of Roundhouse	0.5	0
SP2-1	Tank 2 Excavated Soils		0
SP2-2	Tank 2 Excavated Soils		173

[1] ATH readings were obtained as detailed in Section 1.3.1.

- Visual Condition of Tank: The removed tank was an old railroad car, which was converted into a UST. The tank had a fill pipe, vent pipes, and two supply lines to Roundhouse 3. There was slight soil staining around the fill pipe. The turret of the rail car was exposed above ground and appeared in good condition. There was no other surface staining observed.

  After removal, the tank was inspected and was in good visual condition. No holes or corrosion was evident.

- Size of the Excavation: The excavation extended approximately 27 feet by 44 feet by 8.5 feet deep (Figure 2-3).

- Estimated Volume of Soil Removed During Excavation: The volume of excavated soil from this tank is approximately 314 cubic yards.

- PVC Gallery: A 2-tier PVC gallery was installed in this excavation. The bottom tier was placed at 8.5 feet below ground surface on the floor of the excavation. This was approximately 1.25 feet below observed groundwater. The upper tier was installed at 4 feet below ground surface. This was approximately 1 foot above groundwater at the time of installation.

  The bottom tier of the gallery was installed on a Friday and the upper tier was installed on a Monday. The groundwater had time to rise and equilibrize over the weekend. To help ensure that groundwater was between the two tiers of the gallery, there is a 4.5-foot distance between the gallery tiers.

- Backfill: The excavation was backfilled with clean gravel from Metco Sand and Gravel. The gravel was placed using a backhoe and a front-end loader.

2.2.3 Laboratory Results

2-4
Figure 2-3 presents the location of the excavation soil samples which were collected for laboratory analysis. Table 2-5 presents the results.

The samples reported in Table 2-5 had DRO levels ranging from 11 ppm to 7,500 ppm. The higher levels were mainly below the tank and toward the southeast corner of the excavation.

Groundwater was encountered at approximately 7 feet below grade on August 7, 1992. The groundwater sample collected had a DRO level at 36 ppm.

Tank 2-5

Analytical Results for Tank 2, Seward

Sample Number[1]	Depth (ft)	Diesel Range Organics (DRO) (mg/kg)
T2-A	8	642
T2-B	8	167
T2-C	10.5	7,500
T2-D	10.5	114
T2-E	10.5	11
T2-F	7	142
T2-WS (Groundwater sample)	7.25	36
P2-1 (Piping)	0.5	117
P2-2 (Piping)	0.5	40
P2-2A (Duplicate of P2-2)	0.5	36

[1] Sample numbers are not consistent with ATH field sample numbers.

Table 2-6

Analytical Results of Tank 2 Excavated Soils, Seward

Sample Number	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-benzene (mg/kg)	Xylenes (mg/kg)	TPH (mg/kg)	PCB (mg/kg)	Halogenated Organics (mg/kg)	Arsenic (mg/kg)	Chromium (mg/kg)	Lead (mg/kg)
SP2-1	< 0.05[2]	< 0.1	< 0.1	< 0.1	87	< 1	< 0.05 to < 0.5[1]	6	40	< 20
SP2-2	< 0.05	< 0.1	0.1	0.8	2,100	< 1	< 0.05 to < 0.5[1]	7	42	< 20

[1] Halogenated organics consist of different compounds that have detection limits, which range from < 0.05 mg/kg to < 0.5 mg/kg.

[2] Sample results reported with < indicate that the sample was below laboratory detection limits. The method detection limit is the number right of the < symbol.

Laboratory analysis results of the excavated soils are presented in Table 2-6. The samples were collected at random locations from the excavated soils.

Benzene, toluene, PCBs, halogenated organics, and lead were not detected in the soils. Ethylbenzene ranged from not detected to 0.1 ppm. Xylenes ranged from not detected to 0.8 ppm. TPH ranged from 87 ppm to 2,100 ppm. Arsenic ranged from 6 ppm to 7 ppm. Chromium ranged from 40 ppm to 42 ppm.

2.3 Tank 3 (T3) 500-gallon Gasoline UST and Tank 4 (T4) 1,000-gallon Diesel Fuel UST

Tank 3 and Tank 4 were located next to each other. A single excavation was dug to remove both tanks. In this report, this excavation is referenced as excavation 3. All samples collected from this excavation or from the removed soils were labeled as T3- or as SP3-.

2.3.1 Tank Removal

- Location: Approximately 1,500 feet north of Roundhouse 3 (see Figure 2-6). Tanks 3 and 4 were removed from the same excavation. Figure 2-7 presents a cross sectional view of the excavation.

- Factors Affecting Tank Removal or Sampling: None.

- Dates Work was Performed: Both USTs were removed on August 10, 1992. The excavation was backfilled on the same date.

2.3.2 Description of the Tank Removal/Soil Sampling Activities

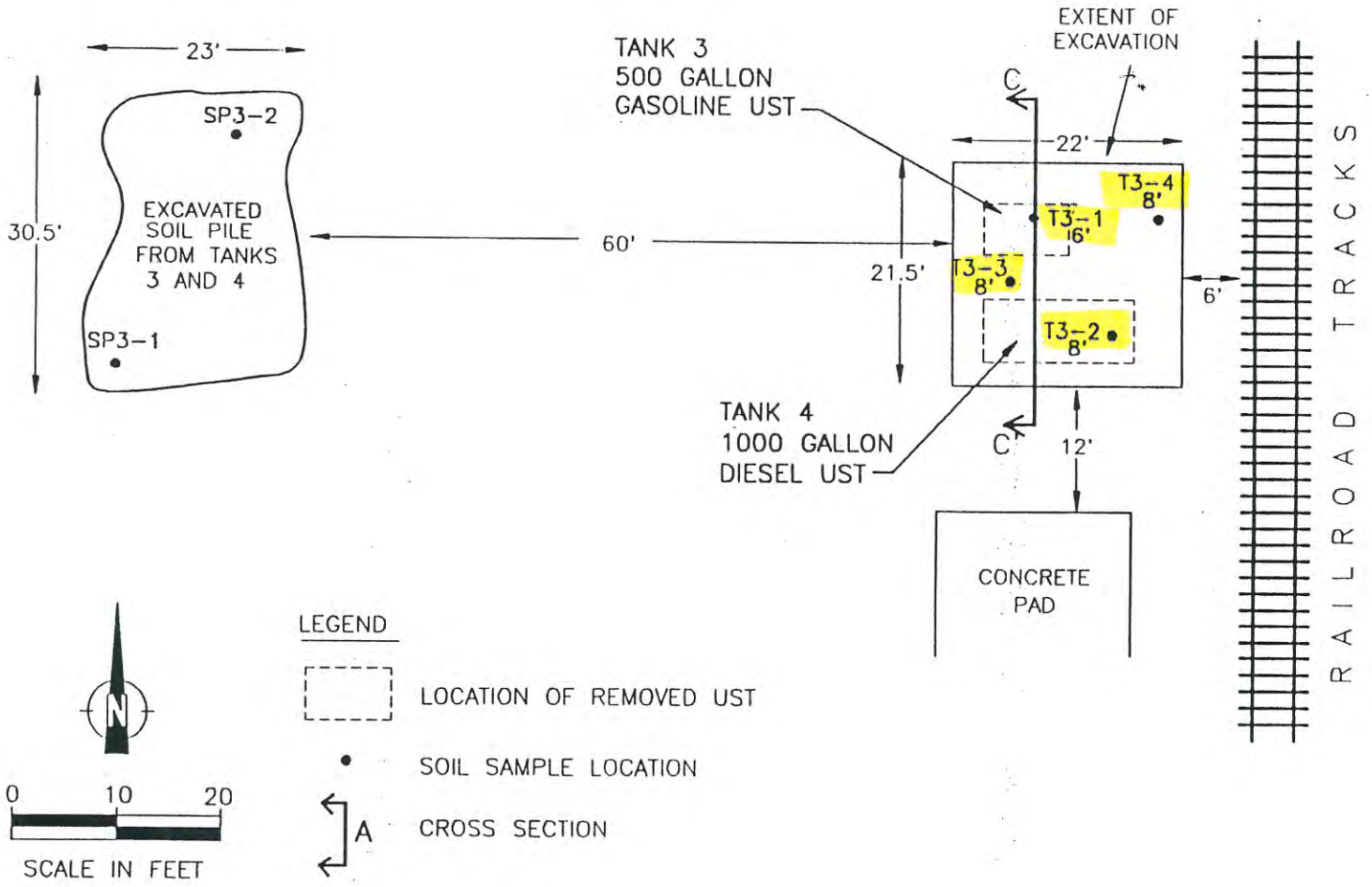
- Soil Types Encountered: There were both fill and native soils encountered during removal. The fill was a gray, sandy gravel with some fine grained sand. The native soils were a dark brown silt and sand. These were encountered approximately 5 feet below ground surface. The native soils were hard, moist, and exhibited fluvial depositional characteristics and features.

- Groundwater Depth: Groundwater was not encountered in this excavation. The excavation was open just after high tide and was closed prior to low tide.

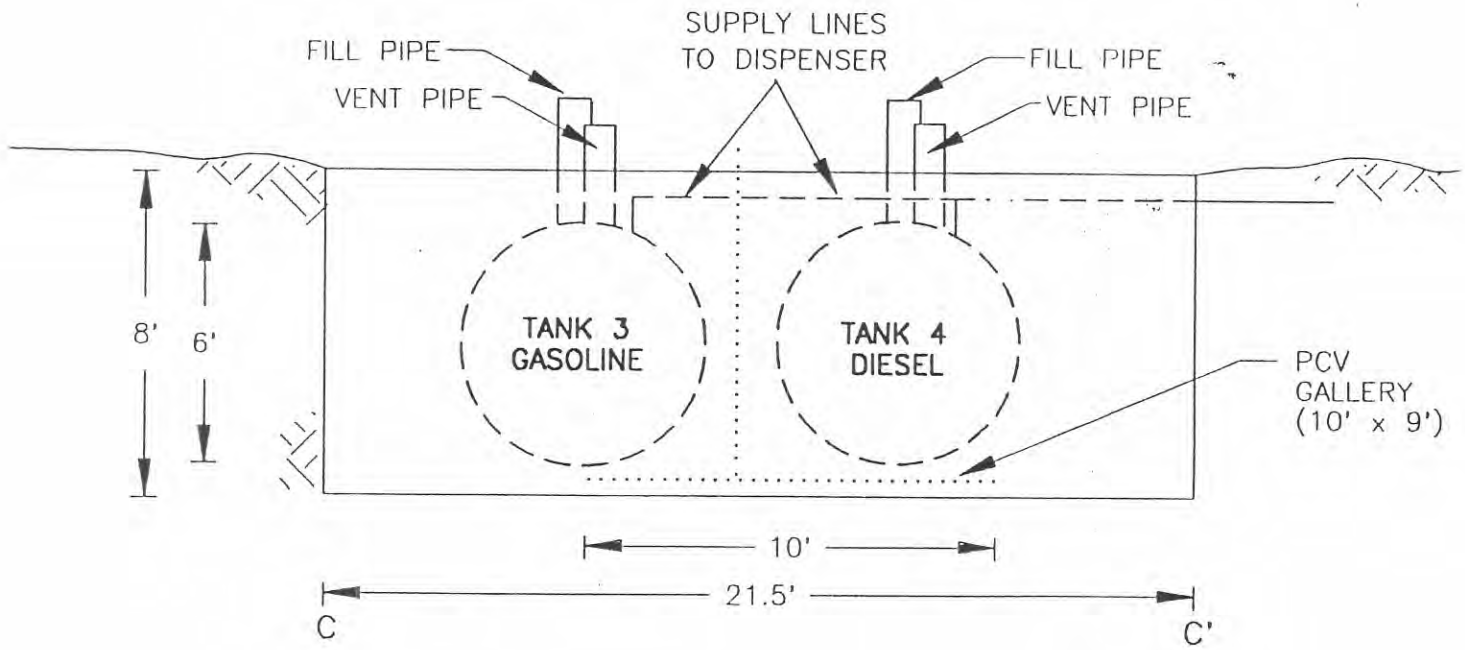
- Location and Extent of Petroleum-Impacted Soil: Visually stained soil was encountered along the east wall of the excavation. The excavation was not extended further east because of potential damage to the railroad track.

  ATH samples were collected for field analysis at various depths and locations throughout the excavation. Table 2-7 presents the general location, depth, and results of the ATH field analysis.

- Visual Condition of the Tanks: Each tank had one vent pipe, one fill pipe, and one supply line to a dispenser in a shed adjacent to and over the tanks. The shed was removed prior to excavating. Surface soils around the fill pipes and dispenser were stained. After removal, both tanks were in good visual condition. No holes or corrosion was observed.



ENSR CONSULTING & ENGINEERING	FIGURE 2-6 UST REMOVAL SOIL SAMPLE LOCATIONS SEWARD, ALASKA	ALASKA RAILROAD ANCHORAGE, ALASKA PROJECT 0092-009-700
DRAWING: EXCAV5 C/SC: 1:1 DATE: 01/26/93 DRAWN: ABB/SR DISK: D/445 CHECK: MM		



TANK 3 (T3) 500 GALLON GASOLINE UST
TANK 4 (T4) 1,000 GALLON DIESEL FUEL UST

N

NOT TO SCALE

ENSR ENSR CONSULTING & ENGINEERING DRAWING: XTANK3-4 DRAWN: ABB C/SC: 1:1 DISK: D/517 DATE: 11/13/92 CHECK: MM	FIGURE 2-7 CROSS SECTION OF TANK 3 & TANK 4 AT SEWARD	ALASKA RAILROAD ANCHORAGE, ALASKA PROJECT 0092-009-700

January 1993

Table 2-7

Ambient Temperature Headspace (ATH) Results
Field Analysis
Tanks 3 and 4, Seward

Sample Number	Approximate Location	Depth (ft)	Reading[1]
T3-1 (gasoline tank)	Middle of excavation	6	78
T3-A	E Side	5	72
T3-2	Middle of excavation	8	523
T3-3 (diesel tank)	East Center of excavation	8	160
T3-4	NE Corner	8	50
SP3-1	Tanks 3 and 4 excavated soils	--	760
SP3-2	Tanks 3 and 4 excavated soils	--	533

[1] ATH readings were obtained as detailed in Section 1.3.1.

- Size of the Excavation: The excavation extended approximately 22 feet by 21.5 feet in area by approximately 8 feet in depth. NO GROUNDWATER ENCOUNTERED.

- Estimated Volume of Soils Removed During Excavation: The volume is approximately 125 cubic yards.

- PVC Gallery: A PVC gallery was installed in this excavation. The gallery was 9 feet by 10 feet and was installed approximately 8 feet below grade.

- Backfill: The excavation was backfilled with clean gravel from Metco Sand and Gravel. The gravel was placed using a backhoe and a front-end loader.

2.3.3 Laboratory Results

Figure 2-5 presents the location of the soil samples, which were collected for analytical analysis. Tables 2-8 and 2-9 present the analytical results from both excavation and excavated soil samples.

Samples collected from the excavation were analyzed for DRO or GRO and BTEX depending on the location of the sample (Figure 2-6). DRO ranges from not detected to 20 ppm. GRO ranges from 6 ppm to 39 ppm. Benzene ranges from 0.13 ppm to 0.19 ppm. Toluene ranges from 0.5 ppm to 2 ppm. Ethylbenzene ranges from not detected to 0.4 ppm. Xylenes range from 1.1 ppm to 11.6 ppm.

The excavated soil stockpile had benzene ranging from 0.07 ppm to 0.15 ppm, toluene from 0.3 ppm to 0.4 ppm, ethylbenzene from 0.1 ppm to 0.2 ppm, xylenes from 0.8 ppm to 5.4 ppm, and TPH from 189 ppm to 1,700 ppm. PCBs, halogenated organics, and lead were all not detected. Arsenic ranged from 7 ppm to 10 ppm and chromium ranged from 41 ppm to 44 ppm.

The ATH results for the excavated soils indicate that SP3-1 should have higher volatile organic compounds values than SP3-2. However, the TPH value for SP3-2 is greater than the TPH value for SP3-1. This may be due to the inconsistencies associated with a PID present in the soil, among other things. Factors such as moisture, temperature, or organic material can affect the performance and thus the accuracy of the readings obtained. These inconsistencies could account for the varied differences of the ATH and TPH values obtained from SP3-1 and SP3-2.

Table 2-8

Analytical Results for Tanks 3 and 4, Seward

Sample Number	Depth (ft)	Diesel Range Organics (DRO) (mg/kg)	Gasoline Range Organics (GRO) (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)
T3-1 (gasoline tank)	6	NA[1]	6	0.13	0.5	ND	1.1
T3-2 (diesel tank)	8	20	NA	NA	NA	NA	NA
T3-3 (between tanks)	8	NA	39	0.19	2	0.4	11.6
T3-4 (NE corner of excavation)	8	< 10[2]	NA	NA	NA	NA	NA

SHOULD HAVE BEEN ANALYZED FOR GRO, BTEX & DRO!

1 NA = Not analyzed.

2 Sample results reported with < indicate that the sample was below laboratory detection limits. The method detection limit is the number right of the < symbol.

Table 2-9

Analytical Results of Tanks 3 and 4 Excavated Soils, Seward

Sample Number	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)	TPH (mg/kg)	PCB (mg/kg)	Halogenated Organics (mg/kg)	Arsenic (mg/kg)	Chromium (mg/kg)	Lead (mg/kg)
SP3-1	0.15	0.4	0.1	0.8	189	< 1[1]	< 0.05 to < 0.5[2]	10	44	< 20
SP3-2	0.07	0.3	0.2	5.4	1,700	< 1	< 0.05 to < 0.5[2]	7	41	< 20

1 Sample results reported with < indicate that the sample was below laboratory detection limits. The method detection limit is the number right of the < symbol.

2 Halogenated organics consist of different compounds that have detection limits, which range from < 0.05 mg/kg to < 0.5 mg/kg.

2.4 Tank 5 (T5) 2,000-gallon Gasoline UST

Tank 5 was removed from the fourth excavation dug. Therefore, Tank 5 was removed from excavation 4. All samples collected from the excavation and removed soils were labeled T4- or as SP4-.

2.4.1 Tank Removal

- Location: North end of the dock building (see Figure 2-2). Figure 2-8 presents a cross sectional view of the excavation.

- Factors Affecting Tank Removal or Sampling: The asphalt parking lot over the UST was cut out and removed to allow access to the UST.

- Dates Work was Performed: The UST was removed on August 11, 1992. The excavation was backfilled on the same day.

2.4.2 Description of the Tank Removal/Soil Sampling Activities

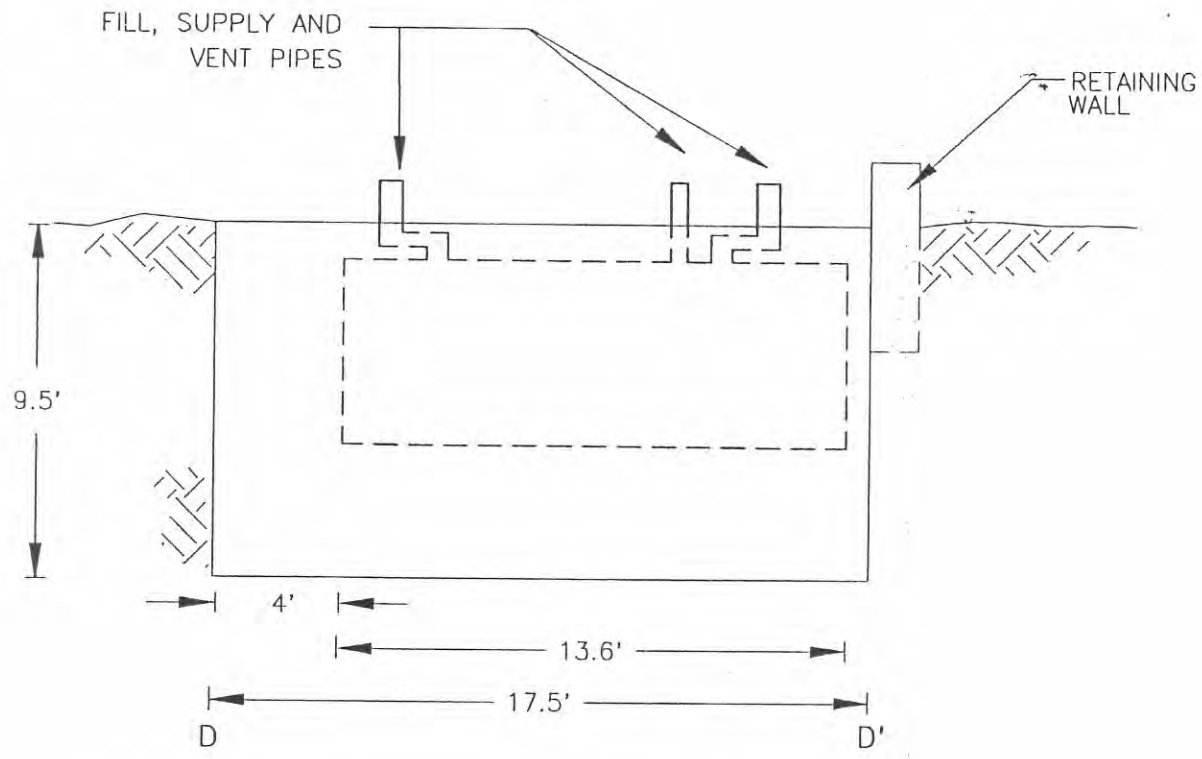
- Soil Types Encountered: The soils were a dark gray to black sandy gravel with cobbles. It could not be determined if the soil was native or fill.

- Groundwater Depth: This excavation was open during high tide. No groundwater was encountered during this excavation.

- Location and Extent of Petroleum-Impacted Soils: Impacted soils were not encountered around this UST. Observation, field analysis, and laboratory analysis indicate no release has occurred. The general location, depth, and results of the ATH field analysis is presented in Table 2-10.

- Visual Condition of the Tank: The tank was under asphalt paving and a small shed. The shed held the dispensing equipment. Both the shed and dispensing equipment were removed prior to cutting the asphalt paving. The tank had a fill pipe, vent pipe, and dispensing pipe, which were removed during tank removal. No staining was observed on the asphalt or concrete. After removal, the tank was inspected and was in good visual condition. Some surficial corrosion was present, but no holes were observed.

- Size of the Excavation: The excavation extended approximately 17.5 feet by 12.5 feet by 9 feet in depth.



TANK 5 (T5) 2,000 GALLON GASOLINE UST

NOT TO SCALE

NOTE: NO PVC GALLERY INSTALLED

ENSR CONSULTING & ENGINEERING DRAWING: XTANK5 DRAWN: ABB C/SC: 1:1 DISK: D/517 DATE: 01/26/93 CHECK: MM	FIGURE 2-8 CROSS SECTION OF TANK 5 AT SEWARD	ALASKA RAILROAD ANCHORAGE, ALASKA PROJECT 0092-009-700

Table 2-10

Ambient Temperature Headspace (ATH) Results
Field Analysis
Tank 5, Seward

Sample Number	Approximate Location	Depth (ft)	Reading[1]
T4-1	Middle of excavation	8	0
T4-2	S Side	8	0

[1] ATH readings were obtained as detailed in Section 1.3.1.

- Estimated Volume of Soils Removed During Excavation: The volume is approximately 45 cubic yards.

- PVC Gallery: No gallery was installed at this time because field conditions did not indicate a release from this UST.

- Backfill: The excavation was backfilled with clean gravel from Metco Sand and Gravel. The gravel was placed using a backhoe.

2.4.3 Laboratory Results

Figure 2-2 presents the location of the soil samples, which were collected for laboratory analysis. Tables 2-11 and 2-12 present the laboratory results for the UST excavation and excavated soils.

The laboratory results for the excavation are below detection limits for GRO, ethylbenzene, and xylenes. Benzene ranged from 0.12 ppm to 0.17 ppm. Toluene ranged from not detected to 0.1 ppm.

The laboratory results for the excavated soil pile are below detection limits for ethylbenzene, PCBs, halogenated organics, and lead. Benzene ranged from not detected to 0.18 ppm. Toluene ranged from 0.2 ppm to 0.5 ppm. Xylenes ranged from 0.1 ppm to 0.3 ppm. TPH ranged from 31 ppm to 44 ppm. Arsenic was 6 ppm in both SP4-1 and SP4-2. Chromium ranged from 38 ppm to 44 ppm.

Table 2-11

Analytical Results for Tank 5, Seward

Sample Number	Depth (ft)	Gasoline Range Organics (GRO) (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)
T4-1	8	< 5[1]	0.17	0.1	< 0.1	< 0.1
T4-2	8	< 5	0.12	< 0.1	< 0.1	< 0.1

1 Sample results reported with < indicate that the sample was below laboratory detection limits. The method detection limit is the number right of the < symbol.

Table 2-12

Analytical Results for Tank 5 Excavated Soils, Seward

Sample Number	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)	TPH (mg/kg)	PCB (mg/kg)	Halogenated Organics (mg/kg)	Arsenic (mg/kg)	Chromium (mg/kg)	Lead (mg/kg)
SP4-1	0.18	0.5	< 0.1	0.3	44	< 1	< 0.05 to < 0.5[1]	6	38	< 20
SP4-2	< 0.05[2]	0.2	< 0.1	0.1	31	< 1	< 0.05 to < 0.5[1]	6	44	< 20

1 Halogenated organics consist of different compounds that have detection limits ranging from 0.05 mg/kg to 0.5 mg/kg.
2 Sample results reported with < indicate that the sample was below laboratory detection limits. The method detection limit is the number right of the < symbol.

6.0 REFERENCES

ADEC. 1991b. 18 AAC 78 Underground Storage Tank, August 21.

ARRC. 1992. Work Plan for 3,000-gallon UST abandonment in-place at Moose Pass. August.

ENSR. 1992a. Corrective Action Plan, 1991 Underground Storage Tank Removals, Tunnel Section. April.

ENSR. 1992b. Health and Safety Plan, Underground Storage Tank Removals and Corrective Actions, Seward, Whittier, Tunnel, Moose Pass, Willow, Sunshine, and Talkeetna. August.

ENSR. 1992c. Work Plan, Underground Storage Tank Removal, Site Assessment and Corrective Action, Seward, Moose Pass, Tunnel, and Whittier. August.

Fitz, Donald G. 1992. ADEC letter to Jack Swanson (Alaska Railroad Corporation) March 16.

APPENDIX A

SEWARD LABORATORY DATA