



HARTCROWSER

Earth and Environmental Technologies

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8-5-93

Hart Crowser, Inc.
2550 Denali Street, Suite 705
Anchorage, Alaska 99503
FAX 907.276.2104
907.276.7475

A-8302-02

July 16, 1993

Peninsula Airways, Inc.
4851 Aircraft Drive
Anchorage, Alaska 99502

Attn: Mr. Orin Seybert

Re: Spill Assessment Report
Peninsula Airways, Inc. Hangar and Terminal Building
ADEC Spill #92-251-339-2
Dillingham, Alaska

Gentlemen:

This report documents the spill assessment and remedial activities conducted by Hart Crowser for Peninsula Airways, Inc. (PENAIR) at the PENAIR hangar and terminal building in Dillingham, Alaska. Field activities focused on the petroleum impacts associated with a recent release of 1,200 gallons of Aviation Gasoline (Avgas) down a floor drain and out through a drainpipe. These activities consisted of excavating and exposing the drainpipe, determining the extent of petroleum impacts by field screening, chemically characterizing the observed impacts, and installing vapor extraction piping in the excavation.

SUMMARY OF FINDINGS AND RECOMMENDATIONS

- ▶ **Vapor extraction recommended for soils at site.** Soils in excess of the Alaska Department of Environmental Conservation Level A cleanup standards exist at this site. We recommend treating these soils with vapor extraction.
- ▶ **Horizontal and vertical extent of hydrocarbon impacts were identified.** Hydrocarbon impacts appear to lie within an area that is approximately 75 feet long



(measured parallel to the drainpipe) and approximately 35 feet wide. The vertical extent appears to be less than 19 feet deep. All of the released Avgas can be accounted for in this soil volume. Based on these findings, it is unlikely that the spilled Avgas had reached the water table.

- ▶ **No further assessment work required.** It is unlikely that this spill has reached the water table and impacted groundwater. For this reason, we do not recommend that any further assessment work be done to identify groundwater impacts due to this spill. We do, however, recommend continued monitoring of the on-site groundwater well.

INTRODUCTION

As reported to the Alaska Department of Environmental Conservation (ADEC) by PENAIR staff, approximately 1,200 gallons of Avgas was released through a floor drain inside the PENAIR hangar in late 1992. The fuel flowed into a drainpipe connected to the floor drain and out to the west of the building.

An on-site groundwater well is located on the south side of the PENAIR hangar. This well was reported to be 37 feet deep with a static water level of 26 feet below the surface (USGS, Water Resources Investigations Report 87-4141, 1987). There are four off-site wells in the vicinity of this site (USGS, 1987). These wells range from 40 to 87 feet deep. The static water level reported for one of these wells is 27 feet below the surface. The static water levels of the other off-site wells were not reported.

As reported earlier, on January 15, 1993, Hart Crowser sampled water from a hose bib in the PENAIR hangar to determine if this water contained petroleum hydrocarbon compounds. Similar samples were also obtained from the buildings north and south of the PENAIR hangar. These samples were analyzed by EPA Methods 8015/8020 and 8100 for volatile petroleum hydrocarbons (VPH), aromatic hydrocarbons (BTEX), and extractable petroleum hydrocarbons (EPH), respectively. The VPH and BTEX constituents for all samples were below detection limits. Samples collected from the buildings north and south of the PENAIR hangar contained detectable EPH at 0.29 mg/L and 0.12 mg/L, respectively. No EPH was detected in the PENAIR hangar water sample.



WORK PERFORMED BY HART CROWSER

On June 7, 1993, a Hart Crowser representative arrived on site to supervise the excavation of the drainpipe exiting the west side of the PENAIR hangar. The excavation work was performed by D & J Construction under subcontract to PENAIR. Using a backhoe, the drainpipe was found to be approximately midway along the west wall of the building at 5 feet below grade. The pipe consisted of a solid, 4-inch pipe connected to a flexible perforated drainpipe (Photo 1). The perforated drainpipe extended to a distance of 54 feet from the building (Figure 1). During the course of this work, the perforated pipe was removed and a 4-inch compression plug inserted into the opening of the solid pipe (Photo 2).

The horizontal extent of Avgas impacts was explored by excavating along the pipe length, and perpendicular to the pipe at approximately 35 feet from the hangar's west wall, to the limits of observable impacts (Figure 1; Photo 3). The vertical extent of Avgas impacts was also explored (Photo 4). Seventeen soil samples were collected for field screening and to guide excavation activities. A Thermo Environmental Instruments Model 580B Organic Vapor Meter was used for field screening. Field screening results are summarized on Figure 1.

Confirmatory samples D-1, D-6 through D-11, D-14, and D-17 were collected from the locations shown on Figure 1 and submitted to North Creek Analytical for VPH, BTEX, and total lead analysis using EPA Methods 5030/8015/8020 and 7421. Confirmatory sample D-1 was submitted because it exhibited the highest field screening results. Other samples were submitted to characterize the vertical and horizontal limits of petroleum impacts. All samples were collected using decontaminated stainless-steel spoons.

Vapor extraction piping, constructed of solid and 0.02-inch slotted, 4-inch, schedule 40 PVC pipe, was laid in the excavation at approximately 7 feet below grade (Photo 5). The piping was bedded in pea gravel and the excavation was backfilled with previously excavated soils and compacted (Photo 6). No soils were generated during the course of this project. A schematic diagram of the vapor extraction piping is shown on Figure 1.

One water sample was collected from the PENAIR hanger building at a point preceding the water filter. This sample, along with a trip blank, was submitted to North Creek Analytical for BTEX analysis by EPA Method 8020.

All soil and water sample collection and handling activities were conducted in accordance with Hart Crowser's approved Quality Assurance Program Plan (QAPP).



RESULTS OF SOIL SAMPLING

Laboratory analytic results for the soil samples are summarized on Figure 1. Analytical reports are presented in Appendix A.

The matrix score for this spill, calculated according to ADEC guidelines, is 46. Since the spilled product is a gasoline-range product and the matrix score is greater than 40, the cleanup levels required for this spill are 50 ppm VPH, 0.1 ppm benzene, and 10 ppm total BTEX. This value corresponds to an ADEC Level A cleanup level.

Excavation was continued horizontally until the limits of petroleum impacts were encountered. The horizontal extent of such impacts under the hangar was not determined. The location of the southwest, northwest, and southeast limits of petroleum impacts were confirmed by the fact that samples D-8, D-14, and D-17 contained no detectable petroleum analytes. The width of the affected area between D-14 and D-17 is about 35 feet. The results of the analysis of D-8 indicates that petroleum impacts extend no more than approximately 10 feet beyond the end to the drainpipe. The petroleum impacts probably extend no more than 10 feet from the other (northeast) end of the drainpipe under the building. For this reason, the length of the affected area, as measured along the drainpipe, is probably no more than 75 feet.

Confirmatory samples D-6, D-11, D-14, and D-17 were collected from the bottom of the excavation. Petroleum analyte concentrations in these samples were equal to or below Level A cleanup levels. This data indicates that the bottom of the petroleum impacts were discovered during this work at a depth of approximately 17 to 19 feet.

The volume of spilled product is of the same order as the observed soil-borne petroleum impacts as revealed by the confirmatory samples. The petroleum impacts were observed over an area of 2,625 square feet and to a depth of 19 feet for an impacted volume of approximately 50,000 cubic feet. Two samples, D-1 and D-7, indicate that the VPH concentration in the more contaminated soils was an average of 2,250 ppm. If we assume that the average concentration throughout the impacted volume is 1,000 ppm and that the average specific weight of the soil and petroleum product are 120 and 45 lbs/cubic foot, respectively, then the impacted volume contains approximately 1,000 gallons of product. Since the VPH numbers on which this calculation is based tend to underestimate the total petroleum content of soils for a spill like this, the actual volume of product in the impacted volume is greater than 1,000 gallons; this calculated product volume is of the same order as the 1,200 gallons of Avgas that was actually spilled. This suggests that the spilled product



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remains above the limits of excavation, 19 feet, and that the spilled product has not reached the water table at 27 feet below grade.

Analytical results of total lead concentrations varied between sample locations. The greatest concentration detected was 120 ppm in sample D-5 collected from the eastern-most section of the excavation. This location corresponds to the junction point of the solid and flexible drainpipe. Total lead concentrations in the remaining confirmatory samples ranged from 13 ppm to 23 ppm.

All soil quality data are considered valid for the purposes of this report. Sample holding times and data quality objectives were in accordance with Hart Crowser's approved QAPP.

RESULTS OF WATER SAMPLING

Laboratory analytic results for the water samples are summarized in Table 1. Analytical reports are presented in Appendix A.

No BTEX constituents were detected in the water sample collected from PENAIR's hanger building (Table 1). However, a 0.68 ppb concentration of toluene was detected in the trip blank. This trip blank was prepared at the site several hours after the sampling event. Because no constituents were detected in the well sample, the toluene in the trip blank was most likely introduced during preparation. We do not feel that the integrity of the well quality results were affected.

All water quality data are considered valid for the purposes of this report. Sample holding times and data quality objectives were in accordance with Hart Crowser's approved QAPP.

HART CROWSER'S CONCLUSIONS AND RECOMMENDATIONS

Based on the assessment data collected to date, we recommend the following:

- ▶ Petroleum hydrocarbon contamination exceeding Level A cleanup levels was measured in the vicinity of the drainpipe. We recommend that the soils encountered during assessment activities be treated using vapor extraction through the piping placed during this work.



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- ▶ Confirmatory sampling indicates that the entire spill was located above a depth of 19 feet and that groundwater has probably not been impacted. The quantity of spilled product can be accounted for in the observed impacted volume. For this reason we do not believe that further assessment work is necessary to identify groundwater impacts beneath the site. However, because of this site and other known petroleum-impacted sites in the immediate vicinity, we do recommend continued monitoring of the on-site water supply well to ensure that it is producing water, free of petroleum hydrocarbons.

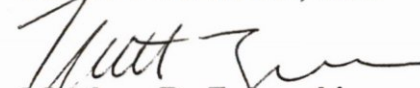
LIMITATIONS

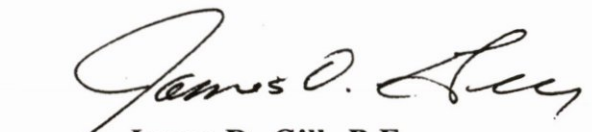
Work for this project was performed, and this letter report prepared, in accordance with generally accepted professional practices for the nature and conditions of the work completed in the same similar localities, at the time the work was completed. It is intended for the exclusive use of Peninsula Airways, Inc. for specific application to the project site. No other warranty, express or implied, is made.

Any questions regarding the field work and this letter report, the presentation of the information and the interpretation of the data are welcome and should be addressed to Matt Zukowski or Debi Geyer.

Sincerely,

HART CROWSER, INC


Matthew D. Zukowski
Project Hydrogeologist

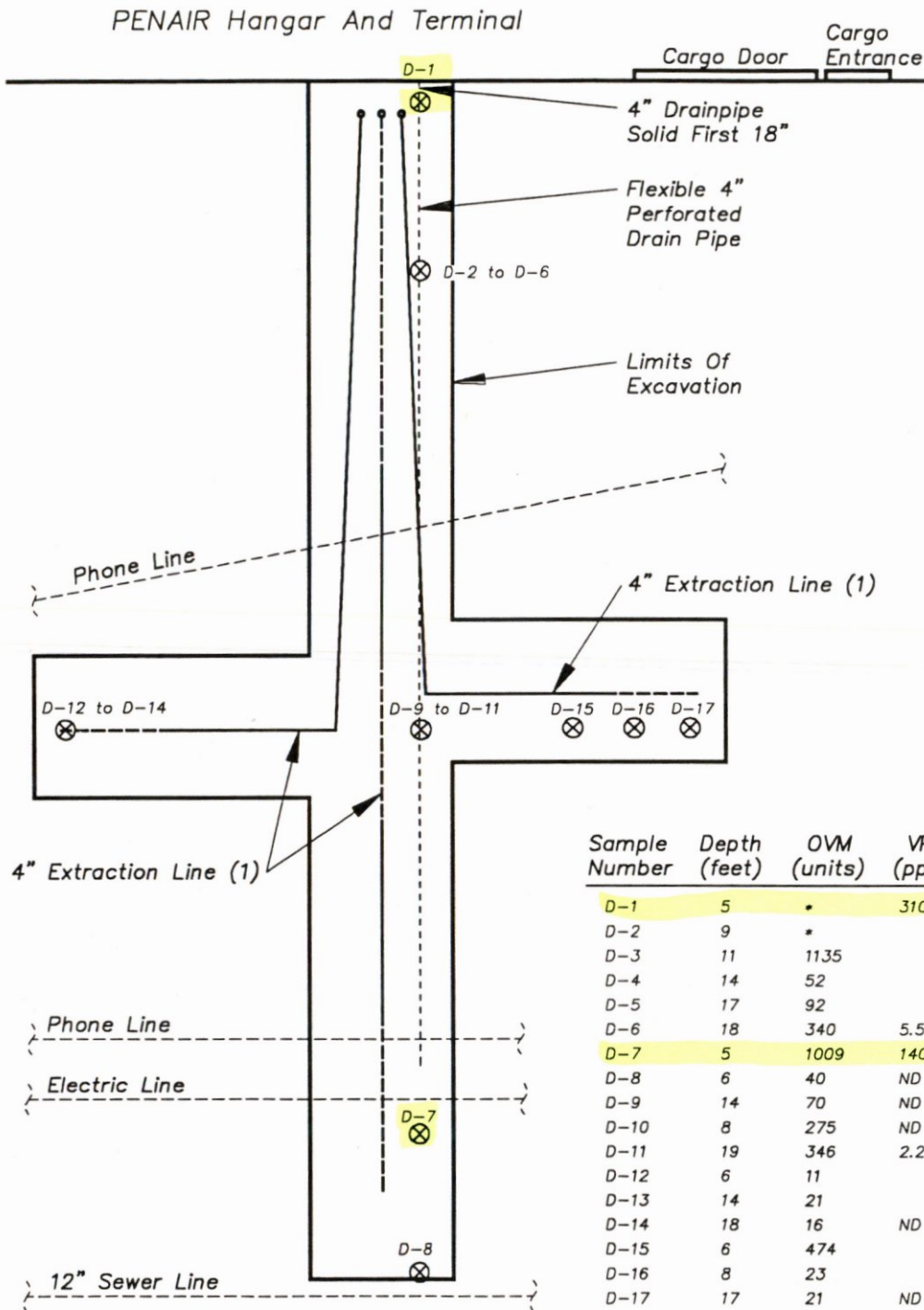

James D. Gill, P.E.
Alaska Manager

DJG/kgd

Attachments:

Figure 1 - PENAIR Site Assessment
Table 1 - Water Quality Data
Photographs 1 through 6
Appendix A - Laboratory Analytical Results

PENAIR Site Assessment And Vapor Extraction Pipe Installation Dillingham, Alaska



LEGEND

⊗ Soil Sample

Sample Number	Depth (feet)	OMV (units)	VPH (ppm)	Benzene (ppm)	Total BTEX (ppm)	Total Lead (ppm)
D-1	5	*	3100	2.5	340.0	120
D-2	9	*				
D-3	11	1135				
D-4	14	52				
D-5	17	92				
D-6	18	340	5.5	ND	1.1	17
D-7	5	1009	1400	ND	130.5	23
D-8	6	40	ND	ND	ND	13
D-9	14	70	ND	ND	0.21	15
D-10	8	275	ND	ND	ND	14
D-11	19	346	2.2	0.11	0.27	16
D-12	6	11				
D-13	14	21				
D-14	18	16	ND	ND	ND	15
D-15	6	474				
D-16	8	23				
D-17	17	21	ND	ND	ND	ND

* - OVM reading off-scale

NOTES:

- 1) Extraction lines shown solid where solid and dashed where slotted. Extraction lines constructed of 4" schedule 40 PVC. Where slotted, lines are made of 0.020 slotted pipe and covered with filter sock (typ).
- 2) Drawing prepared from field measurements collected by Hart Crowser personnel.



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TABLE 1: WATER QUALITY DATA
ARMSTRONG AIR BUILDING
DILLINGHAM, ALASKA

SAMPLE	8020				
	BENZENE (ppb)	TOLUENE (ppb)	ETHYL- BENZENE (ppb)	TOTAL XYLENES (ppb)	TOTAL BTEX (ppb)
PENAIR WELL	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND
TRIP BLANK	ND(0.5)	0.68	ND(0.5)	ND(1.0)	0.68

NOTE: {1} ND(0.5) = Not Detected (Detection Limit)



Photograph 1 - Flexible, 4-inch, perforated drainpipe served as drainpipe for building floor drain.



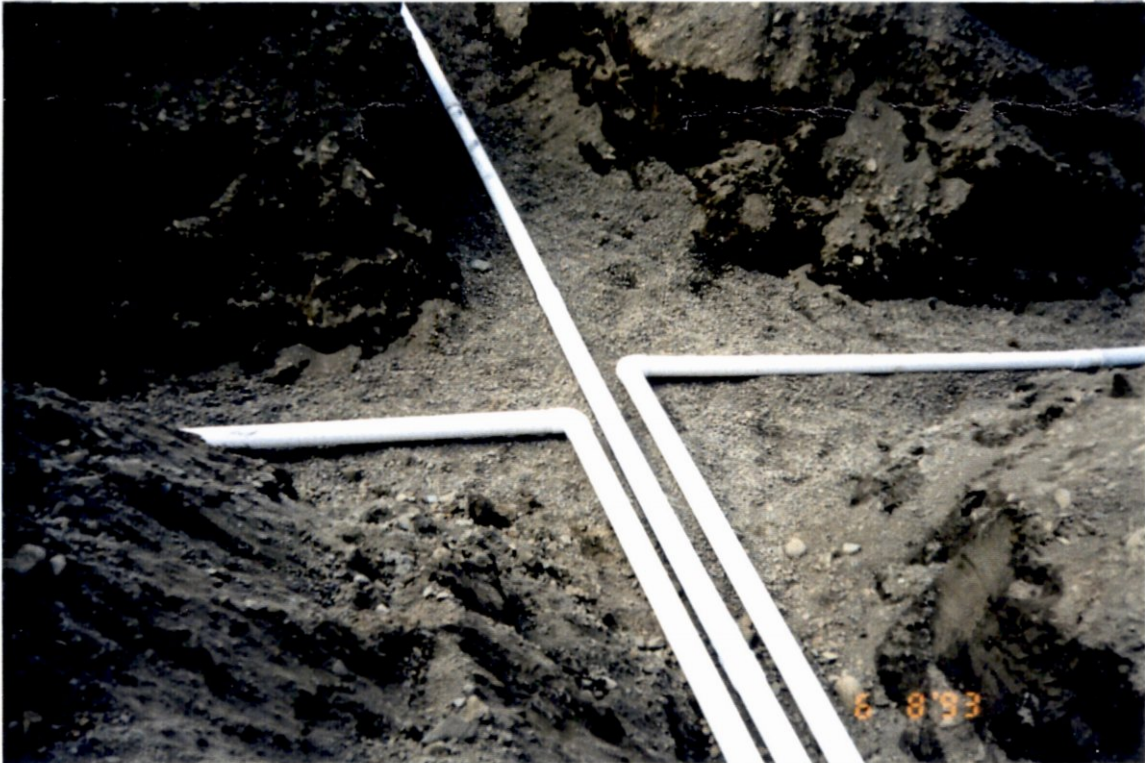
Photograph 2 - Compression plug placed in outlet of old 4-inch drainpipe to seal off any potential discharge.



Photograph 3 - Excavating perpendicular to drainpipe to determine horizontal limits of contamination.



Photograph 4 - Excavating to determine vertical limits of contamination.



Photograph 5 - Placement of vapor extraction piping on gravel bedding in excavation.



Photograph 6 - Work area at completion of site activities.

APPENDIX A
LABORATORY ANALYTICAL RESULTS

Hart Crowser, Anchorage 2550 Denali Street, #705 Anchorage, AK 99503 Attention: Matt Zukowski	Client Project ID: PEN AIR Site, #A-8302-02 Matrix Descript: Soil Analysis Method: AK 101.0 First Sample #: 306-0624	Sampled: Jun 7, 1993 Received: Jun 11, 1993 Analyzed: Jun 21, 1993 Reported: Jun 28, 1993
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VOLATILE PETROLEUM HYDROCARBONS - GASOLINE RANGE ORGANICS

Sample Number	Sample Description	Sample Result mg/kg (ppm)	Surrogate Recovery %
306-0624	D-1	3,100	147
306-0625	D-6	5.5	111
306-0626	D-7	1,400	138
306-0627	D-8	N.D.	107
306-0628	D-9	N.D.	106
306-0629	D-10	N.D.	107
306-0630	D-11	2.2	103
306-0631	D-14 6/8/93	N.D.	104
306-0632	D-17 6/8/93	N.D.	103
BLK062193	Method Blank	N.D.	106

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Reporting Limit:
5.0

Volatile Petroleum Hydrocarbons are quantitated as Gasoline Range Organics (2-Methylpentane - 1,2,4-Trimethylbenzene).
 Surrogate recovery reported is for Bromofluorobenzene. Analytes reported as N.D. were not detected above the stated Reporting Limit.
 The results reported above are on a dry weight basis.

NORTH CREEK ANALYTICAL Inc.


 Matthew T. Essig
 Project Manager

Hart Crowser, Anchorage 2550 Denali Street, #705 Anchorage, AK 99503 Attention: Matt Zukowski	Client Project ID: PEN AIR Site, #A-8302-02 Sample Matrix: Soil Analysis Method: EPA 8020 First Sample #: 306-0624	Sampled: Jun 7, 1993 Received: Jun 11, 1993 Analyzed: Jun 21, 1993 Reported: Jun 28, 1993
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BTEX DISTINCTION

Sample Number	Sample Description	Benzene mg/kg (ppm)	Toluene mg/kg (ppm)	Ethyl Benzene mg/kg (ppm)	Xylenes mg/kg (ppm)	Surrogate Recovery %
306-0624	D-1	2.5	330	2.2	5.3	129
306-0625	D-6	N.D.	1.1	N.D.	N.D.	119
306-0626	D-7	N.D.	120	1.1	9.4	122
306-0627	D-8	N.D.	N.D.	N.D.	N.D.	117
306-0628	D-9	N.D.	0.21	N.D.	N.D.	115
306-0629	D-10	N.D.	N.D.	N.D.	N.D.	116
306-0630	D-11	0.11	0.16	N.D.	N.D.	117
306-0631	D-14 6/8/93	N.D.	N.D.	N.D.	N.D.	115
306-0632	D-17 6/8/93	N.D.	N.D.	N.D.	N.D.	115
BLK062193	Method Blank	N.D.	N.D.	N.D.	N.D.	113

Reporting Limits:	0.050	0.050	0.050	0.10
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4-Bromofluorobenzene surrogate recovery control limits are 63 - 135 %.
 Analytes reported as N.D. were not detected above the stated Reporting Limit.
 The results reported above are on a dry weight basis.

NORTH CREEK ANALYTICAL Inc.

Please Note:

The Reporting Limit for Benzene in #306-0626 = 0.40 mg/kg.

Matthew T. Essig
 Matthew T. Essig
 Project Manager

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 HART CROWSER, INC.

Hart Crowser, Anchorage
 2550 Denali Street, #705
 Anchorage, AK 99503
 Attention: Matt Zukowski

 Client Project ID: PEN AIR Site, #A-8302-02
 Sample Matrix: Soil
 Analysis Method: EPA 7420
 First Sample #: 306-0624

 Sampled: Jun 7, 1993
 Received: Jun 11, 1993
 Digested: Jun 21, 1993
 Analyzed: Jun 23, 1993
 Reported: Jun 28, 1993

METALS ANALYSIS FOR: TOTAL LEAD

Sample Number	Sample Description	Reporting Limit mg/kg (ppm)	Sample Result mg/kg (ppm)
306-0624	D-1	7.5	120
306-0625	D-6	7.5	17
306-0626	D-7	7.5	23
306-0627	D-8	7.5	13
306-0628	D-9	7.5	15
306-0629	D-10	7.5	14
306-0630	D-11	7.5	16
306-0631	D-14 6/8/93	7.5	15
306-0632	D-17 6/8/93	7.5	20
BLK062193	Method Blank	7.5	N.D.

Analytes reported as N.D. were not detected above the stated Reporting Limit.
 The results reported above are on a dry weight basis.

NORTH CREEK ANALYTICAL Inc.

 Matthew T. Essig
 Project Manager

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HART - CROWSER, INC.

Hart Crowser, Anchorage 2550 Denali Street, #705 Anchorage, AK 99503 Attention: Matt Zukowski	Client Project ID: PEN AIR Site, #A-8302-02 Sample Matrix: Water Analysis Method: EPA 8020 First Sample #: 306-0633	Sampled: Jun 8, 1993 Received: Jun 11, 1993 Analyzed: Jun 21, 1993 Reported: Jun 28, 1993
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BTEX DISTINCTION

Sample Number	Sample Description	Benzene	Toluene	Ethyl Benzene	Xylenes	Surrogate Recovery
		$\mu\text{g/L}$ (ppb)	$\mu\text{g/L}$ (ppb)	$\mu\text{g/L}$ (ppb)	$\mu\text{g/L}$ (ppb)	%
306-0633	PEN AIR WELL	N.D.	N.D.	N.D.	N.D.	116
306-0634	TRIP BLANK	N.D.	0.68	N.D.	N.D.	119
BLK062193	Method Blank	N.D.	N.D.	N.D.	N.D.	117

Reporting Limits:	0.50	0.50	0.50	1.0
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4-Bromofluorobenzene surrogate recovery control limits are 82 - 122 %.
 Analytes reported as N.D. were not detected above the stated Reporting Limit.

NORTH CREEK ANALYTICAL Inc.

Matthew T. Essig
 Matthew T. Essig
 Project Manager

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Sample Custody Record

DATE 6/10/93 PAGE 1 OF 1



Hart Crowser, Inc.
2550 Denali Street
Suite 703
Anchorage, Alaska 99503
907.276.7475

JOB NUMBER <u>A-8302-02</u> LAB NUMBER _____					TESTING							NO. OF CONTAINERS	OBSERVATIONS / COMMENTS / COMPOSITING INSTRUCTIONS		
PROJECT MANAGER <u>M. Zukowski</u>					7121 Total lead	518/8/8/8/15	VPH w/ BTEX	distillation	8000 BTEX						
PROJECT NAME <u>PEN AIR Site Assessment</u>															
SAMPLED BY: <u>D. Geyer</u>															
LAB NO.	SAMPLE	TIME	STATION	MATRIX											
3060 624	D-1	2:15	Excavation	Soil	✓	✓							1	Sample collected 6/7/93 ↓ Sample collected 6/8/93 ↓	
625	D-6	3:07	↓	↓	✓	✓							1		
626	D-7	4:45			✓	✓									1
627	D-8	5:00			✓	✓									1
628	D-9	5:15			✓	✓									1
629	D-10	5:30			✓	✓									1
630	D-11	5:40			✓	✓									1
631	D-14	9:25			✓	✓									1
632	D-17	10:40			✓	✓									1
633	PEN AIR well	8:30			Well	Water					✓				
634	trip blank	4:30				Water					✓				2

RELINQUISHED BY <u>Doreen A. Geyer</u> SIGNATURE	DATE <u>6/14/93</u>	RECEIVED BY <u>Dana Heitz</u> SIGNATURE	DATE <u>6/11/93</u>	TOTAL NUMBER OF CONTAINERS <u>13</u>	METHOD OF SHIPMENT <u>Airborne Express</u>
PRINTED NAME <u>Doreen T. Geyer</u>	TIME <u>10:30</u>	PRINTED NAME <u>DANA HEITZ</u>	TIME <u>0845 AM</u>	SPECIAL SHIPMENT/HANDLING OR STORAGE REQUIREMENTS <u>USE AK Protocol</u>	<u>Please return cooler + blue ice</u>
COMPANY <u>Hart Crowser</u>		COMPANY <u>NCA</u>			
RELINQUISHED BY	DATE	RECEIVED BY	DATE	DISTRIBUTION:	
SIGNATURE		SIGNATURE		1. PROVIDE WHITE AND YELLOW COPIES TO LABORATORY	
PRINTED NAME		PRINTED NAME		2. RETURN PINK COPY TO PROJECT MANAGER	
COMPANY		COMPANY		3. LABORATORY TO FILL IN SAMPLE NUMBER AND SIGN FOR RECEIPT	
				4. LABORATORY TO RETURN WHITE COPY TO HART CROWSER	