

KENAI AIRPORT FUEL SERVICE
Phase I December 1991
UST Site Assessment Report
Kenai Airport
Kenai, Alaska

Prepared For:

Kenai Airport Fuel Service
Kenai Airport
403 N. Willow #1
Kenai Alaska 99611

Prepared by:

Peter Campbell
Mike Tauriainen P.E.

Northern Test Lab
35186 Spur Highway
Soldotna, Ak. 99669

90-23-00-268-01

Project No. 91189
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DEPARTMENT OF
ENVIRONMENTAL CONSERVATION
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Northern Test Lab

December 29, 1991

Project # 91189

Dan Pitts
Kenai Airport Fuel Service
403 North Willow #1
Kenai Alaska

Re: Phase I UST Site Assessment

Dan:

Enclosed are two copies of our report of the underground storage tank assessment for the Kenai Airport Fuel Service facility in Kenai, Alaska. The report and recommendations have been compiled after completing our field investigation, and in accordance with our standard procedures. Two releases of fuel have been reported from the site in September of 1990 where from 20 to 100 gallons of jet aviation fuel was released to the ground which subsequently caught fire. Since fuel contaminated soils were reported, a spill report was logged with ADEC. ADEC assigned a spill number to the project, # 90-23-01-268-01.

Application materials for state funding for the site assessment and cleanup of contaminated soils have also been included. The application has been forwarded to the State of Alaska.

If you have any questions regarding this project please contact our office.

Sincerely,



Peter Campbell,
Environmental Scientist

Enclosure

kenaiair/kafssa.rpt

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1. INTRODUCTION

1.1 BACKGROUND

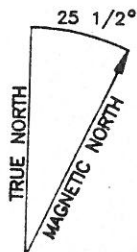
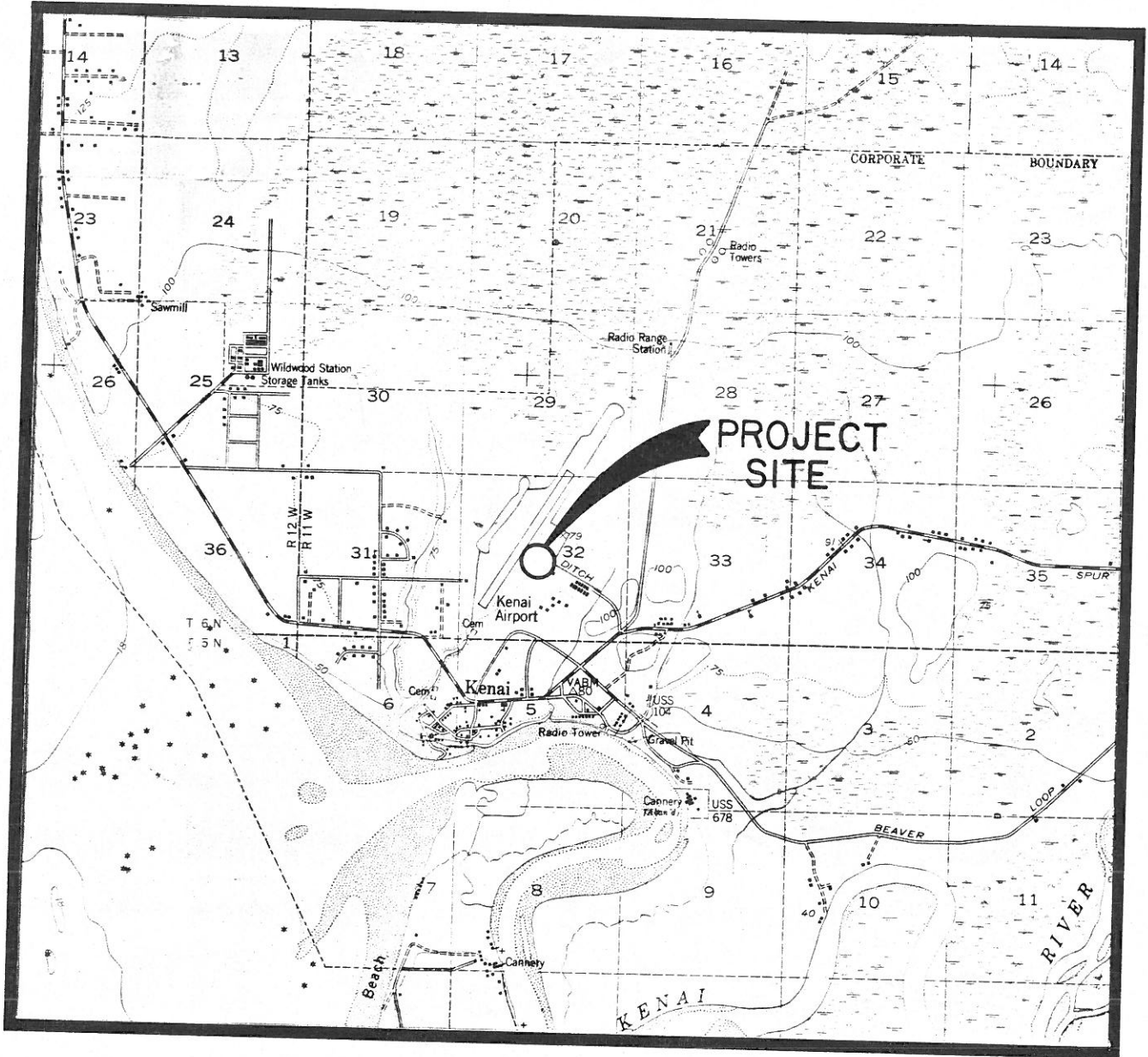
Northern Test Lab (NTL) has been retained by Kenai Airport Fuel Service to conduct a sampling program associated with the site assessment of four underground storage tanks (UST) at the fuel facility in Kenai, Alaska. See Figure 1: Topographic Site Location Map.

Northern Test Lab was contacted to conduct soil sampling in the area of the underground storage tanks after two fuel spills had been reported at the facility. Other releases of fuel may have occurred from overfills of the tanks in the past. Because of the nature of the activities at the site, being an airport with many sources of fuel, there is a potential for offsite source of contamination. R.L. Construction Services of Nikiski, Alaska was retained as the excavation contractor.

The USTs, three 10,000 gallon tanks and one 1,000 gallon tank are located between the Kenai Airport terminal and the air traffic control tower. The facility is



Photo #1: Kenai Airport Fuel Service



APPROXIMATE
MEAN
DECLINATION,
1951

TOPOGRAPHIC SITE LOCATION MAP
KENAI AIRPORT FUEL SERVICE
SE 1/4, NW 1/4, SEC. 32, T6N, R11W S.M.
ADAPTED FROM USGS 1951 15' TOPOGRAPHIC QUADRANGLE
KENAI (C-4), ALASKA



used to fuel airplanes and is located next to Alaska Flying Network. See Photo #1: Kenai Airport Fuel Service. The tanks currently contain jet aviation fuel, aviation gasoline, 100 low lead and the 1,000 gallon tank contains regular unleaded gasoline.

Three test pits were excavated on the property to determine existing environmental conditions. The existing tanks are to be upgraded to meet the new regulatory standards in the summer of 1992.

1.2 SCOPE OF WORK

NTL was contracted by Kenai Airport Fuel Service to develop and implement a site assessment in association with the UST's. This report covers the collection of soil and water samples with analytical tests to accomplish the following objectives:

- o Determine if contamination is present from the UST's;
- o Determine if any additional investigation of site characteristics is necessary.

2. FIELD INVESTIGATION

2.1 SITE INVESTIGATION METHODS

An organic vapor monitor (OVM) is our primary screening device for field analytic results. Our OVM uses a 10.5 electron volt lamp in a non-destructive test to measure volatile organic vapors. A standard calibration gas of approximately 100 parts per million isobutylane is used to program the machine. The OVM is calibrated each time it is turned on.

The OVM measures volatile organic vapors present in the atmosphere. The OVM readings are not a direct measure of soil contamination, but an indicator of relative soil contamination.

The OVM was calibrated to 99.7 ppm Isobutylane and kept on site to screen soils during removal from the excavation with a back hoe. The OVM along with visual observations and odors observed in the soil are combined in making decisions in the field on how far to proceed with the excavation of contaminated soil.

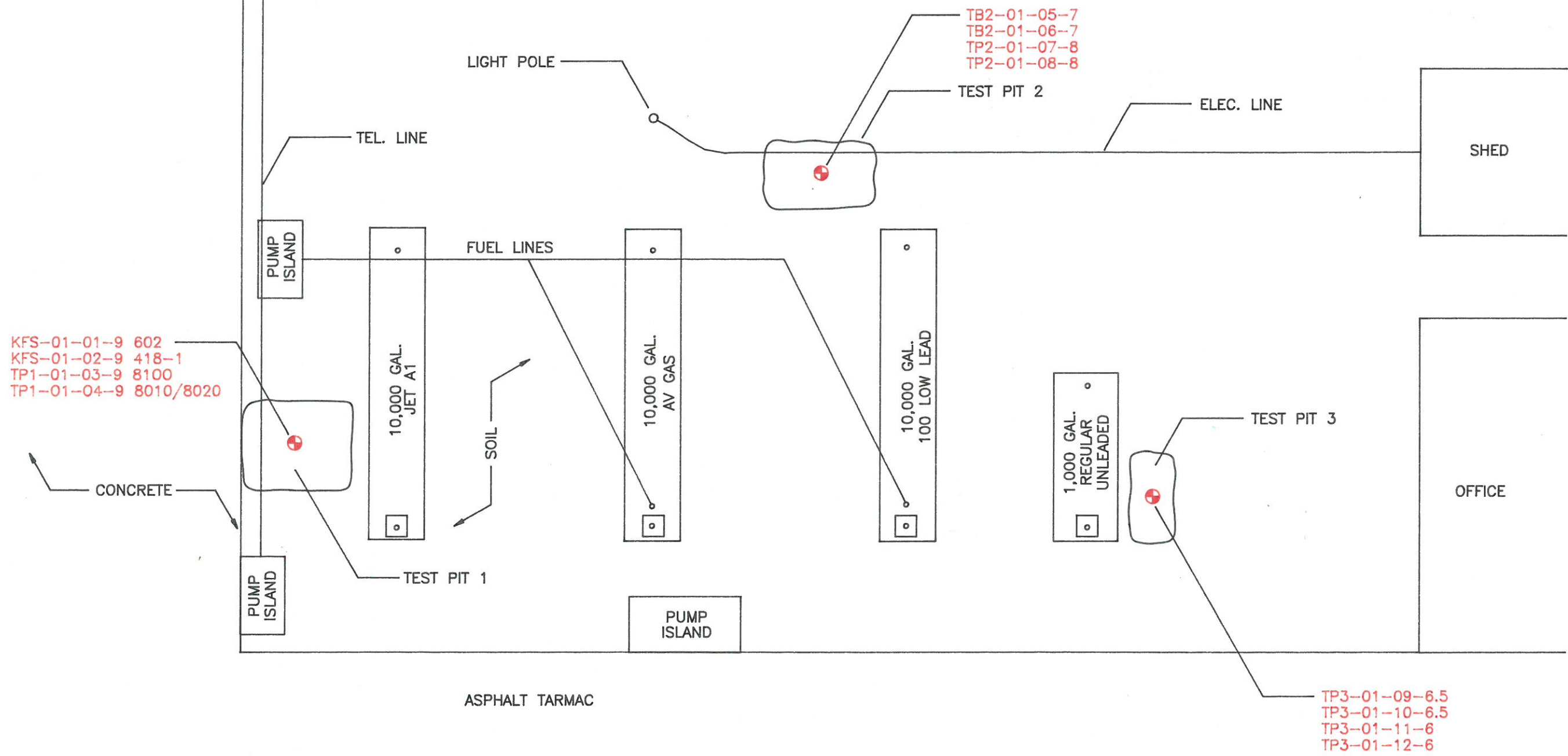
Samples were collected from the excavation with laboratory decontaminated trowels and stored in 250 ml amber glass bottles on blue ice for transport to the laboratory. Soils were screened with an OVM.



Soil samples are then collected to confirm the presence or absence of petroleum contaminants remaining in the excavation. These results are then included in our report and used to make recommendations on further investigations. The following table, Table 1: Soil Testing decision Matrix, is used to determine which analytical tests are to be used in each tank investigation.

PARAMETER / METHOD	GASOLINE		NON-REFINED / DIESEL	CRUDE OIL	UNKNOWN
	LEADED	UNLEADED			
EPH / 8100	NO	NO	YES	YES	YES
VPH / Modified 8015*	YES	YES	NO	NO	YES
BTEX / 8020	YES	YES	NO	YES	YES
METALS					
Arsenic	NO	NO	NO	NO	YES
Chromium	NO	NO	NO	NO	YES
Lead	YES	NO	NO	NO	YES
TOTAL HALOGENS / 8010	NO	NO	NO	NO	YES

*As modified by Chem Lab.

TABLE 1: SOIL TESTING DECISION MATRIX



<p style="text-align: center;">LEGEND</p> <p>SAMPLE LOCATION +</p>	<p style="text-align: center;">  NORTH  Northern Test Lab </p>	<p>DATE: DEC. 1991 DRAWN: H. PACHECO REVISED: 12-28-91 CHECKED: P. CAMPBELL PROJECT NO.: 91189 KENAIARP 1=20</p>	<p>KENAI AIRPORT FUEL SERVICE SAMPLE LOCATION MAP KENAI AIRPORT KENAI, ALASKA</p>	<p>FIGURE #2</p>
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2.2 SITE INVESTIGATION

2.2.1 Test Pit #1



Photo #2: TP#1 in Background and TP#3 in Foreground

Our initial site visit was conducted on December 3, 1991. The tank area was inspected for gross contamination. Evidence of fuel was present on the ground in the area of the western pump island. A test pit was excavated in the area of the western pump island. See Figure 2: Sample Location Map and Photo #2: TP #1 in Background TP#3 in Foreground. Test Pit #1 (TP#1) was excavated to a depth of nine feet below ground level. OVM readings in the soil increased with depth as the excavation was expanded. OVM Readings are presented in Table 2: Test Pit #1 OVM readings.

A telephone wire was severed in the excavation of Test Pit #1. The utility company was notified to make the repair.

Four samples were collected from the TP#1, the sample results are presented in

Table 3: Laboratory Sample Results Test Pit #1. Complete laboratory sample results are presented in Appendix A: Laboratory Sample Results.

OVM #	DEPTH	OVM READING
1	1.5 feet	1280 ppm
2	2.5 feet	1351 ppm
3	5 feet	1555 ppm
4	6 feet	1733 ppm
5	7 feet	3177 ppm

TABLE 2: Test Pit #1 OVM Results

There was a slight fuel sheen on the surface of the water in the excavation.

Test Pit #1 was backfilled with spoils from the excavation after repairs were made to the phone lines.

SAMPLE No.	LOCATION	PARAMETERS	ANALYTIC RESULTS
TP1-9 WATER	TP#1 BASE @ 9' BGL	EPA 602	0.044 ppm 1,2 DICHLOROETHANE 0.005 2.21 ppm BENZENE 0.005 0.023 ppm n-BUTYLBENZENE 0.013 ppm SEC-BUTYLBENZENE 0.199 ppm ETHYLBENZENE *0.668 ppm ETHYL DIBROMIDE (EDB) 0.00005 0.015 ppm ISOPROPYLBENZENE 0.032 ppm p-ISOPROPOYL TOLUENE 0.057 ppm NAPHTHALENE 0.030 ppm n-PROPYLBENZENE 38.5 ppm TOLUENE 1.0 0.284 ppm 1,2,4-TRIMETHYLBENZENE 0.131 ppm 1,3,5-TRIMETHYLBENZENE 0.744 ppm p&m XYLENE 0.492 ppm o-XYLENE
TP-01-02-9	TP#1 BASE @ 9' BGL	EPA 418.1	77.2 ppm PETROLEUM HYDROCARBONS
TP1-01-03-9	TP#1 BASE @ 9' BGL	EPA 8100 LEAD 7421	543 ppm EPH 4.4 mg/kg LEAD
TP-01-04-9	TP#1 BASE @ 9' BGL	EPA 8810 EPA 8015	ND 505 ppm VPH

ND=CONCENTRATION BELOW DETECTION LIMITS

TABLE 3: Laboratory Sample Results Test Pit #1

2.2.2 Test Pit #2

Test Pit #2 (TP#2), was excavated on the north side of the tank field, five feet



Photo #3: Test Pit #2

north of the vent pipes. See Photo #3: Test Pit #2. The excavation was extended to 8 feet BGL where water was encountered. OVM samples were measured as the excavation was expanded. OVM sample results are presented in Table 4: TP#2 OVM Results.

OVM #	DEPTH	OVM READING
1	1.5 feet	1.0 ppm
2	5 feet	1.0 ppm
3	8 feet	1.0 ppm

TABLE 4: Test Pit #2 OVM Results

Four samples were collected from the TP#2, the sample results are presented in Table 5: Laboratory Sample Results Test Pit #2. Complete laboratory sample results are presented in Appendix A: Laboratory Sample Results.

SAMPLE No.	LOCATION	PARAMETERS	ANALYTIC RESULTS
TP2-01-05-7	TP#2 BASE @ 7' BGL	EPA 418.1	0.53 ppm PH 29.3 ppm TPH
TP2-01-06-7 <i>WATER</i>	TP#2 BASE @ 7' BGL	EPA 502.2	0.026 ppm BENZENE <i>0.005</i> 0.0031 ppm ETHYLBENZENE <i>*0.0031 ppm ETHYLENE DIBROMIDE EDB</i> <i>0.0005</i> 1.26 ppm TOLUENE <i>1.0</i> 0.0040 ppm 1,2,4-TRIMETHYLBENZENE 0.0035 ppm 1,3,5-TRIMETHYLBENZENE 0.0049 ppm p&m XYLENE 0.0045 ppm o-XYLENE
TP2-01-07-8	TP#2 BASE @ 8' BGL	EPA 8100' LEAD 7421	ND EPH 2.3 mg/kg LEAD
TP2-01-08-8	TP#2 BASE @ 8' BGL	EPA 8810 <i>8010</i> EPA 8015	ND ND VPH

ND = CONCENTRATION BELOW DETECTION LIMITS

TABLE 5: Laboratory Sample Results Test Pit #2

*Was TEST PIT #2
BACKFILLED WITH
THE EXCAVATION
SPOILS?*

2.2.3 Test Pit #3

Test Pit #3 (TP#3), was excavated near the [redacted] tank field, 25 feet east



Photo #4: Test Pit #3

of the office building. See Photo #4: Test Pit #3. The excavation was extended to 6.5 feet BGL where water was encountered. Soil samples were measured with the OVM as the excavation was expanded and there were no elevated OVM readings in the excavation.

Four samples were collected from the TP#3, the sample results are presented in Table 6: Laboratory Sample Results Test Pit #3. Complete laboratory sample results are presented in Appendix A: Laboratory Sample Results.

SAMPLE No.	LOCATION	PARAMETERS	ANALYTIC RESULTS
TP3-01-09-6.5	TP#3 BASE @ 6.5' BGL	EPA 418.1	0.63 ppm PH <i>TPH-WATER</i>
TP3-01-10-6.5 <i>WATER</i>	TP#3 BASE @ 6.5' BGL	EPA 502.2	0.0094 ppm 1,2-DICHLOROETHANE 0.580 ppm BENZENE <i>0.005</i> 0.058 ppm ETHYLBENZENE 0.0027 ppm ETHYLENE DIBROMIDE EDB <i>0.00005</i> 0.0020 ppm ISOPROPYLBENZENE 0.0046 ppm n-PROPYLBENZENE 1.77 ppm TOLUENE <i>1.0</i> 0.041 ppm 1,2,4-TRIMETHYLBENZENE 0.011 ppm 1,3,5-TRIMETHYLBENZENE 0.194 ppm p&m XYLENE 0.095 ppm o-XYLENE
TP3-01-11-6	TP#3 BASE @ 6.5' BGL	EPA 8100 LEAD 7421	ND EPH 2.2 mg/kg LEAD
TP3-01-12-6	TP#3 BASE @ 6' BGL	EPA 8810 <i>8010</i> EPA 8015	ND ND VPH

ND= CONCENTRATION BELOW DETECTION LIMITS

TABLE 6: Laboratory Sample Results Test Pit #3

3. GEOLOGY AND HYDROGEOLOGY

3.1 GEOLOGIC SETTING

According to the U.S.G.S. Professional Paper 443, Geology of the Kenai Lowlands, the area is in "the Cook Inlet Lowland physiographic region that occupies a structural trough, underlain by rocks of Tertiary age and mantled by [unconsolidated] Quaternary deposits of varying thickness." Further, deposits in the "area consist of proglacial-lake-bottom sediments underlying terraced and channeled surfaces between major morainal belts in [the] lowlands..." This area lies

CONCENTRATION
TEST PIT #3

WAS TEST PIT #3
BACKFILLED WITH
THE EXCAVATION
SPOILS?

north of the Kasilof River and The Caribou Hills Upland. The area is characterized by proglacial lake deposits, windblown sands and silts, swamps and poorly integrated drainage patterns.

3.2 SUBSURFACE LITHOLOGY

The USDA Soil Survey of the Kenai-Kasilof Area, Alaska refers to the native soils in the area as part of the "Soldotna series of well-drained soils developed in a moderately deep to deep mantle of wind-laid silty material over a thick deposit of gravely sand or coarse sand." Soils encountered in the excavation were generally coarse sand with no gravel.

3.3 GROUNDWATER

We estimate groundwater depth at approximately 6.5 to 7 feet below ground in the area of the fuel tanks. Most residences in the area rely on municipal water supply which are located several miles from the site. Little is known about the direction of groundwater flow at this time. Groundwater depths tend to be deeper south of the site, but monitor wells would be required to determine flow directions.

GROUNDWATER INFO.

4. SOIL AND GROUNDWATER CONTAMINATION

4.1 Matrix Score

The following table presents the matrix score for the Kenai Airport Fuel Service Site.

CLEANUP MTR.

DEPTH TO SUBSURFACE WATER: 5-15 FEET	GW CONTAMINATED!	8	10
MEAN ANNUAL PRECIPITATION: 15-25 INCHES		3	
SOIL TYPE: CLEAN, COARSE GRAINED SOILS		10	
POTENTIAL RECEPTORS: NO KNOWN WELL WITHIN 1 MILE		4	
VOLUME OF CONTAMINATED SOIL: 25-100 CUBIC YARDS		5	LINK (?)
TOTAL MATRIX SCORE:		30	

TABLE 7: MATRIX SCORE

With a matrix score of 30 for soil remaining in the ground at the site, the site would fall into the level B matrix score category. The matrix scores are presented bellow in Table 8: Cleanup Levels.

MATRIX SCORE	CLEANUP LEVEL IN mg/kg (ppm)			
	DIESEL	GASOLINE/UNKNOWN		
	DIESEL RANGE PETROLEUM HYDROCARBONS	GASOLINE RANGE PETROLEUM HYDROCARBONS	BENZENE	BTEX
LEVEL A >40	100	50	0.1	10
LEVEL B 27-40	200	100	0.5	15
LEVEL C 21-26	1000	500	0.5	50
LEVEL D <20	2000	1000	0.5	100

Table 8: Cleanup Levels

At a matrix score of 30 (level B), fuel contaminated soils would have to be cleaned up to 100 ppm and benzene to 0.5 ppm.

5. SUMMERY

Two fuel spills have been reported at the facility estimated at 20 to 100 gallons. Spill # 90-23-01-268-01 was assigned to the site. Other releases may have occurred from overfills of the tanks. Three test pits were excavated to determine the extent of contamination.

Levels of benzene in the groundwater from all three test pits are above state and federal limits. Levels of 1,2 dichloroethane in TP#1 and TP#3 also exceeded the maximum contaminant levels (MCL) of 0.005 ppm.

Levels of extractable petroleum hydrocarbons (EPH) in the soils of TP#1 (543 ppm) exceed the allowable level based on the states matrix score sheet.

Total BTEX in TP#1 of 42.145 ppm exceeds the matrix cleanup level of 15 PPM.

6. RECOMMENDATIONS

The Phase I site assessment did not identify the extent of contamination at the site. test pits were located in easily accessible areas that did not require excavation on the airport tarmac. A Phase II assessment should be conducted with the installation of a minimum three monitor wells to determine the direction of groundwater flow and extent of soil and groundwater contamination.

Soils on site need to be remediated. Available alternatives include incineration, bio-remediation, landfilling, landfarming, or solidification. Groundwater remediation on site must also be considered.

We believe this site is eligible for funding under House Bill 220, a financial assistance program established by the State of Alaska, to aid the operators of underground storage tanks with site assessments and remediation. We are completing the application forms for funding to aid Kenai Airport Fuel Service in the remediation of the contaminated soils and groundwater and in the costs associated in this site assessment.

7. CLOSURE

This report was prepared for the sole purpose of determining current environmental conditions at the sites and is presented based on our understanding of the site histories and information collected in our field investigation. The information and data supplied by others which have been considered in this report are from sources believed to be reliable, but no further responsibility is assumed for their accuracy.

Due to the variable nature of site soils and geology, and the lack of a complete record of previous site activities, subsurface conditions may vary from the information presented in this report. Users of this report are cautioned that any investigation is necessarily limited in extent and cannot include all possibilities. Special risks occur, and guarantees cannot be expected, whenever professional consulting services are applied to determine the composition of a site's subsurface

or the existence or non-existence of hazardous substances. We cannot eliminate uncertainties altogether, but have applied good professional practice to reduce the uncertainties to a reasonable level and believe our investigation fairly represents the site.

8. BIBLIOGRAPHY

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Appendix A
Laboratory Sample Results